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Stephen Joseph Poe

2000

Phylogeny of Anoles

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Robert Dudley

James Bull

Phylogeny of Anoles

by

Stephen Joseph Poe, A. B.

Dissertation

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The University of Texas at Austin

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of the Requirements

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Dedication

This dissertation is dedicated to the memory of Ernest E. Williams.

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Phylogeny of Anoles

Publication No._____

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The University of Texas at Austin, 2000

Supervisors: David Cannatella and David Hillis

The evolutionary relationships of *Anolis* lizards were estimated using standard techniques of phylogenetic inference. Morphological data were collected from preserved specimens and combined with previously published data from DNA sequences, chromosomes, allozymes, and immunology. This matrix was analyzed with parsimony, and the resulting tree was used to erect a phylogenetic taxonomy for the genus. The anoline genera *Phenacosaurus*, *Chamaeleolis*, and *Chamaelinorops* were found to be nested within *Anolis*. Many of the smaller groups recognized by recent authors were monophyletic, but larger relationships generally were not upheld.

The strategy of including taxa to subdivide long branches in order to increase the accuracy of a phylogenetic analysis was evaluated using computer simulations. Sampling taxa densely appears to be a beneficial

strategy for increasing accuracy. However, this strategy can be detrimental for accuracy even for likelihood and distance methods. The magnitude of the effect of taxon inclusion on accuracy depends on the position of the included taxon on the long branch of interest. Sampling taxa near the node has a greater effect than sampling near the tip of a branch. For some model trees, the position of the taxon on a given branch determines whether including that taxon is beneficial or detrimental for accuracy.

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Chapter 1: Phylogeny of Anoles

The extraordinarily species-rich, biogeographically complex, ecologically interesting neotropical group of lizards called anoles has been a longstanding favorite of vertebrate biologists. Hundreds of studies have documented the behavioral, ecological, and morphological diversity in these lizards, and they certainly are among the best-studied vertebrates. *Anolis* lizards have been used to address fundamental biological issues such as community ecology (e.g., Williams, 1983), biogeography (e.g., Lazell, 1972), sexual dimorphism (e.g., Fitch, 1975), competition (e.g., Pacala and Roughgarden, 1982), energetics (e.g., Naganuma and Roughgarden, 1990), functional morphology (e.g., Losos, 1990), adaptive radiation (e.g., Williams, 1972), ecomorphology (e.g., Collette, 1961), character displacement (e.g., Schoener, 1970), social behavior (Stamps, 1973), perception (e.g., Fleishman et al., 1993), reproduction (e.g., Sexton et al., 1971), and communication (e.g., Rand and Williams, 1970), among other subjects.

It has become clear that proper interpretation of comparative data requires knowledge of phylogeny (e.g., Felsenstein, 1985a). Many aspects of comparative biology have been recorded for numerous anole species (e.g., Fitch, 1975), however, with notable exceptions (e.g., Williams, 1983; Losos et al., 1998), very few studies have incorporated phylogenetic information. A phylogeny is sorely needed for *Anolis*.

The phylogeny of *Anolis* is a notoriously difficult problem (Williams, 1989). *Anolis* is the largest amniote genus, with over 350 described species, and the great size of the genus and the perceived morphological conservativeness—"a huge group where all the species look virtually the same" (Hillis, 1996)—have hindered the reconstruction of *Anolis* phylogeny. Richard Etheridge's (1959) analysis of 150 species for his PhD dissertation continues to be the most comprehensive treatment of anole evolution. Considering the wealth of comparative data available for *Anolis* and the effect that species sampling can have on hypotheses of relationship and comparative biology, an update of Etheridge's (1959) landmark work is long overdue.

The goal of this paper is to estimate the phylogeny of *Anolis*. I collected morphological data and analyzed these separately and in combination with diverse types of data from the literature. The resulting trees are used to revise the taxonomy of the genus.

Previous hypotheses of anole relationships

Etheridge (1959) divided *Anolis* into two major sections based on a single osteological character (absence of caudal transverse processes in "Alpha" *Anolis*, presence in "Beta" *Anolis*), and identified several informal groups called series within these sections. Williams (1976*a*, *b*) further subdivided the genus into subsections, subseries, species groups, and superspecies. Although based on available data, this work was not a formal phylogenetic analysis. Still, the informal groups proposed by

Williams often have been treated as clades (Guyer and Savage, 1986). The contents of many of the Williams groups were tweaked by Gorman and collaborators (e.g., Gorman and Kim, 1976; Gorman et al., 1983), Lieb (1981), and Shochat and Dessauer (1981). Shochat and Dessauer (1981) used immunological data to present the first challenge to the Alpha/Beta dichotomy, suggesting that Alpha and Beta species from the Carribbean are more closely related to each other than to other *Anolis*.

Implicitly or explicitly, each of the above studies accepted most of the Etheridge/Williams framework. Guyer and Savage (1986) broke from this perspective and attempted to apply a rigorous and modern phylogenetic approach to Etheridge's (1959) data. However, the study and resulting generic rearrangement suggested by Guyer and Savage (1986; see also Savage and Guyer, 1989) was severely criticized by Williams (1989) and Cannatella and de Queiroz (1989) for its problematic data, methods, and taxonomy (e.g., one of their proposed genera is not monophyletic in their preferred tree). Guyer and Savage (1992) demonstrated that many of their results were robust to these criticisms, and their taxonomy has been followed by some researchers, especially those working on Central American forms (e.g., Kohler, 1999). Still, the Guyer and Savage treatment, like more recent papers addressing large-scale *Anolis* phylogeny (e.g., Burnell and Hedges, 1990; Poe, 1998; Jackman et al., 1999), suffers for its paucity of characters and/or taxa included (the most comprehensive modern treatment, by Jackman et al. [1999], analyzed only about 15 % of the species of *Anolis*). Three of the Guyer and Savage

genera have been shown to be paraphyletic (Poe, 1998; Jackman et al., 1999), and recognition of their remaining two genera would necessitate an entirely new *Anolis* taxonomy. Thus, their generic-level taxonomy is not followed here. However, unless otherwise noted, their infrageneric taxonomy (Savage and Guyer, 1989) is employed because it is the most comprehensive treatment and its groups are similar or identical to those recognized by other authors (e.g., Burnell and Hedges, 1990).

Like the majority of pre-Guyer and Savage studies, most modern work has focused on phylogenies of smaller groups of *Anolis* (e.g., Hedges and Burnell, 1990; Poe, 1998; Giannisi et al., 2000). Two exceptions are Burnell and Hedges (1990), who studied 50 Caribbean species using allozyme data, and Jackman et al. (1999), who studied 44 Caribbean and 9 mainland species using DNA sequences. The Burnell and Hedges (1990) study included only 12 informative loci, and so was unable to resolve many relationships (a strict consensus of most-parsimonious trees from their data is unresolved but for two clades). The Jackman et al. (1999) study found well-supported species groups that were in accord with much of the Etheridge-Williams paradigm, and a monophyletic Beta section. But in spite of a large number of data (861 parsimony-informative sites), deep relationships were only weakly resolved.

MATERIALS AND METHODS

Taxa

In this study, at least two species were included from each of the infrageneric groups of Savage and Guyer (1989) except for the *laevis* series and the *onca* series, for which only one species was included. More than two species were included for all of the better-studied groups for which several species were available. Representatives of the formerly recognized anoline genera *Chamaeleolis, Chamaelinorops* (synonymized with *Anolis* by Hass et al., 1993), and *Phenacosaurus* (synonymized with *Anolis* by Poe, 1998; see also Etheridge, 1959) also were included. This selection of species spans the geographic and phenotypic diversity in *Anolis* and allows testing of the monophyly of almost all named genera and smaller groups of *Anolis*.

Species from the genera *Enyalius, Urostrophus, Anisolepis, Polychrus, Leiocephalus,* and *Diplolaemus* were included as outgroups. Frost and Etheridge (1989) found these genera (except *Leiocephalus* and *Diplolaemus*) to be close relatives of *Anolis*. *Leiocephalus* and *Diplolaemus* were included because they have been scored for the DNA sequence data of Hass et al. (1993) and Jackman et al. (1999), respectively.

Characters

Non-morphological characters

Non-morphological data is included from chromosomes, allozymes, DNA, and immunology. Three chromosome characters could

be scored for 97 *Anolis* species and two outgroup species. Chromosome data were taken from Webster (1974), Webster et al. (1972), and Gorman (1973). Allozyme data is incorporated from Gorman and Kim (1976) for the *bimaculatus* series (nine species; six parsimony-informative loci), Gorman et al. (1983) for the *cristatellus* series (10 species; 16 loci), Lieb (1981) for the *gadovi* and *nebulosus* series (7 species; 13 loci), Yang et al. (1974) for the *roquet* series (8 species, 9 loci), and Burnell and Hedges (1990) for 44 Caribbean species (12 loci). These data were coded with the locus as the character and the modal allele as the character state. Although many of these studies analyze the same loci, there is very little overlap in taxonomic coverage. Data from Hedges and Burnell (1990) on the Jamaican *grahami* series and from Case and Williams (1987) for seven *Anolis* species is omitted because of extensive overlap in taxa and loci with the other studies.

The cytochrome *b* mitochondrial DNA sequence data of Giannisi et al. (2000) were included for the *roquet* series (8 species; 105 parsimony-informative characters). The 16S mitochondrial DNA sequence data from Hass et al. (1993) for 23 *Anolis* species and two outgroups were included (67 parsimony-informative sites). Jackman et al.'s (1999) mitochondrial DNA sequence data from the NADH dehydrogenase subunit 2 gene and five transfer RNAs were included for 51 *Anolis* species and two outgroups (861 parsimony-informative sites). And, a single character reflecting immunological distance was included (Hass et al., 1993).

Morphological characters

Morphological data were taken from museum specimens and obtained from the literature. Skull characters were taken from Poe (1998) and new characters were discovered during examination of specimens. Data for skull characters were recorded from dry skulls. Postcranial osteological characters are from Etheridge (1959), and data for these were taken from original data sheets provided by Richard Etheridge, or from dry skeletons or dissection of preserved specimens. External characters were taken from literature sources, including papers by Ernest Williams, Henry Fitch, Rudolfo Ruibal, and many others, and were discovered during examination of specimens. External character data were taken from alcohol-preserved specimens, with some exceptions discussed in the character descriptions.

Morphological character selection criteria followed the recommendations of Poe and Wiens (2000). That is, I included characters that varied intraspecifically and continuously (as well as discrete, intraspecifically invariant characters) if they appeared to vary independently. Intraspecifically varying characters were coded with frequency coding (Wiens, 1995) if two states were recognized, or with the modal state if more than two states were recognized.

Some quantitatively-measured characters were corrected for size effects using linear regression (see below). In these cases, several transformations of independent and dependent variables were attempted

and the transformation(s) (or nontransformation) that best met regression assumptions was used. Mensural characters were coded with Thiele's (1993) gap-weighting method. Outgroup scores were excluded from initial assignment of gap-weighted states, so that extreme conditions in outgroups would not affect weighting of state changes between ingroup species (e.g., *Enyalius iheringi* has a shorter head than any *Anolis* species). Outgroup species were assigned states that corresponded to the conditions in *Anolis* that were closest to their conditions (e.g., *Enyalius iheringi* was assigned the same state as the *Anolis* species that possesses the shortest head).

One-hundred seventy-three of 174 *Anolis* species and 7 of 8 outgroup species were scored for most of the 50 external characters (*Anolis* [*Phenacosaurus*] *nicefori*, included for its DNA data, was scored for only a few characters), 162 *Anolis* species and 7 outgroup species were scored for most of the 7 postcranial osteological characters, and 162 *Anolis* species and 6 outgroup species were scored for most of the 38 skull characters. Over 2000 specimens were examined for this study. Some of these were collected during field trips to the Dominican Republic and to Cuba, but most were borrowed or examined in residence at museums. The Museum of Comparative Zoology and the Smithsonian's National Museum of Natural History provided the bulk of material examined, but specimens from the University of Texas at El Paso, the Univerisity of Texas at Arlington, the University of Michigan, and the Texas Memorial Museum also were loaned. Specimens examined are listed in Appendix 1.

Characters listed below are described if they have not appeared before in a phylogenetic analysis of *Anolis*. If they have been described previously, the reference for this description is given. Many characters, such as keeling of scales, are of traditional importance for *Anolis* (indeed, for lizard) systematics, and it is difficult to find the absolute first reference where this character has been used. Most of such "public domain" characters are listed without reference, with no claim implied for propietary originality. Unless otherwise indicated, characters were scored from museum specimens. A list of specimens examined is available on request. Character state assignments for each species are listed in Appendix 2 for the morphological characters (Nos. 1-95). Species states for other characters have been published previously; references for these are given. The full matrix of character states used in this paper (including previously published DNA, allozyme, and chromosome characters) is available on request.

1 Maximum male snout-to-vent length (38 mm--188 mm). Poe (1998). Gap weighted.

2 Ratio of maximum female snout-to-vent length to maximum male snout to vent length (0.569--1.063). Poe (1998). Gap weighted. Data are from the *Anolis* handlist (Williams et al., 1995).

3 Length of thigh. Gap weighted. The leg was measured from the ventral midline of the specimen lateral to the knee, with the limb aligned perpendicular to the body and bent at the knee. Bivariate plots of snout-to-vent length vs. femoral length demonstrated that this character is correlated with size. In order to correct for size, thigh length was regressed on (independent variable) SVL using natural-log-transformed mean values for each species as data points. Residual values of these regressions for each species were input as raw data for gap weighting. Although this character has been suggested to be an "ecomorph character" in some Caribbean forms (e.g., Williams, 1983; Losos et al., 1998) and thus subject to considerable convergence, it remains a useful and widely-used systematic character in other areas (e.g., Central America; Savage and Talbot, 1974). I cautiously incorporate this character in phylogenetic analysis.

4 Length of head. Gap weighted. Some *Anolis* species (e.g., *A. longiceps*) have long snouts whereas others (e.g., *A. capito*) have short snouts. Head length was measured from the anterior of the ear opening to the tip of the snout. Like femoral length, head length was found to be correlated with SVL. Head length was regressed on SVL using natural-log-transformed mean values for each species as data points. Residuals were gap-weighted. This character also is a likely "ecomorph character" (Williams, 1983; Losos et al., 1998). However, many species (e.g., *A. porcatus* and *A.*

allisoni) apparently share similar head shapes owing not to convergence but rather to common ancestry. Again, I cautiously include this character in phylogenetic analysis.

5 Width of head. Gap weighted. *Anolis* species may have broad (e.g., *A. cybotes*) or narrow (e.g., *A. sheplani*) heads. Head width was measured between the posteroventral corners of the orbits (generally the widest part of the skull). Head width was regressed on SVL using mean raw values for each species as data points. Raw values were found to better meet regression assumptions than transformed values. Residuals for each species were gap weighted. Surprisingly, this character does not appear to be strongly correlated with character 4 (head length) after correction for size.

6 Height of ear. Gap weighted. Ear size varies strikingly in *Anolis;* some species (e.g., *A. vermiculatus*) have a prominent oval tympanum, whereas in others (e.g., *A. darlingtoni*) the ear opening is barely visible. This character was found to be correlated with size. In order to correct for size, ear height was regressed on head length using natural-log-transformed mean values for each species as data points. Residuals for each species were gap weighted. Differences in ear shape also occur, but these were difficult to characterize.

7 Height of rostral scale. Gap-weighted. Some *Anolis* species (e.g., *A. whitemani*) have prominent, shield-like rostrals, whereas in others (e.g., *A. gadovi*) the rostral extends no further superiorly than do the supralabials. Height of rostral was measured at the tip of the snout. Values for this measurement were found to be correlated with size. Mean raw species-values for ear height were regressed on natural-log-transformed mean head length. Residual values were gap-weighted.

8 Relative length of interparietal scale. Gap weighted. In some *Anolis* species (e.g, *A. argenteolus*), the interparietal is several times the size of the surrounding scales. In others (e.g, *A. fraseri*), the interparietal is approximately the same size as the surrounding scales. On each specimen examined, I measured the length of the interparietal and the length of the second-largest scale in lateral contact with the interparietal, excluding the supraorbital semicircles. Mean values of these measurements were compiled for each species, natural-log transformed, and analyzed with linear regression using interparietal length as the independent variable. Residuals were gap weighted.

9 Length of tail. Gap weighted. Data were taken from Williams et al. (1995), who recognized five states: Tail length about equal to SVL (1); about 1.5 times SVL (2); about two times SVL (3); about 2.5 times SVL (4); more than 2.8 times SVL (5). The range of values for each species was

reported, e.g., (2, 3) for species with tail lengths of 1.5 to 2 times SVL. This character was gap-weighted, with extreme values at (1, 1) (that is, invariant for state 1) and (5, 5). Species reported to vary for this character were assigned the median score. For example, a species listed as (2, 3) by Williams et al. (1995) was assigned a state corresponding to 2.5 for gap-weighting. As with charactes 3 and 4, this character has been suggested to be an "ecomorph character" for some species (e.g., Williams, 1983; Losos et al., 1998). However, there are obvious cases where similarities in tail length are due to phylogeny rather than adaptive response (e.g., *A. clivicola* and *A. alutaceus*), so I cautiously include this character in phylogenetic analysis.

10 Mean number of dorsal scales in 5% of SVL. Gap weighted. Number of scales in 5% of SVL is counted just lateral to the dorsal midline. Many authors (e.g., Lazell, 1972) have used some measure of scale size as a systematic character. Gap-weighted.

11 Mean number of ventral scales in 5% of SVL. Gap weighted. Number of scales in 5% of SVL is counted longitudinally on the posterior belly area.

12 Keeling of dorsals, ventrals, supradigitals, and head scales. Unordered. Even weak keeling was scored as "keeled." I originally took data on the keeling of each of these regions with the expectation that each

would be a separate character. However it became apparent in the course of this study that there are strong constraints on which combinations of scalation are possible. For example, 89 % of *Anolis* species in this study display one of only four of the sixteen possible combinations of keeling (states 0, 1, 2, and c; see below), and some combinations do not occur at all. This distribution is very different from that expected if there is random covariation, and work in progress will link this pattern to established models of vertebrate development (Poe, in preparation). For the purposes of this study, each unique combination of scalation is treated as a separate state. The following states are listed in order of whether keels (k) or smooth scales (s) are observed on head scales, ventrals, dorsals, and supradigitals, respectively. For example, "sssk" means that all surfaces except supradigitals are smooth. (0) kkkk; (1) ssss; (2) kskk; (3) kksk; (4) kkks; (5) kkss; (6) ksks; (7) kssk; (8) ksss; (9) skkk; (a) skks; (b) sksk; (c) sskk; (d) sssk; (e) ssks; (f) skss.

13 Transparent scales in lower eyelid absent (a); present (z). Williams and Hecht (1955). *A. argenteolus* has two transparent scales in the lower eyelid, *A. lucius* has three, and other *Anolis* have none.

14 Mental scale partially divided (a); completely divided (z). Frequency-coded. In some anole species (e.g., *A. griseus*) the mental is longitudinally split posteriorly but not anteriorly (state a); in others (e.g., *A. carolinensis*) this division is complete (state z).

15 Mental scale broader than rostral scale (a); rostral broader than mental (z). Frequency-coded. The comparison is made along the rim of the mouth. In some species (e.g., *A. sagrei*), the mental extends farther posteriorly along the mouth than the rostral (state a) whereas in others (e.g., *A. baleatus*) the rostral is broader (state z).

16 Fold of skin extending over dorsal rim of ear opening absent (0); present (1).

17 Modal number of enlarged sublabial scales zero (0); one (0); two or more (1). Ordered. Sublabials are scales in the gular region, medial and running parallel to the infralabials (e.g., Williams et al., 1995). These are counted back from the mental, and are considered to be "enlarged" if at least twice the size of any medial scale.

18 Frontal depression present (0); absent, top of snout is flat (1). Although there are clear differences between several species in degree of frontal depression (e.g., *A. garmani* has a very flat head, *A. reconditus* has a pronounced depression), I found it impossible to erect a satisfactory objectively recognizable character state boundary for this character. Thus, any borderline species are assigned "?".

19 Scales in supraocular disc are equal or vary continuously in size (a); one to three abruptly enlarged scales are present (z). Frequency coded. "Abruptly enlarged" is operationally defined as a difference in size by a factor of two. Thus, species with state (z) display two discrete size classes of scales in the supraocular disc--a group of one or more scales that are all at least twice the size of the next largest scale, and a series of smaller scales that vary in size continuously down to the smallest scales present.

20 Subocular scales and supralabial scales in contact (a); separated by one or more rows of scales (z). Frequency-coded.

21 Mean number of scales across the snout. Gap weighted. This is a minimum count, made between the second canthals. Poe (1998) used median values from the *Anolis* Handlist (Williams et al., 1995) for this character.

22 Mean number of postmental scales. Gap weighted. Poe (1998) used median values from the *Anolis* Handlist (Williams et al., 1995) for this count.

23 Mean number of supralabial scales. Gap weighted. Number of supralabials was counted back from the rostral to directly below the center of the eye (e.g., Williams et al., [1995]).

24 Posterior border of mental scale concave (a); straight or convex (z). Frequency-coded.

25 Supraorbital semicircles separated by one or more rows of scales (a); in contact (z). Frequency coded.

26 Preoccipital scale absent (a); present (z). Frequency coded. The preoccipital is an enlarged scale directly anterior to the interparietal.

27 Middorsal scales of the snout not in regular pattern (a); arranged in two parallel rows that extend from the level of the second canthals to the nares (z). Frequency-coded.

28 Posterodorsal edge of rostral smooth (a); cleft (z). Frequency-coded.

29 Anteromost aspect of rostral scale is even with lower jaw (a); overlaps lower jaw (z). Frequency-coded. Although extensive interspecific variation occurs in this character and scoring for most specimens is straightforward, continuous variation precludes erection of a simple character state boundary. Operationally, I compared borderline specimens to USNM (National Museum of Natural History) 347286 (*A.*

oxylophus). If overlap was equal to or greater than that seen on this specimen, state z was assigned.

30 Modal number of supraciliary scales zero (0); one (1); two (2); three (3). Ordered. Supraciliaries are elongate scales along the dorsal rim of the orbit.

31 Modal nasal scale type: anterior nasal in contact with rostral(0); divided anterior nasal in contact with rostral(1); circumnasal separated from rostral by one scale, not in contact with supralabial (2); external naris separated from rostral by two scales, not in contact with supralabial (3); external naris separated from rostral by three or more scales, not in contact with supralabial (4); circumnasal in contact with rostral (5); circumnasal in contact with supralabial, separated from rostral by one scale (6); circumnasal in contact with supralabial, separated from rostral by two or more scales (7). Most of these conditions are described and figured in Williams et al. (1995). States 3 and 4 generally involve circumnasal scales but occasionally incorporate an anterior nasal. Each species is coded with its modal state. Transformations are weighted according to the following step matrix.

	0	1	2	3	4	5	6	7
[0]	0	1	1	1	2	2	2	2
[1]	1	.	1	1	2	2	2	2

[2] 1 1 . 1 2 1 1 2

[3] 1 1 1 . 1 2 2 1

[4] 2 2 2 1 . 3 2 1

[5] 2 2 1 2 3 . 1 2

[6] 2 2 1 2 2 1 . 1

[7] 2 2 2 1 1 2 1 .

32 Interparietal scale separated from supraorbital semicircles by one or more rows of scales (a); in contact with supraorbital semicircles (z). Frequency-coded.

33 Scales posterior to supraciliaries are in regular rows along orbit (a); chaotic (z). Frequency-coded.

34 Toepads overlapping first phalanx (0); not distinct from first phalanx (1); absent (2). Williams et al. (1995). State 2 is added to Poe's (1998) character 2.

35 Enlarged postanal scales present in males (0); absent in males (1). Data and character are from the *Anolis* handlist (Williams et al., 1995).

36 Row of large spinose middorsal caudal scales separated by smaller smooth scales absent (a); present (z). This character is a modification of

Poe's (1998) character 12 (see also Hedges et al., 1989) to note the condition on the tail (derived condition seen in *A. insolitus*, *A. sheplani*, and *A. placidus*) rather than on the body (derived condition seen only in *A. sheplani* and *A. placidus*).

37 Tail crest absent (0); present in largest adult males (1). Presence and size of tail crest appears to be largely size and sex dependent. Thus, the character is evaluated only in large adult males.

38 Number of rows of enlarged middorsal scales 0-4 (a); 5 or more (z). Frequency-coded. Most species of *Anolis* have either two rows of middorsal scales slightly larger than the surrounding scales (e.g., *A. cybotes*) or a middorsal band of 7 or more abruptly enlarged scales (e.g., *A. semilineatus*).

39 Lining of throat light (0); black (1). Character and data are from Underwood and Williams (1959).

40 Toepad of third toe extends distally as far as third phalange on fourth toe (a); fourth phalange on fourth toe (z). Frequency-coded. To evaluate this character, the third (second-longest) toe is extended fully and the fourth (longest) toe is bent between the third and fourth phalanges. If the pad of the third toe extends beyond this bend, state "a" is assigned.

41 Scales on dewlap in single rows (a); with at least one double row (z). Frequency-coded. Species with scattered dewlap scales or dewlap's mostly lacking scales are coded as "?".

42 Middorsal caudal scale rows single (a); double (z). Williams et al. (1970). Frequency-coded.

43 Axillary pocket absent (a); deep, tubelike (z). Frequency coded.

44 Each ventral scale is bordered posteriorly by two scales (a); by three scales (z). Frequency-coded. State "a" includes species with rectangular ventrals in transverse rows (e.g., *A. carolinensis*). State "z" includes species with the posterior border of the ventral rounded or pointed such that scales appear to be in diagonal rows (e.g., *A. cybotes*).

45 Base of tail round (a); laterally compressed (z). Frequency-coded. On each specimen, cross-sectional height and width of the tail were examined at the point where the knee would reach the tail if the leg were folded back. If the height of the tail is greater than the greatest width, state z is assigned.

46 Male dewlap extends posterior past arms (0); to arms or shorter (1); absent (2). Ordered. This character and data were taken directly from the

Anolis Handlist (Williams et al., 1995), however coding is slightly different. Williams et al. (1995) characterized *Anolis* dewlaps as "large" if the dewlap extends posteriorly past the arms, "intermediate" if it reaches the arms, "small" if it does not reach the arms, and "absent" if nonexistent. Because the arms are a convenient landmark for state delimitation and "intermediate" and "small" are morphologically very similar conditions in *Anolis*--there is more variation within the state "large" than between the other states--I lump the middle two conditions into state (1). Species with only "large" scores in Williams et al. (1995) are assigned state (0); other species are assigned state (1), except for two species (*A. bartschi, A. vermiculatus*) for which dewlap is absent in males, which are assigned state (2).

47 Female dewlap extends posterior past arms (0); to arms or shorter (1); absent (2). Ordered. Many female *Anolis* species completely lack a dewlap. Coding is as for male dewlap.

48 Color of iris dark brown (0); yellow (1); blue or grey (2); green (3) red. Data for this character were taken from the literature, mainly from Schwartz and Henderson (1991) and the *Anolis* handlist (Williams et al., 1995).

49 Tail uniformly patterned (0); base of tail purple, posterior part green or brown (1). Underwood and Williams (1959).

50 Modal number of presacral vertebrae 24 (0); 23 (1); 22 (2). Etheridge (1959). Ordered. Data is from original data sheets provided by Richard Etheridge.

51 Modal number of lumbar vertebrae three (0); four (1); five (2); six (3). Etheridge (1959). Ordered. Data is from original data sheets provided by Richard Etheridge.

52 Modal number of caudal vertebrae anterior to first autotomic vertebrae eleven (0), ten (1), nine (2), eight (3), seven (4), six (5), five (6). Etheridge (1959). Ordered. Data is from original data sheets provided by Richard Etheridge. Species that lack autotomy were coded "?".

53 Caudal autotomy septa present (0); absent (1). Etheridge (1959). Data is from Etheridge (1959) and Williams (1989).

54 Modal postxiphisternal inscriptional rib formula 4:3 (0); 5:1 (1); 4:2 (2); 5:0 (3); 4:1 (4); 3:2 (5); 4:0 (6); 3:1 (7); 2:2 (8); 1:3 (9); 2:1 (a); 5:2 (b). Etheridge (1959). Data is from original data sheets provided by Richard Etheridge. Character changes are weighted according to the following stepmatrix, adapted from Jackman et al. (1999):

```
   0123456789ab
[0].21322333341
[1]2.1112223431
[2]11.211222331
[3]312.12123432
[4]2111.1112322
[5]22121.211222
[6]322112.12323
[7]3222111.1213
[8]33232121.113
[9]343432321.24
[a]4333222112.4
[b]111222333 44.
```

55 Caudal vertebrae are Alpha type (0); Beta type (1); *Sceloporus* type (2). Etheridge (1959). Unordered. Data is from data sheets provided by Richard Etheridge and from Etheridge and de Queiroz (1988).

56 Interclavicle arrow-shaped (0); T-shaped (1). Etheridge (1959). Data is from Etheridge (1959) and Williams (1989).

57 Dorsal surface of skull smooth (0); wrinkled (1); rugose with bony tubercles (2). Ordered. In some *Anolis* (e.g., *A. cuvieri*), most of the surface

of the skull is rugose with a wrinkled appearance. In others (e.g., *A. equestris*) the rugosity is developed into hard pustulate tubercles. Individual specimens were assigned whatever condition predominates on the surface of the skull. Each species is coded with its modal state.

58 Parietal crests form a trapezoid (0); V (1); Y (2); Y with parietal spur (3). Etheridge (1959; see also Poe [1998]). Ordered. Each species is coded with its modal state.

59 Anterolateral corners of parietal crests reach posterolateral corners of frontal (a); reach medial to posterolateral corners of frontal (z). Frequency coded.

60 Parietal casque absent (a); present (z). In some species, the roof of the parietal extnds posterolaterally, shelf-like, over the supratemporal processes of the parietal to form a casque (state z).

61 Pineal foramen at parietal/frontal suture (a); in parietal (z). (Etheridge, 1959). Frequency-coded.

62 Supratemporal processes leave supraoccipital exposed above (a); extend over supraoccipital (z). Etheridge (1959; see also Poe [1998]). Frequency-coded.

63 Postfrontal present (a); absent (z). Poe (1998). Frequency-coded.

64 Prefrontal contacts nasal (a); is separated from nasal by frontal and maxilla (z). Poe (1998). Frequency-coded.

65 Frontal sutures only with nasals anteriorly (0); is separated from nasals by open gap (1); contacts premaxilla and nasals anteriorly (2). Poe (1998). Unordered. State 2 is added to Poe's (1998) character 94. Species are assigned the modal state.

66 Parallel crests extending longitudinally down nasals from frontal to nares absent (a); present (z). Frequency-coded.

67 Anterior edge of nasal forms entire posterior border of naris (0); forms only medial half of posterior border of naris (1); does not reach naris (2). Ordered. Minimal contact with the naris is scored as (1); if more than the medial half of the narial opening is formed by the nasal, scoring is (0). Each species is coded with its modal state.

68 Dorsal process of jugal terminates on posterior or medial aspect of postorbital (a); on lateral aspect of postorbital (z). Poe (1998). Frequency-coded.

69 Jugal/squamosal contact absent (a); present (z). Poe (1998). Frequency-coded.

70 Posteroventral corner of jugal is anterior to posterior edge of jugal (a); posterior to posterior edge of jugal (z). Frequency-coded. In species with state z (e.g., *A. cybotes*), the posterior edge of the jugal is concave; species with state a (e.g., *A. limifrons*) have a straight or convex posterior jugal.

71 Epipterygoid contacts parietal (a); does not contact parietal (z). Poe (1998). Frequency-coded.

72 Pterygoid teeth present (a); absent (z). Etheridge (1959; see also Poe [1998]). Frequency-coded.

73 Lateral edges of vomer smooth (a); with posteriorly directed lateral processes (z). Frequency-coded. This character is similar to Poe's (1998) character 102 (palatine-vomer suture). However in this paper I combine states 0 (transverse suture, no processes) and 1 (posterolateral suture, no processes) into state (a) because the wider sample of taxa examined for this paper demonstrated continuous variation that made objective distinction between states 0 and 1 impossible.

74 Maxilla extends posteriorly to ectopterygoid (a); beyond ectopterygoid (z). Poe (1998). Frequency-coded.

75 Basipterygoid crest absent (a); present (z). Poe (1998). Jackman et al. (1999) called this structure a parabasisphenoid. Frequency-coded.

76 Quadrate lateral shelf absent (a); present (z). Poe (1998). Frequency-coded.

77 Posteroventral process of the squamosal extends ventrally into auditory cup of quadrate (a); squamosal excluded from auditory cup by dorsal surface of quadrate (z). Poe (1998). Frequency coded.

78 Posterodorsal process of squamosal contacts supratemporal only (a); extends above supratemporal to contact parietal (z). Poe (1998). Frequency-coded.

79 Posteriormost tooth is at least partially posterior to anterior mylohyoid foramen (a); posteriormost tooth is at least partially anterior to anterior mylohyoid foramen (m); posteriormost tooth is completely anterior to anterior mylohyoid foramen (z). Coding follows the frequency analysis of Poe (1998).

80 Angular process of articular present, large (a); reduced or absent (z). Williams (1989; see also Poe [1998]). Frequency-coded.

81 Posterior suture of dentary pronged (a); blunt (z). Poe (1998). Frequency-coded.

82 Anteriormost aspect of posterior border of dentary is anterior to mandibular fossa (a); within mandibular fossa (z). Poe (1998). Frequency-coded.

83 Splenial present, large (0); absent (1); present as anteromedial sliver (2). Etheridge (1959; see also Poe [1998]). Unordered. Each species is coded with its modal state. Although some *Anolis* species in the *bimaculatus* series demonstrate a fourth state—splenial present as ventral fragment—none of these species has this state as its modal condition.

84 Anteromedial process of coronoid extends anteriorly (0) <-> ventral aspect of anteromedial process projects posteriorly (z). Poe (1998). Frequency-coded.

85 Surangular foramen completely in surangular (a); bordered laterally by dentary (z). Poe (1998). Frequency-coded.

86 Coronoid labial process absent (a); present (z). Poe (1998; see also Etheridge and de Queiroz [1988]). Frequency-coded.

87 Posterolateral aspect of coronoid terminates anterior to supra-angular foramen (a); extends into or beyond supra-angular foramen (z). Frequency-coded.

88 Black pigment on skull absent (a); present over most bones on the dorsal surface of the skull (z). Frequency-coded. Specimens were scored as state z if a majority of dorsal skull bones had black pigment; other conditions were scored as state a.

89 Premaxilla overlaps nasals laterally or is flush with them (a); nasal overlaps lateral edge of premaxilla (z). Frequency-coded.

90 Posterior of skull slopes superiorly or is flat (a); slopes inferiorly (z). Frequency-coded. If the posterior edge of the parietal is inferior to its anterior edge, a score of (z) is assigned.

91 Parietal crenulation absent (a); present (z). Poe (1998). Frequency-coded.

92 Parietal roof flat (a); convex (z). Poe (1998). Frequency-coded.

93 Jaw sculpturing in large adult males absent (0); *cristatellus* type (1); *krugi* type (2); *cybotes* type (3); *Chamaeleolis* type (4); wrinkled (5). See Etheridge (1959) for descriptions of these conditions. Data for this character is from an unpublished manuscript by Ernest Williams and Susan Case provided by Ernest Williams. Unordered. Each species is coded with its modal state.

94 Supraoccipital cresting continuous across supraoccipital (0); lateral processes distinct from supraoccipital crest (1); single narrow central process (2). Unordered. Species are assigned their modal condition. State 2 is added to character 105 of Poe (1998).

95 Angular present (0); absent (1). Etheridge (1959).

96-117 Allozyme loci. Lieb (1981).

118-129 Allozyme loci. Burnell and Hedges (1990)

130-199 Ribosomal RNA sequence sites from the 16S region. Hass et al. (1993). Sequences were downloaded form Genbank and aligned using Clustal W (Thompson et al., 1994) and by eye.

200-210 Allozyme loci. Gorman and Kim (1976).

211-226 Allozyme loci. Gorman et al. (1983).

227 Sex chromosomes heterogeneity absent (0); XY (1); XXY (2). Webster (1974); Webster et al. (1972); Gorman (1973). Unordered.

228 Number of microchromosomes 24 (0); 20 (1); 16 (2); 14 (3); 8 (4). Webster (1974); Webster et al. (1972); Gorman (1973). Unordered.

229 Number of macrochromosomes 12 (0); 14 (1); 15 (2); 16 (3); 17 (4); 19 (5); 21 (6); 22 (7); 23 (8); 24 (9); 20 (A). Webster (1974); Webster et al. (1972); Gorman (1973). Unordered.

230-1724. Mitochondrial DNA sequence sites from NADH dehydrogenase subunit 2 and five transfer-RNA genes. Jackman et al. (1999). Sequences were downloaded from the Systematic Biology web site and used as aligned.

1725-2326. Mitochondrial DNA sequence sites from the cytochrome-*b* region. Giannasi et al. (2000). Sequences were downloaded form Genebank and aligned using Clustal W (Thompson et al., 1994) and by eye.

2327. Immunological distance. Hass et al.'s (1993) table 2 of immunological distances was entered as a step matrix (scaled such that maximum change was at equivalent parsimony cost to a change at a DNA site):

	1	2	3	4	5	6	7	8
[1]	.	712	1000	806	849	813	777	784
[2]	712	.	619	525	504	619	633	705
[3]	1000	619	.	820	655	597	734	763
[4]	806	525	820	.	424	388	604	755
[5]	849	504	655	424	.	223	583	683
[6]	813	619	597	388	223	.	489	727
[7]	777	633	734	604	583	489	.	791
[8]	784	705	763	755	683	727	791	.

1: *A carolinensis*, 2: *A. cuvieri*, 3: *A. cybotes*, 4: *A. valencienni*, 5: *A. cristatellus*, 6: *A. evermanni*, 7: *A. bimaculatus*, 8: *A.roquet* (this species was assigned the state for *A. extremus*, a species not included here that is sister to *A. roquet* based on chromosome [Gorman and Atkins, 1967] and DNA [Giannisi et al., 2000] data).

ANALYSES

Unless otherwise noted, analyses were performed on various versions of PAUP* 4 (Swofford, 2000).

I performed parsimony analysis of the morphological data alone and in combination with the chromosome, DNA, and allozyme data. All taxa were included in the combined analysis, but *Diplolaemus darwini* was omitted from the morphological analysis because it was not scored for these characters.

Parsimony was selected as an optimality criterion because it has been shown to perform well in simulation studies of various types of characters (e.g. DNA, Huelsenbeck and Hillis, 1993; intraspecifically varying characters, Wiens and Servedio, 1997) and because the evolutionary process assumptions of this method seem reasonable for data matrices such as this one that incorporate several diverse types of data. Furthermore, most other optimality criteria (e.g., likelihood) are not yet suitable for matrices like this one that include missing data and step-matrix characters.

For each data set (morphological and combined), at least 2000 searches for optimal trees were performed. For each search, taxa were added in random order to construct an initial tree, and the tree-bisection-reconnection (TBR) algorithm was used to find optimal trees for that replicate. With some exceptions (noted below and in the character descriptions), characters were weighted such that a change between

adjacent states costs one parsimony step. Binary morphological characters scored with frequency-coding were coded with 26 ordered states (a-z). Change between adjacent states cost 1/26 of change between (e.g.) DNA states, such that a change from 0 to 100% "fixation" costs one step (see Wiens, 1995). Gap-weighted characters were scaled such that changes between extreme values cost two steps. This scaling was adopted rather than a scaling of one step because the latter coding would effectively downweight gap-weighted characters relative to all other characters. This downweighting would occur because taxa are scored on a continuous (mensural) scale and only the extreme values are at maximum parsimony cost. This means that changes between any two taxa except between the two (of few) taxa with the highest and lowest measurements costs less than the maximum. If the maximum is set at one step, then virtually all changes for these characters will cost less than change between non-gap coded characters, and these characters will contribute very little to tree construction.

Support for individual clades was evaluated using the bootstrap (Felsenstein, 1985b) and by examining near-shortest trees (the decay index; Bremer, 1988). For bootstrap analysis of both the morphological and combined data sets, 200 replicate matrices of the same size as the originals were constructed by sampling characters with replacement. Replicate matrices were analyzed with parsimony using one round of random taxon addition and TBR branch swapping, and resulting trees were summarized using a 50% majority-rule consensus tree.

Decay analyses were performed by keeping trees up to one step longer than the most-parsimonious tree. These suboptimal trees were found with 25 searches of random taxon addition and TBR branch swapping and with a search using the optimal tree as the starting tree for TBR brach swapping. From these suboptimal trees, a strict consensus tree was constructed.

RESULTS AND DISCUSSION

Combined analysis

Initial tree

The initial combined analysis produced a single most-parsimonious tree (mpt). This tree is identical to the tree in Figure 1.1 but for the position of *A. oculatus*. In the combined tree using all the data, *A. oculatus* of the *bimaculatus* group occupies a nested position within the *roquet* series. This position of *A. oculatus* is not accepted as the best estimate of its phylogeny for the reasons discussed below.

The A. oculatus *problem*

The nesting of *bimaculatus*-group *A. oculatus* within the *roquet* series is a curious result. The *roquet* series traditionally has been considered to be a basal, well-supported clade (e.g., Etheridge, 1959; Gorman and Atkins, 1967; Williams, 1976a), and the *bimaculatus* series traditionally has been considered to be a more derived, well-supported clade (e.g., Etheridge, 1959; Williams, 1976a; Gorman and Kim, 1976). The nesting of

A. oculatus within the *roquet* group appears to be due to the cytochrome *b* data of Giannisi et al. (2000). These data are scored only for the *roquet* group *Anolis* and for *A. oculatus*, which was included as an outgroup to root the tree. All other species in the combined analysis are scored "?" for cyt *b*. There are many more cyt *b* characters that are informative for these relationships (*roquet* group + *A. oculatus*) than there are other characters (102 cyt *b* vs. 50 other). Furthermore, the cyt *b* characters are relatively internally congruent, at least when analyzed with parsimony, and produce a tree with high bootstrap levels at all nodes (see Giannisi et al., 2000). Thus, the relationships suggested by the cyt *b* data are robust to the addition of more characters in the combined analysis, so the cyt *b* tree emerges in the combined analysis as a sort of "backbone" constraint—the unrooted *roquet* group + *A. oculatus* network in the combined tree is identical to that obtained by analyzing the cyt *b* data alone. However, the other data in the combined analysis do not root this network at the point where *A. oculatus* attaches to the *roquet* group, and therein lies the explanation for the result of a *bimaculatus* series species falling out within the *roquet* series: The combined data roots the *roquet* group + *A. oculatus* network along the branch leading to *A. luciae*, which causes *A. oculatus* to be nested within the *roquet* group.

The interactions of these data are a satisfying explanation for the strange result of a *bimaculatus* series species nesting within the *roquet* series. However, this explanation says nothing about whether the combined result is correct. For reasons discussed below, I believe this

result to be incorrect. In order to isolate the question to the rooting of *A. oculatus* relative to the cyt *b* data, I will reduce the problem to include only the *roquet* series and *A. oculatus*, I will frame the problem in terms of the differences in rooting implied by the cyt *b* data versus that from the other (morphological, allozyme, other DNA) data, and I will make comparisons between the results obtained when *A. oculatus* is scored for the cyt *b* data versus results obtained when *A. oculatus* is not scored for the cyt *b* data. Figure 1.2 shows the rooting points for trees obtained in parsimony analyses of all data (this tree is identical to that obtained if the cyt *b* data are analyzed alone; this rooting will be called the "CB" rooting [in reference to cyt b]) and of a data set excluding only the cyt *b* data for *A. oculatus* (this rooting will be called the "OD" rooting [in reference to "other data"]). The unrooted ingroup trees are identical in the two analyses.

I hypothesize that the CB rooting of *A. oculatus* is incorrect, and that this misplacement is caused by long branch attraction in the cyt *b* data between *A. oculatus* and the interior branch. Several lines of evidence support this contention. First, the cyt *b* DNA data is significantly incongruent with the other data, but only relative to the *A. oculatus* sequence. An ILD test (Farris et al., 1995) comparing the cyt *b* data to the other data finds significant incongruence if the analysis is done including the *A. oculatus* sequence (p=0.006) but nonsignificance if these data sets are compared with the *A. oculatus* sequence omitted (p=0.146; removing any of the seven *roquet* group sequences does not strongly affect significance values for incongruence [p<0.013]). This result suggests that the *A.*

oculatus sequence is responsible for the incongruence (see Poe, 1996). Second, the branch leading to *A. oculatus* is extraordinarily long. Figure 1.3 shows a reconstruction of branch lengths on the CB tree using maximum likelihood and a parameter-rich model (HKY + G, all parameter values estimated from the data). Third, the analytical behavior of the sequence of *A. oculatus* is consistent with an hypothesis of extreme phylogenetic distance causing misplacement. If the *A. oculatus* sequence is so evolutionarily distant from the ingroup that its phylognetic signal is lost, this sequence might be expected to attach to the ingroup similarly to a random sequence of nucleotides. To test this contention, I shuffled the character states in the *A. oculatus* sequence, then analyzed the matrix using this randomized sequence in place of *A. oculatus*. In 100 replicates, the randomized sequence connected in the same place as *A. oculatus* 96 times. This result is consistent with an hypothesis of little phylogenetic signal in the *A. oculatus* sequence. Finally, a parametric bootstrap analysis (see Huelsenbeck et al., 1996) suggests that even if the OD rooting is the true rooting, parsimony analysis of the cyt *b* data will support the CB rooting.

I optimized likelihood parameter values on the OD tree using the HKY + gamma model of DNA sequence evolution (Hasegawa et al., 1985; Yang, 1994). This model allows for unequal equilibrium base frequencies, different rates of change for transitions and transversions, and unequal rates of evolution across sites. The resulting parameter values (including branch lengths) were input as a model of evolution into the simulation program in PAML (evolver; Yang, 2000). One hundred data sets of the

same size as the Giannisi et al. (2000) cyt *b* data set were created (602 sites), and results were analyzed using parsimony. In 93 of 100 replicates, a tree compatible with the CB rooting was obtained, even though data were simulated on the OD tree. This result suggests that even if the OD rooting is the true root, analysis of these cyt *b* sequences will produce a tree with the CB root. Model trees with alternative rootings to the OD rooting (i.e., all 10 other possible rootings of the tree in figure 1.2 produce similar results (data not shown).

These analyses merely show that the data are very consistent with an hypothesis of long-branch attraction in *A. oculatus*. Taken alone, they do not rule out the possibility that the long-branch placement of *A. oculatus* is actually the true position of this species. Methods that are less sensitive to long branch problems (likelihood under complex models, log-det transformed distance analyses) also recover the CB rooting (results not shown), suggesting that this problem, if it is real, pervades all of these methods. Fortunately, however, there is additional compelling evidence that this rooting is incorrect: not a single non-cyt *b* character supports the cyt *b* tree over the other data tree (these data reject the CB tree at p=0.003; Wilcoxon signed-ranks test as implemented in PAUP*; Templeton, 1983). The strength of the non-cyt *b* data against the cyt *b* rooting and the consistency of the cyt *b* data with long branch attraction in *A. oculatus* suggests to me that the cyt *b* data for *A. oculatus* is causing a spurious result in the combined tree. Probably this problem could be rectified by inclusion of cyt *b* data from other, less phylogenetically distant *Anolis*

species to root the *roquet* clade, but unfortunately no additional cyt *b* sequences are available for *Anolis*. Because the *A. oculatus* cyt *b* sequence seems incurably problematic at this time, I elected to exclude this sequence from the preferred combined analysis. Figure 1.1 shows the tree resulting from a parsimony analysis of all data except the *A. oculatus* cyt *b* sequence. I accept this tree as the best estimate of relationships.

The preferred estimate of anole relationships

Combined analysis of all data except the *A. oculatus* cyt *b* sequence produced a single ingroup tree of length 14965.083 with consistency index (CI; Kluge and Farris, 1969) of 0.418 and retention index (RI; Farris, 1989) of 0.409 (Figure 1.1; all tree statistics are given with uninformative characters excluded). (Because *Diplolaemus darwinii* was not scored for morphological characters, it attaches at any of the 13 outgroup branches). Many clades in this tree are in accord with previously-held ideas of anole relationships (see below). See Appendix 2 for morphological support for these clades. A full list of all synapomorphies (i.e., including DNA, allozyme, and chromosome data) is available on request.

Anolis occultus is sister species to the rest of *Anolis* (node A in figure 1.1). This Puerto Rican dwarf twig species has been difficult to place because it possesses a mosaic of primitive and derived characters. Morphological data alone places this species with ecologically similar West Indian forms, but, there are several morphological characters that

support a basal placement of this species as well (e.g., lack of a coronoid labial process, trapezoidal parietal), in agreement with the combined tree.

The next clade to branch off (node B) is composed of Hispaniolan *A. darlingtoni* together with the *equestris* series as sister group to Etheridge's *latifrons* series (i.e., *latifrons* group sensu lato; = Guyer and Savage's [1989] *Dactyloa*) plus "*Phenacosaurus*." The basal placement of these taxa (albeit not their monophyly) accords well with the morphological tree. The nesting of *Phenacosaurus* within *latifrons*-group *Anolis* was anticipated by Etheridge (1959: fig. 10) and supported in recent studies (Poe, 1998; Jackman et al., 1999). *Anolis darlingtoni* shares similarities with these basal forms but also with more derived and geographically contiguous Hispanolan species (e.g., Poe, 1998). More intensive character sampling may place it with these species in future studies. The *latifrons* clade is composed of three monophyletic groups. The traditionally recognized and relatively well-supported *roquet* series (node C) of the Southern Lesser Antilles is sister group to a clade (node D) composed of *Phenacosaurus* with *tigrinus*, *punctatus*, *latifrons*, and *aequatorialis* species group anoles. *Phenacosaurus* is sister clade to *A. proboscis*, a poorly-known South American species, and this group is nested within a clade composed of South American species from the *tigrinus*-series and *punctatus* series. Other *punctatus* series species (*A. chloris*, *A. perracae*, *A. fasciata*) are sister group to a clade (node E) composed of the Malpelo Island endemic *A. agassizi*, *aequatorialis* series *Anolis*, and a mostly monophyletic (but for *A. apollinaris*, mistakenly

considered by Savage and Guyer [1992] to be a Beta *Anolis*) *latifrons* (sensu-stricto) series.

The remainder of the anole radiation (node F) includes the Beta *Anolis* and five clades of "Alpha" *Anolis*. These Alpha anole clades include some that are endemic island radiations (e.g., the *cybotes* series) and others which include species from more than one of the Greater Antilles. Cuba and Hispaniola especially appear to share species from some island radiations.

As a sister group to the Beta *Anolis* plus the other Alpha *Anolis* clades is a clade composed of two Hispaniolan groups, enigmatic *A. monticola*, and the pair of Cuban species recognized by Burnell and Hedges (1990) as the *vermiculatus* group. The *vermiculatus* group, the *chlorocyanus* series, and the *hendersoni* series have traditionally been recognized in *Anolis* systematics (e.g., Williams, 1976a). *Anolis monticola* has been difficult to place, perhaps because of its unusual karyotype (see Webster et al., 1972) combined with a mosaic of primitive and derived morphological characters (e.g., Poe [1998] found it to cluster with a mainland Beta species). I am not confident that this is is the correct placement for this species (it joins with more "derived" clades in only slightly shorter trees), but it appears to be the best estimate at this time.

The next clade to branch off (node H) is an eclectic group of predominately Cuban and Hispaniolan Alpha-anole species, including the *cuvieri* series of Hispaniolan and Puerto Rican crown-giant *Anolis*, *carolinensis* group species and similar forms, the Hispaniolan twig *Anolis*,

Cuban and Hispaniolan grass *Anolis, Chamaelinorops, Chamaeleolis,* and species from Burnell and Hedges' *christophei* series. The basal split in this clade places several species traditionally associated with the *carolinensis* series together with that series and some of the Cuban grass *Anolis* (node I). This split also separates Poe's (1998) *sheplani* series, a morphologically well-supported group, on the strength of Jackman et al.'s (1999) data. A clade of three Cuban grass *Anolis* is outgroup to a group composed of two of the Hispaniolan twig *Anolis* (Burnell and Hedges' [1990] *sheplani* series) and the *carolinensis* series and near-relatives. The other group (node J) in this clade is composed of two clades, one of which includes most of Burnell and Hedges's (1990) *christophei* series and *Chamaelinorops* and grass *Anolis* from Hispaniola and Cuba. This placement of *Chamaelinorops* nested in *Anolis* is consistent with earlier studies (e.g., Hass et al., 1993), although this particular placement of this species within *Anolis* is not strongly supported. The other clade in this group is composed of Burnell and Hedges' (1990) *lucius* series as sister to *Chamaeleolis* as outgroup to the *cuvieri* series. Morphological data strongly supports a clade including *Chamaeleolis,* the *cuvieri* series, and the *equestris* series, and I expect that future studies with additional character sampling will recover this clade, possibly near the base of the tree with the current placement of the *equestris* series.

The next clade to branch off (node K) is a composed of two acutus-series species as outgroup to the *cristatellus* series. The *cristatellus* series is

a traditionally-recognized and well-studied (e.g., Gorman et al., 1983) group of species.

After this *cristatellus*-series clade, the next clade to branch off (node L) is composed of the distichoid *Anolis* as sister to the *bimaculatus* series plus one *acutus* (Guyer and Savage, 1992) or *cristatellus* (Burnell and Hedges, 1990) series *Anolis, A. evermanni.*

The outgroup to the Beta radiation is the *cybotes* series (node M), a well supported and morphologically and geographically cohesive unit from Hispaniola. This result of the *cybotes* series as sister to the Beta *Anolis* accords well with independent morphological data not incorporated in this analysis. Etheridge (1959; and pers. obs. of Etheridge's data sheets) noted that members of the *cybotes* series possess transverse processes on the caudal vertebrae intermediate to the Alpha and Beta condition.

The Beta *Anolis* (node N), recognized by Guyer and Savage (1986) as *Norops*, are composed of two island radiations and a large mainland radiation. First to branch off is the Cuba-endemic *sagrei* series (including *homolechis*-group *Anolis*) (node O), followed by the well-studied Jamaican *grahami* series (e.g, Shochat and Dessauer, 1981) (node P).

Lieb's (1981) excellent work notwithstanding, the phylogenetic relationships of the mainland Beta species (node Q) are currently essentially unstudied. Nevertheless, some of the groups recognized by Lieb (1981) and Williams (1976b) are monophyletic or at least adjacent (i.e., paraphyletic) in this tree. This paper's estimate of the phylogeny of these species is based almost exclusively on morphological data (as few

other data are available), and virtually all relationships within this clade are poorly supported. The first clade to branch off in this group is an *A. lineatus* + *A. vociferans* clade. *Anolis lineatus* appears clearly to be a basal *Anolis* within the mainland Beta radiation (e.g., fig. 1.1; Jackman et al., 1999). However, *A. vociferans* has previously been associated with *pentaprion* group *Anolis* (Myers, 1971). This species could not be scored for many characters in this analysis (no skeleton was available), and future studies may place it in a more nested position within the Beta species. Next to branch off are two enigmatic Beta *Anolis*, *A. onca* and *A. barkeri*, followed by a clade of large (>100 mm SVL) species. Three small-scaled, ecologically cohesive aquatic species that have been grouped at the series level next branch off in succession (*A. aquaticus*, *A. poecilopus*, *A. oxylophus*), followed by a clade of *humilis*-series species together with *A. bitectus* and *A. nitens*. *Anolis meridionalis*, a poorly-known South American species, next groups with the widespread *A. auratus* as sister to a large group of Mexican, Central American, and South American species. *Anolis tropidonotus* is sister to the remaining Beta *Anolis*. This species shares characters with the clade of other *humilis*-group species (e.g., a deep axillary pocket), and I expect that it will fall out with these species in future studies.

Next to branch off are clades of Central American (mainly Mexican) *Anolis*. *Anolis tropidolepis* is sister to the *crassulus* series, and *A. lemurinus*, *A. cupreus*, and *A. dollfusianus* are sequential outgroups to the remaining mainland Beta *Anolis*. *A. cuprinus* falls out nested within the *scheidi* series,

which is sister group to two clades of Mexican species and a final clade of mostly *fuscoauratus*-series species from South and Central America. Within these clades is a monphyletic *gadovi* series and another clade of Mexican species including *nebulosus, sericeus,* and *laeviventris* series *Anolis*. These groups are outgroups to a clade composed of *fuscoauratus* series *Anolis*, two enigmatic species (*A. tolimensis, A. altae*), and two *auratus*-series species (*A. granuliceps, A. tropidogaster*).

Morphological tree

Parsimony analysis of the matrix of morphological characters produced a single tree of length 1829.483 (CI=0.178, RI=0.571), shown in Figure 1.4. A list of node-by-node support is available on request. The formerly recognized anoline genera *Chamaeleolis* and *Chamaelinorps* are nested within *Anolis*, as found by molecular data (Hass et al., 1993), and *Phenacosaurus* is outgroup to the rest of the anoles. The morphological tree has many similarities to the combined tree, including the monophyly or near-monophyly of many of the species groups and larger named taxa. However there are some differences in the arrangement of the larger clades and in the composition of some smaller groups. Below I highlight some of these differences in the better-studied *Anolis* groups and speculate on the causes and potential resolution of these conflicts.

Some of the main differences between the morphological tree (Figure 1.4) and the combined tree (Figure 1.1) are these: 1) the basal group that is monophyletic in the combined tree (composed of Etheridge's

latifrons group, *Phenacosaurus*, *A. darlingtoni*, and the *equestris* group) is paraphyletic in the morphological tree, with *Phenacosaurus* as the first outgroup to the remaining anoles. Basal relationships are not well-supported in either case and the outgroups appear to be quite different from *Anolis* both morphologically and according to molecular data. This discrepancy in results may represent a rooting problem with one (or both) data sets, where the outgroups are too distant to provide reliable information on the root of the tree. 2) *Chamaeleolis* and the *cuvieri* series of giant anoles forms a clade with the *equestris* series rather than nesting within other Caribbean forms. This result makes sense morphologically (these species share synapomorphies such as presence of pterygoid teeth), and these species may be separated spuriously in the combined tree. 3) *Anolis occultus* is not sister to the rest of *Anolis*, but rather is nested within a clade of ecologically similar Caribbean species. This result is most likely due to morphological convergence rather than synapomorphy, because there are several morphological characters consistent with a basal placement of *A. occultus* (e.g, trapezoid-shaped parietal, lack of a labial process of the coronoid). 4) The Beta section is not monophyletic. The three Beta clades are each nearly monophyletic, but are located in separate parts of the tree. The nonmonophyly of the Beta section is believable on morphological (this tree), molecular (see Shochat and Dessauer, 1981) and geographical grounds (e.g., the Cuban *sagrei* series and the Jamaican *grahami* series of the Beta section each fall out with other Caribbean species in the morphology tree). However, the combined result of Beta

monophyly is strongly supported by DNA sequence data (see Jackman et al., 1999) and previous analyses (Etheridge, 1959; Guyer and Savage, 1992). 5) Cuban *A. ophiolepis* nests within mainland Beta species. *Anolis ophiolepis* is similar to mainland Beta species in external morphology but also shares morphological characters with the *sagrei* series, where it is unequivocally placed by DNA sequence data (Jackman et al., 1999). This result appears clearly to be due to morphological convergence. 6) *Anolis lineatus* and *A. vociferans* nest within the *grahami* series. These two species appear to share plesiomorphic similarity with the *grahami* series and apomorphic similarity with the mainland Beta species (see Fig. 1.1). Because the mainland Betas and the *grahami* series are widely separated in the morphological tree, either the apomorphic similarity to the mainland Betas or the plesiomorphic similarity to the *grahami* series is nullified. As *A. lineatus* and *A. vociferans* cluster with the *grahami* series, apparently the plesiomorphic similarity to the *grahami* series in dominant. 7) *Chamaelinorops* nests within the mainland Beta radiation. A *Chamaelinorops*--Beta *Anolis* relationship was first suggested by Etheridge (1959). The placement of this taxon is not strongly supported in either tree, but clearly the morphological placement of this species within a Central American clade seems unlikely geographically compared to the combined-tree placement of this species with other Hispaniolan forms. 8) The Hispaniolan dwarf twig *Anolis* species are monophyletic. The relationships of these species are one of the few areas of strongly supported conflict between morphological and molecular data. Poe (1998)

found strong support for *A. insolitus* + *A. sheplani* + *A. placidus* based on mostly morphological data, but Jackman et al. (1999) found *A. insolitus* to group strongly with *A. etheridgei*, and *A. sheplani* to form a clade with *A. angusticeps*. I tentatively accept the weight of evidence of the combined analysis but await additional independent data on these relationships. 9) *Anolis evermanni* and *A. wattsi* are outside of the *bimaculatus* group clade. Although it is somewhat unusual morphologically, *Anolis wattsi* traditionally has been considered to be a *bimaculatus*-group *Anolis* (e.g., Williams, 1976*a*). However, the nesting of *Anolis evermanni* within this series in the combined analysis is a novel result. In spite of the intensive work on the *bimaculatus* group and its relatives by Gorman and collaborators and others, the monophyly of this group clearly is not well established and should be tested with additional data. 10) Monophyly of the Hispaniolan and Cuban grass *Anolis* (Hispaniola: *A. semilineatus, A. olssoni;* Cuba: *A. alutaceus, A. clivicola, A. cyanopleurus, A. vanidicus).* This group of species is distinctive morphologically (e.g., Williams, 1961), and the molecular support for separation of Hispaniolan and Cuban clades is not strong (see Jackman et al., 1999). Still, these species share the same grass ecomorph, and thus the chance for convergence seems high. Additional data is needed to resolve the relationships of the Hispaniolan and Cuban grass *Anolis*. 11) Monophyly of the *scheidi* group (*A. cobanensis, A. parvicirculatus*). These species are distinctive morphologically (e.g., Campbell et al., 1989), and I expect that they will form a clade in future combined analyses.

Previous hypotheses of *Anolis* relationship and taxonomy

Etheridge (1959) was the first to present a phylogenetic treatment of *Anolis*, and virtually all studies that followed are based implicitly or explicitly on this work. Many of his results agree with the combined tree of this paper. Notable among this concordance is the monophyly of the Beta section, the basal position of the South American and Southern Lesser Antillean Alpha *Anolis* (his *latifrons* series), the close relationship of *Phenacosaurus* with the *latifrons* series, the monophyly of the mainland Beta species, and the monophyly or near-monophyly of many of his series. Given the small character base and limited taxon sample from which he was operating, Etheridge's results are remarkably robust.

Many of the series and species groups of Williams (1976*a*, *b*) are recovered as clades in the combined tree (see below). His subsections and most other larger groups, however, are not monophyletic. Similarly, the smaller groups recognized by Shochat and Dessauer (1981) based on immunological data are mostly monophyletic in the combined tree, but their larger Central Carribbean Species Complex is not. And, the intraisland monophyly of Cuban and Hispaniolan spcies suggested by Burnell and Hedges (1990) is not evident in the combined tree, but many of their series and species groups do form clades. This pattern of easy recovery of smaller groups but nonmonophyly of larger groups is a common theme in *Anolis* studies:

"It is this parallelism that contributes to the notorious 'difficulty' of the genus *Anolis*. Narrow groups are rather easy to recognize (though the specific and infraspecific structure within the group may be puzzling in the extreme) but wider relationships (at least when externals only are considered) are problematical, becoming obscurer with each step more distant from the species group."

Williams (1961)

Jackman et al. (1999) suggested that this pattern may be due to a rapid radiation at the base of the *Anolis* tree.

There is no strongly supported conflict between the results of this paper and those of previous studies of *Anolis* phylogeny (as measured by bootstrap levels; data not shown). However with the exception of Jackman et al. (1999) and Hass et al. (1993), previous studies of *Anolis* are based on very few characters. These studies, many of which were excellent for their times, are thus unable to produce results that are in strong conflict with the results of this paper. Nevertheless, the taxonomies produced in these studies can be compared to the phylogenetic results of this paper. Below, the *Anolis* taxonomies of Etheridge (1959), Williams (1976a), Guyer and Savage (1989), and Burnell and Hedges (1990) are evaluated for their concordance with the results of this paper. Groups discussed below are considered to be monophyletic or not only relative to the species that are common to this study and the

listed study. There is much overlap in content between groups in these studies. The post-Williams studies generally accept the Williams groups with only minor changes. Changes in group composition and name are difficult to track in some cases where authors made changes without analysis or justification. Among the studies discussed below, only Burnell and Hedges (1990) performed phylogenetic analyses that could test the monophyly of Williams' groups. However, many of their named groups reflect conventions from Williams rather than their own results--e.g., six of their named groups are not monophyletic in any of their presented trees (*sagrei* series, *christophei* series, *grahami* series, *cristatellus* series, *pulchellus* group, *stratulus* group; compare their Table 1 to their figs. 1-3) but correspond closely or completely with groups recognized by Williams (1976a).

The relatively small number of concordant clades listed below could be interpreted to suggest great conflict between these studies and the combined tree. This interpretation would be incorrect. Many of the groups recognized by these authors are monophyletic but for one or a few species or otherwise have some phyletic cohesion (e.g., sequential paraphyly). And, it should be remembered that Etheridge (1959) and Williams (1976a, b) published their taxonomies before it was common practice to associate names only with clades. Consider for example that both Williams and Etheridge recognized a genus *Tropidodactylus* [=*A. onca*] nested within *Anolis*; and both discussed the possibility of the Beta section arising from within the Alpha section while simultaneously maintaining

the Alpha/Beta dichotomy taxonomically (Williams, 1976a:3; Etheridge, 1959:194).

Groups recognized by Etheridge (1959) that are monophyletic in the combined tree: Beta section, *grahami* series, *sagrei* series, *latifrons* series.

Groups recognized by Etheridge (1959) that are not monophyletic in the combined tree: Alpha Section, *bimaculatus* series, *carolinensis* series, *coelestinus* series, *cristatellus* series, *angusticeps* series, *petersi* series, *fuscoauratus* series, *chrysolepis* series.

Groups recognized by Williams (1976a) that are monophyletic in the combined tree: *roquet* series, *richardi* superspecies, *distichus* subgroup, *cybotes* subseries/species group, *cristatellus* subseries, *pulchellus* subgroup, *equestris* species group/superspecies, *chlorocyanus* species group, *hendersoni* species group, *angusticeps* subgroup, *argillaceus* species group, *lucius* species group, *vermiculatus* species group, *sagrei* species group, *allogus* superspecies.

Groups recognized by Williams (1976a) that are not monophyletic in the combined tree: Alpha section, *punctatus* subsection, *luciae* species group, *luciae* superspecies, *richardi* superspecies, *roquet* species group, *cuvieri* series, *bimaculatus* series, *stratulus* subseries, *stratulus* species group, *bimaculatus* subseries, *bimaculatus* species group, *bimaculatus* subgroup, *bimaculatus* superspecies, *marmoratus* superspecies, *cristatellus* series, *pulchellus* species group, *carolinensis* subsection, *occultus* series, *darlingtoni* series, *monticola* series, *monticola* species group, *carolinensis* series, *chlorocyanus* superspecies, *carolinensis* species group, *carolinensis*

subgroup/superspecies, *lucius* series, *alutaceus* series, *alutaceus* species group, *alutaceus* superspecies, *spectrum* superspecies, *semilineatus* species group, *grahami* series, *grahami* species group, *grahami* superspecies, *sagrei* series, *sagrei* superspecies, *homolechis* superspecies,

Groups recognized by Savage and Guyer (1989) that are monophyletic in this analysis: *latifrons* series, *roquet* series, *cybotes* series, *cristatellus* species group, *hendersoni* species goup, *chlorocyanus* series, *equestris* series, *Norops*, *grahami* series, *sagrei* series, *crassulus* species group, *gadovi* species group.

Groups recognized by Savage and Guyer (1989) that are not monophyletic in the combined tree: *Dactyloa*, *aequatorialis* series, *punctatus* series, *tigrinus* series, *Semiurus* (later recognized as *Xiphosurus*), *Ctenonotus*, *cristatellus* series, *bimaculatus* series, *Anolis*, *alutaceus* series, *alutaceus* species group, *semilineatus* species group, *angusticeps* series, *carolinensis* series, *carolinensis* species group, *darlingtoni* series, *monticola* series, *lucius* series, *occultus* series, *auratus* series, *scheidi* species group, *laeviventris* subseries, *laeviventris* species group, *subocularis* species group, *nebuloides* species group, *auratus* subseries, *humilis* species group, *lemurinus* species group, *cupreus* species group, *auratus* species group, *nebulosus* species group, *fuscoauratus* series, *fuscoauratus* species group, *lionotus* species group, *petersi* series, *petersi* subseries, *pentaprion* subseries.

Groups recognized by Burnell and Hedges (1990) that are monophyletic in the combined tree: *argillaceus* series, *chlorocyanus* series, *ricordii* group, *angusticeps* group, *equestris* series, *lucius* group, *cybotes*

series, *distichus* series, *vermiculatus* group, *sagrei* series, *allogus* group, *hendersoni* series, *sheplani* series, *roquet* series, *roquet* group.

Groups recognized by Burnell and Hedges (1990) that are not monophyletic in the combined analysis: *alutaceus* series, *spectrum* group, *carolinensis* series, *carolinensis* group, *carolinensis* subgroup, *lucius* series, *homolechis* group, *sagrei* group, *chlorocyanus* group, *christophei* series, *cuvieri* series, *semilineatus* series, *cristatellus* series, *cristatellus* group, *pulchellus* group, *stratulus* group, *bimaculatus* series, *gingivinus* subgroup, *marmoratus* subgroup, *luciae* group, *roquet* subgroup.

A PHYLOGENETIC TAXONOMY OF *ANOLIS*

Here I revise *Anolis* taxonomy to reflect the phylogenetic relationships discovered in this paper. I recognize only clades as named groups and give node-based definitions (de Queiroz and Gauthier, 1990) for taxon names. The selection of clades formally recognized is not based on staunch operational criteria (no hard rules yet exist for this), but rather on considerations of support, stability, tradition, and pragmatism. As with earlier studies, virtually all of the species groups recognized below are adaptations of the groups of Williams (1976*a*, *b*) or, for Mexican species, Lieb (1981). "Presumed" members of species groups are species that were not studied in this paper but are likely to be members of that species group based on other evidence (e.g., the "presumed" species was originally described as nearly identical to a species included in this

analysis). This taxonomy is summarized in Figure 1.5. Numbers for clades refer to the tree in Appendix 2.

Anolis Daudin 1802

Definition: Most recent common ancestor of species listed by Savage and Guyer (1989), and all its descendants.

Diagnosis: Sixty-three unambiguous DNA synapomorphies, and the following unambiguous morphological synapomorphies: presence of anoline toepads (34.2 -> 0), female SVL smaller relative to male SVL (2.a -> e), loss of angular (95.0 -> 1), presence of caudal autotomy (53.1 -> 0), "Alpha" *Anolis* transverse processes on caudal vertebrae (55.3 -> 0), loss of prefrontal-nasal contact (64.a -> n), absence of pterygoid teeth (72.v -> z), loss of squamosal-parietal contact (78.z -> a), greater posterior extent of dentary (82.f -> t), smaller dorsal scales (10.j -> s), scales posterior to supraciliaries no in regular rows (33.a -> g), longer head (4.c -> l), smaller ear (6.u -> r), smaller rostral (7.o -> l), larger interparietal relative to surrounding scales (8.u -> p), greater number of postmentals (22.a -> f), presence of large dewlap in male (46.1 -> 0).

Content: Species in clade 221, and other species assigned to the genus *Anolis*. Savage and Guyer (1989) is a useful species list, although several species have been named since then.

Dactyloa Wagler 1830

Definition: Most recent common ancestor of *A. equestris* and *A. punctatus* and all its descendants

Diagnosis: Seventeen unambiguous DNA synapomorphies. There is no unambiguous morphological support for this clade.

Comment: Includes Etheridge's (1959) *latifrons* series, which was called *Dactyloa* by Guyer and Savage (1986).

Content:

Species groups:

equestris: species in clade 212 (presumed: *A. baracoae, A . pigmaequestris*)

roquet: species in clade 188 (presumed: *A. extremus, A. blanquillanus*).

punctatus: species in clade 207. (presumed: *Phenacosaurus* (*orcesi, neblininus, inderenae, euskalerriari*), *A. laevis, A. phyllorhinus, A. tigrinus, A. menta*)

latifrons: species in clade 200.

monotypic: *A. darlingtoni*

Unstudied species with ambiguous placement in Dactyloa: See Savage and Guyer (1992) listing for their *Dactyloa*. Species from their (=Williams' [1976a]) *latifrons* and *aequatorialis* series are likely to belong in this paper's *latifrons* species group. Species from their *punctatus* series are likely to be relatives of species in the *latifrons* or *punctatus* groups of this paper. Species in their *tigrinus* series are likely to be members of the *punctatus* species group.

Deiroptyx Fitzinger 1843

Definition: Most recent common ancestor of *A. chlorocyanus* and *A. vermiculatus* and all its descendants.

Diagnosis: Thirteen unambiguous DNA synapomorphies, and reduced male dewlap size (46.0 -> 1).

Content:

Species groups:

hendersoni: species in clade 225 (presumed: *A. dolichocephalus*)

chlorocyanus: species in clade 224 (presumed: *A. dominicanus, A. singularis*)

vermiculatus: species in clade 227.

monotypic: *A. monticola*

Xiphosurus Fitzinger 1826

Definition: The most recent common ancestor of *A. cuvieri* and *A. carolinensis* and all its descendants.

Diagnosis: Six unambiguous DNA synapomorphies, one unambiguous albumin change, and decreased male SVL relative to female SVL (**X**.j -> h).

Comment: Guyer and Savage (1986) applied this name to Williams' (1976a) *cuvieri* series, which was found to be paraphyletic in this analysis (see also Jackman et al., 1999).

Content:

Species groups:

carolinensis: species in clade 236 (presumed: *A. fairchildi*)

argillaceus: species in clade 237 (presumed: *A. centralis, A. pumilis*).

angusticeps: species in clade 239 (presumed: *A. guazuma*)

sheplani: species in clade 240.

alutaceus: species in clade 245.

cuvieri: species in clade 253 (presumed: *Chamaeleolis* [*porcus, guamuhaya, barbatus*]).

argenteolus: *A. argenteolus, A. lucius*

semilineatus group: species in clade 257 (presumed: *A. alumina*).

etheridgei: species in clade 260.

monotypic:*A. (Chamaelinorops) barbouri, A. isolepisi*

Unstudied species with ambiguous placement in Xiphosurus: *A. rimarum, A. koopmani,* and *A. rupinae* have been associated with species in this clade and with *A. monticola* of Deiroptyx. Cuban grass anoles that were not analyzed here (see Burnell and Hedges' [1990] *alutaceus* series) are likely to be closely related to either the Cuban grass anole clade (*alutaceus* species group) or the Hispaniolan-Cuban grass anole clade (*semilineatus* species group).

Istiocercus Fitzinger 1843

Definition: The most recent common ancestor of *A. cristatellus* and *A. acutus* and all its descendants.

Diagnosis: Thirty-seven DNA synapomorphies, and presence of characteristic jaw sculpturing (93.0 -> 3), longer third toe relative to fourth (40.n -> t), iris dark brown (48.2 -> 0)

Content:

Species groups:

cristatellus (Williams, 1976a): species in clade 359 (presumed: *A. cooki, A. ernestwilliamsi, A. scriptus, A. monensis*)

acutus: species in clade 361.

Unstudied species with ambiguous placement in Istiocercus: *A. eugenegrahami* (placed by Savage and Guyer [1989] in their *cristatellus* series and by Burnell and Hedges [1990] in their *distichus* series, this species may be related to species in Istiocercus, Phalangoptyon, or Xiphosurus).

Ctenonotus Fitzinger 1843

Definition: The most recent common ancestor of *A. bimaculatus* and *A. distichus* and all its descendants.

Diagnosis: One unambigous allozyme and twelve unambiguous DNA synapomorphies, and the following unambiguous morphological synapomorphies: posteriormost mandibular tooth is partially anterior to anterior mylohyoid foramen (79.a -> n), reduction in size of male dewlap (46.0 -> 1).

Comment: Guyer and Savage used this generic name for a clade containing the *bimaculatus, cristatellus, acutus,* and *cybotes* series. This group was found to be paraphyletic in this analysis (see also Jackman et al., 2000).

Content:

Species groups:

bimaculatus: species in clade 351 (presumed: *A. ferreus*, *A. sabanus*)

distichus (Williams, 1976a): species in clade 343 (presumed: *A. caudalis*, *A. websteri*, *A. marron*)

Audantia Cochran 1934

Definition: The most recent common ancestor of *A. cybotes* and *A. strahmi* and all its descendants.

Diagnosis: Fifty-six unambiguous DNA synapomorphies, and see support for clade 340 in Appendix 2. mental completely divided (14.r -> z), inferior aspect of jugal extends far posteriorly (70.a -> n), quadrate lateral shelf present (76.x -> z), characteristic jaw sculpturing (93.0 -> 4), longer thigh (3.s -> w), wider head (5.o -> p), suboculars sometimes separated from supralabials (20.a -> g), preoccipital sometimes present (26.a -> g).

Content:

Species group:

cybotes: species in clade 340 (presumed: *A. haetianus*)

Norops Wagler 1830

Definition: The most recent common ancestor of *A. sagrei* and *A. auratus* and all its descendants.

Diagnosis: Twenty-three unambigous DNA synapomorphies, and the following morphologial synapomorphies: presence of transverse processes on caudal vertebrae (Beta anole condition; 55.0 -> 1), T-shaped interclavicle (56.0 -> 1), posterior aspect of dentary sometimes blunt (81.a -> h), fewer postmentals (22.m -> l).

Comment: Savage (1973) and Guyer and Savage (1986) recognized Etheridge's (1959) Beta section of *Anolis* as the genus *Norops*.

Content: Trachypilus, Xiphocercus, Draconura (see below).

Trachypilus Fitzinger 1843

Definition: The most recent common ancestor of *A. sagrei* and *A. allogus* and all its descendants.

Diagnosis: Twenty-one DNA unambiguous synapomorphies, and the following unambiguous morphological synapomorphies: shorter tail (9.p -> m), presence of tail crest (37.a -> z), pineal foramen in parietal (61.d -> z), less prefrontal-nasal contact (64.x ->z), presence of basipterygoid crest (75.a -> z), longer third toe relative to fourth (40.n -> z), fewer supralabials (23.l -> g), ventral scales in diagnol and transverse rows (44.a -> m), two supraciliaries (30.1 -> 2).

Content:

Species group:

sagrei: species in clade 273 (presumed: *A. bremeri, A. delafuenti, A. imias, A. nelsoni*).

Xiphocercus Fitzinger 1843

Definition: The most recent common ancestor of *A. grahami* and *A. valencienni* and all its descendants.

Diagnosis: Fourteen DNA synapomorphies, and characteristic jaw sculpturing (93.0 -> 5).

Content:

Species group:

grahami: species in clade 332.

Draconura Wagler 1830

Definition: The most recent common ancestor of *A. lineatus* and *A. nitens* and all its descendants.

Diagnosis: Twenty-two unambiguous DNA synapomorphies, and the following morphological synapomorphies: shorter head (4.0 -> l), anteromedial process of coronoid extends posteriorly less frequently (84.w -> r), .

Comment: Unlike the Caribbean species groups (which are relatively well-studied), the species groups of *Draconura* recognized here correspond only weakly with previously recognized groups. For this reason and because I am less familiar with *Draconura* species than with the rest of *Anolis*, I am not confident of the placement of species not analyzed here. Thus, I recognize few "presumed" members of the species groups.

Content:

Species groups:

petersi: species in clade 321 (presumed: *A. fungosus*).

nitens: species in clade 310

auratus: species in clade 308.

scheidi: species in clade 299 (presumed: *Anolis breedlovei, A. milleri, A. scheidi, A. polyrhachis, A. duellmani, A. naufragus)*

humilis: species in clade 312 (presumed: *A. uniformis*)

gadovi: species in clade 296 (presumed: *A. omiltemanus*)

laeviventris: species in clade 288.

fuscoauratus: species in clade 283

kemptoni: species in clade 275.

tropidogaster: species in clade 277.

limifrons: species in clade 280.

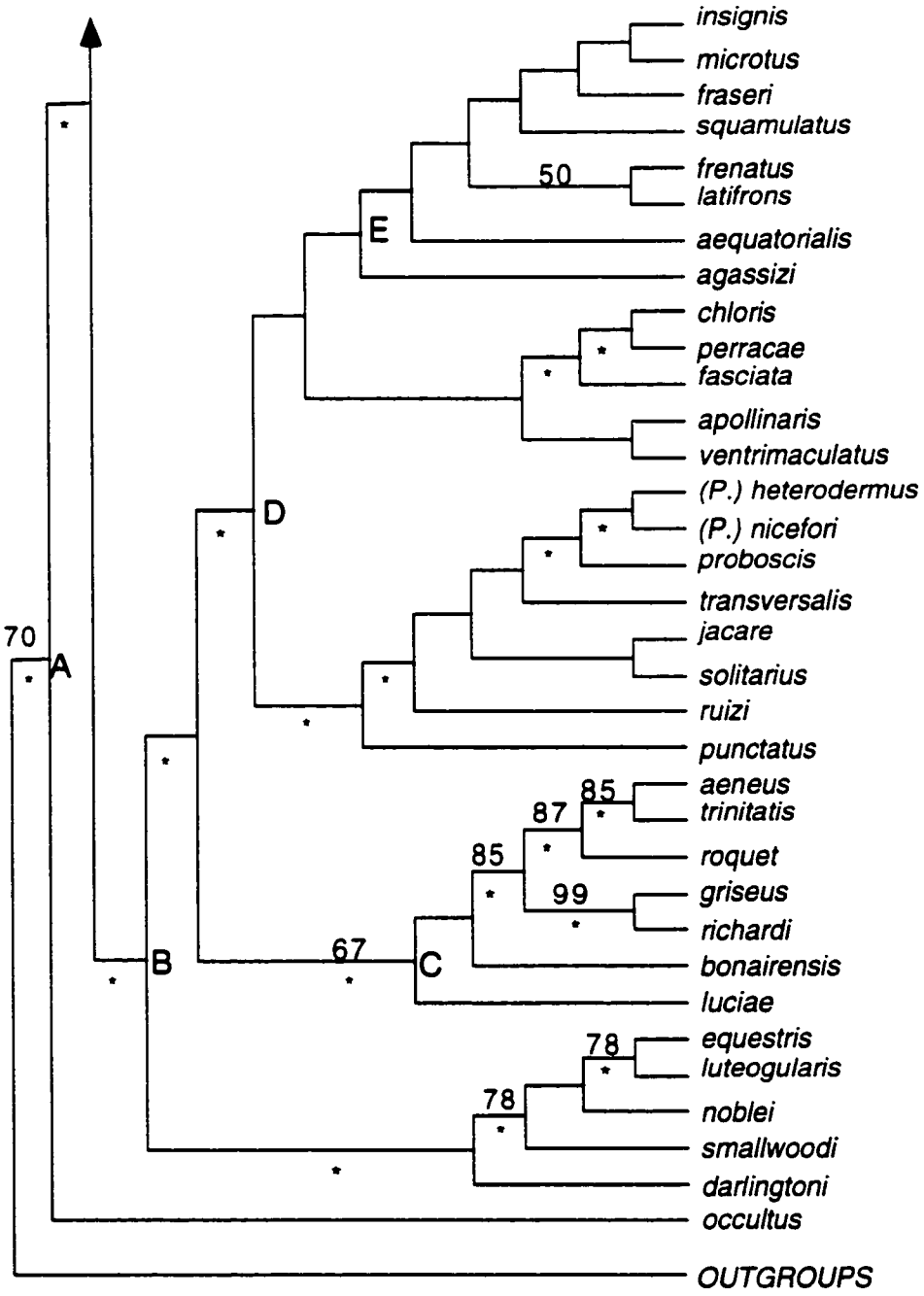
crassulus: species in clade 305. (presumed: *A. haguei*)

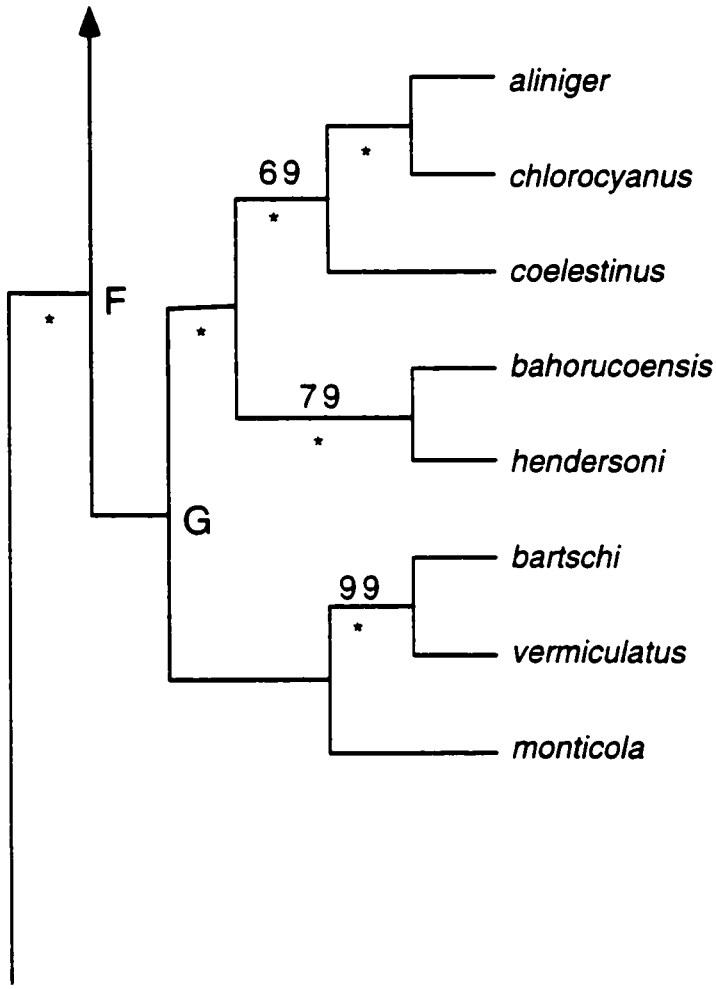
onca: *A. onca* (presumed: *A. annectens*)

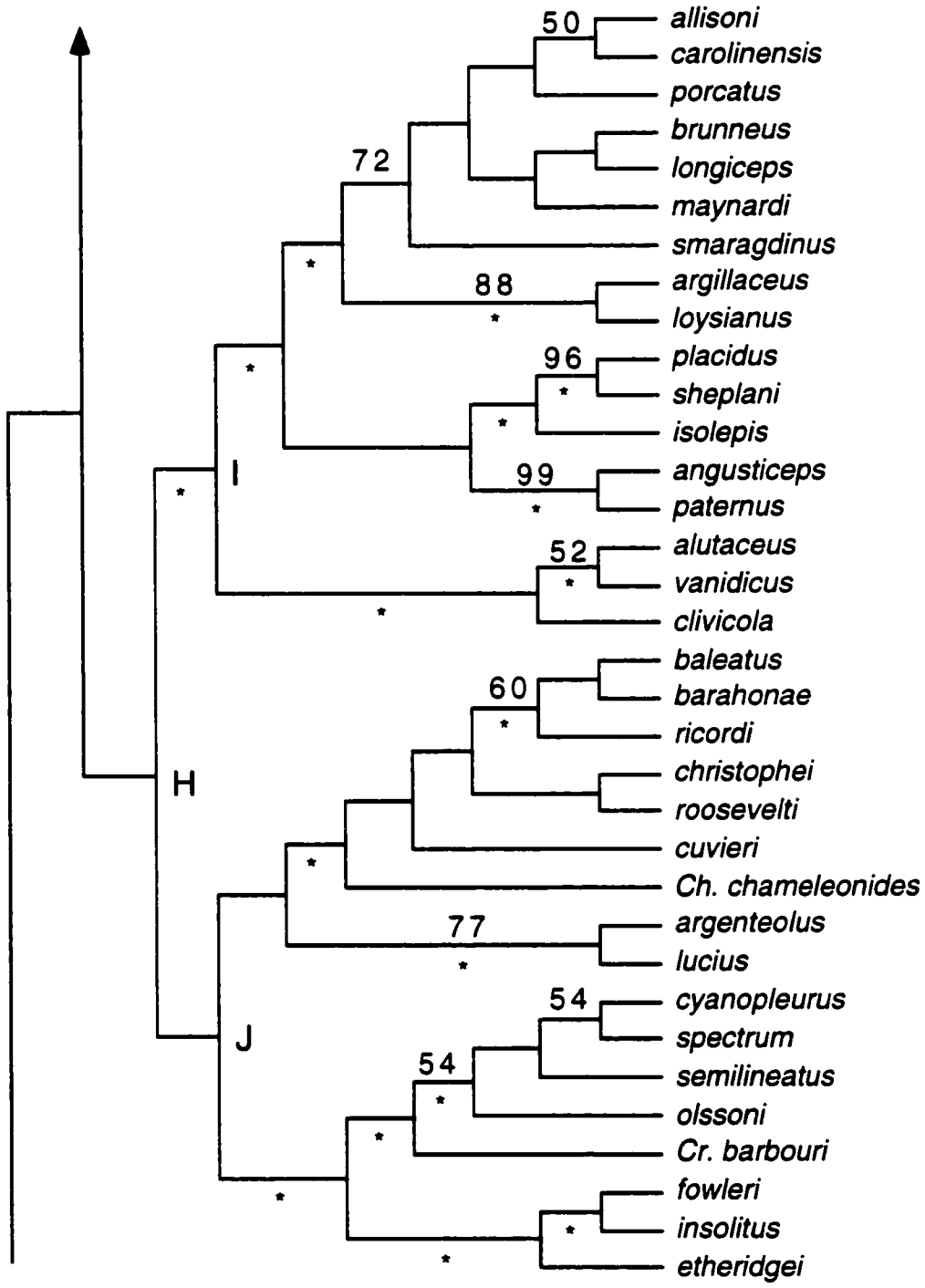
monotypic: *A. lineatus, A. vociferans, A. onca, A. barkeri, A. loveridgei, A. aquaticus, A. poecilopus, A. oxylophus, A. lemurinus, A. cupreus, A. dollfusianus, A. mariarum, A. tropidonotus.*

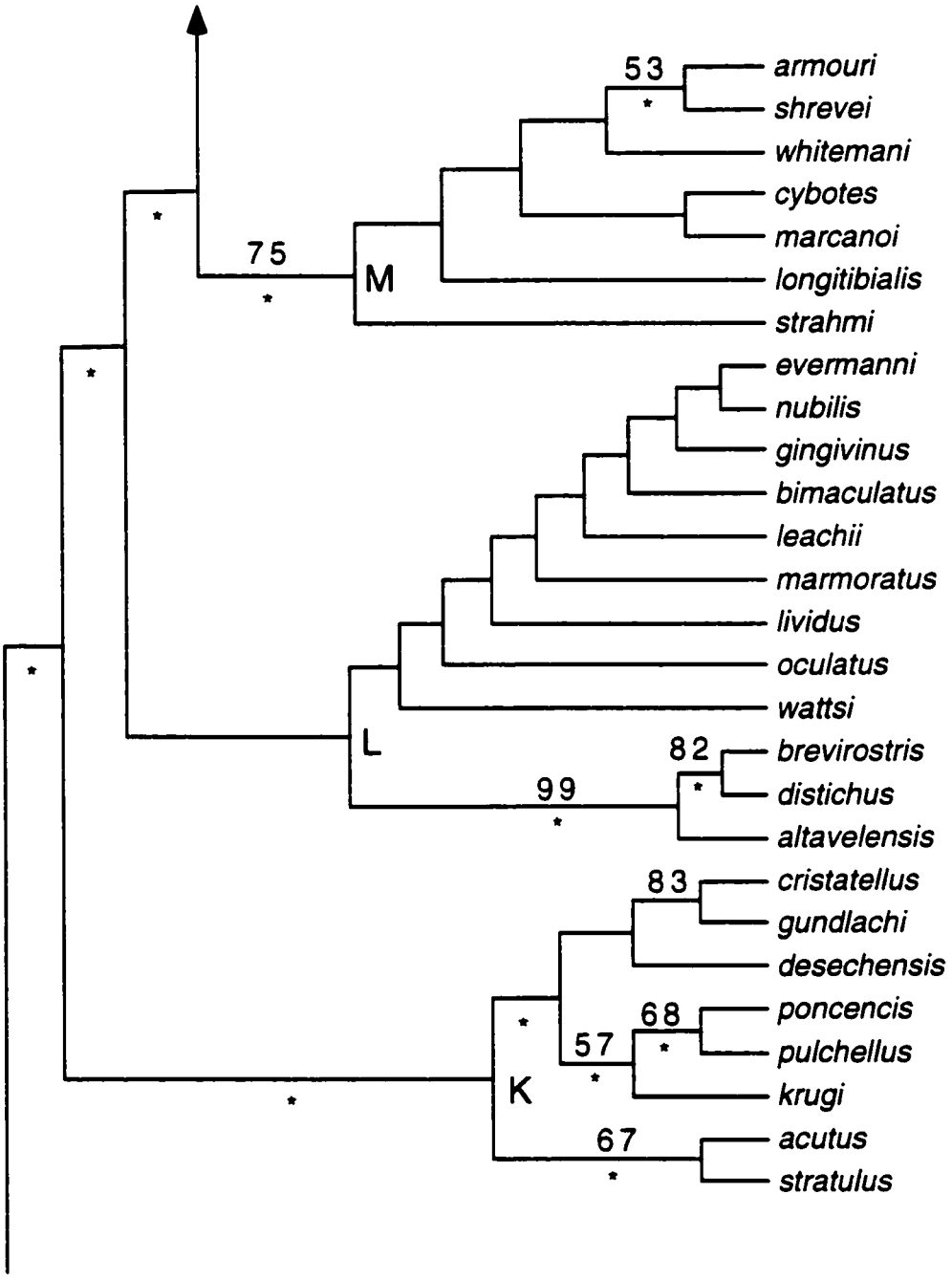
Unstudied species with ambiguous placement in *Draconura*: *Norops* species of Savage and Guyer (1989) that are not in their *grahami* or *sagrei* series (i.e., mainland Beta species) are almost certainly members of *Draconura*.

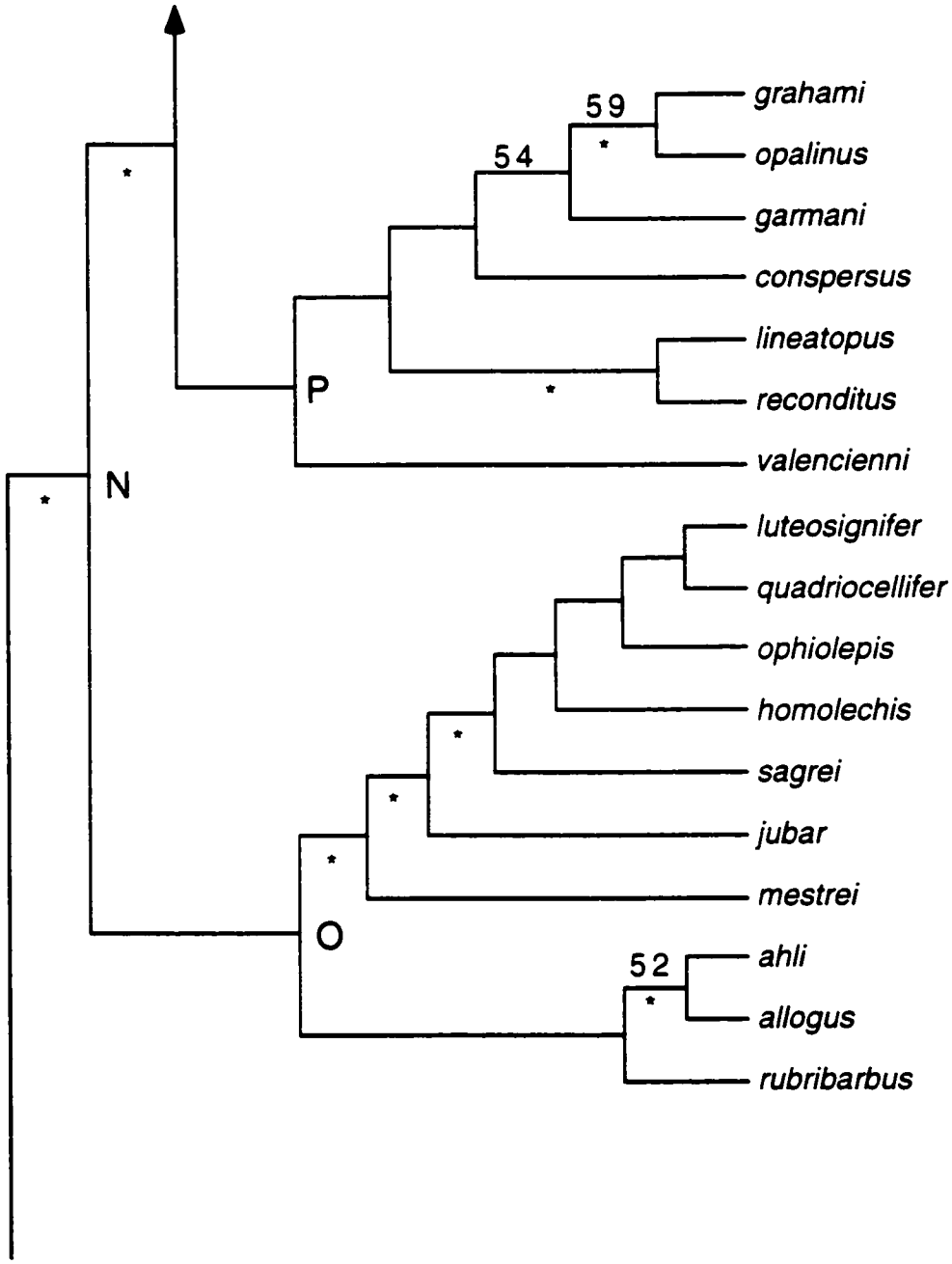
Figure 1.1 (Next six pages). The preferred estimate of relationships. Tree resulting from parsimony analysis of all data except cyt *b* DNA for *A. oculatus*. Numbers above clades are bootstrap values. Asterisked clades appear in trees up to one step longer than the optimal length.


insignis
microtus
fraseri
squamulatus
50
frenatus
latifrons
E
aequatorialis
agassizi
chloris
perracae
fasciata
apollinaris
ventrimaculatus
(P.) heterodermus
D
(P.) nicefori
proboscis
transversalis
70
jacare
A
solitarius
ruizi
punctatus
85
aeneus
87
trinitatis
85
roquet
99
griseus
richardi
67
B
C
bonairensis
luciae
78
equestris
luteogularis
78
noblei
smallwoodi
darlingtoni
occultus
OUTGROUPS


aliniger
chlorocyanus
coelestinus
bahorucoensis
hendersoni
bartschi
vermiculatus
monticola
69
79
99
F
G


50
allisoni
carolinensis
porcatus
brunneus
longiceps
maynardi
smaragdinus
72
88
argillaceus
loysianus
96
placidus
sheplani
isolepis
99
angusticeps
paternus
52
alutaceus
vanidicus
clivicola
I
H
J
baleatus
60
barahonae
ricordi
christophei
roosevelti
cuvieri
Ch. chameleonides
77
argenteolus
lucius
54
cyanopleurus
spectrum
54
semilineatus
olssoni
Cr. barbouri
fowleri
insolitus
etheridgei


53
armouri
shrevei
whitemani
cybotes
marcanoi
75
M
longitibialis
strahmi
evermanni
nubilis
gingivinus
bimaculatus
leachii
marmoratus
lividus
oculatus
wattsi
L
82
brevirostris
99
distichus
altavelensis
83
cristatellus
gundlachi
desechensis
68
poncencis
57
pulchellus
K
krugi
67
acutus
stratulus


59
54
grahami
opalinus
garmani
conspersus
lineatopus
reconditus
valencienni
P
N
luteosignifer
quadriocellifer
ophiolepis
homolechis
sagrei
jubar
mestrei
O
52
ahli
allogus
rubribarbus

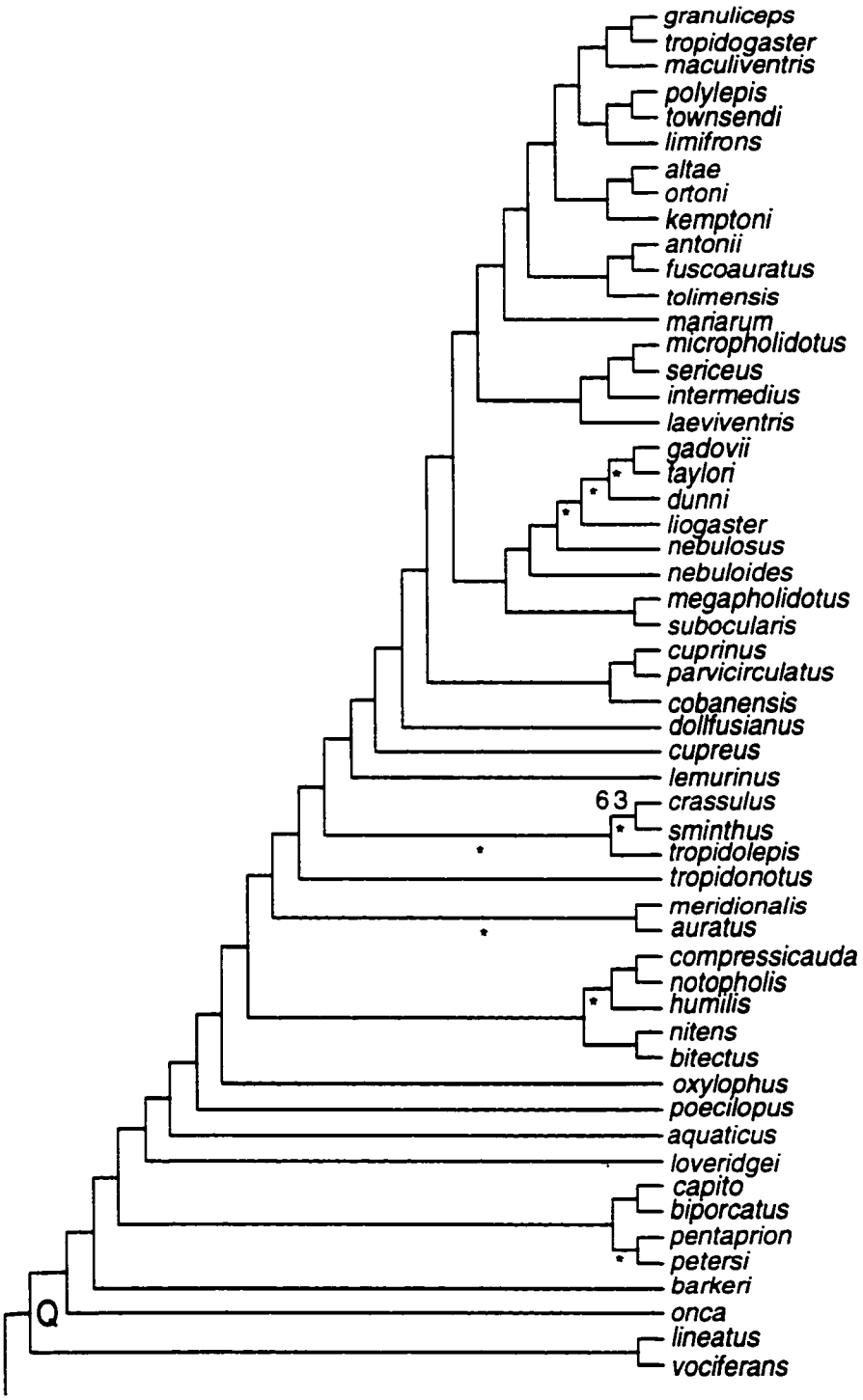

granuliceps
tropidogaster
maculiventris
polylepis
townsendi
limifrons
altae
ortoni
kemptoni
antonii
fuscoauratus
tolimensis
mariarum
micropholidotus
sericeus
intermedius
laeviventris
gadovii
taylori
dunni
liogaster
nebulosus
nebuloides
megapholidotus
subocularis
cuprinus
parvicirculatus
cobanensis
dollfusianus
cupreus
lemurinus
63
crassulus
sminthus
tropidolepis
tropidonotus
meridionalis
auratus
compressicauda
notopholis
humilis
nitens
bitectus
oxylophus
poecilopus
aquaticus
loveridgei
capito
biporcatus
pentaprion
petersi
barkeri
Q
onca
lineatus
vociferans

Figure 1.2 (next page). Tree resulting from parsimony analysis of data for *roquet* series and *A. oculatus*. Rooting points are shown for *A. oculatus* when cyt *b* data of Giannisi et al. (2000) is excluded or included.

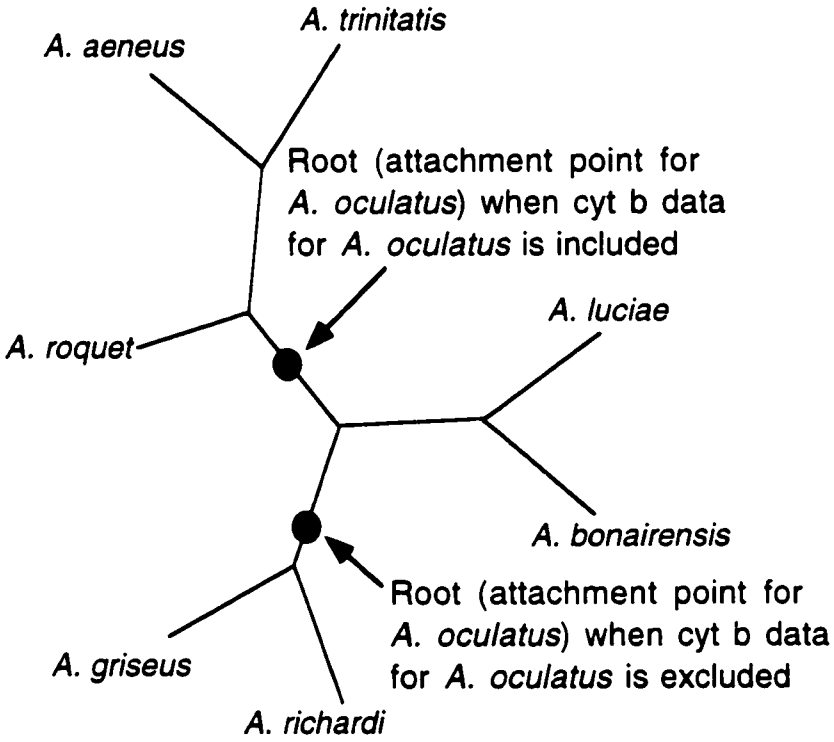

A. trinitatis
A. aeneus
Root (attachment point for
A. oculatus) when cyt b data
for A. oculatus is included
A. luciae
A. roquet
A. bonairensis
Root (attachment point for
A. oculatus) when cyt b data
for A. oculatus is excluded
A. griseus
A. richardi

Figure 1.3 (next page) Estimation of branch lengths for optimal parsimony tree from data of Giannisi et al. (2000) obtained using maximum likelihood and HKY model (Hasegawa et al., 1985) with rate heterogeneity (Yang, 1996).

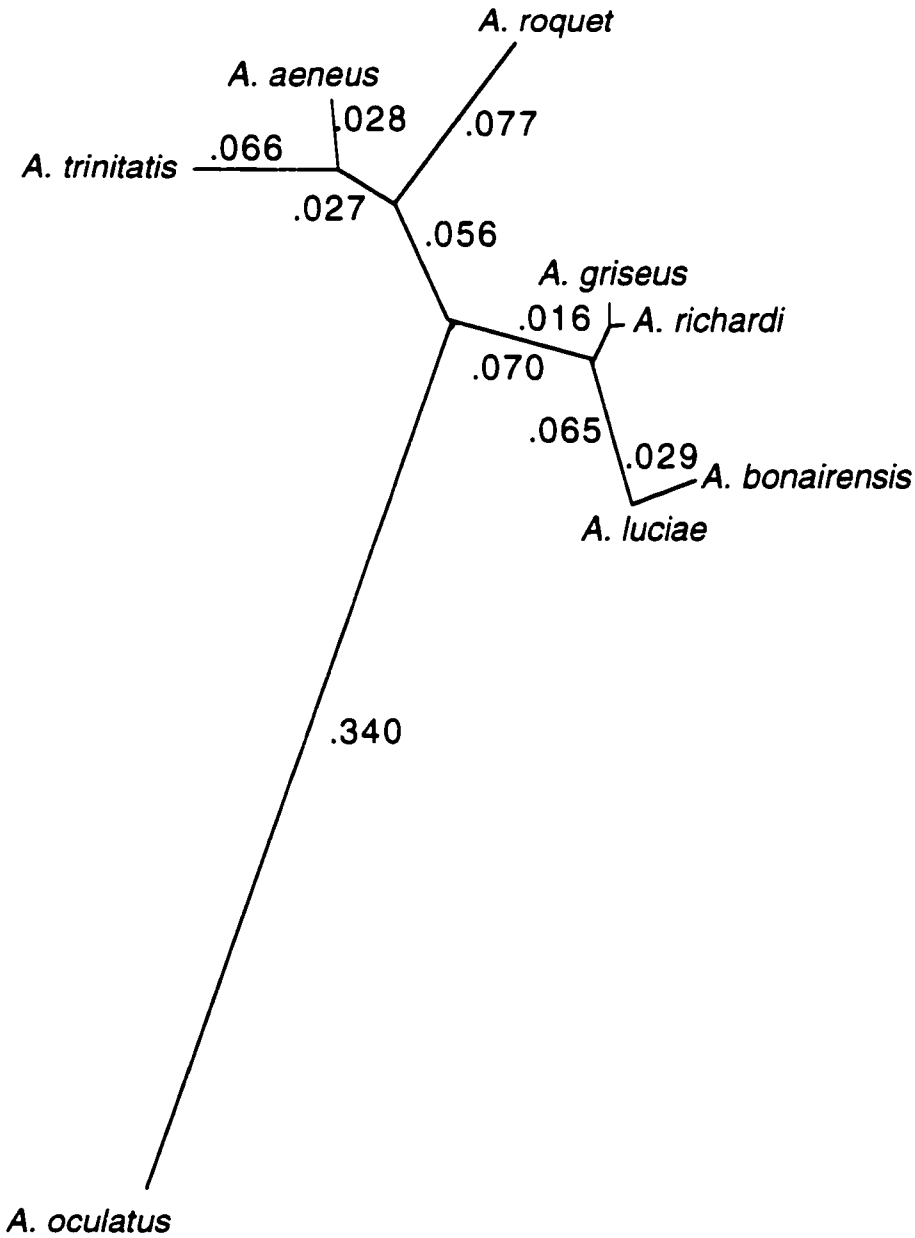
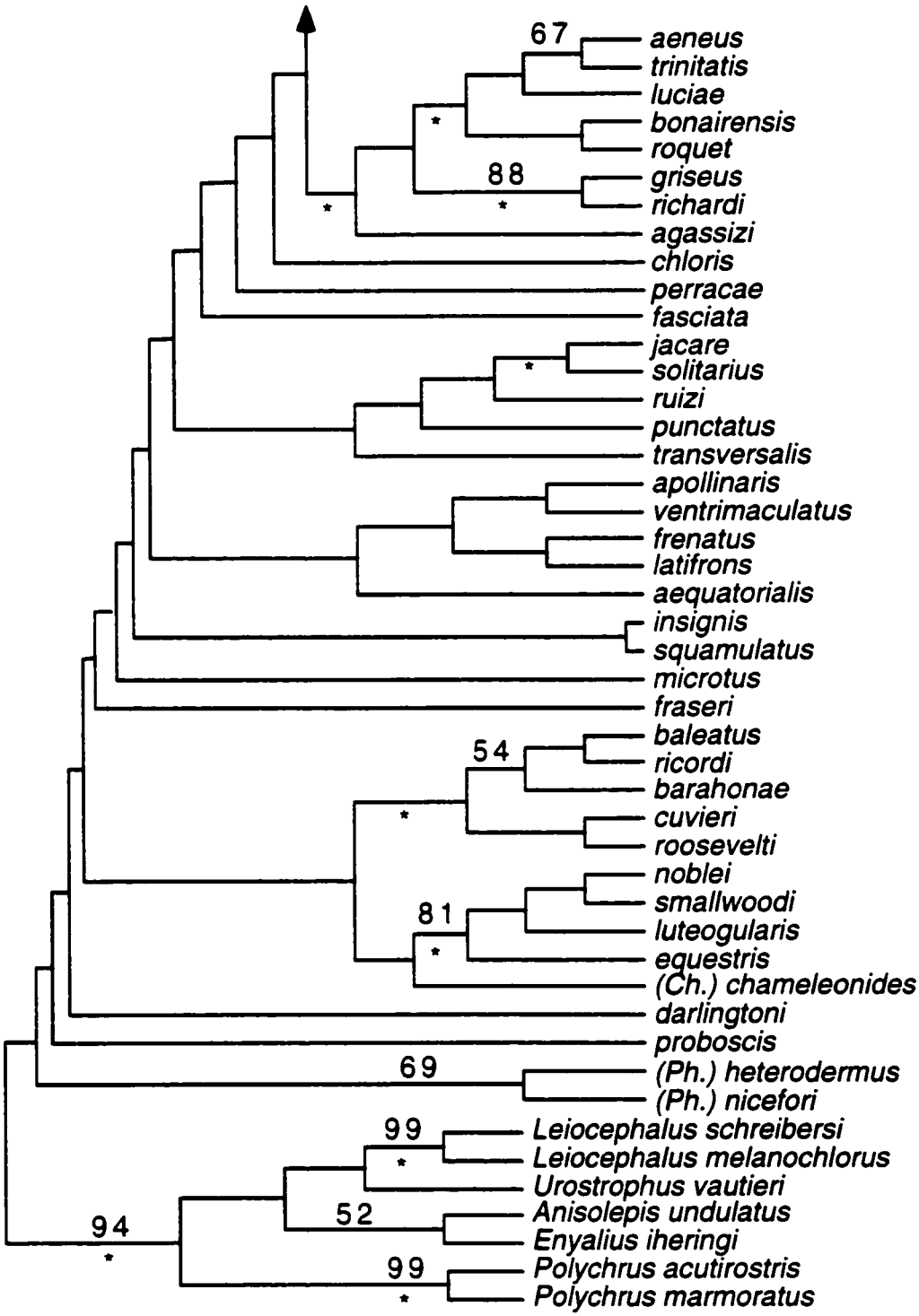
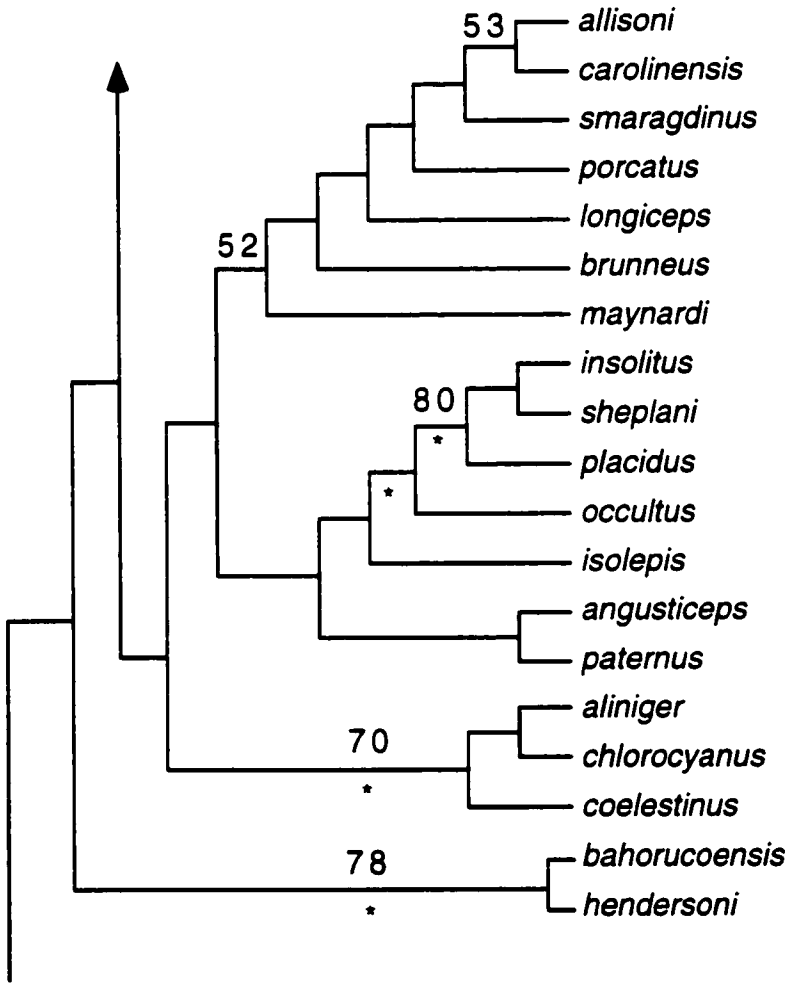
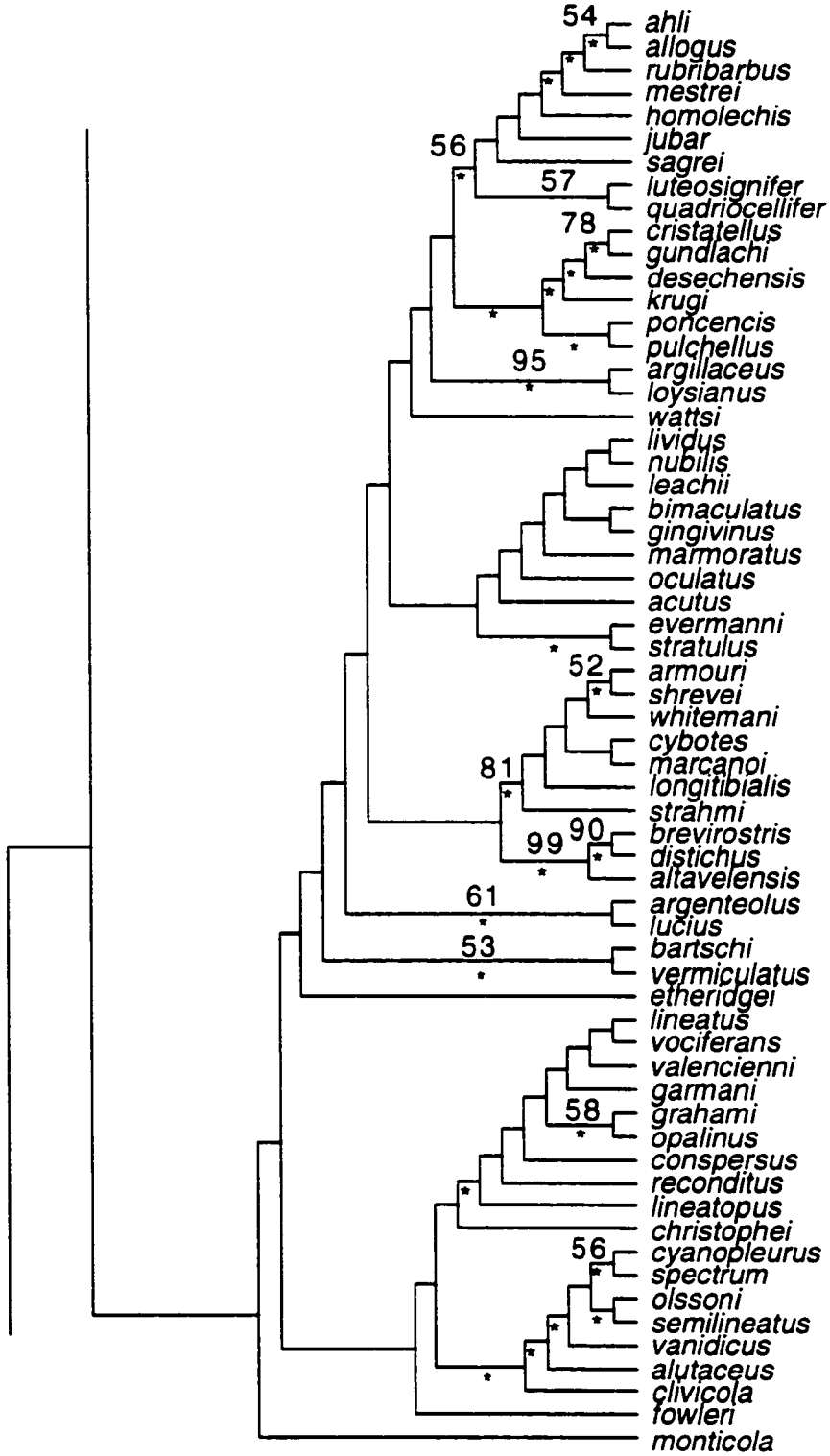

A. roquet
A. aeneus
.028
.077
A. trinitatis
.066
.027
.056
A. griseus
.016
A. richardi
.070
.065
.029
A. bonairensis
A. luciae
.340
A. oculatus

Figure 1.4 (next six pages) Optimal tree from parsimony analysis of morphological data. Numbers above clades are bootstrap values. Asterisked clades appear in trees up to one step longer than the optimal length.


67
88
54
81
69
99
52
94
99
aeneus
trinitatis
luciae
bonairensis
roquet
griseus
richardi
agassizi
chloris
perracae
fasciata
jacare
solitarius
ruizi
punctatus
transversalis
apollinaris
ventrimaculatus
frenatus
latifrons
aequatorialis
insignis
squamulatus
microtus
fraseri
baleatus
ricordi
barahonae
cuvieri
roosevelti
noblei
smallwoodi
luteogularis
equestris
(Ch.) chameleonides
darlingtoni
proboscis
(Ph.) heterodermus
(Ph.) nicefori
Leiocephalus schreibersi
Leiocephalus melanochlorus
Urostrophus vautieri
Anisolepis undulatus
Enyalius iheringi
Polychrus acutirostris
Polychrus marmoratus


53
allisoni
carolinensis
smaragdinus
porcatus
longiceps
52
brunneus
maynardi
insolitus
80
sheplani
placidus
occultus
isolepis
angusticeps
paternus
aliniger
70
chlorocyanus
coelestinus
78
bahorucoensis
hendersoni


54
ahli
allogus
rubribarbus
mestrei
homolechis
jubar
sagrei
56
57
luteosignifer
quadriocellifer
78
cristatellus
gundlachi
desechensis
krugi
poncencis
pulchellus
95
argillaceus
loysianus
wattsi
lividus
nubilis
leachii
bimaculatus
gingivinus
marmoratus
oculatus
acutus
evermanni
stratulus
52
armouri
shrevei
whitemani
cybotes
marcanoi
81
longitibialis
strahmi
99
90
brevirostris
distichus
altavelensis
61
argenteolus
lucius
53
bartschi
vermiculatus
etheridgei
lineatus
vociferans
valencienni
garmani
58
grahami
opalinus
conspersus
reconditus
lineatopus
christophei
56
cyanopleurus
spectrum
olssoni
semilineatus
vanidicus
alutaceus
clivicola
fowleri
monticola

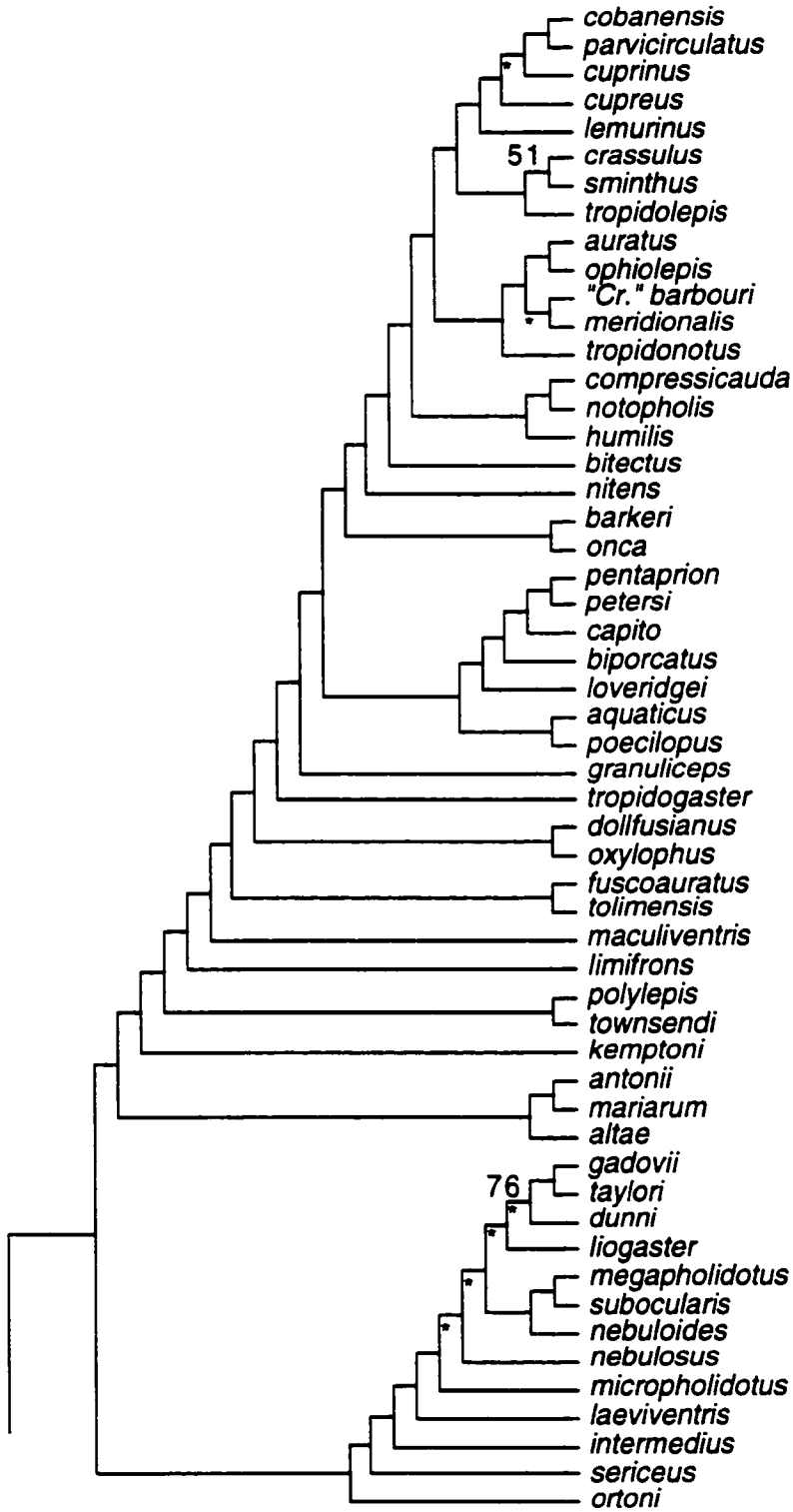
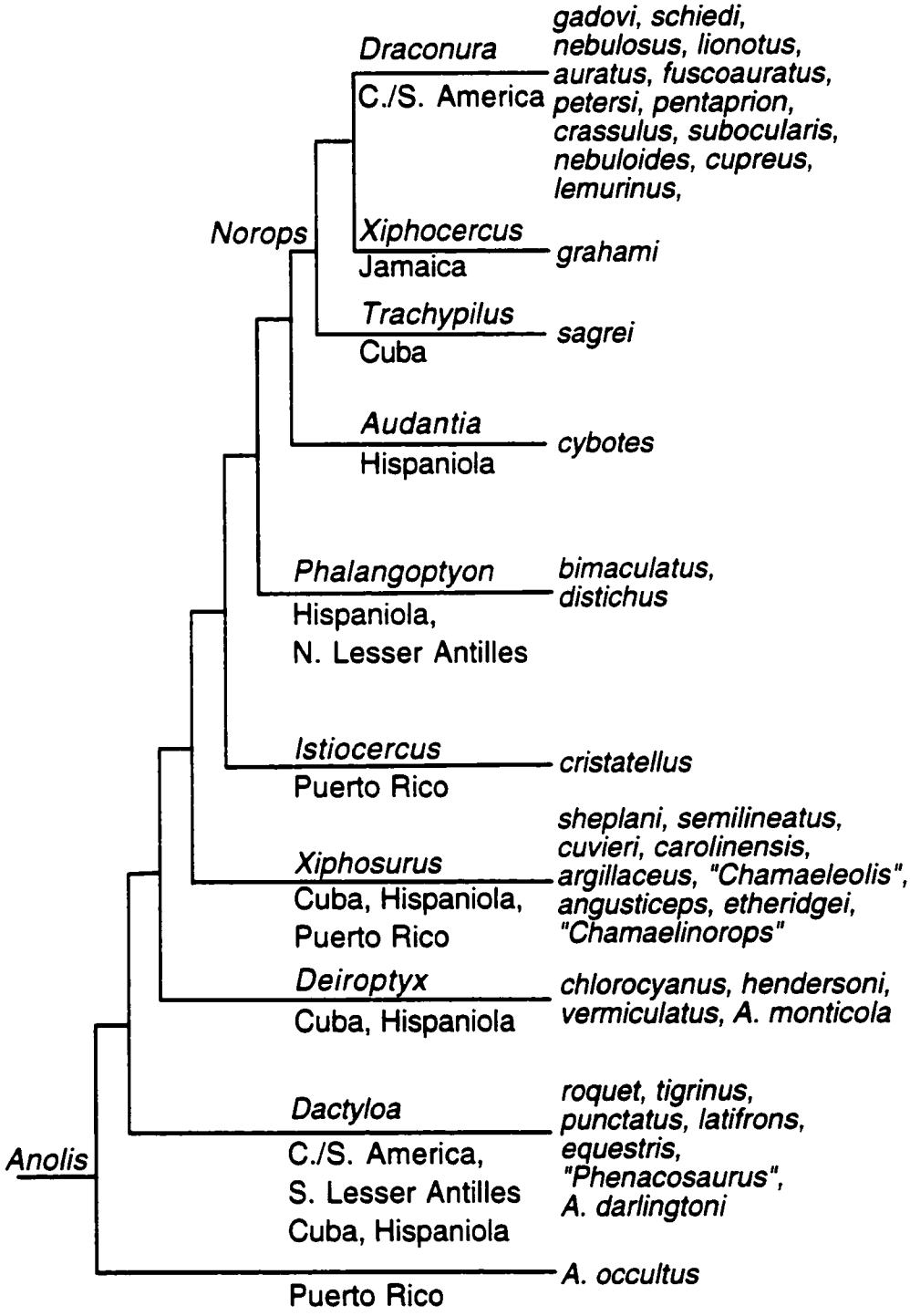

cobanensis
parvicirculatus
cuprinus
cupreus
lemurinus
51
crassulus
sminthus
tropidolepis
auratus
ophiolepis
"Cr." barbouri
meridionalis
tropidonotus
compressicauda
notopholis
humilis
bitectus
nitens
barkeri
onca
pentaprion
petersi
capito
biporcatus
loveridgei
aquaticus
poecilopus
granuliceps
tropidogaster
dollfusianus
oxylophus
fuscoauratus
tolimensis
maculiventris
limifrons
polylepis
townsendi
kemptoni
antonii
mariarum
altae
gadovii
76
taylori
dunni
liogaster
megapholidotus
subocularis
nebuloides
nebulosus
micropholidotus
laeviventris
intermedius
sericeus
ortoni

Figure 1.5 (next page). Summary of phylogenetic taxonomy of anoles based on results of combined analysis of all data. Names above clades are node-based names for each group. Geographic distribution of of each taxon is shown below each clade. Names at tips of branches are species groups included in each taxon.


Draconura
C./S. America
gadovi, schiedi, nebulosus, lionotus, auratus, fuscoauratus, petersi, pentaprion, crassulus, subocularis, nebuloides, cupreus, lemurinus,
Norops
Xiphocercus
Jamaica
grahami
Trachypilus
Cuba
sagrei
Audantia
Hispaniola
cybotes
Phalangoptyon
Hispaniola,
N. Lesser Antilles
bimaculatus, distichus
Istiocercus
Puerto Rico
cristatellus
Xiphosurus
Cuba, Hispaniola,
Puerto Rico
sheplani, semilineatus, cuvieri, carolinensis, argillaceus, "Chamaeleolis", angusticeps, etheridgei, "Chamaelinorops"
Deiroptyx
Cuba, Hispaniola
chlorocyanus, hendersoni, vermiculatus, A. monticola
Dactyloa
C./S. America,
S. Lesser Antilles
Cuba, Hispaniola
roquet, tigrinus, punctatus, latifrons, equestris, "Phenacosaurus", A. darlingtoni
Anolis
Puerto Rico
A. occultus

Chapter 2: Taxon Sampling, Long Branch Subdivision, and Accuracy of Phylogenetic Methods

Methods for reconstructing evolutionary history are sensitive to the number and position of taxa included in the analysis (e.g., Gauthier et al., 1988; Hendy and Penny, 1989; Lecointre et al., 1993; Poe, 1998). Figure 1 illustrates this phenomenon using parsimony analyses of a sample of four species from a large matrix or morphological and molecular data for *Anolis* lizards (chapter 1). Any of the three possible relationships for these species can be obtained by including appropriate additional species in the same analysis. In addition to demonstrating the instability of results relative to taxon sampling, this example shows conclusively that adding taxa may be beneficial to the accuracy of a phylogenetic analysis, and that adding taxa also may be detrimental to accuracy. Even though we do not know which of these three trees is the true tree, we can assume that one of them is correct and two of them are wrong. Because we do not know which tree is the true tree, the three trees in figure 1 must be considered together for this demonstration to be valid.

It might be thought that the sensitivity to taxon sampling shown in figure 1 is restricted to certain methods or only to poorly supported trees. Unfortunately this is not the case, as shown in the example in Fig. 2. These trees were reconstructed using the mitochondrial DNA sequence data of Jackman et al. (1999) for *Anolis* lizards. Tree 2A is obtained when these taxa are analyzed alone using maximum likelihood and minimum

evolution under relatively complex models and using parsimony with equal weights for all character changes. Tree 2B is obtained using these same methods but running the analyses including three other lizard species. This comparison shows that sensitivity to taxon sampling may occur even with strongly supported trees and diverse methods of estimation (and shows that high bootstrap methods and strongly-supported congruence between methods are not necessarily predictors of accuracy--both of these "data sets" obviously have the same history [that is, biological explanations for incongruence like lineage sorting can be excluded], and both trees cannot be correct).

The above examples show the potentially extreme sensitivity of phylogenetic methods to taxon sampling (see also Poe, 1998), but they are of little help in devising a taxon sampling strategy for maximizing the accuracy of a phylogenetic analysis. Given that a researcher is interested in the relationships of a particular subset of taxa in a clade, is it better or worse to include additional taxa in the analysis? Clearly, simply including more taxa without additional character information can be detrimental to accuracy, as more characters are needed to resolve a greater number of nodes. However, adding more taxa adds information about evolutionary history (e.g., Gauthier et al., 1988), which seems likely to have a positive effect on accuracy. Given these potentially countervailing effects, what is the best taxon-sampling strategy for maximizing the accuracy of phylogenetic analyses?

In order to answer this question, we must examine the conditions under which phylogenetic methods have difficulty reconstructing relationships correctly. Felsenstein (1978) showed that parsimony and compatibility methods are prone to error when phylogenies include long, unbranched lineages (due, e.g., to rapid evolution or lack of speciation over a very long period of evolutionary time). Other methods have since been shown to exhibit this same property, albeit to differing degrees (e.g., Huelsenbeck and Hillis, 1993). This difficulty in reconstructing trees with long branches occurs because long branches tend to accumulate many convergent changes that may be interpreted as homologous changes by a phylogenetic method. Such branches will tend to be grouped together regardless of true evolutionary relationship (thus the maxim, "long branches attract").

Because long branches clearly are detrimental for accuracy under at least some conditions, a beneficial sampling strategy might be to attempt to include additional taxa that subdivide long branches, assuming that such taxa can be identified (Hendy and Penny, 1989; Hillis, 1998). This strategy has been evaluated for the parsimony method by Graybeal (1998) and by Poe and Swofford (1999). Graybeal fulfilled Hendy and Penny's (1989) prediction that long branch subdivision can have a strong beneficial effect on the accuracy of estimation of four-taxon trees in the "Felsenstein Zone" of two long opposing branches and a short internal branch (Fig. 3C). Poe and Swofford (1999) examined a wider range of model trees and discovered several conditions of the kind discussed by Zharkikh and Li

(1993) under which long branch subdivision was detrimental for accuracy. In both the Graybeal and Poe and Swofford simulations, the most densely sampled trees were estimated correctly. In general, then, sampling taxa as densely as possible seems to be a prudent strategy for maximizing accuracy of the parsimony method, but it is difficult to judge whether long branch subdivision is beneficial in a particular case.

The taxon sampling strategy of long-branch subdivision (LBS) has not been examined for methods other than parsimony. Poe and Swofford (1999) suggested that phylogenetic methods that take branch lengths into account are less likely to be affected by the problems of long branch subdivision that afflicted the parsimony method in their paper. Thus, adding taxa may be beneficial or at least unaffecting in all cases for these methods, rather than just in the restricted case of the Felsenstein Zone. The aim of this chapter is to test this contention using the methodology of Poe and Swofford (1999). I use computer simulations of phylogenetic data to analyze the effect of adding taxa to subdivide long branches on results of distance, likelihood, and parsimony methods.

METHODS

All simulations were performed using the simulation module of PAML (Evolver; Yang, 2000). All analyses were performed on PAUP (Swofford, 2000).

I created four-taxon model trees with a short internal branch (0.05 expected changes per character) and external branches of two types: long

(0.5 expected changes) and short (0.1 expected changes). All (five) possible trees with at least one long external branch were analyzed (Figure 3). To evaluate the effects of including taxa to subdivide long branches, model trees also were created where a very short-branched (length = 0.00001) taxon was added to subdivide one or more long branches on the five four-taxon trees. All (15) possible ways to subdivide long branches were analyzed. Taxa were added to subdivide the long branch at a distance of 0.1 from the node. This distance was used rather than bisection because some of the results of Poe and Swofford (2000) suggest that taxa included nearer to the node may have a greater effect on accuracy (and see below).

Nucleotide sequence data were simulated on these trees using the model of Jukes and Cantor (1969) with rate heterogeneity (Yang, 1994). This model assumes equal equilibrium base frequencies and equal probabilities of change between states. Rates of change of characters are distributed according to a gamma distribution with shape parameter 0.25 and values chosen from the mean values of each quartile of the distribution (Yang's "discrete gamma"). The parameter value of 0.25 gives a wide variety of rates, with some characters changing multiple times and others not changing at all. Data sets of 2000 characters were created for each of the 20 trees.

Resulting data sets were analyzed with four methods: 1) maximum likelihood (Felsenstein, 1981) using the true model (called MLT), 2) maximum likelihood using the Jukes-Cantor model but assuming no rate

heterogeneity (MLJC), 3) minimum evolution (Kidd and Sgaramella-Zonta, 1971; Rzhetsky and Nei, 1992) using Jukes-Cantor distances with rate heterogeneity assuming the correct parameter value (MET), 4) minimum evolution using Jukes-Cantor distances but assuming no rate heterogeneity (MEJC), 5) maximum parsimony with all character changes weighted equally (MP; Cavallis-Sforza and Edwards, 1967; Fitch, 1971).

Accuracy was judged by whether the original four-taxon tree was reconstructed correctly, regardless of the position of other taxa (if the correct tree was among two or three optimal trees in a given replicate, the fraction of correct optimal trees was counted). Results were summarized in two ways. First, the accuracy of reconstruction for each method on each model tree was recorded for 100 replicate simulations. This approach gives a measure of the absolute ability of the phylogenetic method to recover the four-taxon relationships. Second, accuracy of estimation with and without including taxa to subdivide long branches was evaluated by comparing the performance of each method on individual simulated data sets. Five-hundered data sets were simulated on the most densely sampled model trees (Trees 3B, 3E, 3N, 3T), and each of these data sets was analyzed with all taxa included and with each of the subsamples of taxa shown in figure 3. For each simulated data set, pairwise comparisons were made between the four-taxon tree (Trees 3A-3E) and the possible LBS trees. For a given comparison (e.g., between tree 3A and tree 3B using maximum parsimony), there are 500 pairs of accuracy values. For each such pair, there are four possibilities--both trees

correct, both trees wrong, unsubdivided tree correct and more densely sampled tree wrong, unsubdivided tree wrong and more densely sampled tree correct. I assigned a value of one if the four-taxon tree was reconstructed correctly and zero if not, and performed a sign test (Arbuthnott, J. 1701) to judge whether one of the latter two possibilities occurred more often than would be expected just due to chance. This test thus evaluates whether including taxa to subdivide long branches has a significant effect on accuracy for these model trees.

RESULTS

Results are summarized in figure 3. Accuracy of parsimony was improved by long branch subdivision in nine cases, worsened in three cases, and unaffected in three cases. Accuracy of MLT improved in 14 cases and was never worsened. In one case where the initial four-taxon tree was estimated with high accuracy (95%), accuracy of MLT was unaffected. Accuracy of MET also never was worsened by long branch subdivision. Long branch subdivision improved the performance of this method in 12 cases and had no effect in three cases. The performances of MLJC and MEJC were similar to that of parsimony. Accuracy of MLJC was improved in 10 cases, worsened in two cases, and unaffected in three cases. Accuracy of MEJC was improved in eight cases, worsened in three cases, and unaffected in four cases.

DISCUSSION AND ADDITIONAL EXPERIMENTS

Comparisons with previous studies: Parsimony results

Observed effects of long branch subdivision for the parsimony method generally were consistent with the results obtained by Hendy and Penny (1989), Graybeal (1998), and Poe and Swofford (1999). Accuracy was improved by adding taxa to the long branches in the Felsenstein Zone (Figs. 3D, 3E). And, accuracy of trees similar to those examined by Poe and Swofford (1999) was found to be worsened by long branch subdivision (Figs. 3K, 3M, 3R). The explanation for the improvements in accuracy is that "breaking" long branches lessens the number of long branches in the tree such that spurious attraction is weakened or eliminated (Hendy and Penny, 1989). Decreases in accuracy are caused when breaking branches essentially creates a Felsenstein Zone in a tree where biases were relatively balanced before LBS (Zharkikh and Li, 1993; Poe and Swofford, 1999).

Although results were generally similar, two trees where accuracy of the parsimony method was improved by LBS are similar to trees that Poe and Swofford (1999) found to be worsened by LBS. Poe and Swofford (1999: Fig. 3c) found the accuracy of estimation for trees similar to trees 3L and 3S to be worsened by LBS, whereas in this paper the accuracy of estimation for these trees was improved by LBS. What is the cause of this discrepancy?

Differences between this study and Poe and Swofford include a different simulation program (Swoffordinator in Poe and Swofford [1999]), a different number of possible states per character (two in Poe and Swofford [1999]), a different number of characters per simulation (5000 in Poe and Swofford [1999]), a different principal measure of accuracy (consistency in Poe and Swofford [1999]), a different model for evolving data (no rate-heterogeneity in Poe and Swofford [1999]), and slightly different branch lengths for evaluated trees. Certainly all of these factors had some effect on the results of analyses performed here. However, figures 1b and 1c of Poe and Swofford (1999) suggest that the position of the included taxa (i.e., relative branch lengths) is a prime determinant of response to LBS. In particular, response to LBS appears stronger for taxa added closer to the node. This phenomenon alone is fairly intuitive--one would expect that taxa added near the tips of a tree would have little effect on results. However, the consequences of this phenomenon may be less obvious. Below I use additional computer simulations to show how this phenomenon can explain the discrepancy in results between this paper and Poe and Swofford (1999).

Figure 4A shows the effects of including a single taxon at different branch lengths from the node of the Felsensteing Zone tree. Clearly, including a taxon near the node (up to a point) has the strongest effect, and this effect is weakened nearer to the branch tip. Because the Felsenstein Zone tree is an extremely difficult four-taxon tree to estimate

correctly (e.g., Huelsenbeck and Hillis, 1993), almost all of these locations for LBS will improve the probability of correct estimation.

The situation is different, however, for trees that are not so clearly difficult to reconstruct. Figure 4B shows the effect of including a pair of taxa at various locations along the long opposing branches in the tree of Figure 3I (this is one of the trees where different results were obtained by this study and Poe and Swofford [1999]). If taxa are included near the base of the tree, accuracy is decreased. If taxa are included at more distal locations, accuracy is increased. These changes can be explained in terms of changes in the degree of long branch attraction in the tree. When all long branches are undivided in tree 3I, taxa A, C, and D attract each other equally but the homologous signal in the interior branch keeps taxon A separate from taxa C and D. But, when taxa are added near the nodes of taxa C and D, the undivided long branch A still attracts to C and D strongly, while spurious attraction between sister taxa C and D is lessened because both these branches have been shortened. Thus, A joins with C or D more often than before and accuracy is decreased. When taxa are added more distally, C and D are shortened enough so that A is no longer as attracted to them. In this case, A is the only long branch in the tree and the homologous signal in the interior branch is enough to keep it in its correct place (see e.g. tree 3A). If taxa are added very near to the tips, the tree begins to resemble its undivided form, and accuracy is accordingly unaffected.

Thus, the apparent discrepancy between the results of this paper and those of Poe and Swofford (1999) can be explained as a consequence of slight differences in the branch lengths of the model trees. More important than this explanation, however, is the discovery that not only does the magnitude of change in accuracy depend on the placement of the included taxon, but whether LBS helps or harms can depend on this placement as well.

Results with maximum likelihood and distance methods

Not surprisingly, the responses of the likelihood and distance methods to LBS depend on whether the assumptions of these methods match the processes that produced the data. If the assumptions of the method are met, as in MLT and MET, performance is always relatively good (although in cases where long adjacent branches are present, more biased methods perform slightly better [see Yang, 1996, 1997]). Adding taxa to subdivide long branches improves the performance of these methods in all cases of four-taxon trees that are difficult to estimate (trees 3C, 3F, 3I, 3O), and never degrades performance. Thus, if the model is a good enough approximation to the data, adding taxa to subdivide long branches seems to be a generally beneficial strategy.

Of course, the model never perfectly describes the data, and in many cases the model is an inadequate description of the data (inadequate in the sense that an incorrect tree is obtained because the assumptions of the model are so severely violated). The MLJC and MEJC methods were

included here to assess the effect of wrong models on the results of an LBS strategy. There are several cases where LBS increases accuracy of MLJC and MEJC. However, trees 3K, 3M, and 3R demonstrate that the performance of these methods, like that of MP, also can be degraded by LBS. Thus, even with methods that correct for multiple changes along branches, the LBS strategy is not a panacea for reconstructing difficult phylogenetic trees.

In general, results from the wrong-model methods are similar to those with MP. The three trees for which LBS degrades the performance of MEJC are the same trees for which the performance of MP is degraded, and the two trees for which LBS degrades the performance of MLJC are also trees for which LBS degrades the performance of MP. The similarity in performance of these methods occurs because, in spite of the different underlying foundations of parsimony, likelihood, and distance methods, all of these methods (with a few exceptions) tend to have similar biases when their assumptions are not met. Specifically, phylogenetic methods tend to group branches that have undergone much evolutionary change (e.g., Huelsenbeck, 1995).

In order to illustrate this shared bias using MP and MLJC as an example, I performed simulations on trees of four taxa with a zero-length interior branch ("star trees") and external branches of variable length (see Bruno and Halpern, 1999). There is no phylogenetic information in star trees, so any preference for a particular estimated tree must be due to a bias of the method.

Model trees were constructed using the external branch lengths 0.05, 0.2, 0.4, 0.6 and 0.75. All 120 (see Appendix) distinct four-taxon trees with interior branch length = 0.0 and exterior branches of length 0.05, 0.2, 0.4, 0.6, and 0.75 were evaluated. Data were simulated on model trees according to the substitution model of Hasegawa et al. (1985) with rate heterogeneity distributed across sites according to a gamma distribution (Yang, 1994). This model (called HKY + G) requires specification of transition-transversion rate ratio (5:1 in this study), equilibrium base frequencies (T=0.1, C=0.2, A=0.3, G=0.4), and a shape parameter for the gamma distribution (a=0.5, using discrete approximation with four rate categories and mean values for each category; Yang, 1994). For each model tree, 1000 data sets of 500 sites were created using the above parameter values.

Model trees were analyzed using MP, MLJC, and MLT (likelihood assuming the true model that generated the data). The general procedure was to 1) generate four-state character data on model (star) trees according to the HKY + G(0.5) model, 2) estimate the relationships of the four taxa using MP, MLJC, and MLT, and 3) compare the estimated trees to a reference topology. This reference topology was assumed to be the relationships that would be present in the model tree if the middle branch had nonzero length. The percentage of simulations for which this reference tree is estimated is the bias score for each method. If multiple optimal trees are recovered, the score for that replicate is the fraction of those trees that is the reference tree. A score of 1/3 indicates that the

method is unbiased because an unbiased method will choose each of the three possible resolved trees with equal probability (or will deem all three to be equally optimal). Scores greater than 1/3 indicate bias in favor of the "true" tree and scores less than 1/3 indicate negative bias (see Bruno and Halpern, 1999). Methods that are biased in the same way (e.g., that tend to group long branches together) will tend to select the same wrong tree.

Figure 5A shows a comparison of bias scores for MLJC and MP. The almost perfectly linear relationship indicates that these methods tend to choose the same trees with the same degree of bias, at least under the conditions simulated here. The slight sigmoid appearance of the curve suggests that MP is slightly more biased than MLJC (e.g., Huelsenbeck and Hillis, 1993); that is, MP tends to choose a (incorrect) tree slightly more often than does MLJC. For comparison, the bias of likelihood assuming the true model also was compared to that of MP. Figure 5B shows that MLT is unbiased even under conditions of extreme branch length inequality. For example, MLT chooses each tree with probability 0.33 even in cases where MP favors a tree with probability of 1.0. These simulations demonstrate that there is no phenomenon of "long branch repulsion" (Siddal, 1998) in ML. The likelihood method, like other methods, is unbiased when its assumptions are met and biased towards joining long branches when its assumptions are not met[1]

[1] There is at least one exception to this rule--if rate heterogeneity is suitably misestimated, long branch repulsion is possible (results not shown).

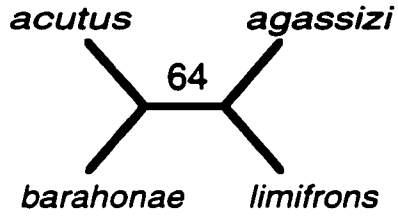
CONCLUSIONS AND RECOMMENDATIONS

Conclusions from this paper: 1) Including taxa that subdivide long branches can be beneficial or detrimental to the accuracy of phylogenetic analyses. Even likelihood and distance methods that correct for unobserved changes may be negatively affected by LBS. 2) If the assumptions of the method are met by the data, LBS will tend to increase accuracy, and will never decrease accuracy. 3) The distance to the node of the included taxon can have a strong effect on the results of LBS. In some cases, whether accuracy is increased or degraded may depend on the location of the included taxon. 4) Parsimony, likelihood, and distance methods are affected by LBS in similar ways. This similarity of response is due to shared biases of these methods.

In general, the recommendations of Hillis (1996) and the cautions of Poe and Swofford (1999) seem still to apply. Sampling taxa as densely as possible is upheld as an excellent strategy for improving the accuracy of parsimony, distance, and likelihood methods, even when the model of the method is not matched by the data (e.g., trees 3B, 3E, 3N, 3T). However, a more densely sampled tree should not necessarily be considered to be a better estimate than a less densely sampled tree, even with corrected distance and likelihood methods.

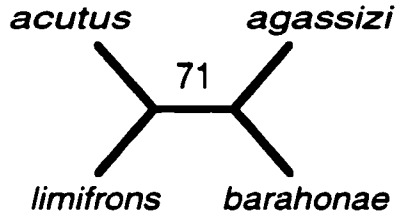
Figure 2.1. Maximum parsimony analyses of data from chapter 1. Trees A, B, and C depict estimates of the relationships of *Anolis acutus*, *A. agassizi*, *A. barahonae*, and *A. limifrons* when analyzed with or without additional taxa. Numbers are bootstrap values from 100 replicates.

A



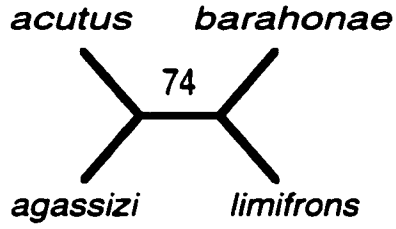
Tree estimated when this quartet is analyzed with *A. sagrei, A. cybotes, A. bimaculatus*

B



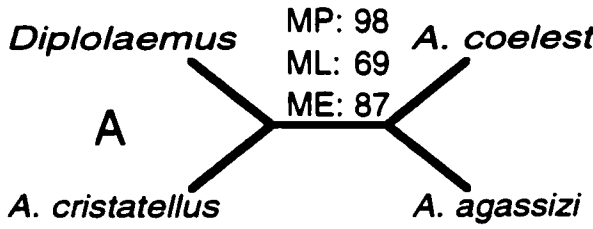
Tree estimated when this quartet is analyzed alone or with all 170 *Anolis* species

C

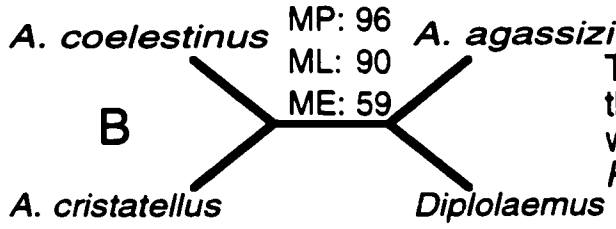


Tree estimated when this quartet is analyzed with *A. equestris, A. bartschi, A. latifrons*

Figure 2.2. Estimates of the relationships of *Diplolaemus darwini*, *Anolis coelestinus*, *A. cristatellus*, and *A. agassizi* using data of Jackman et al. (1999) and various phylogenetic methods when analyzed with (B) or without (A) additional taxa. Likelihood analyses were performed under the HKY model of DNA substitution, with rate heterogeneity. All parameter values were estimated from the data. Minimimum evolution analyses were conducted using HKY distances and allowing for rate heterogeneity. Numbers are bootstrap values from 100 replicates.



Tree estimated when this quartet is analyzed alone



Tree estimated when this quartet is analyzed with *A. acutus*, *A. aliniger*, *Polychrus acutirostris*

Figure 2.3. Results of simulation experiments of including taxa to subdivide long branches. Trees are true (not estimated) trees. A dot indicates to which branch a taxon was added. The box gives branch lengths of model trees and shows which accuracy values (listed to the right of each model tree) correspond with which methods. Numbers are percentage of times true four-taxon tree was recovered in 100 replicate simulations. Whether accuracy was increased , decreased, or unaffected was determined by pairwise sign tests using 500 replicate simulations of data on the most densely sampled trees (B, E, H, N, T) and comparisons between unsubdivided trees (A, C, F, I, O) and trees with additional taxa included (see text).

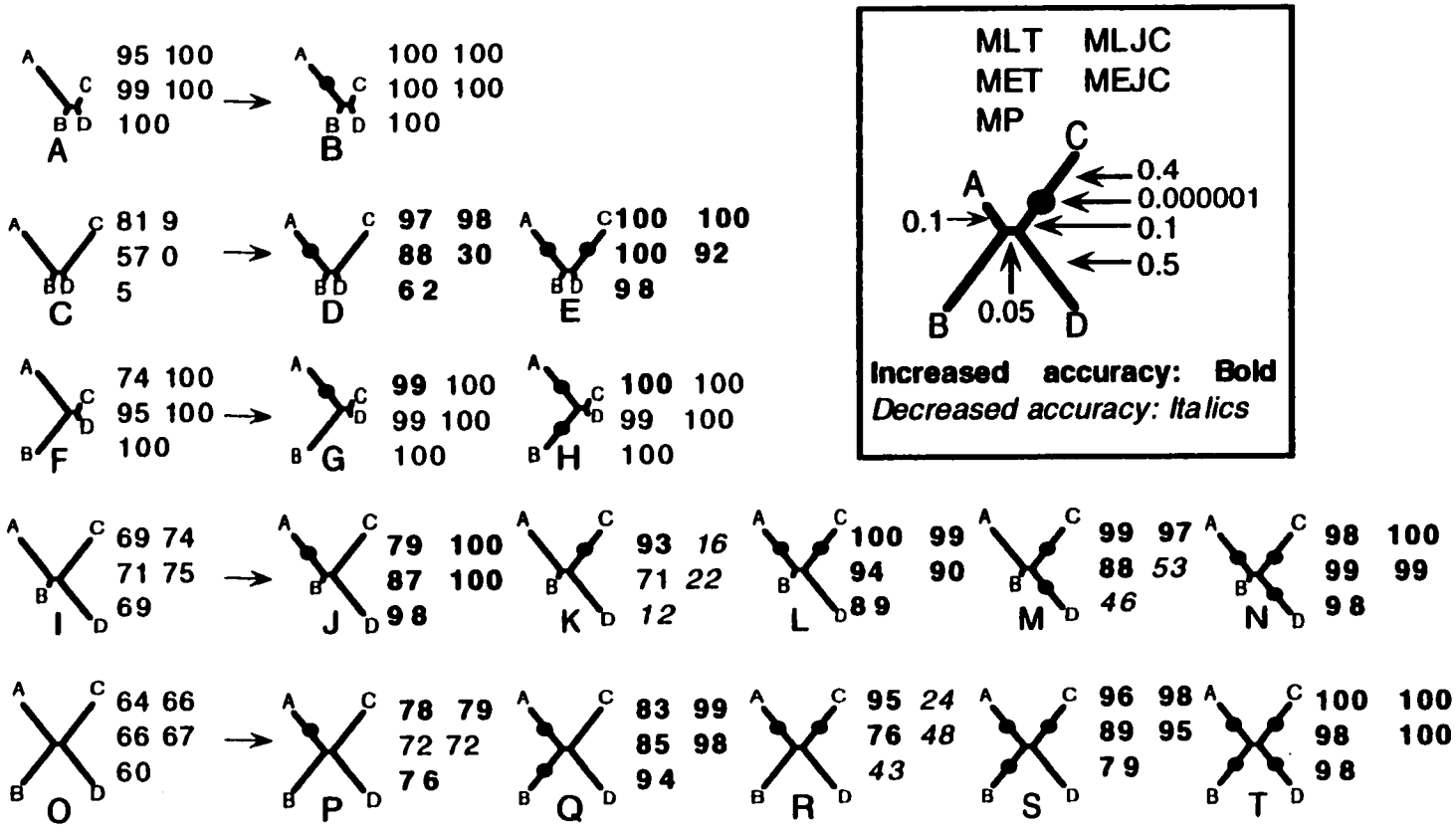

MLT MLJC
MET MEJC
MP
0.4
0.000001
0.1
0.1
0.5
0.05
Increased accuracy: Bold
Decreased accuracy: Italics
A 95 100 99 100 100
B 100 100 100 100 100
C 81 9 57 0 5
D 97 98 88 30 62
E 100 100 100 92 98
F 74 100 95 100 100
G 99 100 99 100 100
H 100 100 99 100 100
I 69 74 71 75 69
J 79 100 87 100 98
K 93 16 71 22 12
L 100 99 94 90 89
M 99 97 88 53 46
N 98 100 99 99 98
O 64 66 66 67 60
P 78 79 72 72 76
Q 83 99 85 98 94
R 95 24 76 48 43
S 96 98 89 95 79
T 100 100 98 100 98

Figure 2.4. Examples of the effect of location of an included taxon on accuracy of the estimate. A. Including a taxon near the node has a stronger effect than adding one near the tip of the branch. B. Subdividing long branches may be beneficial or detrimental for accuracy even for a given four-taxon tree. Here, adding taxa near the nodes degrades accuracy but adding taxa more distally increases accuracy.

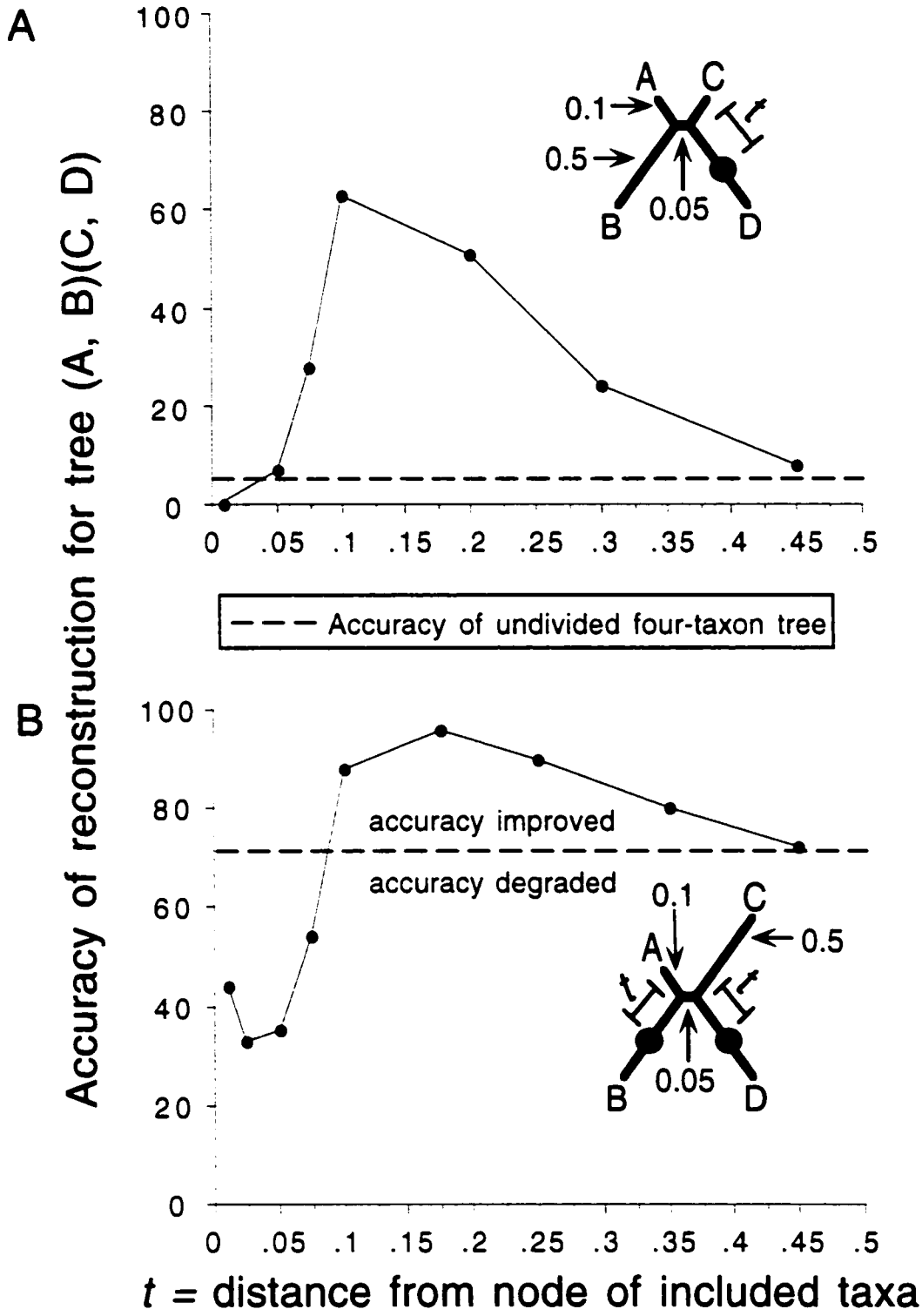

A
B
Accuracy of reconstruction for tree (A, B)(C, D)
100
80
60
40
20
0
0 .05 .1 .15 .2 .25 .3 .35 .4 .45 .5
A C
0.1
0.5
0.05
B D
t
Accuracy of undivided four-taxon tree
accuracy improved
accuracy degraded
0.1 C
A
0.5
0.05
B D
t = distance from node of included taxa

Figure 2.5. Comparison of the biases of MP, MLJC, and MLT. A. MP and MLJC are very similarly biased. These methods tends to select the same tree in the absence of phylogenetic information. B. MLT is unbiased.

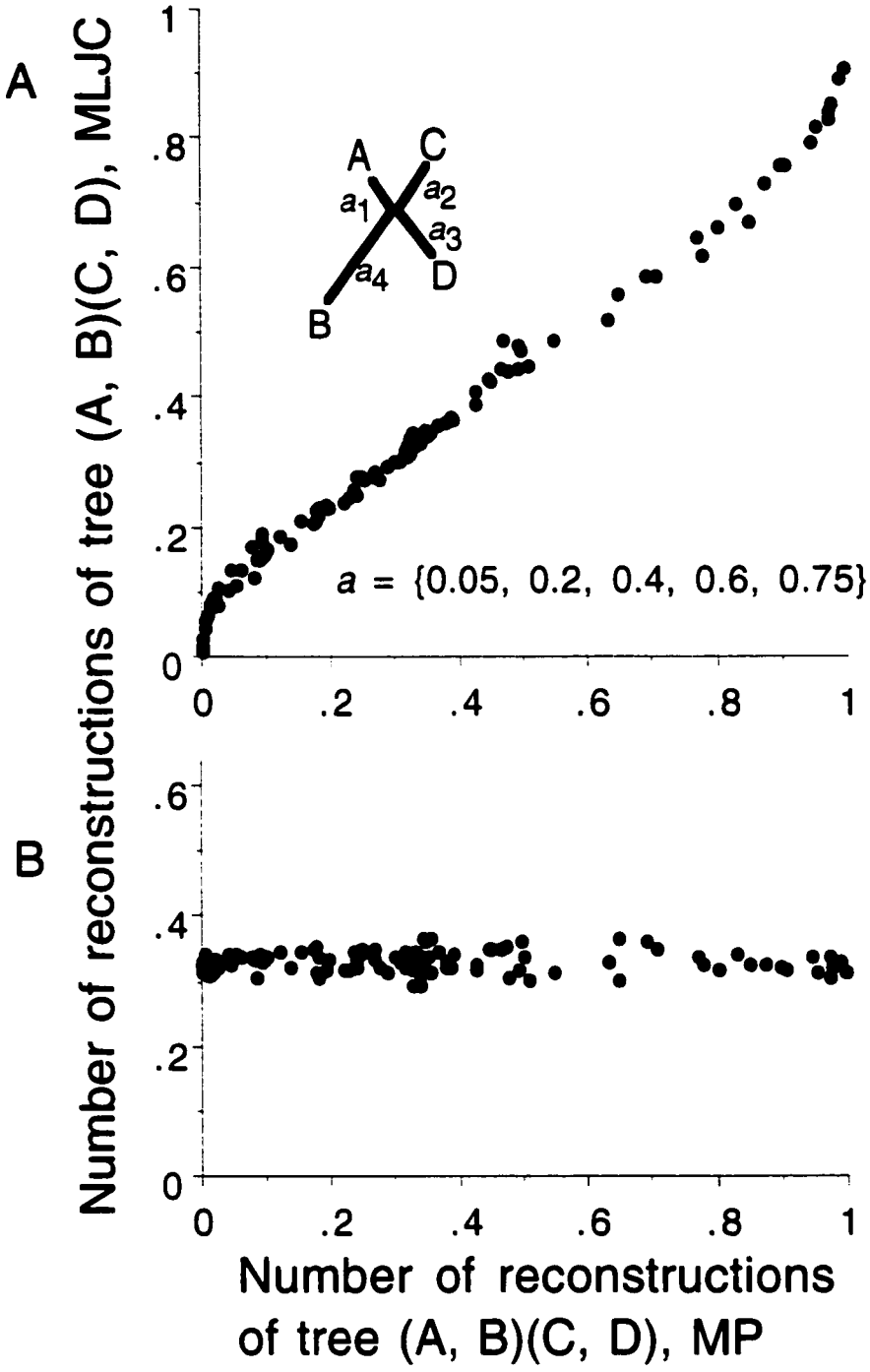
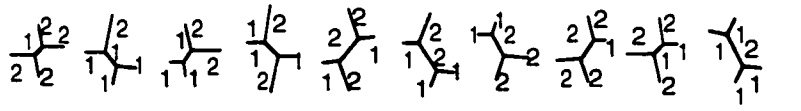
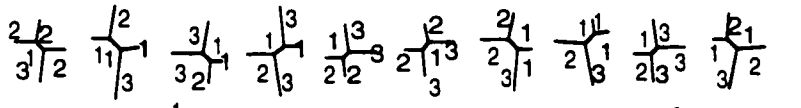

A
B
Number of reconstructions of tree (A, B)(C, D), MLJC
Number of reconstructions of tree (A, B)(C, D), MP
A
C
B
D
a_1
a_2
a_3
a_4
a = {0.05, 0.2, 0.4, 0.6, 0.75}
0
.2
.4
.6
.8
1

Figure 2.6. All possible combinations of branch lengths for a four taxon tree of (A) one, (B) two, (C) three, (D) four, or (E) five possible branch lengths.

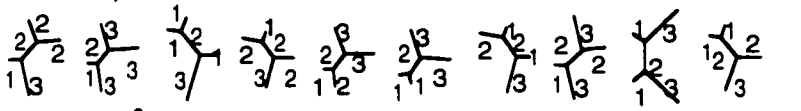
A

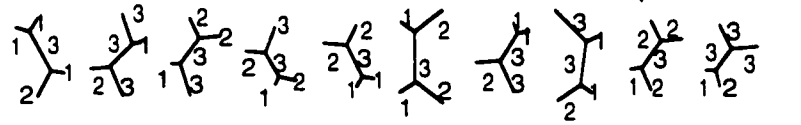
B

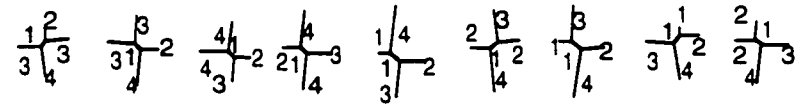


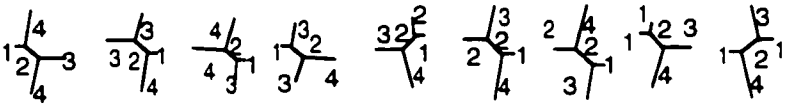


C

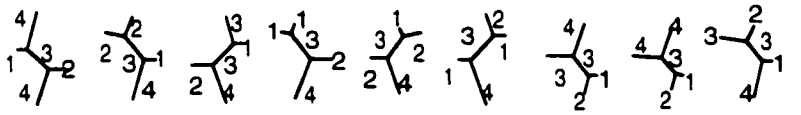


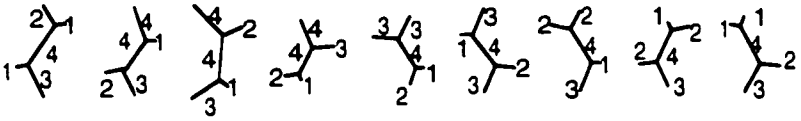




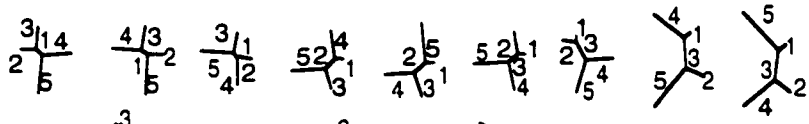


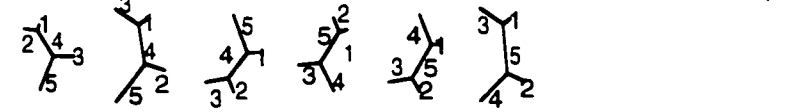
D





E





Appendix 1.1

SPECIMENS EXAMINED

The following specimens were examined for morphological characters. Not all characters were scored on all specimens. Acronyms are as follows: MCZ = Museum of Comparative Zoology, Harvard. USNM = National Museum of Natural History, Smithsonian Institution. UTEP = University of Texas at El Paso. UTA = University of Texas at Arlington. TNHC = Texas Memorial Museum. KDQ = field numbers of Kevin de Queiroz. REE = Private collection of Richard Etheridge. UMMZ = University of Michigan Museum of Zoology. All species listed are *Anolis* unless otherwise noted.

acutus 78929-30, 78934, 78938; MCZ 139194, 139202, 139209-10, s131556. aeneus: USNM 79162-4, 166641-4, 166648, MCZ 81290, 81293, s154140. aequatorialis: USNM 285994, 286298-9; MCZ 164440, 91830, 171148, s100507, s107699, s156811, s176457. agassizi USNM 22101, 22103, 22134; MCZ 130567-8, 130573, s27120, s18088. ahli: USNM 22728, 120742, 140476, s497942; MCZ 19905, 63678, 63681, s63677. aliniger MCZ 79343, 128208, 170725-7, 143370, 170721, s152346-7. allisoni USNM 138133, 138136, 138141, 172476, 335766, 337628-30, s26732, s213699; MCZ 26725, 60884, 60889. allogus USNM 220674, 220677, 220679, 220686, 335767-8, s220605; MCZ 63730, 63732-3, 8544, 63739. altae USNM 297705; MCZ 92930, 92932, 92934, 29385. altavelensis MCZ 45949, 79368, 79370-2, s45948, s79369. alutaceus USNM 337634-6, 337638, 194290; MCZ 42455-6, 93480, s21860. angusticeps

USNM 51847, 160920, 160922, 337640-1, 337644, 515896; MCZ 42317-8, 93455-7, 11146, s93354, s59245, s59248-50. antoni MCZ 58308, 156626, 166505, 166519, s160178. apollinaris MCZ 123975, 156308, s156308. aquaticus USNM 219547-8, 219548, 219550-1; MCZ 92901, 110571; 174135, s109968. argenteolus USNM 220695-6, 315895-7, s220611-2; MCZ 73966, 73968, 55808, 173627. argillaceus USNM 63225-6, 83929, 220700-1; MCZ 173783, 173888-9, s42528, s42559, s173782. armouri USNM 198558-9, 198561-2, 259363, 328981, 329119, s117204; MCZ 169767, 169772, 169776, 169780. auratus USNM 98897, 120566-8, 120570-1, 291131, 291185, 317869; MCZ s77430, s77448, s133473-5, s133480-1, s133483-4; TNHC 24132, 24139. bahorucoensis USNM 146616, 286871, 314283, 314288-91, s329000; MCZ A-93291, A-93295, s132831. baleatus USNM 193975, 193990, s329014, (one USNM skeleton of unrecorded number);MCZ 125630, 132356, 125630, 125632-3, s7831, s57114. barahonae USNM 259365, s259474-5; MCZ A-90263-4, A-90268, s173169. barbouri USNM 314427-8, 329277; MCZ 171030, 171042, 171052, s171839, s177862. barkeri MCZ 58221, 85008, 92103, s92103. bartschi USNM 252464, 335783-6, s252475-6; MCZ 44767, 44762, 44766, 44768. bimaculatus USNM 236180-3, 336060, 336063, 336068, 336070; MCZ 75469-70, 75472, 81298, s10380, s10401, s145813-4, s28717. biporcatus USNM 219885, 338186-7, 338189-90; MCZ 128511-2, 174134, 174438, s24396, s32206, s85556. bitectus USNM 285673, 285770; MCZ 151624, 154581, 151313, 151616, 151316, 151715, 151623-4, 154581, s15459, s176380. bonairensis 79260, 79263-4, 79267; MCZ 82981-2, 141508, 141512, s147324, s147335. brevirostris USNM 260253-7, 286874, 328554-328556, s259476; MCZ 128241, 128244-5, 128238; .

brunneus USNM 81649, 10957; MCZ 42042, 42044-5. s152529-30. capito USNM 298109, 342275, 342276, 342278; MCZ 133796-7, s132836, s132838, s132839. carolinensis USNM 131648-50, 17696, 286914-6, 315496; MCZ s57012, s57385, sPI, sPII, sPIII. chamaeleonides USNM 27497, 156786; MCZ 57933, 59331, 159586, s7895; REE s488. chlorocyanus USNM 239374, 329137, 260267-8, s259482; MCZ 62931, 62934, 59753, A-93137, A-93148, s62881, s62890. chloris USNM 124239, 285810, 285812, 285816, 285810-1; MCZ 14699, s101290, s119691, s164507. christophei USNM 161606, 260288-9, 329029-30, 329038; MCZ 107058, 125509-10, 125523, A-93189, s79352. chrysolepis USNM 162725, 162727-8, 162730-1, 288859, 321066-7; MCZ 65350, 152114, 152107, 65360, s16786. clivicola USNM 120749-50; MCZ 111205, 111209, 111219, 111224, s42458, s42462. cobanensis UTA 29428, 29760, 29762, 37594, 39944, s29428, s29760. coelestinus USNM 239376-7, 259373, 259376, 239376, 329048-9; MCZ 59802, 62878, 65595, A-93267, A-93270, s131572, s131574, s131994-5, s131999, s132000. s144795, s144780, s144780. compressicauda UTEP 7842, 7851, 7855, s7842, s7851. conspersus USNM 236614-6, s213687; MCZ 87424, 87416-7, 87408, 87421, 87423.. crassulus USNM 27626, 140284, 140286-7; MCZ s93675, UTA 7156, 29446, 29448-9, 39837. cristatellus USNM 86539-40, 115879, 314228, 314230, 327096-7; MCZ 57856, 96265, 96256, 96269,.s35673, s35678, s130048, s131583, s132018-9, s140247. cupreus USNM 74511-2, 342280, 342284-5; MCZ s129776, s15412; UTA 19804, 19896-8, 19907-8.. cuprinus 4974, 8269-70, s8269. cuvieri USNM 12448-9, 12495, 26843; MCZ 35971, 35974, 35977, s35979, s35981-7. cyanopleurus 63223, 83928, 220702, s220621; MCZ 42499,

42516, 120099, 12337, s42530, s177825. cybotes USNM 220910, 220913, 314318, 314321-2, 260384, 260399, 260411; MCZ s119698, s131601, s131605, s131297, s132864-5, s134012 . dollfusianus USNM 35675, 46880-1, 85675. darlingtoni USNM 286899; MCZ 38251, s173207. desechensis USNM 220943, 220948, 220966, 220964, 220977, s221709, MCZ 118862, ,161973-4, 161977, s118863, KDQ 1884, 1886. distichus USNM 250500, 259402, 259407-9, 260500, 260503, 314333-4; MCZ s142512, s152483, s152488, s152491, s140063, s140234, s140237, s142514, s145319, s142512. dollfusianus USNM 35674, 46880; UTA 19913, 19944, 19959, 19966, 19973, s19913, s19944. dunni MCZ 78696-7, 78720, 78726, s78699, s78701. equestris USNM 164272, 337647-8; MCZ 143902-4, 143908, s55630, s55633, s66843, s131609-10. etheridgei USNM 260330, 260532, 260519-20, 260545, s221831; MCZ 107034, 107048, 128282, s107037. evermanni USNM 48763, 286824, 304651-2, 327112, 327114; MCZ 148431, 148435, 148437, 148443, s132035, s132042. fasciatus USNM 142255, 286278; MCZ 143961, 151645, 154126, s147010, s1417012. fowleri USNM 194002-3; MCZ 125640, 135386, s135388, s166996. fraseri USNM 60521, 234610, 234612-13; MCZ 127689, 164608, 176453-4s107694, s147042. frenatus USNM 48954, 150094, 150096; 133839-40, s20609, s20611, s22296. fuscoauratus USNM 258138, 288868, 288874, 288876-7, 288882-3, 303477; MCZ 173950-1, 173953, 178321-2, 178326, s53248, s140041. gadovi MCZ 39707, 93669, s171206; UTEP 11839-40. garmani USNM 252142, 252460-1, 252130, 337569, 337572; MCZ s131620; TNHC 50091; KDQ s157. gingivinus USNM 315526, 315567-9, 315547, s315641, MCZ 75606, 75608, 75617, 75631. grahami USNM 337577-8, 337583-4; MCZ 175345, 175345-7, 175349, 52302,

s138508-11, s52305, s154134-5. granuliceps USNM 151603-5, 151631, 234695-6; MCZ 87247, 153157, 153159, 153167-8, s124808, s124816, s124818. griseus USNM 314519, 314536, 314542-3; MCZ 6164, 82926, 82929, s81333, s82009, s82013, s82927-8, s82931. gundlachi USNM 25600, 26900, 26902-3; MCZ 139557-60, 150968, s132057, s140265. hendersoni USNM 146619, 239393-4; MCZ 62956, 62960, 62965-6, s66037-8, s66056, s66030, s66042, s66045, s66050, s66069, s131628; RE s1491. heterodermus USNM 95922, 127100-1; MCZ 104409, 78519, 78522, s110133-8, s145325. homolechis USNM 220704, 220706, 315917, 315922, 315927, 315931, s26674, s317837; MCZ 63935, 63929-31, 63939. humilis USNM 244866, 338206, 338532-3, 338536-7, s319209, 338541-2; MCZ 128746, 128773, 128793, 177875, s131630. insignis USNM 347482; MCZ 15439, 347482, s15439. insolitus USNM 286903-4, 286885, 286888-9; MCZ 128303, 128306-7, 128311, s107015, s107017-8. intermedius USNM 75441, 80912, 165357-8; MCZ 109944-5, 110800, 171136, s16787. isolepis 42489, 45704, 74034-5. jacare MCZ 8079, 112097, s20639, s112096. jubar USNM 335797, 335800, 337659-60, s284467; MCZ 160638-9, 141466, 141474, s42478. kemptoni MCZ 46247, 50148, 165220, s165219. krugi USNM 304660, 327129, 327132, 336301-2; MCZ 150595, 150598-601, 162840-1, s132080, s132090. laeviventris USNM 84277-8, 2850, 175182, 175165, 224807, 344798, 344800-1.

latifrons USNM 124267-8, 161222, MCZ 77402, 77404, 77408, 77411, s77410, s77407. leachi USNM 509076-8, 521114-5, s224022; MCZ 16167, 75779, 82108, s75781. lemurinus USNM 220012, 266271-2, 266277, s319210, 338192-6; MCZ 55088, 133931, 174439, 174176, s?. limifrons USNM 330177,

338217, 338219, 338223, 338225, 338227-8, s313770, s319219; MCZ 92429, 92941, 92950, 92952-4; TNHC 32131, 34434. lineatopus USNM 83749, 83751, 233895, 252271, 252274, 252279, s244595; MCZ 73180-1, 52234, 175538; TNHC 24402. lineatus USNM 266290, 266292-3, 266296, s266292; MCZ 144611, 144613, 144615, 144625, s69532, s76644. liogaster USNM 304814-5, 304817; MCZ 85021-2, . lividus USNM 199004-5, 199007, 199010, 199014, 236477, s236515; MCZ 82023-5, s57383. longiceps USNM 8089, 65495-6; MCZ 16794, 16797-8, 16804, s29066, s16794. longitibialis USNM 259419, 314388-9; MCZ 128342, 132370, 151834, 151831, 151837, s31774. loveridgei USNM 344802-4; MCZ 38700, 38831, s38832. loysiana USNM 26690, 26695, 515908-10; MCZ 74036, 74038-40, 74046, s74041. luciae USNM 198828-9, 198831, 198858, 198860, 128831; MCZ 6173-4, 171329, 171335, s71691, s71796. lucius USNM 128117, 337664-6, 337669-70; MCZ 19917, 19920, 68029, 93483, s55801-3, s67990, s68012, s68014, s68020-22. luteogularis USNM 51841, 75811-4, 167301-2; MCZ 119385, 35507-9, s55576; KDQ s1842. luteosiginifer USNM 107946, 107948-50, 107952; MCZ 156600, 156609-12, 156583, 156622, 156616. maculiventris USNM 234723-5, 234616; MCZ 159589, 160216, s158380. marcanoi USNM 224962-3, 314390-2; MCZ 107075, 131876, 143244, s143247. mariarum USNM 120746-7; MCZ 32303-7, s166479-80 . marmoratus USNM 283143-4, 283172-3, 283165-6, s283222; MCZ 70723-4, 70730, s152457. mayndardi USNM 81729, 108004, 108006-7, 236622; MCZ 176355, 92719-21, 16804, 16797-8, 178385, 176355, s92721. megapholidotus UTA 4291-2. meridionalis USNM 148771; MCZ 10617, 19772, 79125, 79130, 79132, 10617, s18089-90. micropholidotus UTEP 7770. monticola USNM

329227, 329239-41, 329243; MCZ 124910-1, 124915, s120013, s124866, s124878, s124888, s124891, s124917, s124921, s124935-6`. meridionalis USNM 148771. mestrei USNM 337673-4, 515912; MCZ 63686, s75018. microtus USNM 31282; MCZ 15424, s15424. nebuloides USNM 304887; MCZ 92967-9, s92965-7, s100379. nebulosus USNM 304838-9, 304858-9, 346532-3; MCZ 126159, 133848, 133860-1, 154476, s133998-9, s134009. noblei USNM 29784, s220622; MCZ 2665, 359325-6, s127832. notopholis USNM 124243-5; MCZ 112291, 112294, 112296-7, 112302, 112304, 112300, 112303, s131935, s132827-8. nubilis USNM 140263-6; MCZ 82934-7, s57384. occultus USNM 327133-5; MCZ 83664, 80303, 92724, 92728, s83657, s83660, s131667, s146683-4. oculatus USNM 160550-1, 160566-8, 160570, s218288; MCZ 60216, 60219, 60227. olssoni USNM 197366-7, 314398, 314404, 314408, 314398, s65663, s65678; MCZ 12495, 131137, 131140, 131144. onca USNM 107321, 151517-8, 112400-1, 112406-7, s57386, s110066, s140261-2, s140264, s144822, s145312. opalinus USNM 252188, 252191, 337603, s244599, 337599, 337602-3; MCZ 51966.1-3, 179706, s102095, s144260. ophiolepis USNM 57043-4, 110112, 150226, 157246, 315940-1, 315943, 315946, 515913, s315939; MCZ 93498-500, 60933, 68175-6. ortoni USNM 298884, 316711, 316714, 316716, 321079; MCZ 84046, s127688, s141214. oxylophus USNM 321732-3, 347285-6, s313779; MCZ s56131; TNHC 23363, 24116. parvicirculata UTEP 7976, 8220, 8222, 8330, 9362, s8218, s8222. paternus USNM 498070-1, s498070; MCZ 11141, 11147, 160645, s59326. pentaprion USNM 67349, 298136, 344805; MCZ s20603; TNHC 54776. peraccae USNM 234753, 234761, 234763, 285819-20; MCZ 170479, 170487, 170495, 170482, s156782, s175914. petersi USNM 3595,

25059-60, 136013-4; MCZ 57277, 93673, s93673, 58224, s58224. placidus USNM 286865-8; MCZ s102839, s173209. poecilopus USNM 50149, 148507-8, 150107; MCZ 139348, 177829, 177836, s177850. polylepis USNM 129920, 219562-3, 219565; MCZ s132870, s132873, s133825, s133828, s132871-2, s133827, s132869, s133824-5, s132870, s132873; TNHC 54595, 54686. poncensis MCZ 34855-6, 34858, 34860-3, 61995, s62006, s158326. porcatus USNM 224966, 220716, 315953, 315956, 515914, 337675, 515914, s220369, s317842; MCZ 55554-6, 132241, s10884. proboscis USNM 207671-2, s207673; MCZ 54300. pulchellus USNM 58863, 115859-60, 115862-3, 221425, 221435-6, 221441-2; MCZ 36085, 36126, 36137, 179264-6, 179307, s131921, s131968. punctatus USNM 159179, 159180-1, 159183, 222333; MCZ 156842, 157244, s20630, s84050, s84052, s92537, s153994. quadriocellifer USNM 515915, 515919-20, 51591?; MCZ 90611, 11867, 11907, s93577. reconditus USNM 252143, 328369, 328373, 337608, 337610, s244600; MCZ 143869-70, 66932, 68958, s68956. richardi USNM 167484, 227922-3, 306096, 319169-71; MCZ 81954-5, 81957, s56851, s61028. ricordi USNM 123347, 123974, 123988, 286907, s72632; MCZ 8619, 68479, 132329-30, s72632, s80937, s80940, s119715. roosevelti UMMZ 73644; MCZ 36138. roquet USNM 10130, 139909-10, 79040-1, 79044, 79048, 82269-70, 82553-4, s66857, s148400. rubribarbus MCZ 28762, 28766-7, 63663, 63665, s63664, s17685. ruizi USNM 127103-4, 234061; MCZ s46446. sagrei USNM 245314, 301979, 337612-3, 337681, 337692; MCZ s61106-7, s68149, s71577, s71590, s142509, s142511, s171990, s177997, s142511, s142509, s177990; TNHC 55301-2. sheplani USNM 194015-6, 314419-20; MCZ 125641-2, s140021, s125691. semilineatus USNM 74888,

260549, 260555-6; MCZ 57671, 57673-4, 57678, s63427, s63430-1, s64842, s64862, s79316, s152521-2; RE s1490. sericeus USNM 209827-8, 32145, 121406-8, 32147; MCZ 100367, 27612-3, 126152, s22964, s27604. shrevei USNM 329261, 329263-5, 329268, 329270; MCZ 44365-7, 44369, s7820, s132819, s147436. smallwoodi USNM 286820, 315963-4, 335858-9, s319278; MCZ 57928, 42551, 68921. smaragdinus USNM 5147.1-4, s102337; MCZ 37983, 42018-20, 37983, 49737-8, s141787, TNHC 50097. sminthus MCZ 32348, 49951, 57280, s57280. squamulatus USNM 216911-2; MCZ 80903, 136172, 131674, 159123, s159123, s66895. strahmi USNM 314421; MCZ 146827, 151859-61, s146829, 146834. solitarius MCZ 12053, 24893, s24393; ICN s6153, s6179. spectrum USNM 340219; MCZ 160656-7. stratulus USNM 115876, 115882, 115887-8, 212319, 221444-5, s221177; MCZ 18490, 36153, 361823-4, s131985, s132100. subocularis USNM 46678, 46680, 46755, 47851, 133743, 133746, 133761; MCZ 32080, 167240-1, 56003, s167239, s167242. taylori MCZ 57279, 132358-9, 132361; MCZ s171147. tolimensis USNM 120755; MCZ 160156, 160158-9. townsendi USNM 80045-6, 31052, 31055; MCZ 139131, 139151, 139138, 139140, 139145, 139152, s139134, s139141,. transversalis USNM 200680, 234798, 234802, 332989; MCZ 11983, s45777, s84351, s151750. trinitatis USNM 314550, 314553, 314556-7, 314560-1, s314572; MCZ 82087, 82089-90. tropidogaster USNM 120600-1, 120604, 120606, 120701, 153964, 267829-30; MCZ 160180, 160184-6, 160188, s78498, s131688. tropidolepis USNM 244951; MCZ 92977-81, 92984, s54998. tropidonotus USNM 217595, 217598, 224813, 342339, 342344, 342352; MCZ s38817, s38821, s177987, TNHC 32616-7, RE s1207. valencienni USNM

252153-4, 286860, 337615; MCZ 180571, 52001-2, 53267, s7341, s7358, s45139, s68761, s73535, s140103, s145320-1; TNHC 50087. vanidicus USNM 337695, 337697-9, 337701, s337700; MCZ 74080, 74082, 22768, s22764-5. ventrimaculatus MCZ 127711-12, 137321, 137324, s127711, s137323. vermiculatus USNM 337702-3, 335855-6, s220645; MCZ 38425-8, s119659, s119719. vociferans MCZ 38686, 165523. wattsi USNM 218463, 218462-5, 509081, s218334; MCZ 127572-5. whitemani USNM 224967-8, 224970, 260558, 329275, s259509; MCZ 60055, 62827, 62829, 156206, s62831.

Anisolepis undulatus MCZ 84031-2, s59273, s59274, s84033, s133191. Enyalius iheringi MCZ s6316. Leiocephalus melanochlorus MCZ 74605-6, s37528. Leiocephalus schreibersi MCZ 64908, 64918. Polychrus acutirostris MCZ 24882, 47024. Polychrus marmoratus MCZ 163953, 164694, s6101, s46441, s74149, s74150, s74153, s147437, s74151, s74152, s131670-2, s173135. Urostrophus vautieri MCZ 5566, 154237, s7319, s84036.

Appendix 1.2

MATRIX OF MORPHOLOGICAL CHARACTER STATES (FOLLOWING PAGES)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
acutus	j	o	r	u	o	s	k	n	p	u	o	0	a	a	a	0	2	0	0
aeneus	l	p	n	m	l	q	o	o	p	t	p	e	a	z	a	0	2	0	0
aequatorialis	o	h	w	i	f	t	g	u	z	u	t	2	a	a	a	0	2	0	0
agassizi	t	n	v	i	d	u	l	p	s	s	s	9	a	a	a	0	2	0	0
ahli	h	l	t	o	o	y	g	f	m	u	o	7	a	z	a	0	2	0	0
aliniger	h	g	n	s	p	k	d	v	p	r	o	2	a	a	a	0	0	1	0
allisoni	o	p	n	y	m	o	g	n	s	n	o	0	a	z	a	0	2	?	0
allogus	i	m	v	o	n	x	i	i	p	w	p	(27)	a	f	a	0	2	0	0
altae	c	a	o	l	m	p	k	n	s	?	?	2	a	a	a	?	?	?	?
altavelensis	f	j	s	m	p	r	m	m	m	v	q	1	a	a	a	0	2	0	0
alutaceus	a	f	r	s	k	q	l	m	v	m	n	2	a	z	a	0	2	0	0
angusticeps	f	k	h	w	l	f	h	j	m	v	p	8	a	z	a	0	2	?	2
antonii	g	f	r	k	l	o	l	n	s	u	r	2	a	a	a	0	1	0	0
apollinaris	q	i	t	j	g	j	i	u	z	r	r	(02)	a	a	a	0	0	0	0
aquaticus	k	i	w	i	h	u	j	a	p	r	q	0	a	a	a	0	0	0	0
argenteolus	g	j	t	q	k	w	?	h	s	w	o	1	z	g	a	0	2	0	0
argillaceus	e	m	m	t	p	l	i	l	p	u	l	1	a	z	a	0	2	?	2
armouri	j	k	s	v	x	?	n	n	m	t	f	(12)	a	z	a	1	2	0	0
auratus	f	h	n	l	i	l	k	m	z	h	b	0	a	n	a	0	0	0	0
bahorucoensis	f	j	s	y	l	q	o	l	v	u	m	2	a	t	a	0	2	0	0
baleatus	y	k	q	q	j	r	h	s	p	m	t	2	a	a	l	0	2	?	0
barahonae	w	h	p	q	i	q	l	r	s	l	q	2	a	a	s	0	2	?	0
barkeri	p	n	q	a	a	v	h	o	p	t	q	0	a	a	a	0	1	0	0
bartschi	l	j	w	o	k	z	m	g	v	y	u	1	a	n	a	0	2	0	0
bimaculatus	s	y	s	q	r	q	i	o	p	p	o	(e6)	a	i	a	0	2	0	0
biporcatus	p	f	p	n	k	q	b	r	v	s	l	0	a	a	a	0	0	0	0
bitectus	f	e	v	i	h	q	i	k	p	o	i	0	a	a	a	0	(01)	0	0
bonairensis	k	m	r	q	l	r	n	i	p	t	l	1	a	a	a	0	2	0	0
brevirostris	f	e	t	o	q	t	p	g	h	w	n	(e1)	a	n	a	0	2	0	0
brunneus	l	h	n	y	k	e	a	m	s	o	q	0	a	z	a	0	2	?	0
(Ch.) chameleonides	y	f	j	u	n	o	d	r	h	c	z	8	a	a	a	0	2	?	0
capito	o	c	x	h	l	w	e	q	p	o	o	3	a	f	n	0	0	0	0
carolinensis	k	n	m	w	p	i	h	n	p	p	p	0	a	z	a	0	2	?	0
chloris	i	g	p	k	g	n	i	m	p	w	u	7	a	a	a	0	2	?	0
chlorocyanus	m	n	m	q	k	l	e	s	s	r	n	(c2)	a	r	a	0	2	1	0
christophei	e	i	t	p	m	t	k	o	m	v	r	(27)	a	h	a	0	2	0	0
chrysolepis	l	e	y	f	k	q	e	p	s	t	i	0	a	r	g	0	0	0	0
clivicola	e	h	t	t	p	p	i	r	v	q	p	0	a	z	a	0	0	?	0
cobanensis	h	n	v	n	m	t	j	n	s	r	m	0	a	g	a	0	2	0	0
coelestinus	m	o	n	r	l	o	e	m	s	s	q	2	a	i	a	0	(012)	1	0

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
compressicauda	f	e	v	p	o	z	h	r	p	c	h	0	a	a	a	0	0	0	0
conspersus	j	p	q	q	m	q	k	m	p	v	s	2	a	a	a	0	2	1	0
crassulus	f	d	q	m	p	o	j	r	s	j	d	0	a	z	a	0	2	0	0
cristatellus	m	h	t	q	r	s	p	k	s	x	q	2	a	a	a	0	2	0	0
(Cr.) barbouri	d	k	t	r	o	n	h	u	x	c	b	0	a	t	a	0	2	0	0
cupreus	g	h	s	l	l	r	j	n	s	o	l	0	a	n	a	0	1	0	0
cuprinus	j	m	v	k	m	s	i	q	s	p	n	0	a	r	a	0	(01)	0	0
cuvieri	u	h	u	u	p	s	k	n	s	l	s	2	a	a	z	0	2	?	0
cyanopleurus	c	i	r	q	i	q	k	p	x	j	l	0	a	z	a	0	(12)	0	2
cybotes	m	l	u	u	t	v	l	q	p	w	l	(c2)	a	t	a	0	2	0	0
darlingtoni	l	?	k	y	j	f	c	r	h	n	p	d	a	a	z	0	2	?	(02)
desechensis	g	m	t	r	o	r	l	i	p	u	n	2	a	z	a	0	2	0	0
distichus	h	j	u	m	p	v	o	g	h	u	n	1	a	a	a	0	2	0	0
dollfusianus	c	h	s	l	m	r	o	k	p	o	k	0	a	n	a	0	0	0	0
dunni	h	k	r	j	m	p	l	f	s	q	n	c	a	n	a	0	2	0	2
equestris	z	h	o	s	q	n	i	t	s	h	p	1	a	u	w	0	2	?	0
etheridgei	c	f	z	q	o	v	m	h	x	t	n	2	a	a	a	0	2	?	0
evermanni	l	o	r	q	m	s	l	o	m	s	s	7	a	a	a	0	2	0	0
fasciata	k	f	s	d	b	r	j	o	s	u	t	(27)	a	a	a	0	2	0	0
fowleri	l	f	s	p	p	m	f	w	x	q	s	c	a	a	z	0	2	0	0
fraseri	q	c	n	l	f	r	h	r	s	t	r	c	a	a	a	0	2	?	0
frenatus	v	k	t	h	a	u	j	m	s	s	t	2	a	a	a	0	0	?	0
fuscoauratus	d	a	r	l	j	q	k	g	p	u	r	2	a	j	a	0	0	?	0
gadovii	m	j	v	j	i	t	m	f	p	t	t	c	a	n	a	0	2	0	(02)
garmani	t	r	k	q	o	q	i	t	v	q	t	2	a	a	a	0	2	1	0
gingivinus	k	o	s	v	r	p	n	p	p	t	l	e	a	z	a	0	2	0	0
grahami	l	j	p	s	p	n	j	f	p	v	r	2	a	a	a	0	2	1	0
granuliceps	d	d	w	k	l	v	m	b	v	v	p	0	a	a	a	0	0	0	0
griseus	u	u	t	o	o	v	z	i	v	s	o	0	a	a	a	0	2	?	0
gundlachi	k	k	w	s	p	v	o	h	p	u	q	0	a	a	a	0	2	0	0
hendersoni	f	h	q	y	h	n	m	m	z	u	n	2	a	z	a	0	2	?	0
homolechis	j	r	q	n	n	t	l	j	h	u	k	6	a	z	a	0	2	0	0
humilis	c	e	t	q	p	v	j	u	h	i	j	0	a	i	a	0	0	0	0
insignis	x	i	p	n	a	o	?	?	p	w	v	d	a	a	a	0	2	?	0
insolitus	d	g	k	t	i	k	i	u	h	u	q	1	a	a	a	0	2	?	2
intermedius	f	f	n	m	n	p	n	p	p	q	l	0	a	t	a	0	(012)	?	0
isolepis	f	f	k	t	n	j	f	p	h	o	o	0	a	z	g	0	2	1	0
jacare	k	g	n	m	g	h	k	n	s	t	o	(c2)	a	a	?	0	2	?	0
jubar	i	q	s	o	n	u	n	m	h	t	j	0	a	z	a	0	2	0	0
kemptoni	f	d	n	j	g	j	m	m	s	t	q	2	a	a	a	0	0	0	0

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
krugi	g	m	s	t	m	o	m	h	z	u	l	0	a	r	a	0	2	0	0
laeviventris	d	c	l	j	n	n	n	l	m	q	k	0	a	l	a	0	(012)	?	0
latifrons	d	c	v	k	f	v	f	r	m	s	v	2	a	a	a	0	1	?	0
leachii	r	u	s	t	z	n	o	r	s	r	o	2	a	g	a	0	2	?	0
lemurinus	l	f	s	k	m	s	i	n	p	q	j	0	a	a	a	0	1	?	0
limifrons	e	g	t	o	l	r	n	m	p	u	n	2	a	a	a	0	0	0	0
lineatopus	k	r	r	r	o	r	j	n	p	t	r	0	a	a	a	0	2	0	0
lineatus	k	j	s	l	i	o	l	o	s	r	r	0	a	p	a	0	2	?	0
liogaster	f	c	s	m	o	q	m	m	s	n	h	2	a	z	a	0	2	0	2
lividus	m	u	s	r	m	s	l	n	p	s	p	c	a	a	a	0	2	?	0
longiceps	m	h	n	z	i	i	e	m	v	m	p	0	a	z	a	0	2	?	0
longitibialis	k	l	x	s	q	t	l	o	v	v	n	2	a	z	a	0	2	0	0
loveridgei	s	?	u	l	l	r	j	m	s	u	p	2	a	r	a	0	0	0	0
loysianus	b	h	n	r	o	m	i	p	a	s	p	1	a	z	a	0	2	0	2
luciae	o	q	r	m	j	v	j	m	p	v	o	(c2)	a	a	a	0	2	0	0
lucius	j	j	v	m	m	x	l	h	s	w	p	1	z	a	a	0	2	0	0
luteogularis	z	h	o	r	o	i	l	t	s	k	q	1	a	z	z	0	2	?	0
luteosignifer	g	p	r	m	m	t	l	j	m	m	m	4	a	a	a	0	2	?	0
maculiventris	d	c	s	i	k	q	k	j	p	x	t	(27)	a	n	a	0	0	0	0
marcanoi	h	l	v	u	t	t	j	m	s	v	j	2	a	z	a	0	2	0	0
mariarum	f	f	p	m	l	l	m	k	s	s	n	0	a	n	a	0	(01)	0	0
marmoratus	m	s	r	s	o	q	k	q	p	t	r	2	a	a	a	0	2	0	0
maynardi	l	u	n	y	h	k	d	n	p	p	q	0	a	z	i	0	2	?	0
megapholidotus	f	h	o	k	n	q	l	o	p	g	i	0	a	z	a	0	1	0	2
meridionalis	h	e	n	f	l	h	l	l	s	o	i	0	a	z	a	0	0	?	0
mestrei	g	k	p	p	n	t	k	l	h	v	o	6	a	z	a	0	2	?	0
micropholidotus	c	c	n	g	j	n	l	l	p	l	k	0	a	z	z	0	2	1	2
microtus	s	i	m	m	e	f	?	?	v	q	p	c	a	?	?	0	2	?	0
monticola	g	l	w	q	k	r	o	h	v	v	o	0	a	a	a	0	2	0	0
nebuloides	f	k	s	l	n	t	o	m	?	i	h	0	a	z	a	0	2	0	2
nebulosus	d	g	o	l	n	n	k	k	m	n	l	0	a	z	a	0	2	0	2
noblei	z	l	q	t	y	g	s	x	v	m	j	1	a	z	z	0	2	?	0
notopholis	e	d	v	l	m	u	i	z	s	f	f	0	a	i	a	0	0	0	2
nubilis	m	t	t	r	p	p	i	n	s	r	q	(ce)	a	t	a	0	2	?	0
occultus	c	e	e	l	f	h	h	p	a	s	m	1	a	a	z	0	0	?	0
oculatus	o	s	s	s	o	s	k	m	s	u	r	2	a	r	a	0	2	0	0
olssoni	e	i	o	n	g	l	p	l	z	i	g	0	a	z	a	0	2	?	0
onca	o	l	q	l	k	s	j	u	p	p	l	0	a	z	a	0	2	0	0
opalinus	g	h	o	q	o	r	k	k	p	u	r	7	a	a	a	0	2	1	0
ophiolepis	b	i	k	m	k	s	o	m	p	a	a	0	a	z	a	0	(12)	?	0

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
ortoni	h	j	o	k	l	o	k	l	p	w	r	d	a	a	a	0	(012)	?	0
oxylophus	l	i	t	a	f	t	l	y	p	p	s	3	a	a	a	0	0	0	0
(Ph.) heterodermus	l	g	f	o	g	g	g	y	h	e	m	(e1)	a	a	i	0	2	?	2
parvicirculatus	e	e	y	o	m	s	j	u	p	r	q	2	a	a	a	0	1	0	0
paternus	e	h	k	s	k	a	e	i	m	t	p	(b0)	a	z	a	0	2	?	(02)
pentaprion	l	m	l	k	l	l	e	m	h	u	r	1	a	n	a	0	2	?	0
perracae	f	h	o	k	i	s	j	g	p	u	s	2	a	a	a	0	2	0	0
petersi	s	h	r	j	j	n	i	u	x	u	s	0	a	a	z	0	2	0	0
placidus	d	e	d	p	g	j	g	s	a	s	r	1	a	z	a	0	2	?	2
poecilopus	k	g	w	g	g	s	k	b	p	p	r	0	a	a	a	0	(01)	0	0
polylepis	g	h	t	j	i	s	k	i	p	w	t	2	a	a	a	0	1	0	0
poncencis	e	i	n	q	l	k	l	p	v	f	e	0	a	z	a	0	2	?	0
porcatus	l	l	l	y	m	m	h	p	s	o	o	0	a	z	a	0	2	?	0
proboscis	k	?	h	u	e	g	?	h	m	s	r	(d1)	a	a	a	0	2	?	0
pulchellus	f	l	o	t	g	k	k	m	v	n	j	0	a	u	a	0	2	?	0
punctatus	n	j	o	p	e	n	t	n	v	w	q	2	a	a	a	0	2	0	0
quadriocellifer	g	p	q	l	m	u	l	j	m	t	m	(026)	a	r	a	0	2	0	0
reconditus	p	k	v	t	q	u	n	r	s	t	q	(02)	a	a	a	0	2	0	0
richardi	u	z	s	l	i	x	v	l	s	u	r	0	a	g	a	0	2	0	0
ricordi	w	g	q	r	k	s	o	t	p	n	s	2	a	a	w	0	2	?	0
roosevelti	w	i	v	u	x	w	o	v	s	l	o	2	a	z	z	0	2	?	0
roquet	n	n	p	m	k	s	j	k	p	s	p	c	a	a	a	0	2	0	0
rubribarbus	i	p	t	o	o	u	f	h	m	w	r	2	a	r	a	0	2	0	0
ruizi	g	e	l	o	j	o	?	?	s	v	o	c	a	a	a	0	2	?	0
sagrei	j	s	p	n	l	s	l	n	p	p	j	0	a	z	a	0	2	?	0
semilineatus	d	h	r	s	j	m	o	q	z	k	h	0	a	z	a	0	2	?	0
sericeus	f	h	o	j	k	j	l	k	v	n	f	0	a	z	a	0	2	0	0
sheplani	b	f	a	p	e	f	g	u	a	s	r	1	a	z	a	0	0	?	0
shrevei	h	k	t	t	t	?	o	v	p	q	h	0	a	z	a	1	2	?	0
smallwoodi	z	j	o	s	t	i	k	t	s	l	p	1	a	z	z	0	2	?	0
smaragdinus	g	q	m	t	k	h	d	m	s	o	o	(09)	a	z	a	0	2	?	0
sminthus	?	?	q	k	o	n	m	r	s	l	j	(09)	a	n	a	0	1	0	0
solitarius	f	f	l	n	h	o	i	x	m	t	n	c	a	a	n	0	2	0	0
spectrum	c	g	p	n	g	o	j	q	s	c	e	0	a	z	a	0	2	0	2
squamulatus	o	c	s	q	j	s	n	h	x	w	t	2	a	a	a	0	(012)	0	0
strahmi	m	l	w	p	p	u	p	n	s	t	q	d	a	z	a	0	2	0	0
stratulus	f	i	q	t	n	r	l	j	m	v	p	(d17)	a	a	a	0	2	?	0
subocularis	i	n	t	j	m	u	l	n	m	l	j	(09)	a	z	a	0	1	0	2
taylori	l	l	s	k	j	p	m	l	p	u	s	c	a	a	a	0	2	0	2
tolimensis	g	g	q	k	i	k	m	k	p	s	q	2	a	z	a	0	1	0	2

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
townsendi	d	g	t	n	k	r	l	k	p	s	q	(02)	a	a	a	0	0	0	0
transversalis	l	e	p	j	d	r	p	i	p	z	t	1	a	a	a	0	2	?	0
trinitatis	k	n	o	n	j	r	p	h	m	u	s	2	a	a	a	0	2	0	0
tropidogaster	g	f	v	l	k	s	n	j	p	q	n	0	a	z	a	0	0	0	0
tropidolepis	h	f	v	l	n	u	j	q	p	s	o	0	a	a	a	0	1	0	0
tropidonotus	g	f	t	l	o	u	l	v	m	c	b	0	a	m	a	0	1	0	0
valencienni	n	i	k	t	k	j	e	r	h	p	s	1	a	a	a	0	2	1	0
vanidicus	a	g	q	u	j	r	j	o	p	f	h	0	a	z	a	0	2	0	0
ventrimaculatus	m	m	w	i	h	v	j	e	x	u	t	2	a	a	a	0	0	0	0
vermiculatus	s	g	s	s	b	w	o	c	m	w	w	0	a	a	a	0	2	?	0
vociferans	g	a	l	n	m	p	j	x	h	s	w	0	a	a	a	0	(12)	?	0
wattsi	h	m	p	s	n	s	k	l	p	u	m	0	a	z	a	0	2	0	0
whitemani	j	l	u	v	u	r	n	p	p	r	l	0	a	z	a	0	2	0	0
Polychrus acutirostris	s	a	a	b	a	v	q	y	z	n	n	?	a	a	n	0	1	1	0
Polychrus marmoratus	t	a	l	c	a	y	y	?	z	j	j	9	a	a	g	0	(01)	1	0
Leiocephalus schreibersi	?	?	m	a	q	z	z	z	?	j	i	6	a	a	z	0	2	1	0
Leiocephalus melanochloru	?	?	q	a	m	z	z	z	?	c	e	6	a	a	z	0	2	1	0
Urostrophus vautieri	m	a	i	a	k	r	t	v	h	m	j	1	a	?	z	0	2	1	0
Anisolepis undulatus	j	a	l	a	h	u	o	u	v	g	g	9	a	?	z	0	(12)	1	0
Enyalius iheringi	?	?	t	e	q	z	?	?	?	?	?	?	a	a	z	?	?	?	?
Phenacosaurus nicefori	i	g	?	?	?	?	?	?	m	?	?	(e1)	?	?	?	?	?	?	?
Diplolaemus darwinii	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?

	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
acutus	a	g	m	i	z	z	a	a	a	a	1	0	m	a	0	0	a	a	a
aeneus	a	h	o	j	z	r	a	a	a	a	1	0	z	z	0	1	a	a	a
aequatorialis	m	p	r	m	z	a	m	a	a	a	1	0	a	w	1	0	a	a	a
agassizi	a	f	y	f	z	a	a	a	a	a	1	0	a	a	0	0	?	a	a
ahli	a	j	d	g	a	a	a	a	a	a	2	1	a	j	0	0	a	a	a
aliniger	a	i	l	o	a	a	a	a	a	a	1	0	a	a	0	0	a	a	a
allisoni	a	e	h	j	a	a	a	m	a	t	1	(34)	a	a	0	0	a	a	a
allogus	a	l	e	o	a	a	i	a	a	a	(23)	1	a	j	0	0	a	z	a
altae	a	j	j	m	a	i	a	a	a	a	1	0	?	?	0	0	a	a	a
altavelensis	a	d	l	l	z	z	m	z	t	a	1	0	g	a	0	0	?	a	a
alutaceus	a	g	f	k	m	a	a	g	a	a	2	0	a	a	0	0	a	a	z
angusticeps	a	g	r	m	z	a	a	a	a	g	(01)	3	a	m	0	0	a	a	a
antonii	a	i	m	r	m	a	a	a	a	a	1	0	a	j	0	0	?	a	i
apollinaris	z	l	m	k	z	a	a	a	a	?	1	(23)	a	m	0	0	?	a	a
aquaticus	z	n	r	u	d	a	a	a	a	a	(01)	(13)	a	m	0	1	a	a	a
argenteolus	a	f	s	o	z	z	a	a	a	g	1	0	a	z	0	0	a	a	a
argillaceus	a	c	l	i	z	z	g	a	a	a	1	2	a	a	0	0	a	a	a
armouri	a	d	l	g	z	z	a	a	a	a	2	0	a	a	0	0	a	a	a
auratus	z	i	m	h	p	f	f	a	a	i	2	3	a	a	1	0	a	a	z
bahorucoensis	a	f	o	j	z	a	a	a	a	p	1	2	a	m	0	0	a	a	f
baleatus	z	b	m	q	m	a	a	a	a	a	0	3	a	m	0	0	a	z	a
barahonae	t	c	m	q	g	a	a	a	a	a	0	2	a	m	0	0	a	z	a
barkeri	m	i	l	x	a	a	a	a	a	m	(01)	(34)	a	a	1	?	?	a	a
bartschi	a	k	q	n	z	a	a	a	m	a	1	0	a	q	0	0	a	a	a
bimaculatus	a	e	n	f	z	t	a	a	a	a	1	0	a	a	0	0	a	a	a
biporcatus	m	k	l	y	a	a	a	a	a	i	1	3	a	g	0	1	a	a	a
bitectus	g	l	i	y	d	a	a	a	a	?	2	1	a	j	0	0	a	a	z
bonairensis	a	g	v	i	z	z	a	a	a	a	1	0	z	z	0	1	a	a	a
brevirostris	a	d	q	h	z	z	z	z	u	a	1	0	p	a	0	0	a	a	a
brunneus	a	e	f	o	z	m	g	g	a	a	1	3	g	a	0	0	a	a	a
(Ch.) chameleonides	m	f	w	t	m	a	a	a	a	a	0	4	a	a	0	0	a	a	a
capito	z	l	l	t	z	a	a	a	a	g	1	3	a	a	0	1	a	a	a
carolinensis	a	i	j	s	m	a	a	m	a	r	1	4	a	a	0	0	a	a	a
chloris	a	l	k	o	z	a	a	a	a	m	1	(02)	a	t	0	0	a	a	a
chlorocyanus	a	g	j	p	s	a	f	a	f	k	1	0	a	f	0	0	a	a	a
christophei	p	i	r	u	z	a	a	a	a	g	2	0	a	f	0	0	a	a	a
chrysolepis	z	l	m	u	g	a	a	a	a	i	(12)	3	a	d	0	0	a	a	z
clivicola	a	i	m	j	z	a	a	a	a	a	2	0	a	a	0	0	a	a	z
cobanensis	f	j	f	s	i	a	a	a	a	?	2	0	a	a	0	1	a	a	a
coelestinus	a	l	m	p	d	a	a	a	a	p	1	0	a	z	0	0	a	a	a

	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
compressicauda	z	g	l	n	m	a	a	a	a	a	2	0	a	i	0	1	a	a	z
conspersus	a	i	l	j	z	g	a	a	a	a	1	0	a	a	0	0	a	a	a
crassulus	a	f	d	o	i	a	g	a	a	a	2	1	a	a	0	0	a	a	z
cristatellus	i	e	r	j	i	t	a	a	a	a	1	0	a	a	0	0	a	z	a
(Cr.) barbouri	a	d	a	r	a	a	a	a	a	i	2	(24)	a	g	1	0	a	a	a
cupreus	m	k	l	n	j	a	a	a	a	a	2	1	a	i	0	1	a	a	a
cuprinus	z	i	i	s	a	a	a	a	a	a	2	(123)	a	a	0	1	a	a	i
cuvieri	m	h	k	k	w	a	a	a	a	a	0	(02)	a	a	0	0	a	z	a
cyanopleurus	a	i	e	k	u	a	m	a	a	m	1	0	a	a	0	0	a	a	z
cybotes	z	h	o	j	z	m	f	a	f	a	1	0	a	a	0	0	a	a	a
darlingtoni	a	b	f	m	z	m	a	a	a	a	0	2	m	g	0	0	a	a	a
desechensis	a	e	q	m	u	z	f	a	u	a	1	0	a	a	0	0	a	z	a
distichus	a	c	t	k	z	z	z	z	u	a	1	0	p	a	0	0	a	a	a
dollfusianus	k	l	m	o	o	a	h	a	a	m	2	0	a	o	0	1	a	a	a
dunni	a	g	d	n	a	z	a	a	a	?	2	0	a	a	0	0	?	a	a
equestris	a	d	j	r	t	a	a	a	a	a	0	3	a	a	0	0	a	a	a
etheridgei	t	o	m	g	r	a	a	a	a	a	2	0	a	m	0	0	a	a	a
evermanni	a	e	r	k	z	t	a	a	z	a	1	0	a	d	0	0	a	a	a
fasciata	a	n	r	o	t	g	a	a	a	g	1	0	a	t	0	0	a	a	a
fowleri	a	f	d	u	z	z	a	a	a	a	0	2	a	m	0	0	a	a	a
fraseri	a	i	j	o	j	a	a	a	a	a	0	1	a	a	0	0	a	a	a
frenatus	t	p	z	v	a	a	a	a	a	a	1	0	a	g	0	0	a	a	a
fuscoauratus	a	l	m	r	w	a	a	a	a	r	(12)	0	a	m	0	0	a	a	a
gadovii	a	k	m	p	z	z	a	a	a	?	2	0	a	t	0	0	a	a	a
garmani	a	i	h	k	u	a	a	a	a	a	1	0	a	a	0	0	a	z	a
gingivinus	a	e	o	k	z	z	a	a	a	a	1	0	a	a	0	0	a	a	a
grahami	a	k	m	p	z	a	a	a	a	a	1	0	a	a	0	0	a	a	a
granuliceps	m	x	n	t	g	a	a	a	a	g	1	0	a	m	0	0	a	a	a
griseus	a	h	s	f	z	a	g	a	a	a	1	0	a	w	0	1	a	a	a
gundlachi	a	j	s	k	t	a	a	a	a	m	1	0	a	a	0	0	a	z	a
hendersoni	a	g	o	o	z	a	a	a	a	g	1	0	a	g	0	0	a	a	a
homolechis	a	e	l	g	z	a	a	a	a	a	2	0	a	a	0	0	a	z	a
humilis	m	k	m	u	g	a	a	a	a	z	2	1	a	j	0	1	a	a	z
insignis	a	o	l	n	g	a	a	a	m	a	0	(13)	a	g	0	0	a	a	a
insolitus	a	c	m	n	z	a	a	a	a	g	0	2	a	j	0	0	z	a	a
intermedius	a	e	h	q	a	z	a	a	a	?	1	2	a	a	0	0	a	a	a
isolepis	a	d	h	s	z	a	g	a	a	a	0	3	a	a	0	0	a	a	a
jacare	a	g	l	q	m	m	a	a	a	a	1	2	a	z	0	0	?	a	a
jubar	a	f	m	g	z	m	a	a	a	a	2	0	a	a	0	0	a	z	a
kemptoni	a	i	l	t	a	i	a	a	a	i	1	0	a	m	0	1	?	a	a

	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
krugi	a	f	j	n	t	a	a	a	a	g	1	0	a	a	0	0	a	a	a
laeviventris	a	g	i	p	m	r	a	a	a	a	1	0	a	a	0	0	a	a	a
latifrons	t	o	s	u	a	a	a	a	a	a	0	(02)	a	a	0	0	a	a	a
leachii	a	e	n	j	z	a	a	a	a	a	1	0	a	a	0	0	a	a	a
lemurinus	m	i	j	l	a	l	a	a	a	a	2	1	a	a	0	0	a	a	a
limifrons	a	o	o	o	a	a	a	a	a	z	1	0	a	p	0	0	a	a	a
lineatopus	a	i	k	m	z	a	a	a	a	g	2	0	a	a	0	0	a	a	a
lineatus	a	f	f	h	t	z	a	a	a	a	2	3	a	a	0	0	a	z	a
liogaster	a	f	d	m	j	z	a	a	a	a	2	0	a	a	0	0	a	a	a
lividus	a	e	l	k	z	i	a	a	a	m	1	0	a	a	0	0	a	a	a
longiceps	a	f	g	s	z	t	a	i	a	z	1	4	a	a	0	0	a	a	a
longitibialis	g	f	t	k	z	z	t	a	a	a	1	0	a	a	0	0	a	a	a
loveridgei	t	n	h	x	a	a	a	a	a	a	2	3	a	d	0	0	a	a	a
loysianus	a	c	h	m	z	z	a	a	a	a	1	2	g	a	0	0	a	a	a
luciae	a	h	o	k	z	z	a	a	a	z	1	0	z	z	0	1	a	a	a
lucius	a	e	s	m	z	z	g	a	a	i	1	0	a	d	0	0	a	a	a
luteogularis	a	b	j	k	w	a	a	a	a	a	0	(23)	a	a	0	0	a	a	a
luteosignifer	a	e	f	g	z	a	a	a	a	a	2	0	a	a	0	0	a	z	a
maculiventris	a	q	o	t	j	a	a	a	a	t	1	0	a	q	0	1	a	a	a
marcanoi	u	h	i	m	z	r	f	a	a	a	1	0	a	a	0	0	a	a	a
mariarum	a	k	o	o	j	a	a	a	a	a	1	0	a	d	0	0	a	a	a
marmoratus	a	e	m	m	z	r	a	a	a	h	1	0	a	a	0	0	a	a	a
maynardi	a	e	m	j	z	a	z	g	g	m	1	4	a	a	0	0	a	a	a
megapholidotus	a	h	d	p	a	z	a	a	a	a	3	0	a	t	0	0	a	a	z
meridionalis	z	i	i	n	m	a	a	a	a	?	2	1	a	a	1	1	a	a	z
mestrei	a	f	k	i	z	m	a	a	a	a	2	0	a	j	0	0	a	z	a
micropholidotus	a	f	d	h	a	z	a	a	a	?	1	0	a	a	0	0	a	a	n
microtus	a	h	h	k	z	a	a	a	a	a	0	2	?	a	0	0	?	a	a
monticola	g	o	m	i	z	a	a	a	a	a	1	0	a	q	0	0	a	a	a
nebuloides	a	g	h	m	t	r	a	a	a	a	2	0	a	a	0	1	a	a	z
nebulosus	a	f	d	p	j	z	a	a	a	z	2	0	a	d	0	0	a	a	z
noblei	a	d	n	r	z	a	a	a	a	a	1	4	a	a	0	0	a	a	a
notopholis	m	g	l	s	a	a	a	a	a	a	2	(12)	a	d	1	1	a	a	z
nubilis	a	e	q	j	z	i	a	a	a	a	1	0	a	d	0	0	a	a	a
occultus	a	k	f	z	a	a	g	a	a	a	0	(13)	a	z	0	1	a	a	a
oculatus	a	f	s	n	z	z	a	a	a	a	1	(12)	a	a	0	0	a	z	a
olssoni	a	g	f	g	z	g	a	a	a	f	1	0	a	a	0	0	a	a	z
onca	z	l	j	w	e	a	a	a	a	a	1	3	a	a	2	0	a	a	a
opalinus	a	g	m	m	z	a	a	a	a	g	1	0	a	a	0	0	a	a	a
ophiolepis	a	e	l	a	z	m	a	a	a	g	2	0	a	a	1	0	a	a	z

	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
ortoni	a	k	l	r	g	z	a	a	a	a	1	0	a	a	0	0	a	a	a
oxylophus	z	n	r	w	i	a	k	a	a	z	1	1	a	m	0	0	a	a	z
(Ph.) heterodermus	a	a	g	r	m	a	a	a	a	a	0	2	t	a	0	0	a	a	a
parvicirculatus	z	i	m	x	f	a	a	a	a	?	(12)	1	a	c	0	1	a	a	f
paternus	a	f	u	p	z	z	a	g	a	m	1	3	m	a	0	0	a	a	a
pentaprion	a	i	j	x	a	e	a	a	a	a	0	3	a	g	0	1	a	a	a
perracae	a	l	m	j	z	g	a	a	a	a	1	0	a	m	0	0	a	a	a
petersi	t	n	h	v	a	a	a	a	a	a	0	3	a	g	0	1	a	a	a
placidus	a	e	f	v	t	a	a	a	a	a	0	4	a	m	0	0	z	a	a
poecilopus	t	z	r	v	t	a	a	a	a	a	1	(23)	a	m	0	0	a	a	r
polylepis	f	l	q	p	m	a	a	a	a	z	2	1	a	i	0	0	a	a	a
poncencis	a	e	j	h	z	g	a	a	a	?	1	0	a	a	0	0	a	a	z
porcatus	a	e	m	l	z	m	a	g	g	t	1	4	a	a	0	0	a	a	a
proboscis	a	j	c	y	k	a	a	a	a	z	0	2	a	z	0	0	a	a	a
pulchellus	a	e	j	i	z	a	a	a	a	a	1	0	a	a	0	0	a	a	v
punctatus	a	l	i	r	t	a	a	a	g	z	1	0	a	d	0	0	a	a	a
quadriocellifer	a	g	l	f	z	a	a	a	a	a	2	0	a	g	0	0	a	z	a
reconditus	a	g	g	j	z	a	a	a	a	g	2	0	a	a	0	0	a	a	a
richardi	a	i	s	g	z	r	a	a	a	a	1	0	a	z	0	1	a	a	a
ricordi	m	g	o	p	a	a	a	a	a	a	0	(02)	a	?	0	0	a	z	a
roosevelti	m	f	w	g	a	a	a	a	a	a	2	1	a	a	0	0	a	z	a
roquet	a	g	n	h	z	z	a	a	a	a	1	0	z	z	0	1	a	a	a
rubribarbus	a	j	g	f	w	a	a	a	a	a	3	(01)	a	a	0	0	a	z	a
ruizi	a	g	l	p	w	z	a	a	a	a	1	(02)	z	g	0	0	?	a	a
sagrei	a	f	h	e	z	a	a	a	a	f	2	0	a	a	0	0	a	z	a
semilineatus	a	k	j	g	t	m	a	a	a	z	1	0	a	a	0	0	a	a	z
sericeus	a	f	f	m	f	k	a	a	a	a	1	0	a	d	0	1	a	a	e
sheplani	a	d	i	w	z	m	a	a	a	g	0	4	a	q	0	0	z	a	a
shrevei	p	i	m	g	u	m	a	a	a	a	2	0	a	a	0	0	a	a	a
smallwoodi	a	d	k	q	z	a	a	a	a	a	0	3	a	a	0	0	a	a	a
smaragdinus	a	h	j	q	i	g	a	a	a	a	1	(34)	a	a	0	0	a	a	a
sminthus	a	f	l	p	g	a	a	a	a	a	(123)	(02)	a	a	0	0	?	a	z
solitarius	a	g	d	q	a	z	a	a	a	a	(01)	0	z	t	0	0	?	a	a
spectrum	a	d	d	k	m	a	a	a	a	a	1	0	a	a	0	0	a	a	z
squamulatus	z	m	d	q	g	a	a	a	a	z	(01)	2	a	q	0	1	a	a	a
strahmi	z	g	t	n	z	z	g	a	a	a	1	0	a	a	0	0	a	a	a
stratulus	a	e	p	m	z	g	a	a	a	a	1	0	a	a	0	0	a	a	a
subocularis	g	h	g	o	j	r	a	a	a	a	2	0	a	a	0	0	a	a	u
taylori	a	g	d	n	m	z	a	a	a	z	(12)	0	a	d	0	0	?	a	g
tolimensis	a	k	k	s	a	a	a	a	a	z	1	0	a	i	0	0	a	a	a

	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
townsendi	a	m	l	n	m	a	a	a	a	a	(12)	0	a	z	0	0	a	a	a
transversalis	a	e	n	q	z	z	a	a	a	g	0	0	a	z	0	0	a	a	a
trinitatis	a	i	m	k	z	z	a	a	a	a	1	0	t	z	0	1	a	a	a
tropidogaster	m	r	m	q	t	a	a	a	a	t	1	0	a	j	0	0	a	a	e
tropidolepis	z	q	m	p	a	a	a	a	a	?	2	3	a	m	0	1	a	a	z
tropidonotus	u	h	l	k	z	a	f	a	a	i	2	1	a	c	1	0	a	a	z
valencienni	a	b	o	q	a	u	p	a	a	a	0	0	m	a	0	0	a	a	a
vanidicus	a	e	d	l	z	r	a	g	a	g	2	0	a	a	0	0	a	a	z
ventrimaculatus	z	t	o	k	w	a	a	a	a	a	1	(01)	a	z	0	0	?	a	a
vermiculatus	t	l	l	l	z	a	a	a	a	z	1	0	a	d	0	0	a	a	a
vociferans	a	g	d	m	a	z	a	a	a	?	(12)	(23)	a	z	0	0	a	a	a
wattsi	a	f	r	l	z	z	a	a	a	k	2	0	a	a	0	0	a	a	a
whitemani	g	g	j	l	z	t	a	a	a	a	1	0	a	a	0	0	a	a	a
Polychrus acutirostris	a	c	a	j	m	a	a	a	z	a	0	7	a	a	2	1	a	a	a
Polychrus marmoratus	a	b	a	a	m	a	a	a	m	a	0	7	?	a	2	1	a	a	a
Leiocephalus schreibersi	m	e	a	a	a	z	a	a	a	a	2	5	a	a	2	0	a	a	a
Leiocephalus melanochloru	a	f	a	a	a	z	a	a	m	a	3	5	a	a	2	1	a	a	a
Urostrophus vautieri	m	d	a	d	a	a	a	a	a	a	0	2	a	a	2	1	?	a	a
Anisolepis undulatus	z	h	a	m	a	a	a	a	a	a	(01)	6	a	a	2	1	?	a	z
Enyalius iheringi	z	l	a	q	a	a	a	a	a	a	0	3	?	?	2	1	a	a	a
Phenacosaurus nicefori	a	d	d	l	?	?	?	?	?	?	?	2	?	?	0	0	?	?	a
Diplolaemus darwinii	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?

	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
acutus	?	p	?	a	a	a	g	1	1	?	0	0	1	5	0	7	0	0	a
aeneus	?	i	?	a	a	a	z	0	1	?	0	0	1	3	0	6	0	0	a
aequatorialis	?	a	z	z	a	a	z	0	1	2	0	?	?	?	?	6	?	1	a
agassizi	?	a	m	?	a	a	z	1	1	?	0	0	1	3	0	6	0	0	a
ahli	?	a	a	a	a	m	a	1	1	2	0	0	(01)	(56)	0	8	1	1	a
aliniger	?	m	a	a	a	a	z	1	2	?	0	0	1	4	0	7	0	1	g
allisoni	?	a	?	a	a	a	z	1	2	?	0	0	1	(45)	0	7	0	1	g
allogus	?	z	?	a	a	m	a	0	1	2	0	0	0	6	0	8	1	1	a
altae	?	?	?	?	?	a	z	1	1	?	0	1	0	4	0	7	1	1	?
altavelensis	?	n	a	a	a	a	a	1	2	?	0	0	1	(45)	0	7	0	0	a
alutaceus	?	z	a	a	a	a	z	0	2	2	0	0	(23)	4	0	7	0	1	a
angusticeps	?	m	a	a	a	a	z	0	2	?	0	0	(12)	4	0	8	0	1	a
antonii	?	z	a	a	a	a	z	1	2	?	0	0	0	3	0	7	1	1	a
apollinaris	?	a	?	a	a	a	z	0	2	?	0	?	?	?	?	?	?	?	a
aquaticus	?	a	a	a	a	w	a	0	2	2	0	0	0	5	0	8	1	1	a
argenteolus	?	z	z	a	a	a	m	0	2	?	0	0	1	5	0	7	0	1	a
argillaceus	?	j	a	a	a	m	a	1	2	?	0	0	2	5	0	8	0	1	a
armouri	?	m	a	a	a	z	m	0	2	?	0	0	0	4	0	9	0	0	a
auratus	?	?	a	a	a	z	u	1	2	?	0	0	1	4	0	8	1	1	a
bahorucoensis	?	z	?	a	a	a	p	1	2	?	0	0	1	4	0	7	0	1	a
baleatus	?	a	?	a	a	a	a	0	0	?	0	?	?	?	?	?	?	?	z
barahonae	?	a	?	a	a	a	a	0	0	?	0	0	0	3	0	7	0	0	z
barkeri	?	r	a	z	a	a	a	0	1	?	0	0	0	4	0	5	1	1	a
bartschi	?	a	?	a	a	a	z	2	2	?	0	0	1	5	0	7	0	1	a
bimaculatus	?	a	a	a	a	a	k	1	2	?	0	0	1	5	0	7	0	0	a
biporcatus	?	a	a	a	a	g	m	1	1	?	0	0	0	3	0	5	1	1	a
bitectus	?	z	a	a	a	z	m	1	1	0	0	0	0	(56)	0	7	1	1	a
bonairensis	?	a	a	a	a	a	z	1	1	?	0	0	1	4	0	6	0	0	a
brevirostris	?	m	a	a	a	a	k	1	2	?	0	0	1	5	0	7	0	0	a
brunneus	?	a	a	a	a	a	z	1	?	?	0	0	1	4	0	7	0	1	a
(Ch.) chameleonides	?	a	a	a	a	a	a	0	0	?	0	0	0	?	1	2	0	0	n
capito	?	z	a	a	a	a	z	1	1	?	0	0	0	2	0	(35)	1	1	a
carolinensis	?	a	a	a	a	g	z	1	1	?	0	0	1	4	0	7	0	1	d
chloris	?	z	a	z	a	a	z	0	2	2	0	0	1	?	1	6	0	0	a
chlorocyanus	?	a	a	a	a	a	z	1	1	?	0	0	1	4	0	7	0	1	d
christophei	?	z	z	a	a	a	g	0	1	2	0	0	1	5	0	7	0	1	a
chrysolepis	?	z	a	a	a	z	t	1	1	3	0	0	0	4	0	8	1	1	a
clivicola	?	z	a	a	a	a	t	0	2	2	0	0	(23)	4	0	7	0	1	a
cobanensis	?	a	a	a	a	n	k	0	2	?	0	1	0	4	0	8	1	1	a
coelestinus	?	f	a	a	a	a	z	1	1	?	0	0	1	4	0	6	0	1	a

	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
compressicauda	?	r	a	a	z	z	a	0	2	?	0	0	0	(45)	0	8	1	1	n
conspersus	?	z	a	a	a	a	m	1	1	?	0	0	0	4	0	7	1	1	a
crassulus	?	e	a	a	f	z	d	1	1	1	0	2	0	5	0	8	1	1	n
cristatellus	?	z	a	a	a	e	i	0	1	0	0	1	1	5	0	8	0	0	a
(Cr.) barbouri	?	?	a	z	a	z	z	1	1	?	0	0	2	?	1	4	2	0	a
cupreus	?	z	a	a	a	v	t	0	2	?	0	0	1	4	0	8	1	1	a
cuprinus	?	z	a	a	i	i	z	0	2	0	0	2	0	2	0	a	1	1	a
cuvieri	?	a	?	a	a	a	a	0	0	?	0	0	0	3	0	7	0	0	n
cyanopleurus	?	z	?	a	a	z	k	0	2	3	0	0	2	2345	0	7	0	1	a
cybotes	?	t	?	a	a	z	f	0	2	?	0	0	1	5	0	8	0	0	a
darlingtoni	?	a	?	a	a	a	a	0	?	0	0	0	0	?	1	6	0	1	n
desechensis	?	?	a	a	a	a	k	0	2	?	0	?	?	?	?	?	?	?	a
distichus	?	r	a	a	a	a	i	1	2	?	0	0	0	5	0	7	0	0	a
dollfusianus	?	v	a	a	g	z	z	0	2	0	0	0	(01)	5	0	8	1	1	a
dunni	?	m	a	a	a	a	g	1	1	0	0	1	0	4	0	8	1	1	a
equestris	?	a	?	a	a	a	a	0	0	?	0	0	0	(12)	0	7	0	1	z
etheridgei	?	m	a	a	a	a	m	1	2	2	0	0	3	(34)	0	7	0	1	a
evermanni	?	g	a	a	a	a	g	0	1	2	0	0	1	5	0	7	0	0	a
fasciata	?	g	z	z	a	a	z	0	2	2	0	0	1	?	1	6	0	0	a
fowleri	?	a	t	a	a	a	z	0	1	(23)	0	?	?	?	0	7	0	1	a
fraseri	?	a	z	g	a	a	i	0	0	0	0	0	0	?	1	6	0	(01)	n
frenatus	?	r	z	z	a	a	m	0	1	?	0	0	(01)	?	1	6	0	(01)	a
fuscoauratus	?	z	a	a	a	a	z	1	2	?	0	0	0	3	0	7	1	1	a
gadovii	?	m	a	a	m	a	g	0	1	0	0	1	0	5	0	8	1	1	a
garmani	0	n	a	a	a	a	a	0	2	?	0	0	0	4	0	7	1	1	a
gingivinus	?	a	a	a	f	q	m	1	1	?	0	0	1	5	0	7	0	0	a
grahami	1	a	a	a	a	m	a	1	2	?	1	0	0	5	0	7	1	1	a
granuliceps	?	z	a	m	a	m	z	1	1	0	0	0	1	?	1	?	?	?	a
griseus	?	i	a	a	a	a	t	1	1	?	0	0	1	3	0	6	0	0	a
gundlachi	?	z	a	a	a	e	a	0	1	2	0	1	1	5	0	8	0	0	a
hendersoni	?	z	?	a	a	a	t	1	1	?	0	0	1	4	0	7	0	1	a
homolechis	?	r	a	a	a	z	a	1	2	1	0	0	1	5	0	8	1	1	a
humilis	?	r	a	a	z	z	t	1	1	(04)	0	1	(01)	5	0	8	1	1	a
insignis	?	m	z	z	a	a	m	0	0	0	0	0	1	?	1	3	0	?	a
insolitus	?	g	n	a	a	a	z	0	0	?	0	0	(12)	?	1	7	0	1	a
intermedius	?	g	a	a	a	m	t	1	1	?	0	1	2	3	0	8	1	1	a
isolepis	?	a	?	?	a	a	g	1	1	?	0	0	1	4	0	7	0	1	?
jacare	?	a	a	z	a	a	m	0	1	?	0	1	0	?	1	6	0	0	a
jubar	?	i	a	a	a	z	a	0	2	(03)	0	?	?	?	?	?	?	?	a
kemptoni	?	m	a	a	i	a	m	0	1	?	0	0	1	4	0	7	1	1	a

	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
krugi	?	z	a	a	a	z	r	0	2	0	0	1	(01)	5	0	8	0	0	a
laeviventris	?	i	a	a	a	r	z	1	2	?	0	1	0	5	0	8	1	1	?
latifrons	?	z	z	z	a	a	z	0	1	0	0	0	0	?	1	6	0	(01)	g
leachii	?	a	a	a	a	a	t	1	1	?	0	0	1	5	0	7	0	0	a
lemurinus	?	r	a	a	a	z	t	1	1	?	0	0	0	4	0	8	1	1	a
limifrons	?	z	a	a	a	k	u	0	2	?	0	0	1	4	0	7	1	1	a
lineatopus	0	z	a	a	a	g	a	0	1	?	0	0	0	4	0	7	1	1	a
lineatus	?	a	?	a	a	a	a	1	1	?	0	0	0	4	0	8	1	1	a
liogaster	?	a	a	a	a	z	i	0	1	?	0	1	0	4	0	8	1	1	?
lividus	?	f	a	a	a	a	j	1	1	?	0	0	1	(56)	0	7	0	0	a
longiceps	?	a	a	a	a	a	z	1	1	?	0	0	1	4	0	7	0	1	a
longitibialis	?	a	?	a	g	a	g	0	2	?	0	0	1	4	0	8	0	0	a
loveridgei	?	a	a	a	g	g	a	0	?	?	0	0	0	4	0	5	1	1	a
loysianus	?	m	a	a	g	g	t	1	2	?	0	0	(12)	4	0	8	0	1	a
luciae	?	i	a	a	a	a	z	1	1	(02)	0	0	1	3	0	6	0	0	a
lucius	?	z	z	a	g	a	a	1	2	0	0	0	1	5	0	7	0	1	a
luteogularis	?	a	?	a	a	a	a	0	0	?	0	0	0	(12)	0	7	0	1	z
luteosignifer	?	z	a	a	a	z	a	1	2	?	0	0	1	5	0	8	1	1	?
maculiventris	?	z	a	a	a	a	t	0	2	1	0	0	1	4	0	7	1	1	a
marcanoi	?	z	a	a	a	z	g	0	2	?	0	0	(01)	5	0	8	0	0	a
mariarum	?	u	a	a	f	a	z	0	2	?	0	0	0	4	0	7	1	1	a
marmoratus	?	a	a	a	a	a	m	1	2	?	0	0	1	5	0	7	0	0	a
maynardi	?	a	a	a	a	g	z	1	?	?	0	0	1	4	0	7	0	1	a
megapholidotus	?	p	a	a	f	z	a	0	2	0	0	1	1	5	0	8	1	1	?
meridionalis	?	a	a	a	a	z	t	1	1	?	0	0	1	?	1	5	1	1	a
mestrei	?	z	a	a	g	m	a	0	2	1	0	0	1	5	0	8	1	1	a
micropholidotus	?	z	a	a	a	z	z	1	2	0	0	?	?	?	?	?	?	?	?
microtus	?	?	?	z	a	a	a	0	0	?	0	0	0	?	1	3	0	?	a
monticola	?	z	a	a	a	a	m	1	1	?	0	0	1	5	0	7	0	1	a
nebuloides	?	z	a	a	i	z	m	?	2	0	0	?	?	?	?	?	?	?	a
nebulosus	?	z	a	a	a	t	z	0	2	?	0	?	0	4	0	?	1	1	a
noblei	?	a	?	a	a	a	a	0	0	?	0	?	?	?	?	?	?	?	z
notopholis	?	t	a	a	z	z	t	0	1	?	0	0	0	4	0	7	1	1	a
nubilis	?	a	a	a	a	a	a	1	1	?	0	0	1	5	0	7	0	0	a
occultus	?	a	a	?	a	a	z	0	1	?	0	1	(01)	2	0	3	0	1	a
oculatus	?	z	a	a	a	a	a	1	1	?	0	0	0	4	0	7	0	0	a
olssoni	?	z	a	a	a	z	z	0	2	?	0	0	2	4	0	7	0	1	a
onca	?	z	a	a	a	m	z	1	1	?	0	0	0	3	0	8	1	1	a
opalinus	1	u	a	a	a	a	t	0	1	?	1	0	0	5	0	7	1	1	a
ophiolepis	?	p	a	a	a	z	g	1	1	?	0	0	(01)	5	0	8	1	1	a

	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
ortoni	?	a	a	a	a	a	z	1	1	?	0	0	1	5	0	8	1	1	a
oxylophus	?	a	a	a	a	k	z	0	2	4	0	?	?	?	?	?	?	?	a
(Ph.) heterodermus	?	a	a	a	a	a	a	1	1	?	0	2	0	?	1	1	0	(01)	g
parvicirculatus	?	z	a	a	a	n	f	0	2	0	0	1	0	4	0	8	1	1	a
paternus	?	v	a	a	g	a	t	0	1	?	0	0	2	4	0	8	0	1	a
pentaprion	?	a	a	a	a	a	z	0	1	?	0	0	0	3	0	5	1	1	n
perracae	?	r	z	z	a	a	t	0	1	(02)	0	0	1	?	1	6	0	0	a
petersi	?	a	a	a	a	a	z	1	1	?	0	0	0	0	0	5	1	1	a
placidus	?	a	a	?	?	a	z	0	0	?	0	?	?	?	?	?	?	?	a
poecilopus	?	a	a	a	a	m	t	1	1	(01)	0	0	0	4	0	8	1	1	a
polylepis	?	z	f	a	a	a	a	0	1	?	0	0	(12)	4	0	7	1	1	a
poncencis	?	a	?	a	a	z	g	1	1	2	0	1	0	5	0	8	0	0	a
porcatus	?	a	a	a	a	a	z	1	2	?	0	0	1	5	0	7	0	1	a
proboscis	?	a	?	a	a	a	a	1	?	?	0	0	0	?	1	6	0	0	a
pulchellus	?	m	a	a	a	z	t	0	1	0	0	1	1	5	0	8	0	0	a
punctatus	?	a	a	z	a	a	z	1	1	(04)	0	1	0	?	1	6	0	0	a
quadriocellifer	?	z	?	a	g	z	a	1	2	?	0	0	1	5	0	8	1	1	a
reconditus	0	g	a	a	a	a	a	0	1	?	0	0	0	4	0	7	1	1	a
richardi	?	r	a	a	a	a	m	1	1	?	0	0	(12)	3	0	6	0	0	a
ricordi	?	a	z	a	a	a	a	0	0	?	0	0	0	3	0	5	0	0	z
roosevelti	?	a	z	a	a	a	a	0	0	?	0	0	0	4	0	5	0	0	n
roquet	?	g	a	a	a	a	z	1	1	?	0	0	1	4	0	6	0	0	a
rubribarbus	?	z	a	a	a	g	a	0	2	2	0	0	1	5	0	8	1	1	a
ruizi	?	a	a	a	a	a	z	0	1	?	0	?	?	?	?	?	?	?	a
sagrei	0	s	a	a	a	z	a	1	2	?	0	0	1	6	0	8	1	1	a
semilineatus	?	z	a	a	a	z	z	0	2	2	0	0	3	4	0	7	0	1	a
sericeus	?	z	a	a	a	z	z	1	1	?	0	0	1	4	0	8	1	1	a
sheplani	?	a	a	?	a	a	z	0	0	?	0	0	1	?	1	1	0	1	a
shrevei	?	r	a	a	f	z	p	0	2	?	0	0	0	5	0	8	0	0	a
smallwoodi	?	?	?	a	?	a	a	0	0	?	0	?	?	?	?	?	?	?	z
smaragdinus	?	g	a	a	a	a	z	1	1	?	0	0	1	4	0	7	0	1	a
sminthus	?	a	a	a	a	z	z	0	1	?	0	1	0	4	0	7	1	1	n
solitarius	?	z	a	z	a	a	z	0	1	?	0	1	0	?	1	6	0	0	a
spectrum	?	t	a	a	a	z	m	0	?	1	0	0	(23)	(34)	0	7	0	1	?
squamulatus	?	a	z	z	a	a	a	0	1	?	0	1	0	?	1	6	0	?	a
strahmi	?	a	?	a	g	a	g	0	2	?	0	0	0	5	0	8	0	0	a
stratulus	?	t	a	a	a	a	u	0	1	0	0	0	1	5	0	7	0	0	a
subocularis	?	z	a	a	g	z	z	0	2	1	0	1	1	5	0	8	1	1	a
taylori	?	z	a	a	a	a	g	0	1	0	0	1	1	4	0	8	1	1	a
tolimensis	?	t	a	a	a	a	t	0	2	?	0	0	0	3	0	7	1	1	?

	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
townsendi	?	p	a	a	a	a	z	0	1	?	0	0	1	4	0	8	1	1	a
transversalis	?	z	z	z	a	a	z	0	1	?	0	1	0	?	1	6	0	0	a
trinitatis	?	r	a	a	a	a	z	0	1	?	0	0	1	3	0	6	0	0	a
tropidogaster	?	z	a	a	a	g	t	0	1	?	0	0	0	4	0	(78)	1	1	a
tropidolepis	?	a	a	a	a	t	z	1	1	(14)	0	1	0	4	0	8	1	1	a
tropidonotus	?	z	a	a	z	z	n	1	2	?	0	0	0	4	0	8	1	1	a
valencienni	0	i	a	a	a	a	k	0	1	?	0	0	0	4	0	8	1	1	a
vanidicus	?	u	a	a	a	z	z	1	2	3	0	0	2	4	?	7	0	1	a
ventrimaculatus	?	i	z	z	a	a	z	0	2	?	0	0	0	?	1	6	0	0	a
vermiculatus	?	m	?	a	a	a	g	2	2	2	0	0	0	(45)	0	7	0	1	e
vociferans	1	a	a	a	a	a	a	1	1	?	0	?	?	4	0	?	1	?	?
wattsi	?	z	a	a	g	m	a	1	2	?	0	0	1	5	0	7	0	1	a
whitemani	?	z	a	a	a	t	m	0	2	?	0	?	?	?	?	?	?	?	a
Polychrus acutirostris	?	a	a	z	a	a	m	1	1	?	0	0	0	?	1	?	3	0	?
Polychrus marmoratus	?	a	z	t	a	a	z	1	1	?	0	?	0	?	1	?	3	?	n
Leiocephalus schreibersi	?	?	?	a	a	a	a	2	2	?	0	0	0	?	0	?	4	?	a
Leiocephalus melanochlor	?	?	?	a	a	z	a	2	2	?	0	0	0	?	0	?	4	?	?
Urostrophus vautieri	?	?	?	?	a	a	m	2	2	?	0	0	0	?	1	b	4	?	?
Anisolepis undulatus	?	?	?	?	a	a	m	2	2	?	0	(01)	0	?	1	0	?	?	?
Enyalius iheringi	?	?	?	?	?	a	a	2	2	?	0	0	0	?	?	?	3	?	?
Phenacosaurus nicefori	?	?	?	?	?	?	?	1	(12)	?	?	1	0	?	1	(01)	0	0	?
Diplolaemus darwinii	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?

	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
acutus	2	a	a	a	z	a	z	0	a	a	a	a	a	a	a	a	a	a	a
aeneus	0	a	a	a	a	a	z	0	a	a	a	a	a	a	z	a	a	a	a
aequatorialis	1	a	a	g	z	a	g	0	a	a	a	z	a	a	z	a	q	a	r
agassizi	1	a	a	a	a	a	a	0	a	a	a	a	n	a	z	a	g	a	g
ahli	2	a	a	n	z	a	n	(02)	a	a	a	z	a	a	z	a	z	z	n
aliniger	0	a	a	a	a	a	z	0	a	a	a	a	a	a	n	a	a	a	z
allisoni	2	z	a	a	z	a	z	0	z	a	a	z	n	a	n	n	a	a	n
allogus	2	a	a	z	z	a	z	0	a	a	a	n	a	a	n	?	z	z	a
altae	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
altavelensis	2	a	a	a	z	a	a	0	a	a	a	?	a	a	z	a	z	a	z
alutaceus	2	a	a	z	a	a	z	0	a	a	a	?	a	a	z	a	a	a	a
angusticeps	(12)	a	a	f	p	a	u	0	a	a	d	j	a	a	z	a	a	a	k
antonii	0	a	a	z	a	a	a	0	a	a	a	a	a	?	z	a	z	a	a
apollinaris	0	a	a	a	a	a	a	0	a	a	a	z	a	a	z	a	z	a	a
aquaticus	2	a	a	a	z	a	z	0	a	a	a	?	a	?	z	a	z	a	a
argenteolus	2	a	a	z	n	a	a	0	a	?	a	g	a	a	z	n	a	a	g
argillaceus	0	r	a	z	a	a	z	0	a	a	a	a	a	a	z	a	z	a	n
armouri	2	n	a	a	z	a	z	0	a	a	a	a	z	a	a	a	z	a	z
auratus	(12)	a	a	a	a	z	t	0	a	a	a	a	a	a	z	a	r	a	a
bahorucoensis	2	a	a	n	n	a	a	0	a	a	a	a	a	n	a	a	g	a	a
baleatus	2	a	a	a	z	a	a	0	a	n	n	r	a	a	a	a	z	a	n
barahonae	2	a	a	a	z	a	a	0	a	n	a	i	a	a	a	a	z	a	e
barkeri	2	a	a	a	z	z	z	0	a	a	a	z	a	a	z	?	z	a	a
bartschi	(12)	a	a	z	z	a	a	0	a	a	a	z	a	a	n	a	n	a	a
bimaculatus	2	z	a	n	z	a	z	0	a	a	a	a	a	a	a	a	a	a	x
biporcatus	1	a	a	a	n	a	z	0	a	a	a	n	a	a	z	a	z	a	a
bitectus	(12)	a	a	a	n	n	a	0	a	a	a	a	a	a	z	a	z	a	a
bonairensis	0	a	a	a	a	a	a	0	a	a	a	a	a	a	z	a	a	a	a
brevirostris	1	a	a	a	z	a	n	0	a	a	a	a	a	a	z	a	z	a	z
brunneus	2	n	a	a	a	a	n	0	z	a	a	?	a	?	z	a	a	a	a
(Ch.) chameleonides	2	a	z	a	z	a	g	0	a	z	z	z	a	z	a	z	z	a	a
capito	2	a	a	a	z	a	z	1	a	a	n	r	a	a	z	a	z	a	a
carolinensis	2	z	a	a	g	a	w	0	z	a	a	z	n	a	g	a	z	a	a
chloris	1	a	a	z	a	a	a	0	a	a	a	a	a	a	z	a	z	a	a
chlorocyanus	0	a	a	a	a	a	g	(02)	a	a	a	n	a	a	a	a	a	a	a
christophei	(12)	a	a	z	z	a	z	0	a	a	a	z	?	a	z	a	z	a	a
chrysolepis	2	a	a	a	z	z	z	0	a	a	a	a	a	a	a	a	z	a	a
clivicola	1	a	a	z	z	a	z	0	a	a	a	z	a	a	z	a	z	a	a
cobanensis	1	a	a	n	a	a	a	0	a	a	a	g	a	a	z	a	z	a	a
coelestinus	1	a	a	a	a	a	v	0	a	a	e	a	a	a	a	a	a	a	s

	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
compressicauda	2	a	a	a	a	a	n	0	a	a	a	n	a	a	z	a	t	a	a
conspersus	2	a	a	z	z	a	z	0	a	?	a	z	z	a	z	a	g	a	n
crassulus	0	a	a	a	a	a	z	0	a	a	a	z	a	a	z	a	z	a	a
cristatellus	2	a	a	w	z	h	z	0	a	a	a	e	a	a	d	a	z	z	z
(Cr.) barbouri	0	a	a	a	z	n	z	0	a	a	a	z	z	a	z	a	z	a	a
cupreus	(12)	a	a	z	a	a	z	0	a	a	a	z	a	?	z	a	z	a	a
cuprinus	2	a	a	z	z	a	z	0	a	a	a	z	m	a	z	a	z	a	a
cuvieri	2	a	a	a	z	a	g	0	a	n	a	n	a	a	a	a	y	a	b
cyanopleurus	1	a	a	z	i	a	a	0	a	a	a	a	a	a	z	a	i	a	a
cybotes	2	n	a	a	z	n	x	0	a	a	a	l	z	a	f	a	z	a	z
darlingtoni	2	a	a	a	z	a	a	0	a	n	z	a	a	z	z	a	z	a	a
desechensis	2	a	a	z	z	a	g	0	a	a	a	a	a	a	n	a	z	z	a
distichus	2	a	a	a	t	a	l	0	a	?	a	i	a	a	z	a	z	a	q
dollfusianus	(12)	a	a	a	a	a	z	0	a	a	a	g	a	a	z	a	z	a	a
dunni	2	a	a	a	a	n	z	0	a	a	a	z	a	a	z	a	z	a	a
equestris	2	a	z	a	z	a	i	0	a	z	a	n	a	i	a	z	u	a	i
etheridgei	2	a	a	z	t	a	t	0	a	a	a	n	a	a	z	a	z	a	g
evermanni	2	a	a	z	z	a	a	0	a	a	a	a	n	a	a	a	n	a	a
fasciata	1	a	a	a	a	a	z	0	a	a	a	n	a	a	z	a	n	a	a
fowleri	1	a	a	z	z	a	a	0	a	a	a	z	a	a	z	a	n	a	n
fraseri	1	a	a	a	a	a	a	0	a	g	a	z	a	a	z	a	z	a	a
frenatus	0	a	a	a	a	a	n	(02)	a	a	a	z	a	a	z	a	z	a	a
fuscoauratus	(12)	a	a	a	a	a	t	0	a	a	a	a	a	a	z	a	z	a	?
gadovii	2	a	a	a	a	z	z	0	a	a	a	a	a	z	z	a	z	a	z
garmani	2	a	a	z	z	a	n	0	a	a	a	n	a	a	n	a	n	a	n
gingivinus	2	a	a	z	a	a	z	0	a	?	a	a	a	a	a	?	a	a	z
grahami	2	a	a	z	y	a	s	0	a	?	a	n	?	a	e	a	a	a	u
granuliceps	2	a	a	a	z	a	i	0	a	a	a	n	a	?	z	a	z	a	a
griseus	0	?	a	a	a	a	a	0	a	a	a	a	a	a	z	a	a	a	z
gundlachi	2	a	a	z	z	a	n	0	a	a	a	t	g	a	a	a	z	z	n
hendersoni	(12)	a	a	z	c	a	n	0	a	?	a	a	a	a	a	a	a	a	a
homolechis	2	a	a	n	z	n	z	0	a	?	a	z	a	a	z	a	z	z	n
humilis	2	a	a	n	a	n	z	0	a	a	a	z	a	a	z	a	z	a	a
insignis	2	a	a	a	z	a	a	0	a	a	a	n	a	a	z	a	?	a	a
insolitus	3	a	a	z	z	z	z	0	a	a	n	a	a	z	z	?	a	a	a
intermedius	1	a	a	a	a	a	?	2	a	a	a	a	a	a	a	a	z	a	a
isolepis	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
jacare	3	a	a	a	z	a	z	1	a	g	a	a	a	n	z	a	z	a	a
jubar	2	a	a	z	n	z	z	0	a	a	a	n	a	a	z	a	z	z	n
kemptoni	1	a	a	a	?	a	z	0	a	a	a	a	a	a	z	?	n	a	a

	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
krugi	2	a	a	z	z	a	a	0	a	a	a	a	a	a	?	a	z	z	a
laeviventris	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
latifrons	(01)	a	a	a	n	a	a	0	a	a	a	z	a	a	z	a	z	a	a
leachii	2	a	a	a	z	a	n	0	a	a	a	a	n	a	n	a	a	a	a
lemurinus	(12)	a	a	a	a	a	z	0	a	a	a	z	a	a	z	a	z	a	a
limifrons	1	a	a	a	a	a	g	0	a	?	a	a	a	a	z	a	z	a	a
lineatopus	1	a	a	z	a	a	z	0	a	?	a	t	a	a	z	a	p	a	a
lineatus	2	a	a	a	z	a	n	0	a	a	a	a	n	a	z	a	n	a	z
liogaster	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
lividus	2	a	a	a	z	a	z	0	a	a	a	a	a	a	z	a	a	a	a
longiceps	2	n	a	a	z	a	a	0	z	a	a	a	g	a	a	a	a	a	a
longitibialis	2	a	a	a	z	z	z	0	a	a	a	a	z	a	a	a	z	a	z
loveridgei	2	a	a	a	z	a	n	0	a	a	a	n	?	a	?	a	z	a	a
loysianus	1	a	a	a	n	a	z	(02)	a	a	a	t	a	a	n	a	z	a	a
luciae	0	a	a	a	a	a	z	1	a	a	a	z	a	n	z	a	a	a	a
lucius	2	a	a	o	z	k	e	0	a	?	a	o	a	a	a	a	z	a	g
luteogularis	2	a	z	a	z	a	a	0	a	z	a	z	a	n	a	z	z	a	n
luteosignifer	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
maculiventris	2	a	a	a	a	a	a	0	a	a	a	z	?	a	z	a	z	a	a
marcanoi	2	z	a	a	z	z	z	0	a	?	a	n	z	a	a	a	z	a	z
mariarum	0	a	a	a	a	a	z	2	a	a	a	?	a	a	z	a	z	a	a
marmoratus	2	a	a	a	z	a	z	(01)	a	a	a	a	a	a	n	a	a	a	z
maynardi	2	z	a	a	a	a	z	0	a	a	z	a	a	?	z	a	a	a	a
megapholidotus	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
meridionalis	0	a	a	a	a	a	z	0	a	a	a	z	a	a	a	a	z	a	a
mestrei	2	a	a	z	z	a	z	0	a	a	a	z	?	a	z	a	z	z	z
micropholidotus	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
microtus	1	a	a	?	z	a	z	0	a	a	a	a	z	?	z	a	z	a	a
monticola	1	a	a	d	r	a	n	0	a	?	a	e	a	a	z	a	q	a	a
nebuloides	(01)	a	a	a	a	z	z	0	a	a	a	n	a	a	z	a	z	a	a
nebulosus	(01)	a	a	a	a	a	z	0	a	a	a	n	a	a	z	a	z	a	a
noblei	2	a	z	a	z	a	?	0	a	z	a	n	a	a	a	z	z	a	g
notopholis	1	a	a	a	i	z	z	0	a	a	a	i	a	a	z	a	z	a	a
nubilis	2	a	a	z	z	a	z	0	a	a	a	?	a	a	a	a	a	a	a
occultus	0	a	a	a	a	g	z	1	a	a	z	a	a	w	z	a	a	a	a
oculatus	2	a	a	a	z	a	z	0	a	?	a	a	a	a	z	?	n	a	z
olssoni	(12)	a	a	a	n	a	n	0	a	a	a	a	a	a	z	a	a	a	a
onca	2	a	a	a	z	z	x	0	a	?	a	s	n	f	v	a	z	a	j
opalinus	2	a	a	r	i	a	n	0	a	a	a	e	a	a	r	a	a	a	r
ophiolepis	2	a	a	a	z	z	a	0	a	a	a	a	a	?	?	?	?	a	a

	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
ortoni	(01)	a	a	a	a	a	t	0	a	a	a	?	a	a	z	a	z	a	a
oxylophus	(12)	a	a	a	a	a	z	0	a	a	a	z	a	a	z	a	z	a	a
(Ph.) heterodermus	0	a	a	a	z	a	i	0	a	?	v	s	z	z	z	a	a	a	a
parvicirculatus	2	a	a	n	a	a	a	0	a	a	a	z	a	a	z	a	t	a	a
paternus	2	a	a	a	n	a	z	0	a	a	a	a	a	a	z	a	a	a	a
pentaprion	1	a	a	a	z	a	a	0	a	a	a	z	a	?	z	a	z	a	a
perracae	0	a	a	a	a	a	n	0	a	a	a	t	a	a	z	a	r	a	a
petersi	2	a	a	a	a	a	z	2	a	a	a	z	a	a	z	a	z	a	a
placidus	3	a	a	a	z	a	z	0	a	a	z	a	a	z	z	?	a	a	a
poecilopus	2	a	a	a	z	a	a	0	a	a	a	n	?	a	z	a	z	a	a
polylepis	(12)	a	a	q	d	a	o	0	a	?	a	r	a	a	z	a	y	a	a
poncencis	2	a	a	z	z	a	t	0	a	a	a	a	a	a	z	a	z	a	z
porcatus	2	z	a	a	r	a	i	0	z	a	a	a	a	a	r	a	a	a	i
proboscis	2	a	a	a	z	a	a	0	a	?	a	z	n	z	z	a	z	a	a
pulchellus	2	a	a	a	z	a	n	0	a	a	a	?	a	a	z	a	a	a	a
punctatus	(12)	a	a	a	f	a	i	1	a	?	a	i	a	a	z	a	z	a	a
quadriocellifer	2	a	a	z	z	z	z	0	a	a	a	a	a	a	z	a	z	z	a
reconditus	2	a	a	z	z	a	z	0	a	a	a	t	z	a	n	a	z	a	a
richardi	0	a	a	a	a	a	n	0	a	a	a	a	a	a	z	a	z	a	n
ricordi	2	a	a	a	z	a	a	0	a	n	a	z	a	a	a	a	z	a	n
roosevelti	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
roquet	0	a	a	a	a	a	n	0	a	a	a	n	a	a	z	a	a	a	a
rubribarbus	2	a	a	z	a	a	z	0	a	a	a	z	z	a	z	a	z	z	t
ruizi	2	a	a	a	a	a	n	1	a	a	z	a	?	a	z	a	z	a	a
sagrei	2	i	a	z	w	t	t	0	a	?	a	q	a	a	z	a	w	z	w
semilineatus	1	a	a	l	f	f	b	0	a	a	a	h	a	a	z	a	l	a	d
sericeus	0	a	a	a	a	n	t	0	a	a	a	a	a	a	z	a	n	a	a
sheplani	3	a	a	z	z	z	z	0	a	a	z	a	a	z	z	?	a	a	a
shrevei	2	n	a	a	z	z	a	0	a	a	a	g	z	a	z	a	z	a	z
smallwoodi	2	a	z	a	z	a	?	0	a	?	a	z	?	a	a	z	z	a	a
smaragdinus	2	z	a	n	n	a	z	0	n	a	a	a	a	a	z	a	a	a	a
sminthus	0	a	a	a	a	a	z	0	a	a	a	z	?	a	?	a	z	a	a
solitarius	3	a	a	a	z	a	r	1	a	a	?	e	a	z	z	a	e	a	a
spectrum	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
squamulatus	2	a	a	a	z	a	a	0	a	a	a	z	a	a	z	a	z	a	a
strahmi	2	n	a	a	z	a	g	0	a	a	a	z	n	a	z	a	z	a	z
stratulus	0	a	a	a	a	i	z	0	a	a	a	i	i	a	a	a	a	a	a
subocularis	(01)	a	a	a	a	z	n	0	a	a	a	n	a	a	z	a	z	a	a
taylori	2	?	a	a	a	n	z	0	a	a	a	z	a	a	z	z	z	a	a
tolimensis	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?

	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
townsendi	0	a	a	a	a	a	n	0	a	a	a	g	a	a	z	a	z	a	a
transversalis	2	a	a	a	z	a	z	0	a	a	a	z	a	a	z	a	z	a	a
trinitatis	0	a	a	a	a	a	z	0	a	?	a	a	a	a	z	a	a	a	a
tropidogaster	(12)	a	a	a	r	z	z	0	a	a	a	a	a	a	z	a	z	a	a
tropidolepis	1	a	a	a	a	a	z	0	a	a	a	a	z	a	z	?	z	a	a
tropidonotus	(12)	a	a	a	a	a	z	1	a	a	a	z	a	a	z	a	z	a	a
valencienni	2	a	a	d	z	a	w	0	a	?	a	f	a	a	d	a	i	a	z
vanidicus	0	a	a	z	i	a	z	0	a	a	a	n	a	a	z	a	v	a	a
ventrimaculatus	2	a	a	?	n	a	n	0	a	a	a	z	a	a	z	a	z	a	a
vermiculatus	2	a	a	z	z	a	a	0	r	?	a	z	a	a	a	a	z	a	i
vociferans	?	?	?	a	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
wattsi	2	a	a	a	z	a	z	0	a	?	a	a	n	a	z	a	z	a	a
whitemani	2	z	a	a	z	z	z	0	a	a	a	g	z	a	a	a	z	a	z
Polychrus acutirostris	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
Polychrus marmoratus	0	a	a	?	a	z	a	0	a	a	z	a	a	t	v	?	a	?	a
Leiocephalus schreibersi	0	a	a	a	a	a	a	0	a	a	a	n	a	a	z	?	a	a	a
Leiocephalus melanochlor	0	?	a	a	a	a	a	0	?	?	a	a	?	a	z	?	a	a	a
Urostrophus vautieri	0	?	a	a	a	a	a	0	?	?	z	a	?	z	a	?	a	?	a
Anisolepis undulatus	0	?	a	a	a	a	a	0	?	?	z	a	?	?	a	?	a	?	a
Enyalius iheringi	0	?	a	a	a	a	a	0	?	?	z	a	?	?	a	?	a	?	a
Phenacosaurus nicefori	0	?	?	a	?	a	?	?	?	?	?	?	?	?	?	?	?	?	?
Diplolaemus darwinii	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?

	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95
acutus	a	a	a	a	a	z	0	z	a	z	a	a	a	a	a	a	5	0	1
aeneus	a	a	n	a	a	z	0	z	a	z	a	a	a	a	a	a	0	0	1
aequatorialis	a	z	a	a	a	a	0	w	a	z	a	a	a	a	a	a	0	0	1
agassizi	a	z	a	a	a	z	0	z	a	z	a	a	a	a	a	a	0	0	1
ahli	n	n	g	a	n	z	1	z	a	z	a	a	z	a	a	a	?	0	1
aliniger	a	n	g	a	a	z	1	a	a	z	a	z	a	a	a	a	5	0	1
allisoni	a	z	z	a	z	z	1	a	a	z	a	a	a	a	a	a	0	0	1
allogus	a	z	a	a	n	z	0	z	a	z	a	a	z	a	a	a	0	0	1
altae	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	1
altavelensis	z	a	t	n	a	z	0	z	a	z	a	a	n	n	a	a	?	0	1
alutaceus	?	?	a	?	a	z	1	z	z	z	a	a	z	a	a	a	0	1	1
angusticeps	u	g	p	g	u	z	1	f	j	z	a	a	a	a	a	a	0	1	1
antonii	a	a	a	a	n	z	1	n	a	z	a	a	z	a	a	a	0	1	1
apollinaris	a	a	a	a	a	n	0	z	a	z	?	a	z	a	a	a	?	0	?
aquaticus	a	z	a	a	a	z	1	z	?	z	a	a	a	z	a	a	?	?	1
argenteolus	a	a	a	a	z	z	1	z	a	z	a	a	?	a	a	a	0	1	1
argillaceus	z	z	n	a	r	z	1	n	a	z	a	z	a	a	a	a	?	1	1
armouri	a	z	a	a	a	z	1	z	a	z	a	a	z	a	a	a	?	0	1
auratus	a	a	c	a	r	z	1	h	r	z	a	a	r	a	a	a	0	(01)	1
bahorucoensis	z	a	a	a	a	z	0	z	a	z	a	a	a	a	a	a	0	0	1
baleatus	a	r	a	a	a	z	3	i	a	z	z	a	?	a	a	a	0	0	1
barahonae	a	a	a	a	a	z	3	i	a	z	r	a	?	a	a	a	0	0	1
barkeri	a	n	a	a	a	z	1	n	z	z	a	a	z	a	a	a	?	1	1
bartschi	a	a	g	a	a	z	1	z	n	z	a	a	a	a	a	a	0	0	1
bimaculatus	a	u	a	a	z	z	1	o	l	z	a	a	a	a	a	a	5	0	1
biporcatus	a	z	a	a	n	z	0	z	a	z	a	a	a	a	a	a	0	1	1
bitectus	a	t	a	a	n	z	1	n	n	z	a	a	n	z	a	a	?	1	1
bonairensis	a	a	n	a	a	n	0	z	a	z	a	a	a	a	a	a	0	0	1
brevirostris	z	a	a	a	a	z	0	z	z	z	a	a	a	a	a	a	0	0	1
brunneus	a	?	n	a	z	z	1	a	a	z	a	a	n	a	a	a	0	0	1
(Ch.) chameleonides	a	z	n	a	a	z	0	a	a	z	z	a	a	a	a	a	1	2	0
capito	a	z	a	a	r	z	1	z	e	z	a	a	r	a	a	a	0	1	1
carolinensis	a	z	z	a	n	z	1	q	a	z	a	a	a	a	a	a	0	0	1
chloris	i	a	c	a	a	r	(01)	n	a	z	a	a	a	n	a	a	0	1	1
chlorocyanus	a	t	a	a	a	z	1	a	a	z	a	z	a	a	a	a	5	0	1
christophei	a	a	a	a	z	z	1	t	a	z	a	a	a	a	a	a	0	1	1
chrysolepis	a	a	a	a	n	z	1	z	a	z	a	a	z	z	a	a	0	1	1
clivicola	a	n	a	a	a	z	1	n	a	z	a	?	n	a	n	a	0	1	1
cobanensis	a	a	a	a	a	z	1	z	a	z	a	a	n	a	a	a	0	1	1
coelestinus	e	d	a	a	a	z	1	a	d	z	a	n	a	a	a	a	5	0	1

	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95
compressicauda	a	a	a	a	t	z	1	n	n	z	a	a	z	a	a	a	0	1	1
conspersus	a	a	a	a	w	z	1	z	n	z	a	a	z	a	a	a	5	0	1
crassulus	a	z	a	a	a	z	0	a	a	z	a	a	z	a	a	a	0	1	1
cristatellus	n	a	a	a	r	z	0	z	g	z	a	a	z	a	a	a	(23)	0	1
(Cr.) barbouri	a	z	a	a	a	z	1	n	n	z	a	a	a	a	a	a	0	1	1
cupreus	a	n	a	a	t	z	1	z	n	z	a	a	n	n	a	a	0	1	1
cuprinus	a	a	a	a	a	z	1	z	a	z	a	a	z	n	a	a	0	1	1
cuvieri	a	v	a	a	a	z	3	z	a	z	a	a	a	a	a	a	1	0	1
cyanopleurus	n	a	e	a	i	z	1	z	a	z	a	a	a	a	a	a	0	1	1
cybotes	a	u	a	a	r	z	1	z	e	z	a	a	i	a	a	a	(45)	1	1
darlingtoni	?	a	a	a	a	n	0	a	a	z	a	a	?	a	a	a	0	1	1
desechensis	a	a	a	a	t	z	0	z	n	z	a	a	z	a	a	a	?	0	1
distichus	y	a	o	a	l	z	0	z	s	z	a	a	a	n	a	a	0	0	1
dollfusianus	a	a	d	a	n	z	1	z	g	z	a	a	n	a	a	a	0	1	1
dunni	a	t	g	a	z	z	1	z	z	z	a	a	z	n	a	a	0	1	1
equestris	k	z	a	a	a	a	0	d	a	z	a	a	?	a	n	a	1	0	1
etheridgei	a	a	a	a	a	z	1	z	a	z	a	a	a	a	a	a	0	1	1
evermanni	a	a	a	a	n	z	(01)	z	a	z	a	a	z	a	a	a	0	0	1
fasciata	a	a	a	z	a	z	0	n	a	z	a	a	n	a	a	a	0	1	1
fowleri	?	a	a	a	a	z	1	n	a	z	a	a	a	a	a	a	0	1	1
fraseri	n	z	a	a	a	a	0	a	a	z	a	a	?	a	a	a	0	0	1
frenatus	a	z	a	a	a	a	0	z	a	z	a	a	n	a	a	a	0	0	1
fuscoauratus	a	a	d	a	z	z	1	z	n	z	a	a	n	n	a	a	0	1	1
gadovii	a	z	a	a	z	z	1	n	z	z	?	a	z	z	a	a	0	0	1
garmani	n	a	g	a	n	z	1	z	a	z	a	a	n	a	a	a	5	0	1
gingivinus	?	z	a	a	z	z	1	z	?	z	a	a	z	a	a	a	5	1	1
grahami	n	a	d	a	v	z	1	z	d	z	a	a	a	a	a	a	5	0	1
granuliceps	a	n	a	a	n	z	1	r	r	z	a	a	i	r	a	a	0	1	1
griseus	a	a	a	a	a	e	0	z	f	z	a	a	n	a	a	a	0	0	1
gundlachi	z	a	a	a	z	z	(03)	z	n	z	a	a	t	a	a	g	(23)	0	1
hendersoni	a	a	c	a	a	z	0	q	i	z	a	a	a	a	a	a	0	0	1
homolechis	a	a	a	a	t	z	1	z	a	z	a	a	n	?	a	a	0	0	1
humilis	z	n	a	a	n	z	1	n	z	z	a	a	r	z	a	a	0	1	1
insignis	a	z	a	a	a	a	0	n	a	z	a	a	?	a	a	a	?	0	1
insolitus	a	a	r	z	z	z	1	i	a	z	a	a	a	a	z	z	0	1	1
intermedius	a	a	a	a	z	z	1	z	a	z	a	a	a	z	a	a	0	(01)	1
isolepis	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	1
jacare	a	z	a	z	a	a	0	n	a	z	a	n	n	a	a	a	0	(01)	1
jubar	a	z	a	a	z	z	1	z	a	z	a	a	n	a	a	a	0	0	1
kemptoni	a	a	a	a	n	z	1	n	?	z	a	z	a	a	a	a	?	1	1

	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95
krugi	a	a	a	a	a	z	0	z	a	z	a	a	z	a	a	a	3	0	1
laeviventris	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	1
latifrons	a	z	a	a	a	a	0	z	a	z	a	a	n	a	n	a	0	0	1
leachii	a	n	a	a	t	z	1	g	a	z	a	a	a	a	a	a	5	0	1
lemurinus	a	n	a	a	g	z	1	z	a	z	a	a	i	i	a	a	0	(01)	1
limifrons	a	a	a	a	z	z	1	z	z	z	a	a	a	a	a	a	0	1	1
lineatopus	a	a	n	a	n	z	1	z	n	z	a	a	a	a	a	a	5	1	1
lineatus	a	a	a	a	n	z	1	r	a	z	a	a	z	a	a	a	0	0	1
liogaster	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	1
lividus	a	g	n	a	z	z	1	z	t	z	a	a	a	a	a	a	0	0	1
longiceps	a	a	n	a	a	z	1	a	a	z	a	a	a	a	a	a	0	0	1
longitibialis	a	z	a	a	a	z	1	z	a	z	a	a	a	a	a	a	4	0	1
loveridgei	a	z	a	a	z	z	0	z	a	z	a	a	a	a	a	a	0	0	1
loysianus	n	z	n	a	t	z	1	t	a	z	a	z	a	a	a	a	0	1	1
luciae	a	g	a	a	a	z	0	g	a	z	a	a	a	a	a	a	0	0	1
lucius	i	i	a	a	n	z	1	s	a	z	a	a	i	a	a	a	0	0	1
luteogularis	a	z	a	a	a	a	(01)	a	a	z	a	a	?	a	n	a	?	0	1
luteosignifer	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	0	?	1
maculiventris	a	a	a	a	?	z	1	z	n	z	a	a	a	z	a	a	?	1	1
marcanoi	a	z	a	a	a	z	1	z	a	z	a	a	a	a	a	a	4	0	1
mariarum	a	a	a	a	i	z	1	t	a	z	a	n	a	a	a	a	0	1	1
marmoratus	a	n	g	a	z	z	1	z	a	z	a	a	a	a	a	a	5	0	1
maynardi	?	a	n	a	n	z	1	a	a	z	a	a	a	a	a	a	?	0	1
megapholidotus	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	1
meridionalis	a	z	a	a	g	z	1	t	n	z	a	a	a	a	a	a	0	(01)	1
mestrei	a	?	a	a	z	z	1	z	n	z	z	a	z	a	a	a	0	0	1
micropholidotus	?	?	?	?	?	?	?	?	?	?	?	?	?	z	?	?	?	?	1
microtus	a	?	a	a	a	a	0	a	a	z	a	a	z	a	a	a	?	?	1
monticola	c	a	a	a	c	z	1	c	n	z	a	a	a	a	a	a	0	1	1
nebuloides	a	g	a	a	a	z	1	z	z	z	a	a	z	a	a	a	0	1	1
nebulosus	a	g	a	a	t	z	1	z	z	z	a	a	i	a	a	a	0	1	1
noblei	a	z	a	a	a	n	0	a	a	z	a	a	a	a	a	a	1	0	1
notopholis	z	a	a	a	r	z	1	n	n	z	a	a	z	z	a	a	0	1	1
nubilis	a	n	g	a	z	z	1	z	z	z	a	a	a	a	a	a	0	0	1
occultus	a	a	x	z	a	z	1	a	a	a	a	?	a	a	a	a	0	1	1
oculatus	a	a	n	a	z	z	1	z	a	z	a	a	n	a	a	a	5	0	1
olssoni	z	a	a	a	a	z	1	z	a	z	a	a	a	a	a	a	0	1	1
onca	a	i	a	a	h	z	1	q	e	z	n	a	r	n	a	a	0	(01)	1
opalinus	i	a	n	a	n	z	1	z	a	z	a	a	n	a	a	a	5	0	1
ophiolepis	a	a	a	a	n	z	1	z	a	z	a	a	z	a	a	a	0	1	1

	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95
ortoni	a	a	g	a	a	z	0	z	n	z	a	z	n	a	a	a	0	1	1
oxylophus	a	a	a	a	g	z	1	z	n	z	a	a	n	z	a	a	?	1	1
(Ph.) heterodermus	a	n	c	z	a	h	0	v	c	z	a	n	a	a	z	a	0	2	1
parvicirculatus	a	a	a	a	a	z	1	z	t	z	a	a	z	a	a	a	0	1	1
paternus	a	n	z	a	n	z	1	a	a	z	a	a	a	a	a	a	?	0	1
pentaprion	a	z	a	a	a	z	1	z	a	z	a	z	a	z	a	a	0	1	1
perracae	g	a	i	a	a	z	0	z	r	z	a	a	a	a	a	a	0	1	1
petersi	a	a	a	a	a	z	1	n	a	z	a	a	a	a	a	a	?	1	1
placidus	a	a	t	z	a	?	1	a	a	z	a	a	a	a	z	z	0	1	1
poecilopus	a	z	a	a	z	z	1	z	a	z	a	a	a	z	a	a	?	(01)	1
polylepis	e	d	a	a	z	z	1	w	z	z	a	a	z	a	a	a	0	1	1
poncencis	z	a	a	a	g	z	1	z	a	z	a	a	n	a	a	a	5	0	1
porcatus	a	z	z	a	z	z	1	a	a	z	a	a	a	a	a	a	0	0	1
proboscis	a	n	a	z	a	a	0	?	a	z	a	z	?	a	a	a	?	2	1
pulchellus	a	a	t	a	z	z	(01)	z	a	z	a	a	a	a	a	a	(23)	0	1
punctatus	a	a	a	a	a	z	0	p	a	z	a	a	a	a	a	a	0	0	1
quadriocellifer	a	a	a	a	z	z	1	z	a	z	a	a	z	a	a	a	?	0	1
reconditus	a	a	a	a	a	z	1	z	a	z	a	a	z	a	a	a	5	(01)	1
richardi	a	a	g	a	a	a	0	n	a	z	a	a	n	a	a	a	0	0	1
ricordi	a	n	a	a	a	z	3	r	a	z	z	a	?	a	a	a	0	0	1
roosevelti	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	1
roquet	a	a	g	a	a	z	0	z	a	z	a	a	a	a	a	a	0	0	1
rubribarbus	n	z	a	a	g	z	1	z	a	z	a	a	z	a	a	a	0	0	1
ruizi	a	a	a	z	a	a	0	n	a	z	a	a	a	a	a	a	?	1	1
sagrei	l	o	a	a	n	z	1	t	d	z	a	a	n	n	a	a	5	0	1
semilineatus	l	a	b	a	l	z	1	y	a	z	a	a	a	a	a	a	0	1	1
sericeus	a	a	a	a	n	z	1	z	g	z	a	a	a	z	a	a	?	1	1
sheplani	?	a	j	z	a	z	1	a	a	z	a	a	?	a	z	z	0	1	1
shrevei	a	n	a	a	e	z	1	z	a	z	a	a	a	a	a	a	4	0	1
smallwoodi	a	a	a	a	a	a	0	a	a	z	?	a	?	a	a	a	?	0	1
smaragdinus	a	t	w	a	z	z	1	a	a	z	a	a	n	a	a	a	0	(01)	1
sminthus	a	z	a	a	z	z	0	z	a	z	a	a	z	a	a	a	?	1	1
solitarius	a	z	i	z	a	a	0	i	a	z	i	r	a	a	a	a	?	1	1
spectrum	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	1
squamulatus	a	z	a	a	a	a	0	t	a	z	a	a	n	a	a	a	0	0	1
strahmi	g	t	a	a	a	z	1	z	a	z	a	a	n	a	a	a	4	0	1
stratulus	a	i	a	a	r	z	1	z	a	z	a	a	a	a	a	a	3	0	1
subocularis	a	a	a	a	z	z	1	n	t	z	a	a	z	a	a	a	?	0	1
taylori	a	a	a	a	z	z	1	z	a	z	a	a	z	n	a	a	0	0	1
tolimensis	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	1

	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95
townsendi	a	z	a	a	z	z	1	z	z	z	a	a	z	a	a	a	?	1	1
transversalis	a	a	a	z	a	a	0	n	a	z	a	a	i	a	a	a	?	1	1
trinitatis	a	a	n	a	a	z	?	z	?	z	a	a	a	a	a	a	0	0	1
tropidogaster	a	a	a	a	n	z	1	z	z	z	a	a	a	i	a	a	0	1	1
tropidolepis	a	z	a	a	a	z	1	z	a	z	a	a	z	z	a	a	0	1	1
tropidonotus	a	r	a	a	e	z	1	v	i	z	a	a	u	n	a	a	0	1	1
valencienni	z	c	a	a	e	z	1	w	a	z	a	r	i	a	a	a	5	0	1
vanidicus	a	a	e	i	a	z	1	r	i	z	a	a	a	a	a	a	0	1	1
ventrimaculatus	a	n	a	a	a	t	0	g	a	z	a	?	a	a	a	a	0	0	1
vermiculatus	a	a	a	a	a	a	1	i	a	z	i	a	a	a	a	a	0	0	1
vociferans	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	1
wattsi	a	?	n	a	z	z	1	z	z	z	a	a	a	a	a	a	0	0	1
whitemani	a	z	a	a	a	z	1	z	a	z	a	a	a	a	a	a	?	0	1
Polychrus acutirostris	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	0
Polychrus marmoratus	a	z	a	a	a	f	0	s	a	k	a	a	?	a	a	a	?	(02)	0
Leiocephalus schreibersi	a	z	a	z	a	a	0	a	z	z	?	a	?	z	a	a	?	0	0
Leiocephalus melanochloru	a	z	?	a	a	a	0	a	n	z	?	?	?	?	a	a	?	0	0
Urostrophus vautieri	?	?	a	a	?	?	0	a	a	a	?	?	?	?	a	a	?	(02)	0
Anisolepis undulatus	?	?	a	a	?	?	0	?	a	a	?	?	?	?	a	a	?	(02)	0
Enyalius iheringi	?	?	a	a	z	?	0	a	a	a	?	?	?	?	a	a	?	(02)	0
Phenacosaurus nicefori	?	?	?	?	?	?	0	?	?	?	?	?	?	?	?	?	?	?	1
Diplolaemus darwinii	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?

Appendix 1.3

Matrix of Non-morphological Character States

christophei	??????????????????????caiiljbghjdmttcaactgcattaaacaaccgtttataaaaattatc
chrysolepis	??
clivicola	??
cobanensis	??
coelestinus	??????????????????????hfmjdibgikdm?????????????????????????????????????
compressicauda	??
conspersus	??
crassulus	??
cristatellus	?????????????????????????gfnzpwbkffd2ttcaaccgtattttacaaccgcgcagcacaattatt
Cr._barbouri	??????????????????????????fkkagdc(de)fgdgttcaaccgtatttaacaaccgttcagaaacactatt
cupreus	??
cuprinus	??
cuvieri	?????????????????????????????????????ttaaactccatttaacaaccgctcagaaaatttatt
cyanopleurus	??
cybotes	??????????????????????????fedkmebffhdlttcaacagaacttaataaccgcccaggaaccttatt
darlingtoni	??????????????????????????ffrlnkfgi?dnttcaaccgcagtaatcaaccg?ttaaaataattgtt
desechensis	??
distichus	??????????????????????????hinaolbgemdoctcattagcatttaacaaccgcctaagttacttatc
dollfusianus	??
dunni	bbacbbbacbaabbbbfaaadb??
equestris	??
etheridgei	??????????????????????????chondmggfodi??????????????????????????????????
evermanni	??????????????????????????ef(en)0b4baefd3??????????????????????????????????????
fasciata	??
fowleri	??????????????????????????cgoologgfpdp??????????????????????????????????
fraseri	??
frenatus	??
fuscoauratus	??
gadovii	acacbacbbbaadbcabaaadb??
garmani	??????????????????????????fflxvqbgkyax??????????????????????????????????
gingivinus	??
grahami	??????????????????????????fflxbxbgkzdyttaaaccgtatttaacaactgcttaaataaattatt
granuliceps	??
griseus	?????????????????????????????????????tccgatagtggaaaccgattgctcagacaaattatt
gundlachi	??????????????????????????efg1bwbbk5f4??????????????????????????????????
hendersoni	??????????????????????????gjppdfbgfqdqttcaaccgcagtaaacgaccgtccagaacacttacc
homolechis	??????????????????????????bfjbbabbbbab??????????????????????????????????

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clivicola          ????????????????????????????????????????????????????????????????????????
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coelestinus        ??????????????????????hfmjdibgikdm??????????????????????????????????????
compressicauda     ????????????????????????????????????????????????????????????????????????
conspersus         ????????????????????????????????????????????????????????????????????????
crassulus          ????????????????????????????????????????????????????????????????????????
cristatellus       ??????????????????????gfnzpwbkffd2ttcaaccgtattttacaaccgcgcagcacaattatt
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cybotes            ??????????????????????fedkmebffhdlttcaacagaacttaataaccgcccaggaaccttatt
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distichus          ??????????????????????hinaolbgemdoctcattagcatttaacaaccgcctaagttacttatc
dollfusianus       ????????????????????????????????????????????????????????????????????????
dunni              bbacbbbacbaabbbbfaaadb?????????????????????????????????????????????????
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humilis	??
insignis	??
insolitus	?????????????????????cfoqdpgbjrdr???
intermedius	??
isolepis	??
jacare	??
jubar	??
kemptoni	??
krugi	?????????????????????ifn2bybbffdq???
laeviventris	??
latifrons	??
leachii	??
lemurinus	??
limifrons	????????????????????????????????????ttaaactgtgttttacaactgcttaaattttcaact
lineatopus	?????????????????????cevibqbgl0dv???
lineatus	??
liogaster	bdacbabacbaabbbccaaacb??
lividus	??
longiceps	??
longitibialis	??
loveridgei	??
loysianus	??
luciae	??
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maculiventris	??
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maynardi	??
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meridionalis	??
mestrei	??
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microtus	??
monticola	?????????????????????????jfrepdhhdjes??????????????????????????????????????

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notopholis                ????????????????????????????????????????????????????????????????????????
nubilis                   ????????????????????????????????????????????????????????????????????????
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Phenacosaurus_heterodermus ???????????????????????????????????????????????????????????????????????
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perracae                  ????????????????????????????????????????????????????????????????????????
petersi                   ????????????????????????????????????????????????????????????????????????
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quadriocellifer           ????????????????????????????????????????????????????????????????????????
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rubribarbus               ????????????????????????????????????????????????????????????????????????
ruizi                     ????????????????????????????????????????????????????????????????????????
sagrei                    ??????????????????????cflcbqbgm3dzttcgaccgtatttaacaaccgctttaaataaatact
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solitarius                ??????????????????????????????????????????????????????????????????????????
spectrum                  ??????????????????????????????????????????????????????????????????????????
squamulatus               ??????????????????????????????????????????????????????????????????????????
strahmi                   ??????????????????????????????????????????????????????????????????????????
stratulus                 ?????????????????????????ffn4b2baffdq??????????????????????????????????????
subocularis               ??????????????????????????????????????????????????????????????????????????
taylori                   bbacbababbaa(bc)bccfaaacb?????????????????????????????????????????????????????
tolimensis                ??????????????????????????????????????????????????????????????????????????
townsendi                 ??????????????????????????????????????????????????????????????????????????
transversalis             ??????????????????????????????????????????????????????????????????????????
trinitatis                ??????????????????????????????????????????????????????????????????????????
tropidogaster             ??????????????????????????????????????????????????????????????????????????
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tropidonotus              ??????????????????????????????????????????????????????????????????????????
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wattsi                    ??????????????????????????????????????????????????????????????????????????
whitemani                 ?????????????????????????fedkuwbffhdh??????????????????????????????????????
Polychrus_acutirostris    ??????????????????????????????????????????????????????????????????????????
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Urostrophus_vautieri      ??????????????????????????????????????????????????????????????????????????
Anisolepis_undulatus      ??????????????????????????????????????????????????????????????????????????
Enyalius_iheringi         ??????????????????????????????????????????????????????????????????????????
Phenacosaurus_nicefori    ??????????????????????????????????????????????????????????????????????????
Diplolaemus_darwinii      ??????????????????????????????????????????????????????????????????????????
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altae               ??????????????????????????????????????????????????????????????????????????
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alutaceus           tacctaatgaacaactaaaaaatttattgactca??????????????????????????????atgaac
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antonii             ??????????????????????????????????????????????????????????????????????????
apollinaris         ??????????????????????????????????????????????????????????????????????????
aquaticus           ??????????????????????????????????????????????????????????????401??????
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armouri             ??????????????????????????????????????????????????????????????????????????
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baleatus            ??????????????????????????????????????????????????????????????????????????
barahonae           ??????????????????????????????????????????????????????????????????atgagc
barkeri             ??????????????????????????????????????????????????????????????????????????
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biporcatus          ??????????????????????????????????????????????????????????????322??????
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brunneus            ??????????????????????????????????????????????????????????????????????????
Ch._chameleonides   acatcagtgaacaactaaaactcttatcgcttca??????????????????????????700??????
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christophei        aagtcagcgaattactacaattcctaccgcttca??????????????????????????????atgagc
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crassulus          ??????????????????????????????????????????????????????????????413??????
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Cr._barbouri       tacctagcgaataactacaacacctatcacttca??????????????????????????????atgagc
cupreus            ????????????????????????????????????????????????????????????40a??????
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cybotes            ttacttgtgagcagctaaaatctctaccgcttca??????????????????????????700??????
darlingtoni        tagtcagcgaataaccgcaattctcatcgcctca??????????????????????????????????????
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equestris          ????????????????????????????????????????????????????????????700atgagc
etheridgei         ????????????????????????????????????????????????????????????????atgagc
evermanni          ??????????????????????????????????????????????b(ab)badbddfbcefdce113??????
fasciata           ????????????????????????????????????????????????????????????????????????
fowleri            ????????????????????????????????????????????????????????????????????????
fraseri            ????????????????????????????????????????????????????????????????????????
frenatus           ????????????????????????????????????????????????????????????601??????
fuscoauratus       ????????????????????????????????????????????????????????????????40a??????
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garmani            ??????????????????????????????????????????????????????????????????401atgagc
gingivinus         ?????????????????????????????????ecacbbcacba??????????????????027??????
grahami            ttattaatgcacacctaaaacttctatcgcttca??????????cbcbdabbdcbfeceg403atgagc
granuliceps        ????????????????????????????????????????????????????????????????????????
griseus            taattagcaaaacattacaaccctcatcgc?tca??????????????????????????????????????
gundlachi          ??????????????????????????????????????????????dbeadaddedcafefb125??????
hendersoni         acattagtgagtaactacaactcccatagcctca??????????????????????????????700??????
homolechis         ????????????????????????????????????????????????????????????????301??????
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humilis	??40aatgagc
insignis	??
insolitus	??atgaac
intermedius	??40a??????
isolepis	??
jacare	??500??????
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kemptoni	??
krugi	??bbaacadcccecceefc125atgagc
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latifrons	??
leachii	????????????????????????????????????ecabbbcaafd?????????????????027??????
lemurinus	??408??????
limifrons	ttaattgtgcacttctaaaattcctatcgcttca????????????????????????????40aatgagc
lineatopus	??401atgagc
lineatus	??401atgagt
liogaster	??418??????
lividus	????????????????????????????????????ecacbbcabhd?????????????????027??????
longiceps	??
longitibialis	??
loveridgei	??
loysianus	??atgaac
luciae	??700??????
lucius	taattagcgaacaactacaacacttatcgcttca????????????????????????????700atgagc
luteogularis	??atgagt
luteosignifer	??301??????
maculiventris	??
marcanoi	??atgagc
mariarum	??
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maynardi	??700atgagc
megapholidotus	??
meridionalis	??
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micropholidotus	??
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monticola	??70a??????

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noblei                     ????????????????????????????????????????????????????????????????????????
notopholis                 ????????????????????????????????????????????????????????????????????????
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opalinus                   ????????????????????????????????????????????????????????????401??????
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Phenacosaurus_heterodermus ????????????????????????????????????????????????????????????700??????
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paternus                   ????????????????????????????????????????????????????????????????0atgagc
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petersi                    ????????????????????????????????????????????????????????????????????????
placidus                   ????????????????????????????????????????????????????????????????????????
poecilopus                 ????????????????????????????????????????????????????????????????????????
polylepis                  ????????????????????????????????????????????????????????????????40a??????
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porcatus                   taaccagctaataaatgtgacccctatcgcctca??????????????????????????????700??????
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pulchellus                 ????????????????????????????????????????????????cbaacaddcecffdff125??????
punctatus                  ????????????????????????????????????????????????????????????????????????
quadriocellifer            ????????????????????????????????????????????????????????????????301??????
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richardi                   ??????????????????????????????????????????????????????????????700atgagc
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roquet                     ????????????????????????????????????????????????????????????????600??????
rubribarbus                ????????????????????????????????????????????????????????????????301??????
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sericeus                  ??????????????????????????????????????????????????????????40a??????
sheplani                  ????????????????????????????????????????????????????????????atgagc
shrevei                   ????????????????????????????????????????????????????????????????????
smallwoodi                tacttagcgaactactgcaaatcccctcacttca??????????????????????????????????
smaragdinus               ????????????????????????????????????????????????????????????????????
sminthus                  ????????????????????????????????????????????????????????????????????
solitarius                ????????????????????????????????????????????????????????????????????
spectrum                  ????????????????????????????????????????????????????????????????????
squamulatus               ??????????????????????????????????????????????????????????700??????
strahmi                   ????????????????????????????????????????????????????????????atgagc
stratulus                 ??????????????????????????????????????????????bcbabbb(dh)bbaefdcc224atgagc
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taylori                   ????????????????????????????????????????????????????????????41a??????
tolimensis                ????????????????????????????????????????????????????????????????????
townsendi                 ????????????????????????????????????????????????????????????????????
transversalis             ????????????????????????????????????????????????????????????????????
trinitatis                ????????????????????????????????????????????????????????????700??????
tropidogaster             ????????????????????????????????????????????????????????????40a??????
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tropidonotus              ????????????????????????????????????????????????????????????40a??????
valencienni               ????????????????????????????????????????????????????????????401??????
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wattsi                    ??????????????????????????????????beacbccbcbe??????????????????027atgagc
whitemani                 ????????????????????????????????????????????????????????????????????
Polychrus_acutirostris    ????????????????????????????????????????????????????????????atgagc
Polychrus_marmoratus      aagctggcacacaattgcaccccccctcgaccca??????????????????????????????????
Leiocephalus_schreibersi  ttgtttgcacacaattgcaatcctcatcgcttca??????????????????????????700??????
Leiocephalus_melanochlorus ????????????????????????????????????????????????????????????????????
Urostrophus_vautieri      ????????????????????????????????????????????????????????????????????
Anisolepis_undulatus      ????????????????????????????????????????????????????????????????????
Enyalius_iheringi         ????????????????????????????????????????????????????????????700??????
Phenacosaurus_nicefori    ????????????????????????????????????????????????????????????atgagc
Diplolaemus_darwinii      ????????????????????????????????????????????????????????????atgagc
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acutus	cccacaatctatacaattattatatcaagcctagcaacaggcacaattattaccataaccagctaccact
aeneus	cctgcaatatataccattattttatctagccttgcaacaggcactattattacaatatccagctatcact
aequatorialis	??
agassizi	cctataatatacataatcattatctccagcctcacaacaggcaccatcattaccatgtctagtcatcact
ahli	ccaataatatacacaattatactatcaagcctagcaacaggcactatcgttaccataacgagctaccact
aliniger	cctacagtttattcaattattttgtcaagcctaccaacaggcacagttattactataaccagctaccatt
allisoni	??
allogus	??
altae	??
altavelensis	??
alutaceus	ccaacaattattataattaccctaaccagcctggcaactggtacagttattaccatacatagcttccatt
angusticeps	ccccccattttacaattatcatctcaagtctagcaacaggtacaattattaccataaccagctaccatt
antonii	??
apollinaris	??
aquaticus	??
argenteolus	??
argillaceus	??
armouri	??
auratus	??
bahorucoensis	cccataatttactcaattgtattctcaagcctagc?acaggtactattattactataaccagctaccact
baleatus	??
barahonae	ccgctaatttatatgattattttatcaagcttagcaacaggcacaattattacaataacgagttttcatt
barkeri	??
bartschi	ccaataatttattctatcgacctatcaagcctagcaacaggaactattatcacaataactagctatcatt
bimaculatus	ccaacaatcaatataattattttatcaagcctagcaacaggcaccatcattaccataagcagcttccact
biporcatus	??
bitectus	??
bonairensis	??
brevirostris	ccactaatccacacaattatactctcaagtctagcaacaggcactattattactatatctagccaccact
brunneus	??
Ch._chameleonides	??????atttataccattattttatcaagcttagcaacaggcacaattattactatatctagctatcact
capito	??
carolinensis	ccaactattcacataattattttatcaagcctagcaaccggcaccattattaccataaccagctaccact
chloris	??
chlorocyanus	??

christophei	cccttaatttttacaattatcctgtcaagcctagcaacaggcacagttattactataaccagcttccatt
chrysolepis	??
clivicola	??
cobanensis	??
coelestinus	ccactaattttttcaatcgtcctgtcaagcctagcaacaggcactattattaccataaccagctatcact
compressicauda	??
conspersus	??
crassulus	??
cristatellus	???acaatctacacaattattttgt?????ctagcaacaggcactatcatcactataactagcttccact
Cr._barbouri	ccaattatacatacaattattttatcaagcctagcaacaggcacaattattactataactagctttcact
cupreus	??
cuprinus	??
cuvieri	ccaacaattctctcaatcattttatcaagcctagcagcaggaacaattattacaataacaagctttcatt
cyanopleurus	??
cybotes	??
darlingtoni	??
desechensis	??
distichus	ccgccaatctacgcaattatactatcaagcttagcaacaggcaccattatcactataaccagttaccatt
dollfusianus	??
dunni	??
equestris	ccaacaatttattcaattatcctatcaagccttgcaa?????acaattattactataaccagccaccatt
etheridgei	cctgccatctataccattattttatcaagcctagcaacaggcacactcctaactataaccagctttcact
evermanni	??
fasciata	??
fowleri	??
fraseri	??
frenatus	??
fuscoauratus	??
gadovii	??
garmani	ccaaccatccttataattattatctcaagcctggcaacaggtaccattattaccataacaagccaccact
gingivinus	??
grahami	ccatcaatccttataattattatttcaagcctggcaacaggcactattattactataacaagccaccact
granuliceps	??
griseus	??
gundlachi	??
hendersoni	??
homolechis	??

humilis	cccactgttcttatagtaattttatcaagcctagccactgggactatcatcaccataacaagccaccatt
insignis	??
insolitus	ccaactattcttacattaattttatcaagcttagcaacaggtacaatccttacaataatcagctttcact
intermedius	??
isolepis	??
jacare	??
jubar	??
kemptoni	??
krugi	cctgcaatttacacaattatattatcaagcttggcaacaggcactatcatcactataacaagcttccact
laeviventris	??
latifrons	??
leachii	??
lemurinus	??
limifrons	ccatcaatttttataattattttatcaagtctagccacagggacaattattattataacaagccaccatt
lineatopus	cctgctatcttttcaattgtcatatccagcctagcaacaggcactattattaccataacaagccaccact
lineatus	ccaacaatttttataattatagtgataagcctaacaaccgggactattattaccttaacaagccaccact
liogaster	??
lividus	??
longiceps	??
longitibialis	??
loveridgei	??
loysianus	ccagtcgttatt???attcttctatcaagcctagcaactggtactattattactataactagctatcact
luciae	??cagccaccatt
lucius	ccaacaatttatataatcactttatcaagcctagcaacagggactattatcaccataacaagctaccact
luteogularis	ccaacaatttattcaattattctatcaagccttgcaacaggtacaattattactataaccagctaccatt
luteosignifer	??
maculiventris	??
marcanoi	ccaacaatttttcaattatgctatcgagtctagcaacaggcaccattattactataacaagctttcact
mariarum	??
marmoratus	??
maynardi	ccaccatc?tata?aattattttatcaagcctagcaaccggcaccattattaccataaccagctatcact
megapholidotus	??
meridionalis	??
mestrei	??
micropholidotus	??
microtus	ccgataactgacacaatcattatttccagccttacaaccggcac??????actataaccagctaccatt
monticola	??

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nebuloides                 ??????????????????????????????????????????????????????????????????????????
nebulosus                  ??????????????????????????????????????????????????????????????????????????
noblei                     ??????????????????????????????????????????????????????????????????????????
notopholis                 ??????????????????????????????????????????????????????????????????????????
nubilis                    ??????????????????????????????????????????????????????????????????????????
occultus                   cccaataatctacttaatagtttaattagcttatttata???acaacactagtaaccactagccaccact
oculatus                   ??????????????????????????????????????????????????????????????????????????
olssoni                    cccaccatctccataaattatctatcaagcctagcaacaggaacaattattactatgaccagctttcatt
onca                       ??????????????????????????????????????????????????????????????????????????
opalinus                   ??????????????????????????????????????????????????????????????????????????
ophiolepis                 ccaacaatctttataattattttatcaagtcttgcaactggtacaattattactataactagttatcact
ortoni                     ??????????????????????????????????????????????????????????????????????????
oxylophus                  ??????????????????????????????????????????????????????????????????????????
Phenacosaurus_heterodermus ??????????????????????????????????????????????????????????????????????????
parvicirculatus            ??????????????????????????????????????????????????????????????????????????
paternus                   ccatttatttttacaattatttttcaagcttagcaacaggcacaattattactataaccagctaccact
pentaprion                 ??????????????????????????????????????????????????????????????????????????
perracae                   ??????????????????????????????????????????????????????????????????????????
petersi                    ??????????????????????????????????????????????????????????????????????????
placidus                   ??????????????????????????????????????????????????????????????????????????
poecilopus                 ??????????????????????????????????????????????????????????????????????????
polylepis                  ??????????????????????????????????????????????????????????????????????????
poncencis                  ??????????????????????????????????????????????????????????????????????????
porcatus                   ??????????????????????????????????????????????????????????????????????????
proboscis                  ??????????????????????????????????????????????????????????????????????????
pulchellus                 ??????????????????????????????????????????????????????????????????????????
punctatus                  ??????????????????????????????????????????????????????????????????????????
quadriocellifer            ??????????????????????????????????????????????????????????????????????????
reconditus                 ??????????????????????????????????????????????????????????????????????????
richardi                   cctgcaatatacacaatcatcttatccagccttgcaacaggtactattattactatgtcaagttaccact
ricordi                    ??????????????????????????????????????????????????????????????????????????
roosevelti                 ??????????????????????????????????????????????????????????????????????????
roquet                     ??????????????????????????????????????????????????????????????????????????
rubribarbus                ??????????????????????????????????????????????????????????????????????????
ruizi                      ??????????????????????????????????????????????????????????????????????????
sagrei                     ccaacaatctttataattatcatactaagtcttgcaactggtacaattattactactactagccaccact
semilineatus               ??????????????????????????????????????????????????????????????????????????
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sericeus                  ??????????????????????????????????????????????????????????????????????????
sheplani                  ccaaccatctacacaattattttatcaagcctagcaaccggcactattattacaatatctagttatcact
shrevei                   ??????????????????????????????????????????????????????????????????????????
smallwoodi                ??????????????????????????????????????????????????????????????????????????
smaragdinus               ??????????????????????????????????????????????????????????????????????????
sminthus                  ??????????????????????????????????????????????????????????????????????????
solitarius                ??????????????????????????????????????????????????????????????????????????
spectrum                  ??????????????????????????????????????????????????????????????????????????
squamulatus               ??????????????????????????????????????????????????????????????????????????
strahmi                   ??????????????????????????????????????????????????????actataacaagctaccact
stratulus                 cctataatttacacaatcattttgtcaagcctagcaacagggacaattattaccataaccagctaccact
subocularis               ??????????????????????????????????????????????????????????????????????????
taylori                   ??????????????????????????????????????????????????????????????????????????
tolimensis                ??????????????????????????????????????????????????????????????????????????
townsendi                 ??????????????????????????????????????????????????????????????????????????
transversalis             ??????????????????????????????????????????????????????????????????????????
trinitatis                ??????????????????????????????????????????????????????????????????????????
tropidogaster             ??????????????????????????????????????????????????????????????????????????
tropidolepis              ??????????????????????????????????????????????????????????????????????????
tropidonotus              ??????????????????????????????????????????????????????????????????????????
valencienni               ??????????????????????????????????????????????????????????ataacaagttatcatt
vanidicus                 ccaacaatttatacaactattctaaccagtcttgccaccggaacaattattacaataaccagccaccact
ventrimaculatus           ??????????????????????????????????????????????????????????????????????????
vermiculatus              ccaacaatctactcaattattttatctagcctagcaacaggcaccatcattactataactagctaccatt
vociferans                ??????????????????????????????????????????????????????????????????????????
wattsi                    ccagcaattcacataattatctcatcaagcctagcaacaggcaccattattaccatgaacagccaccact
whitemani                 ??????????????????????????????????????????????????????????????????????????
Polychrus_acutirostris    ccagtaacaataacaatcctactctccagcatcgcagcaggaacaattcttaccatatctagctaccact
Polychrus_marmoratus      ??????????????????????????????????????????????????????????????????????????
Leiocephalus_schreibersi  ??????????????????????????????????????????????????????????????????????????
Leiocephalus_melanochlorus ?????????????????????????????????????????????????????????????????????????
Urostrophus_vautieri      ??????????????????????????????????????????????????????????????????????????
Anisolepis_undulatus      ??????????????????????????????????????????????????????????????????????????
Enyalius_iheringi         ??????????????????????????????????????????????????????????????????????????
Phenacosaurus_nicefori    ccaacaatatattcaattattatctctagccttgcaaccggcactatcattactataaccagtcaccatt
Diplolaemus_darwinii      ccaactacaataataattattacatctagcctagccacgga?acaatcatcaccgcatcaagctaccact
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acutus              gacttatagcttgaataggcctagaacttaatacactagcaattattccaatcatttcatcacaacacca
aeneus              gattaatagcctgaattggcctagaaattaatacactagcaatcattccaattatttccatacaacacca
aequatorialis       ??????????????????????????????????????????????????????????????????????
agassizi            gactactagcttgaattggcctagaaatcaacacattagcaatcattccaatcatctcaatacaacacca
ahli                gactcctagcctgaatcggactagaaataaacactttatcaattattccaattatttctaccatacacca
aliniger            gattaatagcctgagtcgggctagaaattaacacactcgcaattattcctgttgtttcaatacaacatca
allisoni            ??????????????????????????????????????????????????????????????????????
allogus             ??????????????????????????????????????????????????????????????????????
altae               ??????????????????????????????????????????????????????????????????????
altavelensis        ??????????????????????????????????????????????????????????????????????
alutaceus           gattaatggcctga?tcggattaga?atcaatacactatcaattattccaataatttcaacattacacca
angusticeps         gactcatagcctgagttggtctagaaataaatacactagcaattattcctattatttcaacaacacatca
antonii             ??????????????????????????????????????????????????????????????????????
apollinaris         ??????????????????????????????????????????????????????????????????????
aquaticus           ??????????????????????????????????????????????????????????????????????
argenteolus         ??????????????????????????????????????????????????????????????????????
argillaceus         ??????????????????????????????????????????????????????????????????????
armouri             ??????????????????????????????????????????????????????????????????????
auratus             ??????????????????????????????????????????????????????????????????????
bahorucoensis       gatttatggcctgaatcggactagaaattaatacactagcagtaatccccattatttcaacactacacca
baleatus            ??????????????????????????????????????????????????????????????????????
barahonae           gaattatagcttgaattgggttagaaatcaacaccttagcaattatcccaattatttctatattacacca
barkeri             ??????????????????????????????????????????????????????????????????????
bartschi            gactaatagcctgaattggactagaaatcaacacactagcaattattccaattatctcaattaaacacca
bimaculatus         gattaatagcctgaatcggcctagaaattaatacactagcaattattccaatcctctcaacaccacacca
biporcatus          ??????????????????????????????????????????????????????????????????????
bitectus            ??????????????????????????????????????????????????????????????????????
bonairensis         ??????????????????????????????????????????????????????????????????????
brevirostris        gactaatagcctgaattggattagaaattaacacactagcaattatccccatcatttcaacatcccacca
brunneus            ??????????????????????????????????????????????????????????????????????
Ch._chameleonides   gattaatagcctgagtcggattagaaatcaacactttatctattatccctattgtatctatat??catca
capito              ??????????????????????????????????????????????????????????????????????
carolinensis        gacttatagcctgagtgggcctagaaataaataccttagcaattattccaatcatctcaacaatacacca
chloris             ??????????????????????????????????????????????????????????????????????
chlorocyanus        ??????????????????????????????????????????????????????????????????????
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christophei        gactattagcttgaattgggttagaaatcaatacactagcaattattccaattatttctacaattcatca
chrysolepis        ????????????????????????????????????????????????????????????????????
clivicola          ????????????????????????????????????????????????????????????????????
cobanensis         ????????????????????????????????????????????????????????????????????
coelestinus        gattaatagcttgaattggtctagaaataaacacacttgctattattccaattatctcaatacaacatca
compressicauda     ????????????????????????????????????????????????????????????????????
conspersus         ????????????????????????????????????????????????????????????????????
crassulus          ????????????????????????????????????????????????????????????????????
cristatellus       gactaatggcctgaatcggactagagcttaatacgctagcaattatcccgattatttcaacattacacca
Cr._barbouri       gactaatagcatgagtcggcctagaaatcaacaccctagcaatgattcccattatttcagcaccccatca
cupreus            ????????????????????????????????????????????????????????????????????
cuprinus           ????????????????????????????????????????????????????????????????????
cuvieri            gattaatagcctgaattggactagaaattaatacactagcaattattccaattatctcaataatacatca
cyanopleurus       ????????????????????????????????????????????????????????????????????
cybotes            ????????????????????????????????????????????????????????????????????
darlingtoni        ????????????????????????????????????????????????????????????????????
desechensis        ????????????????????????????????????????????????????????????????????
distichus          gactaatggcctgaattggactagaaattaatacactagcaattcttccaattattgcaacatcacacaa
dollfusianus       ????????????????????????????????????????????????????????????????????
dunni              ????????????????????????????????????????????????????????????????????
equestris          gactaatagcctga?tcggattagaaattaacacattagcaattatcccaattatttcaacattacacca
etheridgei         gattaatagcatgaatcggattagaaattaatacactagcaataattccaattatctcaacacctcacca
evermanni          ????????????????????????????????????????????????????????????????????
fasciata           ????????????????????????????????????????????????????????????????????
fowleri            ????????????????????????????????????????????????????????????????????
fraseri            ????????????????????????????????????????????????????????????????????
frenatus           ????????????????????????????????????????????????????????????????????
fuscoauratus       ????????????????????????????????????????????????????????????????????
gadovii            ????????????????????????????????????????????????????????????????????
garmani            gactcatagcctgaatcggactagaaataaataccttagctattattccaatcattactactatacacaa
gingivinus         ????????????????????????????????????????????????????????????????????
grahami            gacttatagcctgagtcggactagaaataaatactttggcaattatcccaattatttctactacacacag
granuliceps        ????????????????????????????????????????????????????????????????????
griseus            ????????????????????????????????????????????????????????????????????
gundlachi          ????????????????????????????????????????????????????????????????????
hendersoni         ????????????????????????????????????????????????????????????????????
homolechis         ????????????????????????????????????????????????????????????????????
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humilis          gactatttgcctgactcggactagaaataaataccctagcaattattcccaccatcaccaccctccacaa
insignis         ??????????????????????????????????????????????????????????????????????
insolitus        gactactcgcatgaattggtctagagattaataccctagcaattattcctattatctcagcacctcacca
intermedius      ??????????????????????????????????????????????????????????????????????
isolepis         ??????????????????????????????????????????????????????????????????????
jacare           ??????????????????????????????????????????????????????????????????????
jubar            ??????????????????????????????????????????????????????????????????????
kemptoni         ??????????????????????????????????????????????????????????????????????
krugi            gactaatagcctgagttggactagaacttaatacattagcaattatcccaattatttcaacattacacca
laeviventris     ??????????????????????????????????????????????????????????????????????
latifrons        ??????????????????????????????????????????????????????????????????????
leachii          ??????????????????????????????????????????????????????????????????????
lemurinus        ??????????????????????????????????????????????????????????????????????
limifrons        gactttttgcctgacttggcttagaaataaacactttagcaattatcccaactatttctactacccataa
lineatopus       gactattagcctgaatagggttagaaataaataccctagcaattattccaattatttctattacccacaa
lineatus         gacttatggcctgaataggcctggaaataaacaccttagcaattattccaatcatttcctacacccataa
liogaster        ??????????????????????????????????????????????????????????????????????
lividus          ??????????????????????????????????????????????????????????????????????
longiceps        ??????????????????????????????????????????????????????????????????????
longitibialis    ??????????????????????????????????????????????????????????????????????
loveridgei       ??????????????????????????????????????????????????????????????????????
loysianus        gattaatagcctgagttggactagaaataaacacattagcaattattccaatcatttcaacaactcacca
luciae           gattaatagcttgaattggattagaaatcaacacactagccattattcctattatctcaatacaacatca
lucius           gactaatagcctgagtggggttagaaatcaacacactatcaattattccaatcatttcaataatacatca
luteogularis     gactaatagcctgagtcggattagaaattaacacattagcaattatcccaattatttcaacattacacca
luteosignifer    ??????????????????????????????????????????????????????????????????????
maculiventris    ??????????????????????????????????????????????????????????????????????
marcanoi         gactaatggcctgagtcggcttagaaattaatacgctagctgctattccaattatttcaatacaacacca
mariarum         ??????????????????????????????????????????????????????????????????????
marmoratus       ??????????????????????????????????????????????????????????????????????
maynardi         gacttatagcctgagtcggcctagaaataaacaccttagcaatcatcccaatcatctcaacaatacatca
megapholidotus   ??????????????????????????????????????????????????????????????????????
meridionalis     ??????????????????????????????????????????????????????????????????????
mestrei          ??????????????????????????????????????????????????????????????????????
micropholidotus  ??????????????????????????????????????????????????????????????????????
microtus         gattggtagcttgacttggactagagatcaacacattggcaatcattccaatcatctcaatacaacacca
monticola        ??????????????????????????????????????????????????????????????????????
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nebuloides	??
nebulosus	??
noblei	??
notopholis	??
nubilis	??
occultus	gattattagcgtgagttggcttggaaattaacacacttgcagctattccacttatctcaacaaaacatca
oculatus	??
olssoni	gattaatagcatgaattggattagaagtcaacacactagcaattattccaatcatctcagcccctcacca
onca	??
opalinus	??
ophiolepis	gactattagcctgaatcggcctagaaattaatacccttatcaattatcccacttatttcaacaacccacca
ortoni	??
oxylophus	??
Phenacosaurus_heterodermus	??
parvicirculatus	??
paternus	gacttatagcctgagttggattagaaataaacacactagcaattattcccattatctcaacaacacatca
pentaprion	??
perracae	??
petersi	??
placidus	??
poecilopus	??
polylepis	??
poncencis	??
porcatus	??
proboscis	??
pulchellus	??
punctatus	??
quadriocellifer	??
reconditus	??
richardi	gattaatagcttga?ttggcttagaaattaatacactagcaattattccaattatttctatacaacacca
ricordi	??
roosevelti	??
roquet	??
rubribarbus	??
ruizi	??
sagrei	gactattagcctgaatcggcctagaaattaatacccctctcaattattccaattatttcaataacccacca
semilineatus	??

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sericeus                  ??????????????????????????????????????????????????????????????????????
sheplani                  gactaatggcctgaatcggcctagagattaatacactagcaataatcccgatcatctcaacaacacatca
shrevei                   ??????????????????????????????????????????????????????????????????????
smallwoodi                ??????????????????????????????????????????????????????????????????????
smaragdinus               ??????????????????????????????????????????????????????????????????????
sminthus                  ??????????????????????????????????????????????????????????????????????
solitarius                ??????????????????????????????????????????????????????????????????????
spectrum                  ??????????????????????????????????????????????????????????????????????
squamulatus               ??????????????????????????????????????????????????????????????????????
strahmi                   gactcatagcctgaattggactagaaattaacaccttagccattattccaattatttctatacaacacaa
stratulus                 gattaatagcttgaataggcctagaacttaatactctagcaattattccattatctcatacaacacacaa
subocularis               ??????????????????????????????????????????????????????????????????????
taylori                   ??????????????????????????????????????????????????????????????????????
tolimensis                ??????????????????????????????????????????????????????????????????????
townsendi                 ??????????????????????????????????????????????????????????????????????
transversalis             ??????????????????????????????????????????????????????????????????????
trinitatis                ??????????????????????????????????????????????????????????????????????
tropidogaster             ??????????????????????????????????????????????????????????????????????
tropidolepis              ??????????????????????????????????????????????????????????????????????
tropidonotus              ??????????????????????????????????????????????????????????????????????
valencienni               gacttatggcctgaattggactagaaataaacacattagcaattattccaatta?atttactatacacaa
vanidicus                 gattaatagcctga?tcggattagaaat?aatacattagcaataatcccaactatctcaacaatgcacca
ventrimaculatus           ??????????????????????????????????????????????????????????????????????
vermiculatus              gactaatggcctgaattgggctagaaatcaacacactagcaatcattccaattatttcaactaaatacca
vociferans                ??????????????????????????????????????????????????????????????????????
wattsi                    gattaatggcctgacttgggctagaaattaacacactagcaattattccaataatcacatcaccacatca
whitemani                 ??????????????????????????????????????????????????????????????????????
Polychrus_acutirostris    ggctcttggcttgactcggattagaaattaatacccctggcaatcatcccgattatttcaaaacagcatca
Polychrus_marmoratus      ??????????????????????????????????????????????????????????????????????
Leiocephalus_schreibersi  ??????????????????????????????????????????????????????????????????????
Leiocephalus_melanochlorus ?????????????????????????????????????????????????????????????????????
Urostrophus_vautieri      ??????????????????????????????????????????????????????????????????????
Anisolepis_undulatus      ??????????????????????????????????????????????????????????????????????
Enyalius_iheringi         ??????????????????????????????????????????????????????????????????????
Phenacosaurus_nicefori    gactgctagcctgtctcggactagaaatcaacacactagcaattgttccaaccatttcaataaaccacaa
Diplolaemus_darwinii      gactactggcctgagtaggcctagaactaaatacactagcaattcttccaataatttcaaaatatcacca
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acutus              cccccgatctacagaagctgcaacaaaatattttctgacacaagcagcagcatccgccataattttattc
aeneus              cccacgatcaacggaggccgctacaaagtacttcttaattcaagcagcagcttcagctataattttattt
aequatorialis       ??????????????????????????????????????????????????????????????????????
agassizi            cccacgatccacagaagccgccacaaaatatttcctaacacaagcagcagcttccgctataatcctattc
ahli                cccacgatcaacagaggccgccacaaaatactttttaacacaagcagcggcttctgccataatcttgttt
aliniger            cccacggtccacagaagccgccacaaaatattttctaacacaagcagcagcctccgccttaattctattt
allisoni            ??????????????????????????????????????????????????????????????????????
allogus             ??????????????????????????????????????????????????????????????????????
altae               ??????????????????????????????????????????????????????????????????????
altavelensis        ??????????????????????????????????????????????????????????????????????
alutaceus           cccacgatcaactgaagctgctacaaaatatttcctcacccaagcagctgcttca?ctttaatccttttt
angusticeps         cccacgagccacagaagcttccacaaaatattttcttacacaagctgcagcctctgctctaattttattt
antonii             ??????????????????????????????????????????????????????????????????????
apollinaris         ??????????????????????????????????????????????????????????????????????
aquaticus           ??????????????????????????????????????????????????????????????????????
argenteolus         ??????????????????????????????????????????????????????????????????????
argillaceus         ??????????????????????????????????????????????????????????????????????
armouri             ??????????????????????????????????????????????????????????????????????
auratus             ??????????????????????????????????????????????????????????????????????
bahorucoensis       cccacgatctacagaagctgctacaaaatacttcttaacacaagcagcagcctccgccacaatcctattt
baleatus            ??????????????????????????????????????????????????????????????????????
barahonae           cccacgttctactgaagcagccacaaaatattttcttacacaagcagcagcatccgctataatcctattt
barkeri             ??????????????????????????????????????????????????????????????????????
bartschi            cccacgatccacagaagcagctacaaaatattttctcacacaagctgcagcctccgctacaatcctattt
bimaculatus         cccacgatcaacagaagctgctataaaatactttttaacacaagccgcagcctcgtccataattttattc
biporcatus          ??????????????????????????????????????????????????????????????????????
bitectus            ??????????????????????????????????????????????????????????????????????
bonairensis         ??????????????????????????????????????????????????????????????????????
brevirostris        cccacgatcaacagaagctgccacaaaatatttccttacacaagcagcagcctctgccaccgtactattt
brunneus            ??????????????????????????????????????????????????????????????????????
Ch._chameleonides   cccacgatccacagaagcagcaacaaaatattttcttacacaagcggcagcctcagctataattttattc
capito              ??????????????????????????????????????????????????????????????????????
carolinensis        cccgcgatctacagaagcagccacaaagtacttcttaacccaagctgcagcctccgcactaatcttat?t
chloris             ??????????????????????????????????????????????????????????????????????
chlorocyanus        ??????????????????????????????????????????????????????????????????????
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christophei	cccacgctcaacagaagcagccacaaagtacttccttacacaagcagcagcatcagctatagtcttattt
chrysolepis	??
clivicola	??
cobanensis	??
coelestinus	ccctcgatctacagaagccgctacaaaatatttccttacacaagcagcagcctccgctatgattttattc
compressicauda	??
conspersus	??
crassulus	??
cristatellus	cccacgatcaacagaagccgcaacaaaatacttcttaacacaagcagcagcctctgcaataattatgttt
Cr._barbouri	cccccgctccacagaagcagctacaaaatattacctcacacaagcagcagcctcctctataattttactc
cupreus	??
cuprinus	??
cuvieri	cccacgatctacagaagcagccacaaaatattttctcacacaagcagcagcatcagctataatcctgttc
cyanopleurus	??
cybotes	??
darlingtoni	??
desechensis	??
distichus	cccacgatccacagaagctgccacaaaatactttttaacacaatcagcagcttccgccactatcttattt
dollfusianus	??
dunni	??
equestris	cccacgatccacagaagccgccacaaaatatttcctaacacaagcagctgcttctgctataattttattt
etheridgei	accacgatctacagaagctgctacaaaatatttcctcacacaagcagcagcctccgctataattttattt
evermanni	??
fasciata	??
fowleri	??
fraseri	??
frenatus	??
fuscoauratus	??
gadovii	??
garmani	cccacgatcaacagaagccgccacaaaatacttcttaacacaagcagcagcctctgccataatcttattc
gingivinus	??
grahami	cccgcgatccacagaagccgctacaaaatatttttaacacaagcagctgcctctaccataatcttattt
granuliceps	??
griseus	??
gundlachi	??
hendersoni	??
homolechis	??

humilis	cccacgatcaacagaagcagccacaaaatattttctaacacaagcagcagcctctgccataattttattt
insignis	??
insolitus	cccccgacccacagaagcctccacaaaatatttccttacacaagcagctgcttctgctacaatcttattt
intermedius	??
isolepis	??
jacare	??
jubar	??
kemptoni	??
krugi	cccccgggccacagaagcctcaacaaagtatttcctcactcaagcagcagcctctgccataattttattt
laeviventris	??
latifrons	??
leachii	??
lemurinus	??
limifrons	cccacgatcaacagaagcagctacaaagtatttttaacacaagcagcagcctccgccttaattttattt
lineatopus	cccccgagccacagaagccgccacaaagtacttcttaacacaagcagcagcctcagccatagttttattt
lineatus	cccacgatccaccgaagctgccacaaaatatttcctaacccaagcagcagcctccgctacaattttattt
liogaster	??
lividus	??
longiceps	??
longitibialis	??
loveridgei	??
loysianus	cccacgagccacagaagcagccacaaaatacttcttaacccaagctgcagcctccgccctaatcttattt
luciae	cccacgaactacagaagctgccacaaaatacttttttaacccaagcagcagcatctgccataatccttttt
lucius	cccacgatccacagaagctgccacaaaatatttcttaacccaagcagcagcctcagctctaattttattt
luteogularis	tccacgatccacagaagcagccacaaaatacttcctaacacaagcagctgcttctgctataattttattt
luteosignifer	??
maculiventris	??
marcanoi	ccctcgatcaacagaagcagccacaaaatacttttttaacacaagcaactgcatcctccttaattttattt
mariarum	??
marmoratus	??
maynardi	cccacggtctacagaagcagctacaaaatacttcttaacccaagctgcagcctcagctctaattttattt
megapholidotus	??
meridionalis	??
mestrei	??
micropholidotus	??
microtus	cccccgatccacagaagctgccacaaaatacttcctcacacaagcagcagcctctgccatagtcttattc
monticola	??

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nebuloides                 ??????????????????????????????????????????????????????????????????????????
nebulosus                  ??????????????????????????????????????????????????????????????????????????
noblei                     ??????????????????????????????????????????????????????????????????????????
notopholis                 ??????????????????????????????????????????????????????????????????????????
nubilis                    ??????????????????????????????????????????????????????????????????????????
occultus                   cccccgagctacagaatcagccacaaaatactttttaattcaagcagcagcctcagctacaatcttattt
oculatus                   ??????????????????????????????????????????????????????????????????????????
olssoni                    cccacgatcaacagaagctgcaacaaaatactttctcacacaagcagctgcctccgctataattctattt
onca                       ??????????????????????????????????????????????????????????????????????????
opalinus                   ??????????????????????????????????????????????????????????????????????????
ophiolepis                 tccacgagccacagaagccgctaccaagtattttcttacacaagcagcagcttcggccataattttgttt
ortoni                     ??????????????????????????????????????????????????????????????????????????
oxylophus                  ??????????????????????????????????????????????????????????????????????????
Phenacosaurus_heterodermus ??????????????????????????????????????????????????????????????????????????
parvicirculatus            ??????????????????????????????????????????????????????????????????????????
paternus                   cccacgagccacagaagcttccacaaaatattttcttacacaagctgcagcctctgccttaattttattt
pentaprion                 ??????????????????????????????????????????????????????????????????????????
perracae                   ??????????????????????????????????????????????????????????????????????????
petersi                    ??????????????????????????????????????????????????????????????????????????
placidus                   ??????????????????????????????????????????????????????????????????????????
poecilopus                 ??????????????????????????????????????????????????????????????????????????
polylepis                  ??????????????????????????????????????????????????????????????????????????
poncencis                  ??????????????????????????????????????????????????????????????????????????
porcatus                   ??????????????????????????????????????????????????????????????????????????
proboscis                  ??????????????????????????????????????????????????????????????????????????
pulchellus                 ??????????????????????????????????????????????????????????????????????????
punctatus                  ??????????????????????????????????????????????????????????????????????????
quadriocellifer            ??????????????????????????????????????????????????????????????????????????
reconditus                 ??????????????????????????????????????????????????????????????????????????
richardi                   cccacggtctacagaagccgctacaaaatacttcttaatccaagcagcagcttcagccataatttt?ttt
ricordi                    ??????????????????????????????????????????????????????????????????????????
roosevelti                 ??????????????????????????????????????????????????????????????????????????
roquet                     ??????????????????????????????????????????????????????????????????????????
rubribarbus                ??????????????????????????????????????????????????????????????????????????
ruizi                      ??????????????????????????????????????????????????????????????????????????
sagrei                     cccacgatccacagaagccgctaccaagtactttctgacacaagcagcagcctccgccctaattttattt
semilineatus               ??????????????????????????????????????????????????????????????????????????
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sericeus	??
sheplani	cccacgatctacagaagcagccacaaaatatttttaattcaagctgcagcctccgccctaattttgttc
shrevei	??
smallwoodi	??
smaragdinus	??
sminthus	??
solitarius	??
spectrum	??
squamulatus	??
strahmi	cccacgatcaacggaagccgcaacaaaatacttcctaactcaagcagctgcatcctccctaattttattc
stratulus	cccacgatctacagaagccgcaacaaaatacttcttaacacaagcagcagcatctgctataatcttgttt
subocularis	??
taylori	??
tolimensis	??
townsendi	??
transversalis	??
trinitatis	??
tropidogaster	??
tropidolepis	??
tropidonotus	??
valencienni	cccacgagccacagaagctgccacaaagtacttcctaacacaagcatcagcatcagccataattttattt
vanidicus	ccctcgatcaactgaagctgccacaaaatacttcttaactcaggcagctgcctcagccttaattctcttt
ventrimaculatus	??
vermiculatus	cccacgatccacagaagctgccacaaaatacttcctcacacaagcagcagcctctgctataattttattt
vociferans	??
wattsi	cccacggtccacagaagccgccataaaatacttcttaacacaagcagcagcctcggccataatcttattt
whitemani	??
Polychrus_acutirostris	tccccgagctaccgaagctacaacaaaatatttcctaacacaagcagccgcatccgccctaatcctattc
Polychrus_marmoratus	??
Leiocephalus_schreibersi	??
Leiocephalus_melanochlorus	??
Urostrophus_vautieri	??
Anisolepis_undulatus	??
Enyalius_iheringi	??
Phenacosaurus_nicefori	cccacgagccacagaagccactataaagtacttttaacacaaacagcagcttcggccataattttattt
Diplolaemus_darwinii	cccacgagcaacagaagctgcaacaaaatatttcctaacacaagcagcagcctccgccataatcatattt

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acutus	tccagcatatccaatgcctga?ttactggtacatgggacatcactcaaatatcttacaccccctctaata
aeneus	gctagtacaacaaatgcctgatacacaggaacatgaagtattatccaaatatctaccttaccttcacata
aequatorialis	??
agassizi	tcaagttctaccaacgcctgatacacaggaacatgagacattactcaaataactaccactcactccaaca
ahli	tcaagcataattaacgcctgacaaaccggatcatgggatattactcaattatcatctacaccatcacaca
aliniger	gctagcacaactaacgcctgatcaacgggcacatgagatattacccaaatatcctctaccccctctcata
allisoni	??
allogus	??
altae	??
altavelensis	??
alutaceus	tcaagcacaattaatgcctgacaaacaggatcatgagacattacccaactatcatcaaccccctcacaca
angusticeps	tctagtataattaacgcatgacacacaggatcttgagacattactcaaatattatctacccaatcaaata
antonii	??
apollinaris	??
aquaticus	??
argenteolus	??
argillaceus	??
armouri	??
auratus	??
bahorucoensis	tcaagtataattaatgcctgacaaacaggcacatgagatattacccaattatccacaaccccgcccaca
baleatus	??
barahonae	tcaagtataattaatgcctgacaaacaggaacatgagatatcactcaaataactaatatccaatccaaca
barkeri	??
bartschi	tctagcacaatcaatgcctgactaacaggcacatgagatattacccaaatctccaccaccccttcccaca
bimaculatus	tctagcatgactaatgcctgatatttaggcacatgagatattactcaattagcctatacccccctcaacca
biporcatus	??
bitectus	??
bonairensis	??
brevirostris	tctagtataattaatgcctgacaaaccggaacatgagacatcactcaaatatcttatgcaccatccaaca
brunneus	??
Ch._chameleonides	tcaagcataattaacgcctgacaaacgggcacatgagatattactcaaataaccactattccatccaaca
capito	??
carolinensis	tcaagcataacaaatgcttgaaacctaggctcatgagacattactcaaacattagcccccccctcacata
chloris	??
chlorocyanus	??

christophei	tcaagcataattaacgcctgacaaacaggaacatgagacattactcaaataactactgatcaatctaaca
chrysolepis	??
clivicola	??
cobanensis	??
coelestinus	gccagcacaacaaatgcttgatacacaggcacatgagacatcactcaaatttccgccaccccatcccaca
compressicauda	??
conspersus	??
crassulus	??
cristatellus	tctagcataattaatgcctgaaacataggaacatgggacattactcaaatatcttataccccatcaaatg
Cr._barbouri	tctagcacactcaacgcatgacaaacaggatcatgagatattactcaaccatccacaaccccctcccaca
cupreus	??
cuprinus	??
cuvieri	tcaagcataattaatgcttgacaaacagggacatgagatattacccaaatatatactcctcaatctaaca
cyanopleurus	??
cybotes	??
darlingtoni	??
desechensis	??
distichus	tctagcatacttaacgcctgacaaaccggaacatgagacattactcaaatatcttatgcgccatctaacc
dollfusianus	??
dunni	??
equestris	tctagcataacaaatgcttgatacacaggtacatgagacattacccaaatatcagccaacccctcccata
etheridgei	tcaagcataattaatgcctgacaaacaggatcatgagacattacccaaacatctactttcccctctcata
evermanni	??
fasciata	??
fowleri	??
fraseri	??
frenatus	??
fuscoauratus	??
gadovii	??
garmani	tcaagcataattaatgcctgacaaataggatcatgaaatattattaacttaacatacgaacccgcgcaca
gingivinus	??
grahami	tcaagcataaccaacgcctgacaaacaggcacatgagacattattaacttaacatatgagcccgcgcaca
granuliceps	??
griseus	??
gundlachi	??
hendersoni	??
homolechis	??

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humilis          tcaagcataactaatgcttgacaaaccggatcatgagatattactagcacgatatctacaccagcccata
insignis         ????????????????????????????????????????????????????????????????????
insolitus        tcaagcataattaatgcttgactaacaggcacatgaaacattacccaaatatcctctactcccgctaata
intermedius      ????????????????????????????????????????????????????????????????????
isolepis         ????????????????????????????????????????????????????????????????????
jacare           ????????????????????????????????????????????????????????????????????
jubar            ????????????????????????????????????????????????????????????????????
kemptoni         ????????????????????????????????????????????????????????????????????
krugi            tctagcataattaatgcctgacacacgggaacatgggacattactcaaatatcttacacccccctccaaca
laeviventris     ????????????????????????????????????????????????????????????????????
latifrons        ????????????????????????????????????????????????????????????????????
leachii          ????????????????????????????????????????????????????????????????????
lemurinus        ????????????????????????????????????????????????????????????????????
limifrons        tcaagtacaattaatgcttgacaaacaggaacctgagatattactaacacactatctacacccgcacaca
lineatopus       gcaagcataactaatgcttgacaaacaggaacatgagatattactagcctatcatatatgccctcacata
lineatus         tcaagtataactaatgcctgacaaacaggcacatgaga????accaatatatcttacgaaccatcatgca
liogaster        ????????????????????????????????????????????????????????????????????
lividus          ????????????????????????????????????????????????????????????????????
longiceps        ????????????????????????????????????????????????????????????????????
longitibialis    ????????????????????????????????????????????????????????????????????
loveridgei       ????????????????????????????????????????????????????????????????????
loysianus        tcaagtacaattaatgcttgatactcaggctcatgaaatattacccaaatactaaccttcccatcacaca
luciae           gcaagcacaacaaacgcttgatttacaggaacatgaaatattacccaaatatcaactaccccctcccata
lucius           tctagtacaacacacgcatgatattcaggcacatgagatattacccaaacatcaaatattacctccaaca
luteogularis     tctagcataacaaatgcttgatacacaggtacatgagacattacccaaatatcagctaacccctcccata
luteosignifer    ????????????????????????????????????????????????????????????????????
maculiventris    ????????????????????????????????????????????????????????????????????
marcanoi         tcaagtatgattaatgcttggcatacaggaacatgagacattactcaaatttcaactacccaatcatgca
mariarum         ????????????????????????????????????????????????????????????????????
marmoratus       ????????????????????????????????????????????????????????????????????
maynardi         tcaagcataacaaatgcttgaagctcaggctcatgagatatcactcaaacattaacctcccccctcacata
megapholidotus   ????????????????????????????????????????????????????????????????????
meridionalis     ????????????????????????????????????????????????????????????????????
mestrei          ????????????????????????????????????????????????????????????????????
micropholidotus  ????????????????????????????????????????????????????????????????????
microtus         gcaagcacaaccaacgcttgacatacaggaacatgagacattacccaaataaccacccctcattccaaca
monticola        ????????????????????????????????????????????????????????????????????
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nebuloides	??
nebulosus	??
noblei	??
notopholis	??
nubilis	??
occultus	tcaagtaccattaatgcttgacacacaggctcatgagacattacccaaataaccacaaacccatccaata
oculatus	??
olssoni	gccagtataattaacgcctgacaaacaggcacatgagacattactcaactgtcaaccacccctgcccaca
onca	??
opalinus	??
ophiolepis	tctagtataactaatgcatgagagacaggcacatgagatattacccagctatcatcaacaccatcacaca
ortoni	??
oxylophus	??
Phenacosaurus_heterodermus	??
parvicirculatus	??
paternus	tctagtataaccaatgcatgacatacgggatcttgagacattactcaaatattatttactccatcaaaca
pentaprion	??
perracae	??
petersi	??
placidus	??
poecilopus	??
polylepis	??
poncencis	??
porcatus	??
proboscis	??
pulchellus	??
punctatus	??
quadriocellifer	??
reconditus	??
richardi	gcaagcacaacaaatgcctgacatacaggcacatgaaatattattca?atatctactacccccttcacaca
ricordi	??
roosevelti	??
roquet	??
rubribarbus	??
ruizi	??
sagrei	tccagtataactaatgcatgagaaacaggtacatgagacattacacaactctcatcaacaccatcacaca
semilineatus	??

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sericeus                  ??????????????????????????????????????????????????????????????????????????
sheplani                  tcaagtataactaacgcctgatatacaggctcctgggacattacccaaatagtaaacaagccctcaaata
shrevei                   ??????????????????????????????????????????????????????????????????????????
smallwoodi                ??????????????????????????????????????????????????????????????????????????
smaragdinus               ??????????????????????????????????????????????????????????????????????????
sminthus                  ??????????????????????????????????????????????????????????????????????????
solitarius                ??????????????????????????????????????????????????????????????????????????
spectrum                  ??????????????????????????????????????????????????????????????????????????
squamulatus               ??????????????????????????????????????????????????????????????????????????
strahmi                   gcaagcctatttaacgcctgacaagtaggcacatgagatattacacaactatcaactacacaagcacaca
stratulus                 tccagcataaccaacgcctgctttacgggcatatgagacattactcaaatatcttatttaccatctaata
subocularis               ??????????????????????????????????????????????????????????????????????????
taylori                   ??????????????????????????????????????????????????????????????????????????
tolimensis                ??????????????????????????????????????????????????????????????????????????
townsendi                 ??????????????????????????????????????????????????????????????????????????
transversalis             ??????????????????????????????????????????????????????????????????????????
trinitatis                ??????????????????????????????????????????????????????????????????????????
tropidogaster             ??????????????????????????????????????????????????????????????????????????
tropidolepis              ??????????????????????????????????????????????????????????????????????????
tropidonotus              ??????????????????????????????????????????????????????????????????????????
valencienni               tcaagcacaattaacgcctgacaaacagggacctgagacattactaacctctcatccgaaccagcacaca
vanidicus                 tctagtataactaacgcctgacaaacaggctcctgagatattacccatctatcatcaaccccagcacata
ventrimaculatus           ??????????????????????????????????????????????????????????????????????????
vermiculatus              tcaagcacaactaatgcttgattaacaggcacatgagacatcacccaaatctcaactaccccttctcaca
vociferans                ??????????????????????????????????????????????????????????????????????????
wattsi                    tctagcataattaacgcctgatatctggggacatgagacatcacccaactatcttacaccccgtcagtta
whitemani                 ??????????????????????????????????????????????????????????????????????????
Polychrus_acutirostris    tccagcacaattaatgcctgacaaacggggacctgagatatcacacaaataactaatccaacaccaacca
Polychrus_marmoratus      ??????????????????????????????????????????????????????????????????????????
Leiocephalus_schreibersi  ??????????????????????????????????????????????????????????????????????????
Leiocephalus_melanochlorus ?????????????????????????????????????????????????????????????????????????
Urostrophus_vautieri      ??????????????????????????????????????????????????????????????????????????
Anisolepis_undulatus      ??????????????????????????????????????????????????????????????????????????
Enyalius_iheringi         ??????????????????????????????????????????????????????????????????????????
Phenacosaurus_nicefori    gcaagcacaacaaatgcttgacacacaggaacatgagatattacccaaatatcaacaaccacctcttaca
Diplolaemus_darwinii      tcaagcacactaaacgcctgacaaacaggcacatgaaacatcacacaaccaaacaacacaacatcaagca
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acutus	tttttttaaccatagcactagctataaaattaggtttggcaccagtacacttctgatttccagaagtatt
aeneus	ttatattaaccctagcattattaataaaactaggactagccccaatacatttttgattaccagaagtcct
aequatorialis	??
agassizi	tcctactaaccctagcactatcaataaaattaggactggcccccctacacttttgactacccgaagtatt
ahli	ttctattaaccatggcattagcaataaaactgggcctagtcccagtacatttttgactaccagaagttat
aliniger	tccttttaactatcgcgcttgctataaaactaggcctagcacccacccacttctgattaccagaagtagt
allisoni	??
allogus	??
altae	??
altavelensis	??
alutaceus	ttttattaactatggctttggccataaaactaggactcgccccacttcacttttgattaccagaagtaat
angusticeps	ctatattgactatagccctagctataaaactagggctggccccacttcacttttgactaccagaagtaat
antonii	??
apollinaris	??
aquaticus	??
argenteolus	??
argillaceus	??
armouri	??
auratus	??
bahorucoensis	tcctactgactatagcacttgccataaaactaggcctagtcccagcccatttctgactaccagaagtcct
baleatus	??
barahonae	ttctattaacaatagcactt?ccataaaattaggtctagcaccactacatttctgacttccagaagtatt
barkeri	??
bartschi	tcttactaaccacagcactagccataaaactcggcctagccccaatacacttttgacttccagaagtatt
bimaculatus	ttatattgaccgcagccctttccataaaattaggactagcccccctacactactgacttccagaagtact
biporcatus	??
bitectus	??
bonairensis	??
brevirostris	tacttttaactatagcactctccataaagctcggactagccccgctacacttctgacttccagaggttct
brunneus	??
Ch._chameleonides	ccctttttaaccatagcattagccataaaactaggtctagccccaatacacttctgattaccagaagtact
capito	??
carolinensis	ttctattaaccatagcactagccataaaacttggcctagcccctctacacttctgactaccagaagtcat
chloris	??
chlorocyanus	??

```
christophei        ttatattaacaatagcacttgctataaaacttggattagcccca?tacacttctgacttccagaagtatt
chrysolepis        ??????????????????????????????????????????????????????????????????????
clivicola          ??????????????????????????????????????????????????????????????????????
cobanensis         ??????????????????????????????????????????????????????????????????????
coelestinus        tcctcctaactgccgcattagccataaaactaggcctagcccctatacacttctgattaccagaagtcct
compressicauda     ??????????????????????????????????????????????????????????????????????
conspersus         ??????????????????????????????????????????????????????????????????????
crassulus          ??????????????????????????????????????????????????????????????????????
cristatellus       ttcttcttttactagcactggccctaaaactaggactagccccagcacacttctgactcccagaggtatt
Cr._barbouri       tcatcttaacaatagcccttgctataaaactaggcctagcccctttccatttctgactgccagaagtcct
cupreus            ??????????????????????????????????????????????????????????????????????
cuprinus           ??????????????????????????????????????????????????????????????????????
cuvieri            ttttattaactatagcccttgccataaaaataggattagccccaatacacttctgactaccagaagtact
cyanopleurus       ??????????????????????????????????????????????????????????????????????
cybotes            ??????????????????????????????????????????????????????????????????????
darlingtoni        ??????????????????????????????????????????????????????????????????????
desechensis        ??????????????????????????????????????????????????????????????????????
distichus          tccttctctccatagcactagccataaaactaggactagcccccctacacttttgactcccagaagtact
dollfusianus       ??????????????????????????????????????????????????????????????????????
dunni              ??????????????????????????????????????????????????????????????????????
equestris          ttatattaactatggcacttgccataaaactaggcctagcacctctacacttctgactaccagaagtact
etheridgei         ttcttttaaccatggccttagcaataaaattaggccttgcccccttacatttttgactaccagaagttct
evermanni          ??????????????????????????????????????????????????????????????????????
fasciata           ??????????????????????????????????????????????????????????????????????
fowleri            ??????????????????????????????????????????????????????????????????????
fraseri            ??????????????????????????????????????????????????????????????????????
frenatus           ??????????????????????????????????????????????????????????????????????
fuscoauratus       ??????????????????????????????????????????????????????????????????????
gadovii            ??????????????????????????????????????????????????????????????????????
garmani            tcctattaattatggccctagcaataaaacttggcctcgcacccatacacttttgactgccagaagttct
gingivinus         ??????????????????????????????????????????????????????????????????????
grahami            tcctgctaaccctggccctagcaataaaactaggccttgcacctatacacttctga?taccagaagtatt
granuliceps        ??????????????????????????????????????????????????????????????????????
griseus            ??????????????????????????????????????????????????????????????????????
gundlachi          ??????????????????????????????????????????????????????????????????????
hendersoni         ??????????????????????????????????????????????????????????????????????
homolechis         ??????????????????????????????????????????????????????????????????????
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humilis	tcctactaactttagcactaacaataaagctaggacttgccccaatacacttctgactacccgaagttct
insignis	??
insolitus	ttcttctaaccctagcactagcaataaaactaggacttgcccccacacacttctgactaccagaagtgct
intermedius	??
isolepis	??
jacare	??
jubar	??
kemptoni	??
krugi	tcattttaacaatagcactagccataaagctaggacttgccccaatgcacttttgacttccagaagtcct
laeviventris	??
latifrons	??
leachii	??
lemurinus	??
limifrons	ttttattgaccctagcactagcaataaaactaggacttgccccaatacacttctgactgccagaggtatt
lineatopus	ttttattaactatagcattagctataaaactagggcttgccccaatgcacttctgactaccagaagtgct
lineatus	ttctattaacaacagcactagcaataaaactaggactcgcccccatacacttctgactaccagaagtcgt
liogaster	??
lividus	??
longiceps	??
longitibialis	??
loveridgei	??
loysianus	ttctcttagccatagcactggccataaaattaggcctagccccacttcacttctgactaccagaagttat
luciae	tcttactaactatagcactagcaataaaactagggctagccccaacacacttctgactcccagaagtact
lucius	ttcttctaacaatagcacttacaataaaattgggcctagccccattacacttttgattaccagaagtagt
luteogularis	ttatattaaccatagcgcttgccataaaactaggcctagcacctctacacttctgactaccagaagtact
luteosignifer	??
maculiventris	??
marcanoi	cccttcttacaatagcaatctcaataaagctaggcttagccccactacacttctgactaccagaggttct
mariarum	??
marmoratus	??
maynardi	ttctattaactatagcactagctataaagctcggactagccccagtacacttctgactaccagaggtaat
megapholidotus	??
meridionalis	??
mestrei	??
micropholidotus	??
microtus	ctcttcttaccatggcactctcaataaaactaggattaacccccgtacacttctgattgccagaagtact
monticola	??

nebuloides	??
nebulosus	??
noblei	??
notopholis	??
nubilis	??
occultus	ttttactaactatagcccttgccataaaactaggcctagccccaacacacttctgactcccagaagtact
oculatus	??
olssoni	ccctcctaactatagcactagccataaaactaggacttgccccacttcacttctgattaccagaagttat
onca	??
opalinus	??
ophiolepis	tctttcttacaatagcattagcaataaaactaggtctagtcccagtacacttttgattaccagaagtcct
ortoni	??
oxylophus	??
Phenacosaurus_heterodermus	??
parvicirculatus	??
paternus	ccatgctaaccatagccctagccataaaactagggttagctccacttcacttctggctaccagaagtaat
pentaprion	??
perracae	??
petersi	??
placidus	??
poecilopus	??
polylepis	??
poncencis	??
porcatus	??
proboscis	??
pulchellus	??
punctatus	??
quadriocellifer	??
reconditus	??
richardi	ttatattaaccctagcactatcaataaatttgggactagctccaatactcttttgcgttccagaagtctt
ricordi	??
roosevelti	??
roquet	??
rubribarbus	??
ruizi	??
sagrei	tcttattaacagtagcactagcaataaaactaggcctcgtaccaatacactttgactgccagaagtact
semilineatus	??

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sericeus                  ??????????????????????????????????????????????????????????????????????????
sheplani                  ttgcactaacagtagcactggccataaaactaggactggccccacttcacttttgattaccagaggtagt
shrevei                   ??????????????????????????????????????????????????????????????????????????
smallwoodi                ??????????????????????????????????????????????????????????????????????????
smaragdinus               ??????????????????????????????????????????????????????????????????????????
sminthus                  ??????????????????????????????????????????????????????????????????????????
solitarius                ??????????????????????????????????????????????????????????????????????????
spectrum                  ??????????????????????????????????????????????????????????????????????????
squamulatus               ??????????????????????????????????????????????????????????????????????????
strahmi                   ttcttttgactatggccctatcaataaaactaggcctagccccactacacttttgattaccagaagtaat
stratulus                 ttcttctaaccatggcactagccataaaactcggcctagcaccagtgcacttctgatttccagaagtctt
subocularis               ??????????????????????????????????????????????????????????????????????????
taylori                   ??????????????????????????????????????????????????????????????????????????
tolimensis                ??????????????????????????????????????????????????????????????????????????
townsendi                 ??????????????????????????????????????????????????????????????????????????
transversalis             ??????????????????????????????????????????????????????????????????????????
trinitatis                ??????????????????????????????????????????????????????????????????????????
tropidogaster             ??????????????????????????????????????????????????????????????????????????
tropidolepis              ??????????????????????????????????????????????????????????????????????????
tropidonotus              ??????????????????????????????????????????????????????????????????????????
valencienni               ttttattaaccattgcactagcaataaaactaggcctagccccaatacacttttgactaccagaagtact
vanidicus                 ttttattaaccatggccctagcaataaaattaggcctggccccatttcacttttgattaccagaagtcct
ventrimaculatus           ??????????????????????????????????????????????????????????????????????????
vermiculatus              ttctactaacagcagcactagctataaaactaggactagcccctatacatttttgactcccagaagttct
vociferans                ??????????????????????????????????????????????????????????????????????????
wattsi                    ttcttttaaccatagcattagccataaaactaggcctagcccccacacacttctgacttccagaagtact
whitemani                 ??????????????????????????????????????????????????????????????????????????
Polychrus_acutirostris    cactattaaccgccgccctggccataaagctaggacttgcacccacacacttctgacttccagaggtcct
Polychrus_marmoratus      ??????????????????????????????????????????????????????????????????????????
Leiocephalus_schreibersi  ??????????????????????????????????????????????????????????????????????????
Leiocephalus_melanochlorus ?????????????????????????????????????????????????????????????????????????
Urostrophus_vautieri      ??????????????????????????????????????????????????????????????????????????
Anisolepis_undulatus      ??????????????????????????????????????????????????????????????????????????
Enyalius_iheringi         ??????????????????????????????????????????????????????????????????????????
Phenacosaurus_nicefori    ttttacttactcttgcattagcaataaaactaggactagcccccctacacttctgactcccagaagtact
Diplolaemus_darwinii      tcttactaacagtcgcactagctataaaactaggacttgtgccaatacacttctgactaccagaagtatt
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acutus	acaaggatcaaccttatttactgcttttattatttcaacatgacaaaagttagccccaatatcactaagt
aeneus	tcaaggatcaact?tatctactgctcttattattactacatgacaaaaacttgccccaatatccttaatt
aequatorialis	??
agassizi	acaaggctccaccataaccacagcactaattattacaacctgacaaaaactagccccaatgtcattaatt
ahli	tcagggttcaacaataaccacggcactcattattaccacatgacaaaaacttgccccaatttccctaatt
aliniger	tcaaggttcaactataacaacagcgtttattattataacatggcaaaaactagccccaatatcattaatt
allisoni	??
allogus	??
altae	??
altavelensis	??
alutaceus	tcaagggtcttccataaacacagccttaattattgt?acttgacaaaaactagccccaatatccctaatc
angusticeps	ccaaggatcaacaatactaaccgcctttattattactacatgacaaaaactagccccaatatctctaatt
antonii	??
apollinaris	??
aquaticus	??
argenteolus	??
argillaceus	??
armouri	??
auratus	??
bahorucoensis	ccaaggttcaaccattacaactgccctcattattactacatgacaaaaactcgctccaatatcactaatt
baleatus	??
barahonae	acaaggctcaaccttaaataccgcccttattataattacatgacaaaagctagccccaatatcattaatt
barkeri	??
bartschi	gcaaggctcaaccataaaaacagcttttattatcactacatgacaaaaacttgcccccatatctcttatc
bimaculatus	tcaaggatcaaccctctccacagccttcattattgttacatgacaaaaactagcccccatatctctaatt
biporcatus	??
bitectus	??
bonairensis	??
brevirostris	tcaaggctcaaccctacccaccgccctcattattaccacatggcaaaaactagcccctatagcactaatc
brunneus	??
Ch._chameleonides	acaagggtcaactatagacactgccctaattattgccacatgacaaaaacttgctccaatatcactaatc
capito	??
carolinensis	ccaaggatcaaccataaccacagccaacattattaccacatgacaaaaacttgccccaatatcccttatt
chloris	??
chlorocyanus	??

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christophei        acaaggttcaaccttaaatactgctcttattgtaaccacatgacaaaaacttgccccaatatcactaatt
chrysolepis        ??????????????????????????????????????????????????????????????????????
clivicola          ??????????????????????????????????????????????????????????????????????
cobanensis         ??????????????????????????????????????????????????????????????????????
coelestinus        tcaagggtccaccttaaaaacaagctttattattgtcacatgacaaaaactagcccctatatcattaatt
compressicauda     ??????????????????????????????????????????????????????????????????????
conspersus         ??????????????????????????????????????????????????????????????????????
crassulus          ??????????????????????????????????????????????????????????????????????
cristatellus       acagggctcaaccttatttattgccctcattattactacgtggcaaaaactggccccaatgtcacttatc
Cr._barbouri       acaaggatcaaccacacccaccgtttttattattactacatgacaaaaattagccccaataaccctaatt
cupreus            ??????????????????????????????????????????????????????????????????????
cuprinus           ??????????????????????????????????????????????????????????????????????
cuvieri            tcaaggttcaaccttaaacgctgctcttattattaccacatgacaaaaaatcgccccaatgtcattaatt
cyanopleurus       ??????????????????????????????????????????????????????????????????????
cybotes            ??????????????????????????????????????????????????????????????????????
darlingtoni        ??????????????????????????????????????????????????????????????????????
desechensis        ??????????????????????????????????????????????????????????????????????
distichus          tcaaggctcaactttattttctgccctcattattgttacatgacaaaaattagccccaatatcactgatt
dollfusianus       ??????????????????????????????????????????????????????????????????????
dunni              ??????????????????????????????????????????????????????????????????????
equestris          ccaaggctcaaccataaaaaccgcattcatcattacaacatgacaaaaacttgccccaatatcattaatc
etheridgei         tcaaggctcaaccctaaacacagccctaattattaccacatgacaaaagctagctccaatgtcactaatt
evermanni          ??????????????????????????????????????????????????????????????????????
fasciata           ??????????????????????????????????????????????????????????????????????
fowleri            ??????????????????????????????????????????????????????????????????????
fraseri            ??????????????????????????????????????????????????????????????????????
frenatus           ??????????????????????????????????????????????????????????????????????
fuscoauratus       ??????????????????????????????????????????????????????????????????????
gadovii            ??????????????????????????????????????????????????????????????????????
garmani            tcaaggctcaaccttaaccactgcactaattattaccacttgacaaaaactcgccccaatatctttaatt
gingivinus         ??????????????????????????????????????????????????????????????????????
grahami            acaaggctcaaccttaaccactgcactaattattaccacttgacaaaaactagccccaatatccttaatt
granuliceps        ??????????????????????????????????????????????????????????????????????
griseus            ??????????????????????????????????????????????????????????????????????
gundlachi          ??????????????????????????????????????????????????????????????????????
hendersoni         ??????????????????????????????????????????????????????????????????????
homolechis         ??????????????????????????????????????????????????????????????????????
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humilis	acaaggctcaaccctaactacagcactcattattacaacctgacaaaaacttgcacctctaaccctaatt
insignis	??
insolitus	tcaaggctcaactataaacacagccctcattattcatacatgacaaaaacttgccccaatgtcactgatt
intermedius	??
isolepis	??
jacare	??
jubar	??
kemptoni	??
krugi	acaaaactcaacccttattactgcttttattatttctacatgacaaaaacttgccccaatatcactagtc
laeviventris	??
latifrons	??
leachii	??
lemurinus	??
limifrons	acaaggcgttacattagttactgcacttattatttctacctgacaaaaactcgcaccactaaccctaatt
lineatopus	acaaggaacagccctaccaacttcacttattattactacttgacaaaaacttgccccaatgtccctaatt
lineatus	tcaaggaacaacactaactaatgcattaatcatcaccacctgacaaaaacttgcaccaatagccctaatt
liogaster	??
lividus	??
longiceps	??
longitibialis	??
loveridgei	??
loysianus	tcaaggatcaaccataattactgcattt?ttattaccacatgacaaaaactagcccctatgtctcttatt
luciae	acaaggctcaaccataaccaccgccctaatcattaccacatgacaaaaacttgcccccatatccctaatt
lucius	tcaaggatcgactataaatacagcctttatcattatcacatgacaaaaactagccccaatatcacttatt
luteogularis	ccaaggcctaaccataaaaaccgcattcatcattacaacatgacaaaaacttgccccaatatcattaatt
luteosignifer	??
maculiventris	??
marcanoi	ccaaggttcaacaatatttactgctttaattattataacatgacagaaactagcccccatatccctactt
mariarum	??
marmoratus	??
maynardi	ccaaggctcttccataattacagccttcattatcaccacatgacaaaaacttgccccaatctcacttatc
megapholidotus	??
meridionalis	??
mestrei	??
micropholidotus	??
microtus	acaaggatcaaccataactacagcactcattattacaacatgacaaaaactagctcccatatccctaatt
monticola	??

nebuloides	??
nebulosus	??
noblei	??
notopholis	??
nubilis	??
occultus	tcaagggtcaactatagacactgccctaattattacaacatgacaaaaaattgccccaataaccctaatt
oculatus	??
olssoni	tcaaggtgccacccttcccactgctttcatcattgtaacatggcaaaaacttgctcctatatcacttatt
onca	??
opalinus	??
ophiolepis	acaagggtcaaccctaacaactgcacttattattactacatgacaaaaacttgcaccaatatctttagtc
ortoni	??
oxylophus	??
Phenacosaurus_heterodermus	??
parvicirculatus	??
paternus	tcaaggatcaacaacactaaccgcctttattattactacatgacaaaaactagccccaatatctctaatt
pentaprion	??
perracae	??
petersi	??
placidus	??
poecilopus	??
polylepis	??
poncencis	??
porcatus	??
proboscis	??
pulchellus	??
punctatus	??
quadriocellifer	??
reconditus	??
richardi	acaaggatcaaccatatct?ctgccttt?????acaacatgacaaaaacttgccccaatatccttaatt
ricordi	??
roosevelti	??
roquet	??
rubribarbus	??
ruizi	??
sagrei	acaagggtcaagcctaataactgcacttattattactacatgacaaaaaatcgcacctataactttaatt
semilineatus	??

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sericeus                  ??????????????????????????????????????????????????????????????????????????
sheplani                  tcaaggatcaaccacaaccacagcacttattattataacctgacaaaaactagcccccatatcactgatt
shrevei                   ??????????????????????????????????????????????????????????????????????????
smallwoodi                ??????????????????????????????????????????????????????????????????????????
smaragdinus               ??????????????????????????????????????????????????????????????????????????
sminthus                  ??????????????????????????????????????????????????????????????????????????
solitarius                ??????????????????????????????????????????????????????????????????????????
spectrum                  ??????????????????????????????????????????????????????????????????????????
squamulatus               ??????????????????????????????????????????????????????????????????????????
strahmi                   tcaaggatctactatatttactgccttaattattacaacatgacaaaaactagccccaatatctcttatt
stratulus                 acaaggctcaaccctacttaccgcttttattatttcaacatgacaaaaactggccccaatatcactaatt
subocularis               ??????????????????????????????????????????????????????????????????????????
taylori                   ??????????????????????????????????????????????????????????????????????????
tolimensis                ??????????????????????????????????????????????????????????????????????????
townsendi                 ??????????????????????????????????????????????????????????????????????????
transversalis             ??????????????????????????????????????????????????????????????????????????
trinitatis                ??????????????????????????????????????????????????????????????????????????
tropidogaster             ??????????????????????????????????????????????????????????????????????????
tropidolepis              ??????????????????????????????????????????????????????????????????????????
tropidonotus              ??????????????????????????????????????????????????????????????????????????
valencienni               acaagggtcaaccataaccacagcactagttatctctacttgacaaaaactggccccaatagccctaatt
vanidicus                 acaaggatctgctataaatactgcactaatcattactacttgacaaaagctagctccaatatctctaatt
ventrimaculatus           ??????????????????????????????????????????????????????????????????????????
vermiculatus              acaaggatcaactataaaaacagcttttattattacaacatgacaaaaacttgctccaatatcattaatt
vociferans                ??????????????????????????????????????????????????????????????????????????
wattsi                    tcaaggctcaaccctaccaacagcctttatcattgtaacatgacaaaaactcgccccaatatccctaatc
whitemani                 ??????????????????????????????????????????????????????????????????????????
Polychrus_acutirostris    gcaaggcactacaataaacacagccttaattattacaacatgacaaaaactagccccaatatcacttatt
Polychrus_marmoratus      ??????????????????????????????????????????????????????????????????????????
Leiocephalus_schreibersi  ??????????????????????????????????????????????????????????????????????????
Leiocephalus_melanochlorus ?????????????????????????????????????????????????????????????????????????
Urostrophus_vautieri      ??????????????????????????????????????????????????????????????????????????
Anisolepis_undulatus      ??????????????????????????????????????????????????????????????????????????
Enyalius_iheringi         ??????????????????????????????????????????????????????????????????????????
Phenacosaurus_nicefori    acaaggaactaccctacccacagccctaatcattgttacatgacaaaaacttgcccctatatcattaatt
Diplolaemus_darwinii      acaaggctcctccataaaaacagccctcattattagtacatgacaaaacgtagccccaatagcccttatt
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acutus	tttctgactatcaacaatct?ccaccagtaactttattagcactaggactttttcctctgtcattggag
aeneus	ttaataactataaataacctaaacccattaattttacttctacttggactaacttcctcaataataggg
aequatorialis	??
agassizi	tatctaactataaataacctcttcccaacaatcttactctcactaggacttttatcttcaatagttggag
ahli	tatttatctattaataacctctcaacagtggtcctaataaccatgggcctactatcttcaatagtcggag
aliniger	tatttaaccataaataatctttccccaacaattcttcttctattaggaatagcctcatctatgcttggtg
allisoni	??
allogus	??
altae	??
altavelensis	??
alutaceus	tttttaaccataaataatttatcaacaactattttaatgataataggacttgtatcttcacttgtcggag
angusticeps	tttttaactataaataatatatccacaacaatcctcctactaataggaatattatcctcacttgttggcg
antonii	??
apollinaris	??
aquaticus	??
argenteolus	??
argillaceus	??
armouri	??
auratus	??
bahorucoensis	ttcttaaccattaacaacctgtcctcaacagcccttctattattaggcttaatgtcctcattattaggcg
baleatus	??
barahonae	tttataaccattaataacttatcgacaacaatactattattactaggattagtatcaacaatgctaggag
barkeri	??
bartschi	tttttaaccataaacaacctttctacaacaattttaatctttctaggattactatcatccgcagtaggcg
bimaculatus	tatttaaccattaataatcttaataccgaaaccctcctaactttaggacttctatcaaccattattggag
biporcatus	??
bitectus	??
bonairensis	??
brevirostris	tgcctaacaattaataatcttaacccagcaatcctactaatcttaggacttttatcctcaactattgggg
brunneus	??
Ch._chameleonides	tttataaccattaacaacttatcaacaccaaccctgcttctactaggagttatctcctcattaattgggg
capito	??
carolinensis	ttcctaaccataaacaacctatccaccacaattttattattaataggactactatcttcacttatcgggg
chloris	??
chlorocyanus	??

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christophei        tacctaactataaacaacctatcaacaacaactttgctgctactaggagtagtatcctcaatattaggag
chrysolepis        ??????????????????????????????????????????????????????????????????????
clivicola          ??????????????????????????????????????????????????????????????????????
cobanensis         ??????????????????????????????????????????????????????????????????????
coelestinus        tatttaactataaataatctttcctcaacaattcttctctcactaggactagtttcatctatggtaggag
compressicauda     ??????????????????????????????????????????????????????????????????????
conspersus         ??????????????????????????????????????????????????????????????????????
crassulus          ??????????????????????????????????????????????????????????????????????
cristatellus       tacatatgtacaaataatcttccatcagtaattttattaatactaggcattatctcctccactgtcgggg
Cr._barbouri       tttctaacattaaataacctatcatcaacaattctattaacattgggctttttatctacaataattggag
cupreus            ??????????????????????????????????????????????????????????????????????
cuprinus           ??????????????????????????????????????????????????????????????????????
cuvieri            tatttaaccattaataatttatcaacaacaaccttattaacactaggattaatttcttcaatatgaggag
cyanopleurus       ??????????????????????????????????????????????????????????????????????
cybotes            ??????????????????????????????????????????????????????????????????????
darlingtoni        ??????????????????????????????????????????????????????????????????????
desechensis        ??????????????????????????????????????????????????????????????????????
distichus          tatttaactattagtaaccttaacccaactattctactaatcttaggcctcctatcctcaactattgggg
dollfusianus       ??????????????????????????????????????????????????????????????????????
dunni              ??????????????????????????????????????????????????????????????????????
equestris          tacctcattattaataacttatcccccacacttctcctcctattaggactaatatcatctactctgggag
etheridgei         tatttaacagtagataacctatccccctcaattcttctcctacttggtcttctatcttctctagttggcg
evermanni          ??????????????????????????????????????????????????????????????????????
fasciata           ??????????????????????????????????????????????????????????????????????
fowleri            ??????????????????????????????????????????????????????????????????????
fraseri            ??????????????????????????????????????????????????????????????????????
frenatus           ??????????????????????????????????????????????????????????????????????
fuscoauratus       ??????????????????????????????????????????????????????????????????????
gadovii            ??????????????????????????????????????????????????????????????????????
garmani            tatataaccctaaacaatctatcgaccacaattttaattttactcggacttctatcctcaattattggag
gingivinus         ??????????????????????????????????????????????????????????????????????
grahami            tatatgaccctaaacaacctgtcaaccacaactttaatcttactaggacttctatcttcaattattgggg
granuliceps        ??????????????????????????????????????????????????????????????????????
griseus            ??????????????????????????????????????????????????????????????????????
gundlachi          ??????????????????????????????????????????????????????????????????????
hendersoni         ??????????????????????????????????????????????????????????????????????
homolechis         ??????????????????????????????????????????????????????????????????????
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humilis	tacttgactatctctaatttatcaacaataattttaattaccataggactttcatcaactatcattggag
insignis	??
insolitus	tacttaacagtaaataacttatcccctacaattctattatccctgggcctcttatcttccctaattggag
intermedius	??
isolepis	??
jacare	??
jubar	??
kemptoni	??
krugi	tacttgactattaataaccttccaccaataattctgcttaccctaggagttatttcctctactatgggcg
laeviventris	??
latifrons	??
leachii	??
lemurinus	??
limifrons	tacttaacagttaataatctatcaacaacaattctattagttatgggactattatctgccattgtaggcg
lineatopus	tatataactattaatagtttatcaaccataattctaat?tcactaggcctactatcctcaattattggag
lineatus	atgcttaccattaacaacctatcaacaacaattttactactaataggactactttccgcaatcattggtg
liogaster	??
lividus	??
longiceps	??
longitibialis	??
loveridgei	??
loysianus	ttcataacctcaaacaatatgcccacaacaatctttctgcttataggacttctttcctcattcaccggag
luciae	tacataaccataaacaacctatcaccactaatactacttctactaggacttatatcctcaatcattggag
lucius	tacataactataaacaacttatccacaacaattttattaatcataggattaatatcatcaataattggag
luteogularis	tacctcattattaataacctatcacctatacttctcctcctattaggactaatatcatctaccctggggg
luteosignifer	??
maculiventris	??
marcanoi	ttcctcactataaacaacctatccacatcaatactcttaacaattggacttgtatcaacaatagttggcg
mariarum	??
marmoratus	??
maynardi	tt?ataaccataaacaacctatctactacaatc???ttattaataggacttctatcttcactcattggag
megapholidotus	??
meridionalis	??
mestrei	??
micropholidotus	??
microtus	tatctgaccataaacaacctctccccaacaatccttatcacattggggcttctatcttcaatagtagggg
monticola	??

nebuloides	??
nebulosus	??
noblei	??
notopholis	??
nubilis	??
occultus	tacctcaccataaacaacctatacccaagcattctaataacaataggcctattatctacaataatcgggg
oculatus	??
olssoni	tttttaaccataaacaacctaaacccaacaattttacttctccttggacttctatcttctacagtaggag
onca	??
opalinus	??
ophiolepis	tacttaaccattaattccctttcaacaacagttttattattaatgggactcatatccactgttattgctg
ortoni	??
oxylophus	??
Phenacosaurus_heterodermus	??
parvicirculatus	??
paternus	tttttaactataaatagtatgtccacaacaattcttctactaatgggagtcttatcctcacttgttggtg
pentaprion	??
perracae	??
petersi	??
placidus	??
poecilopus	??
polylepis	??
poncencis	??
porcatus	??
proboscis	??
pulchellus	??
punctatus	??
quadriocellifer	??
reconditus	??
richardi	ttaataactgcaaacaacctatccccattaattttacttctacttggactcacttcctcaatgataggag
ricordi	??
roosevelti	??
roquet	??
rubribarbus	??
ruizi	??
sagrei	tatctaacaattaactccctctcaacaacaattctgttatttatgggacttacatcctctatcattgcag
semilineatus	??

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sericeus                 ??????????????????????????????????????????????????????????????????????
sheplani                 tttcttaccataaataacttatctacaacagcccttctactgataggacttctgtcttcaataattgggg
shrevei                  ??????????????????????????????????????????????????????????????????????
smallwoodi               ??????????????????????????????????????????????????????????????????????
smaragdinus              ??????????????????????????????????????????????????????????????????????
sminthus                 ??????????????????????????????????????????????????????????????????????
solitarius               ??????????????????????????????????????????????????????????????????????
spectrum                 ??????????????????????????????????????????????????????????????????????
squamulatus              ??????????????????????????????????????????????????????????????????????
strahmi                  ttcctcaccgcaaacaacttatcaacgacaattcttttaacaataggacttctgtctgcaataatcggcg
stratulus                tttttgacaataagcaatcttccacctataattttattaactttaggacttgtttcctctattattggtg
subocularis              ??????????????????????????????????????????????????????????????????????
taylori                  ??????????????????????????????????????????????????????????????????????
tolimensis               ??????????????????????????????????????????????????????????????????????
townsendi                ??????????????????????????????????????????????????????????????????????
transversalis            ??????????????????????????????????????????????????????????????????????
trinitatis               ??????????????????????????????????????????????????????????????????????
tropidogaster            ??????????????????????????????????????????????????????????????????????
tropidolepis             ??????????????????????????????????????????????????????????????????????
tropidonotus             ??????????????????????????????????????????????????????????????????????
valencienni              tatctgaacattaataatctatcaacagctgtcctaatcttactaggactcttatcatcaattattgggg
vanidicus                ttcttgaccgtaaataacctatctacaacaattcttttaacaatgggacttatatcttcactaatcggag
ventrimaculatus          ??????????????????????????????????????????????????????????????????????
vermiculatus             tatttaaccgtaaacaacctatctacaacaattcttctttcactaggattattatcatccatagtaggag
vociferans               ??????????????????????????????????????????????????????????????????????
wattsi                   ttcttaaccattaataaccttaacacccccacactattagtattaggcattttatcctccattatcggag
whitemani                ??????????????????????????????????????????????????????????????????????
Polychrus_acutirostris   tacctaacaataaacaacctaccccaacaatcctactacttacaggaatactgtcctcactcctaggcg
Polychrus_marmoratus     ??????????????????????????????????????????????????????????????????????
Leiocephalus_schreibersi ??????????????????????????????????????????????????????????????????????
Leiocephalus_melanochlorus ????????????????????????????????????????????????????????????????????
Urostrophus_vautieri     ??????????????????????????????????????????????????????????????????????
Anisolepis_undulatus     ??????????????????????????????????????????????????????????????????????
Enyalius_iheringi        ??????????????????????????????????????????????????????????????????????
Phenacosaurus_nicefori   tacataaccattaacaacctttctacaacattactactaacactaggattattttcctcaatggttggcg
Diplolaemus_darwinii     ttcctgacatccaacacactatcaaccacaattctattattgatagccacactctccaccatcattggtg
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acutus	ggtggggcggtctcaatcaaacacaaacccgaaaaattatagcatattcatcaattgctcacttaggttg
aeneus	gctgaggcggactaaatcaaacacaaatacgaaaaattatagcattttcatcaatcgcccatctagggtg
aequatorialis	??
agassizi	gatggggaggcctaaaccaaacacaaacacgaaaaatcatagcatactcatcaattgcccacctaggatg
ahli	gctgaggcggactaaaccaaacacagacacgaaaaattatggcatattcatcaatcgcacatctaggatg
aliniger	gatgagcaggactaaatcaaacacagacccgaaaaattatagcattttcatcaattgcccaccttggatg
allisoni	??
allogus	??
altae	??
altavelensis	??
alutaceus	gatgagcaggacttaatcaaacacaaactcgaaaaattatagcctactcatctattgctcacctagggtg
angusticeps	gttgagggggctaaaccaaacacaaacccgaaagatcatagcatactcatcaattgctcaccttggatg
antonii	??
apollinaris	??
aquaticus	??
argenteolus	??
argillaceus	??
armouri	??
auratus	??
bahorucoensis	gctgagccggactaaaccaaacacaaacccgaaaaattatagcattttcatccattgctcaccttggatg
baleatus	??
barahonae	gatgaggaggattaaaccaaacacaaatacgaaaaataatagcatattcatcaattgcacatttaggctg
barkeri	??
bartschi	gatgag??ggattaaaccaaacacaaatacgaaaaattatagcatactcatcaatcgctcatctaggatg
bimaculatus	gttgaagcggactaaaccaaacacaaacccgtaaaattatagcatattcatcaatcgcacatctagggtg
biporcatus	??
bitectus	??
bonairensis	??
brevirostris	gttgggccggccttaaccaaacacaaacccgaaaaattatagcatattcatcaattgcccacctaggatg
brunneus	??
Ch._chameleonides	ggtgagccggactaaatcaaacacaaacccgaaaaattatggcatactcatacattgctcacctagggtg
capito	??
carolinensis	gatgggggggattgaaccaaacacaaacccgaaaaatcatagcatactcatcaattgcacacctaggatg
chloris	??
chlorocyanus	??

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christophei      gatggggaggacttaatcaaacacagacacgtaaaattatagcatactcatcaattgcacacctaggatg
chrysolepis      ????????????????????????????????????????????????????????????????????
clivicola        ????????????????????????????????????????????????????????????????????
cobanensis       ????????????????????????????????????????????????????????????????????
coelestinus      gatggggcggactaaaccaaacacaaacccgaaagatcatagcatactcatcaattgcacatctcggatg
compressicauda   ????????????????????????????????????????????????????????????????????
conspersus       ????????????????????????????????????????????????????????????????????
crassulus        ????????????????????????????????????????????????????????????????????
cristatellus     ggtggtctggattaaaccaaacacaaactcgaaaaatcatagcatactcatcaattgcacaccttggatg
Cr._barbouri     gttgagggggacttaaccaaacacaaattcgaaaactcatagcatactcatccattgcacacctcggatg
cupreus          ????????????????????????????????????????????????????????????????????
cuprinus         ????????????????????????????????????????????????????????????????????
cuvieri          gatgagcaggcctaaaccaaacacaaacccgaaaaatcacagcatactcatctattgctcacattggatg
cyanopleurus     ????????????????????????????????????????????????????????????????????
cybotes          ????????????????????????????????????????????????????????????????????
darlingtoni      ????????????????????????????????????????????????????????????????????
desechensis      ????????????????????????????????????????????????????????????????????
distichus        gatggggtgggttaaatcaaacacaaacccgaaaaatcatagcatattcatcaattgctcacctaggatg
dollfusianus     ????????????????????????????????????????????????????????????????????
dunni            ????????????????????????????????????????????????????????????????????
equestris        gctgaggaggactaaaccaaacccaaacccgaaaaatcatagcctattcatcaatcgcccacctaggttg
etheridgei       gctgaggtggactaaatcagacacaaacccgaaaaattatagcatactcatcaattgcacatctaggatg
evermanni        ????????????????????????????????????????????????????????????????????
fasciata         ????????????????????????????????????????????????????????????????????
fowleri          ????????????????????????????????????????????????????????????????????
fraseri          ????????????????????????????????????????????????????????????????????
frenatus         ????????????????????????????????????????????????????????????????????
fuscoauratus     ????????????????????????????????????????????????????????????????????
gadovii          ????????????????????????????????????????????????????????????????????
garmani          gatgggggggactcaatcagacccaaactcgaaaaatcatagcattttcatcaat?cgacacctggggtg
gingivinus       ????????????????????????????????????????????????????????????????????
grahami          ggtggggcggactaaaccaaacccaaacccgaaaaattatagcgttttcatcaatcgcacatcttgggtg
granuliceps      ????????????????????????????????????????????????????????????????????
griseus          ????????????????????????????????????????????????????????????????????
gundlachi        ????????????????????????????????????????????????????????????????????
hendersoni       ????????????????????????????????????????????????????????????????????
homolechis       ????????????????????????????????????????????????????????????????????
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humilis	ggtgaggcggactcaaccaaacacaaatccgaaaaatcatagcatactcatctattgcccacctaggatg
insignis	??
insolitus	gctgagccggactaaatcaaacacaaactcgaaaaattatagcatactcatcaatcgcacacctaggatg
intermedius	??
isolepis	??
jacare	??
jubar	??
kemptoni	??
krugi	gatgagcaggactaaaccaaacacaaactcgaaaaattatagcatactcatcaattgcacacctgggctg
laeviventris	??
latifrons	??
leachii	??
lemurinus	??
limifrons	gatggggcggacttaatcaaacacaaactcgtaaaatcatagcatattcatcaattgctcacctaggctg
lineatopus	gatggggaggactaaaccaaacacaaactcgaaaaattatagcattttcatcaatcgcccacctaggatg
lineatus	gatggggaggactaaaccagacacagacccgaaaaatcatggcctactcatcaatcgcacacctcggatg
liogaster	??
lividus	??
longiceps	??
longitibialis	??
loveridgei	??
loysianus	ggtggggcggactaaaccaaacacagacccgaaaaattatagcctactcatcaatcgcccatctaggatg
luciae	gctggggcggattaaatcaaacacaaacacgaaaaatcatagcatattcatccatcgcccacctaggctg
lucius	gctgaggcggcctaaaccaaacacaagtccgaaaaattatagcctactcatcaattgcacatcttggatg
luteogularis	gctgagggggattaaaccaaacccaaacccgaaaaatcatagcctactcatcaatcgcccatctaggttg
luteosignifer	??
maculiventris	??
marcanoi	gatgggcaggattgaatcagacacaaacacgaaaaattatagcatactcatcaattgcgcatcttggctg
mariarum	??
marmoratus	??
maynardi	gatggggaggacttaaccaaacacaaacccgaaaaatcatagcatactcatcaattgcacatctaggatg
megapholidotus	??
meridionalis	??
mestrei	??
micropholidotus	??
microtus	ggtgagcgggcctaaaccaaacacaaacacgaaaaattatagcatactcatcaatcgctcacctgggatg
monticola	??

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nebuloides                 ??????????????????????????????????????????????????????????????????????????
nebulosus                  ??????????????????????????????????????????????????????????????????????????
noblei                     ??????????????????????????????????????????????????????????????????????????
notopholis                 ??????????????????????????????????????????????????????????????????????????
nubilis                    ??????????????????????????????????????????????????????????????????????????
occultus                   gttgaggaggcctaaaccaaacacaaacccgaaaaattatagcatactcatcaattgcacacttgggttg
oculatus                   ??????????????????????????????????????????????????????????????????????????
olssoni                    gatgagccggattaaaccaaacacaaacccgaaaaattatagcctattcatcaatttcacacttaggctg
onca                       ??????????????????????????????????????????????????????????????????????????
opalinus                   ??????????????????????????????????????????????????????????????????????????
ophiolepis                 gatgagcaggacttaaccaaacacaaacacgaaaaattatagcatactcatcaattgctcaccttggatg
ortoni                     ??????????????????????????????????????????????????????????????????????????
oxylophus                  ??????????????????????????????????????????????????????????????????????????
Phenacosaurus_heterodermus ??????????????????????????????????????????????????????????????????????????
parvicirculatus            ??????????????????????????????????????????????????????????????????????????
paternus                   gttgagggggttaaaccaaacacagacccgaaaaatcatagcatactcatcaattgctcacctcggatg
pentaprion                 ??????????????????????????????????????????????????????????????????????????
perracae                   ??????????????????????????????????????????????????????????????????????????
petersi                    ??????????????????????????????????????????????????????????????????????????
placidus                   ??????????????????????????????????????????????????????????????????????????
poecilopus                 ??????????????????????????????????????????????????????????????????????????
polylepis                  ??????????????????????????????????????????????????????????????????????????
poncencis                  ??????????????????????????????????????????????????????????????????????????
porcatus                   ??????????????????????????????????????????????????????????????????????????
proboscis                  ??????????????????????????????????????????????????????????????????????????
pulchellus                 ??????????????????????????????????????????????????????????????????????????
punctatus                  ??????????????????????????????????????????????????????????????????????????
quadriocellifer            ??????????????????????????????????????????????????????????????????????????
reconditus                 ??????????????????????????????????????????????????????????????????????????
richardi                   gatgaggaggactaaatcaaacacaaatacgaaaaatcatagcattttcatcaattgcacacctaggatg
ricordi                    ??????????????????????????????????????????????????????????????????????????
roosevelti                 ??????????????????????????????????????????????????????????????????????????
roquet                     ??????????????????????????????????????????????????????????????????????????
rubribarbus                ??????????????????????????????????????????????????????????????????????????
ruizi                      ??????????????????????????????????????????????????????????????????????????
sagrei                     gatgagctggacttaatcaaacacaaacacggaaaatcatggcatactcatcaattgctcacctaggatg
semilineatus               ??????????????????????????????????????????????????????????????????????????
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sericeus                  ??????????????????????????????????????????????????????????????????????????
sheplani                  gctgagggggcttaaaccaaacacaagtacgaaaaattatagcatactcatcaattgcccacctagggtg
shrevei                   ??????????????????????????????????????????????????????????????????????????
smallwoodi                ??????????????????????????????????????????????????????????????????????????
smaragdinus               ??????????????????????????????????????????????????????????????????????????
sminthus                  ??????????????????????????????????????????????????????????????????????????
solitarius                ??????????????????????????????????????????????????????????????????????????
spectrum                  ??????????????????????????????????????????????????????????????????????????
squamulatus               ??????????????????????????????????????????????????????????????????????????
strahmi                   gatgagcaggacttaaccaaacacaaacccgaaaaattatagcatactcatcaattgctcaccttggatg
stratulus                 ggtgaggcggacttaaccaaacacaaacccgaaaaatcatagcatactcatcaatcgcacacctaggatg
subocularis               ??????????????????????????????????????????????????????????????????????????
taylori                   ??????????????????????????????????????????????????????????????????????????
tolimensis                ??????????????????????????????????????????????????????????????????????????
townsendi                 ??????????????????????????????????????????????????????????????????????????
transversalis             ??????????????????????????????????????????????????????????????????????????
trinitatis                ??????????????????????????????????????????????????????????????????????????
tropidogaster             ??????????????????????????????????????????????????????????????????????????
tropidolepis              ??????????????????????????????????????????????????????????????????????????
tropidonotus              ??????????????????????????????????????????????????????????????????????????
valencienni               gctgagggggacttaatcaaacacaaacccgaaaaattatggcattttcatcaattgcacacctagggtg
vanidicus                 ggtgggccggactaaatcaaacacaaacccgaaaaattatagctttctcatcaatcgcccacctaggatg
ventrimaculatus           ??????????????????????????????????????????????????????????????????????????
vermiculatus              gatggggaggtttaaatcaaacacaaatacgaaaaatcatagcatactcatcaattgctcacctaggatg
vociferans                ??????????????????????????????????????????????????????????????????????????
wattsi                    gctgaggcggtcttaatcaaacatatattcgaaagctcatggcatactcatcaattgcacaccttggatg
whitemani                 ??????????????????????????????????????????????????????????????????????????
Polychrus_acutirostris    gctggggaggactaaatcaaacacaaacccgaaaactaatggcttactcatcaatcgcccacctggggtg
Polychrus_marmoratus      ??????????????????????????????????????????????????????????????????????????
Leiocephalus_schreibersi  ??????????????????????????????????????????????????????????????????????????
Leiocephalus_melanochlorus ?????????????????????????????????????????????????????????????????????????
Urostrophus_vautieri      ??????????????????????????????????????????????????????????????????????????
Anisolepis_undulatus      ??????????????????????????????????????????????????????????????????????????
Enyalius_iheringi         ??????????????????????????????????????????????????????????????????????????
Phenacosaurus_nicefori    gatgagctggactaaaccaaacacaaacacgaaaaataatagccttctcatcaatcgctcacttaggatg
Diplolaemus_darwinii      gctgaggcggattaaaccaaacacagctacgaaaaattatagcattctcatcaatcgcccatattggctg
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acutus	aatggctgtaatttcctcaattgcaacaaacattataattataaacctactaatttatctaataataaca
aeneus	aataataataatagcatcaatcataacaaatattttcatcttaaatcttataatttacctaattataacc
aequatorialis	??
agassizi	aatagcaacagtatcatcaatcataacaaacattttagtattaaatctactaatctacctaacaataaca
ahli	aataaccactgtttcctcaattataccaaacattatagttttaaacttaataatttacctaattacaacc
aliniger	aatagctgtaattgcatctattatgacaaatattcttactcttaaccttatactttacttaattatgaca
allisoni	??
allogus	??
altae	??
altavelensis	??
alutaceus	aatagcagccatttcctcaattataacaaacattttaatcctcaacctattaatttacctaattataact
angusticeps	aatagccacaatttcatctattataaccaacatcctaatcttaaacctagttctttacctaattatgact
antonii	??
apollinaris	??
aquaticus	??
argenteolus	??
argillaceus	??
armouri	??
auratus	??
bahorucoensis	aatagccactatttcatcaattataaccaatatccttatcataaacttactactttatttaattatgaca
baleatus	??
barahonae	aatagcaacaatttcttctattataacaaatattcttattataaacttcttaatctatataattttaacc
barkeri	??
bartschi	aatagccacaatctcatcaattataaccaaccttctaattatgaatctcctactatatctaatcattaca
bimaculatus	aatggcctccatttcctcaattataacaaacattataatcataaacttagcaatttatttgatcataaca
biporcatus	??
bitectus	??
bonairensis	??
brevirostris	aatagccgcaatcgcctcaatcataacaaacatcataattataaacctcctaatttacttaatgataaca
brunneus	??
Ch._chameleonides	aatagctacaatttcatcaattataacaaacatcctacttataaatattttaatttacctagttttaact
capito	??
carolinensis	aatagcaacaatctcttcaa?cataacaaatatc?ttaaacataaactacaaatttaccttatcataaca
chloris	??
chlorocyanus	??

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christophei        aatggccacaatttcttctattataacaaacattctaattataaatttattaatttatttaattttaaca
chrysolepis        ??????????????????????????????????????????????????????????????????????
clivicola          ??????????????????????????????????????????????????????????????????????
cobanensis         ??????????????????????????????????????????????????????????????????????
coelestinus        aatggcctcaatctcctccattataactaatattcttgttataaatttagtactttacctaattataaca
compressicauda     ??????????????????????????????????????????????????????????????????????
conspersus         ??????????????????????????????????????????????????????????????????????
crassulus          ??????????????????????????????????????????????????????????????????????
cristatellus       aatggctataatcgcctcaattataacaaacatcataattataaacctggtgatttatttaataataaca
Cr._barbouri       aatagccacaatttctctaatcttatcaaatattcttattataaacctactaatttacttaattataaca
cupreus            ??????????????????????????????????????????????????????????????????????
cuprinus           ??????????????????????????????????????????????????????????????????????
cuvieri            aatggctacaatttcttcaattataacaaatattcttattataaacctattaatttatttaattataaca
cyanopleurus       ??????????????????????????????????????????????????????????????????????
cybotes            ??????????????????????????????????????????????????????????????????????
darlingtoni        ??????????????????????????????????????????????????????????????????????
desechensis        ??????????????????????????????????????????????????????????????????????
distichus          aatggccattattgccaccattataacaaacctcatagtcatgaacctcttaatttatctaataataaca
dollfusianus       ??????????????????????????????????????????????????????????????????????
dunni              ??????????????????????????????????????????????????????????????????????
equestris          aatagctacaatctcttcaatcataaccaatattcttgttataaacctattactttatataactatgaca
etheridgei         aatagccaccgtaacttcaattataacaaatattcttctcataaaccttataatttatttaattataaca
evermanni          ??????????????????????????????????????????????????????????????????????
fasciata           ??????????????????????????????????????????????????????????????????????
fowleri            ??????????????????????????????????????????????????????????????????????
fraseri            ??????????????????????????????????????????????????????????????????????
frenatus           ??????????????????????????????????????????????????????????????????????
fuscoauratus       ??????????????????????????????????????????????????????????????????????
gadovii            ??????????????????????????????????????????????????????????????????????
garmani            gataattactgtctcatcaattatgccgaacattataattttaaacctaattatttatttagtcataaca
gingivinus         ??????????????????????????????????????????????????????????????????????
grahami            aataattactatttcatcaattatacccaatattatagttttaaacctgacaatctacctaatcataaca
granuliceps        ??????????????????????????????????????????????????????????????????????
griseus            ??????????????????????????????????????????????????????????????????????
gundlachi          ??????????????????????????????????????????????????????????????????????
hendersoni         ??????????????????????????????????????????????????????????????????????
homolechis         ??????????????????????????????????????????????????????????????????????
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humilis          aatactgtctatctcatctattataacaaacattataattttaaacttgataatttacttaattgtaaca
insignis         ????????????????????????????????????????????????????????????????????
insolitus        aatggccacagtagcctcaattataacaaatattcttctaataaacctcataatctacttgttaataaca
intermedius      ????????????????????????????????????????????????????????????????????
isolepis         ????????????????????????????????????????????????????????????????????
jacare           ????????????????????????????????????????????????????????????????????
jubar            ????????????????????????????????????????????????????????????????????
kemptoni         ????????????????????????????????????????????????????????????????????
krugi            aatggcctctattgcctcaatcataacaaacattataatcatgaatctaatgatttatttaattataaca
laeviventris     ????????????????????????????????????????????????????????????????????
latifrons        ????????????????????????????????????????????????????????????????????
leachii          ????????????????????????????????????????????????????????????????????
lemurinus        ????????????????????????????????????????????????????????????????????
limifrons        aatactctctatttcatccatcatagttaatattatacttttaaactta???????????????????
lineatopus       aataattactatttttcactcataacaaatattataatcttaaacctaacaatttacttaatcataaca
lineatus         aataattaccatttcatcaatcataacaaacatcatactaattaacctacttatttacttaattataacc
liogaster        ????????????????????????????????????????????????????????????????????
lividus          ????????????????????????????????????????????????????????????????????
longiceps        ????????????????????????????????????????????????????????????????????
longitibialis    ????????????????????????????????????????????????????????????????????
loveridgei       ????????????????????????????????????????????????????????????????????
loysianus        aatcgcctccatttcctcaattataacaaacattataattattaacctactaatctacctaattataacg
luciae           aatagcagccattacatcaattataacaaatattttaatcttaaacttactaatttaccttgtcataaca
lucius           aatagcaacaatttcaacaattataactaatattttagttttaaacctattaatttacctaattataaca
luteogularis     aatagctacaatctcttcaatcataaccaatattcttgttataaacctattactttatataattataaca
luteosignifer    ????????????????????????????????????????????????????????????????????
maculiventris    ????????????????????????????????????????????????????????????????????
marcanoi         aatagcccctattgcctcaattataacaaacattcttattataaatttacttatttacttacttcttaca
mariarum         ????????????????????????????????????????????????????????????????????
marmoratus       ????????????????????????????????????????????????????????????????????
maynardi         aatagcaacaatttcttcaatcataacaaatattctcattatgaacttattagtctatcttattataaca
megapholidotus   ????????????????????????????????????????????????????????????????????
meridionalis     ????????????????????????????????????????????????????????????????????
mestrei          ????????????????????????????????????????????????????????????????????
micropholidotus  ????????????????????????????????????????????????????????????????????
microtus         aatagcagcagtatcatcaattataacaaacatcctaacactaaatttatttatctacttaataataaca
monticola        ????????????????????????????????????????????????????????????????????
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nebuloides                 ??????????????????????????????????????????????????????????????????????????????
nebulosus                  ??????????????????????????????????????????????????????????????????????????????
noblei                     ??????????????????????????????????????????????????????????????????????????????
notopholis                 ??????????????????????????????????????????????????????????????????????????????
nubilis                    ??????????????????????????????????????????????????????????????????????????????
occultus                   aatggccgtaatttccaccctaataacaaacatctttattataaacctaattatgtatctaattataaca
oculatus                   ??????????????????????????????????????????????????????????????????????????????
olssoni                    aatggccgcaatctcctctattataactaatattcttattataaacctaaccctttatttaattataaca
onca                       ??????????????????????????????????????????????????????????????????????????????
opalinus                   ??????????????????????????????????????????????????????????????????????????????
ophiolepis                 aatagtcgctgtttcttctattataataaacctcatagtaataaatctaattatttatttaatcatgacc
ortoni                     ??????????????????????????????????????????????????????????????????????????????
oxylophus                  ??????????????????????????????????????????????????????????????????????????????
Phenacosaurus_heterodermus ??????????????????????????????????????????????????????????????????????????????
parvicirculatus            ??????????????????????????????????????????????????????????????????????????????
paternus                   aatagctacaatttcatctattataacaaacatcttaattttaaacctaactatttacctaattataaca
pentaprion                 ??????????????????????????????????????????????????????????????????????????????
perracae                   ??????????????????????????????????????????????????????????????????????????????
petersi                    ??????????????????????????????????????????????????????????????????????????????
placidus                   ??????????????????????????????????????????????????????????????????????????????
poecilopus                 ??????????????????????????????????????????????????????????????????????????????
polylepis                  ??????????????????????????????????????????????????????????????????????????????
poncencis                  ??????????????????????????????????????????????????????????????????????????????
porcatus                   ??????????????????????????????????????????????????????????????????????????????
proboscis                  ??????????????????????????????????????????????????????????????????????????????
pulchellus                 ??????????????????????????????????????????????????????????????????????????????
punctatus                  ??????????????????????????????????????????????????????????????????????????????
quadriocellifer            ??????????????????????????????????????????????????????????????????????????????
reconditus                 ??????????????????????????????????????????????????????????????????????????????
richardi                   aataataacag?agcatcaatcacaacaaatattataa????aaa????ctaatttatttaattataacc
ricordi                    ??????????????????????????????????????????????????????????????????????????????
roosevelti                 ??????????????????????????????????????????????????????????????????????????????
roquet                     ??????????????????????????????????????????????????????????????????????????????
rubribarbus                ??????????????????????????????????????????????????????????????????????????????
ruizi                      ??????????????????????????????????????????????????????????????????????????????
sagrei                     aataattgctatttcctctattatgacgcatcttatagtaataaacctaataatttacttaattataacc
semilineatus               ??????????????????????????????????????????????????????????????????????????????
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sericeus                 ??????????????????????????????????????????????????????????????????????
sheplani                 gatagcctccgtttcctcaattataacaaacctttaatcataaacctggtaatttatattattgtaaca
shrevei                  ??????????????????????????????????????????????????????????????????????
smallwoodi               ??????????????????????????????????????????????????????????????????????
smaragdinus              ??????????????????????????????????????????????????????????????????????
sminthus                 ??????????????????????????????????????????????????????????????????????
solitarius               ??????????????????????????????????????????????????????????????????????
spectrum                 ??????????????????????????????????????????????????????????????????????
squamulatus              ??????????????????????????????????????????????????????????????????????
strahmi                  aatatccacaattgcctcaatctatacaaacatttttattataaacttatttatttacttactactaaca
stratulus                aatagctgtaatttcctcaattataacaaacattataattataaacctttagtttatttaataataaca
subocularis              ??????????????????????????????????????????????????????????????????????
taylori                  ??????????????????????????????????????????????????????????????????????
tolimensis               ??????????????????????????????????????????????????????????????????????
townsendi                ??????????????????????????????????????????????????????????????????????
transversalis            ??????????????????????????????????????????????????????????????????????
trinitatis               ??????????????????????????????????????????????????????????????????????
tropidogaster            ??????????????????????????????????????????????????????????????????????
tropidolepis             ??????????????????????????????????????????????????????????????????????
tropidonotus             ??????????????????????????????????????????????????????????????????????
valencienni              aataattactgtttcatctattataactaatatcatgattataaacttaataatctacttaattataact
vanidicus                aatagcagctatctcttctattataacaaacattttaattctaaacctacttatttacctaattataaca
ventrimaculatus          ??????????????????????????????????????????????????????????????????????
vermiculatus             aatagccacaatttcatcaatcataaccaaccttctaataataaatttaataatctatttaattataaca
vociferans               ??????????????????????????????????????????????????????????????????????
wattsi                   aatggcttctatttcctcaatcataacaaacattataatcataaatttactagtctatctaattataaca
whitemani                ??????????????????????????????????????????????????????????????????????
Polychrus_acutirostris   aatggccgtaatttccacgataataccgaacattctaattcttaccctaacaacatacattctaataact
Polychrus_marmoratus     ??????????????????????????????????????????????????????????????????????
Leiocephalus_schreibersi ??????????????????????????????????????????????????????????????????????
Leiocephalus_melanochlorus ????????????????????????????????????????????????????????????????????
Urostrophus_vautieri     ??????????????????????????????????????????????????????????????????????
Anisolepis_undulatus     ??????????????????????????????????????????????????????????????????????
Enyalius_iheringi        ??????????????????????????????????????????????????????????????????????
Phenacosaurus_nicefori   aatatcaacagtagcatcaattataacaaacattctaatcttaaatctaattatttatttaactataaca
Diplolaemus_darwinii     aatggcggcaatctcaacaatttcagaaaacattttaaccctaaatttaatactttatctattaataact
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acutus	acagccctattttcttccttaattttaaccaaatcaaaaacaattcaagacacaacaaa?acttgaacaa
aeneus	tccaatatattctactccataattatattaaaaactaaaactattcaagactcatcaacttcatgaacaa
aequatorialis	??
agassizi	acaaccatatttttctcactaattctatcaaaatctaaaacaatccaagatacaacaacctcttgaacaa
ahli	gcagccacatttttcacactaatactgtttaaatcaaaaactattcaagatacaacaataaactgaacct
aliniger	acaaccgcgttctttaccctaattttatcaaaatcaaaaacaattcaagatacaacagcaacctgaactc
allisoni	??
allogus	??
altae	??
altavelensis	??
alutaceus	acctcagtattttgctttattattattacaaaatcaaaaacaatccaaaacacagctactatttggacaa
angusticeps	acatcaatgtttgtctctttaattatttctaagtcaaaaacaatccaaaatacagcagaaacctgaacac
antonii	??
apollinaris	??
aquaticus	??
argenteolus	??
argillaceus	??
armouri	??
auratus	??
bahorucoensis	acaactatattttactcccttattttatcaaaatctaaaactattcaagacacaataaccacctgaacac
baleatus	??
barahonae	ttatctatatttttattacttattttctcaaattctaaaacaattcaagacaccacaacagcctgaaccc
barkeri	??
bartschi	acagccatattttgggccataatcctgtcaaactcaaagacaattcaagacacaacaaccacctgaaccc
bimaculatus	acagccctattcttctcccttattttatctaaatcaaaaacaattcaagacacagcaaccacctgaacaa
biporcatus	??
bitectus	??
bonairensis	??
brevirostris	accgccctattctgctccctaatcttttcaaagtcaaaaactattcaagatacaacaaccacctgagcca
brunneus	??
Ch._chameleonides	acatctatattttctatatttattttttctaagtccaaaacaattcaagacactactaccacttgaccct
capito	??
carolinensis	acttcaatatttct?tctcttattatttc?aaatcaaaaacaatccaaaacgcaacatccacctgaaccc
chloris	??
chlorocyanus	??

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christophei        gtatctatatttcttctacttattttttaaactccaaaaccattcaagatactataataacctgaaccc
chrysolepis        ??????????????????????????????????????????????????????????????????????
clivicola          ??????????????????????????????????????????????????????????????????????
cobanensis         ??????????????????????????????????????????????????????????????????????
coelestinus        acatctgtattctacgctttgatcttaacaaagtctaaaacaattcaagatacaacaaccacctgaacac
compressicauda     ??????????????????????????????????????????????????????????????????????
conspersus         ??????????????????????????????????????????????????????????????????????
crassulus          ??????????????????????????????????????????????????????????????????????
cristatellus       accaccttgtttaccaccctaatttgctctaaatcaaaaacaattcaagacacagcaaccacttgaacaa
Cr._barbouri       acaaccatattttgtctactaattataactaaatccaagacaatccaagacataataaacaccaaaccac
cupreus            ??????????????????????????????????????????????????????????????????????
cuprinus           ??????????????????????????????????????????????????????????????????????
cuvieri            atctctatatttaactcactaattttatccaaatctaaaactattcaagacacgtcaatgacatgaacat
cyanopleurus       ??????????????????????????????????????????????????????????????????????
cybotes            ??????????????????????????????????????????????????????????????????????
darlingtoni        ??????????????????????????????????????????????????????????????????????
desechensis        ??????????????????????????????????????????????????????????????????????
distichus          acagccctattctccctcctaattttttccaaatcaaaaaccattcaagacacaacaacaacctgagcac
dollfusianus       ??????????????????????????????????????????????????????????????????????
dunni              ??????????????????????????????????????????????????????????????????????
equestris          acatcaatatttttttaccccttattttatcaaaatctaaaacaattcaagatacaactacctcatgaacac
etheridgei         acaaccatattcttctctttaattttatccaaatccaaaacaattcaagactcaactattacctgaacac
evermanni          ??????????????????????????????????????????????????????????????????????
fasciata           ??????????????????????????????????????????????????????????????????????
fowleri            ??????????????????????????????????????????????????????????????????????
fraseri            ??????????????????????????????????????????????????????????????????????
frenatus           ??????????????????????????????????????????????????????????????????????
fuscoauratus       ??????????????????????????????????????????????????????????????????????
gadovii            ??????????????????????????????????????????????????????????????????????
garmani            accgccctattttactcactaatcttatc?aaatcaaatggaatccaagacacaacaacaacttgaacac
gingivinus         ??????????????????????????????????????????????????????????????????????
grahami            attgccctattttattcactaattctatctaaatcaaaaacaatccaagatacaaca?caacttggacac
granuliceps        ??????????????????????????????????????????????????????????????????????
griseus            ??????????????????????????????????????????????????????????????????????
gundlachi          ??????????????????????????????????????????????????????????????????????
hendersoni         ??????????????????????????????????????????????????????????????????????
homolechis         ??????????????????????????????????????????????????????????????????????
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humilis          acagccctatttagcttcttaatttttactcgatccaaaacaattcaagatacaataataacctgaacac
insignis         ??????????????????????????????????????????????????????????????????????
insolitus        acagccatatttttctctcttattttatccaaaactaaaacaattcaagactcagcaataacctgagcac
intermedius      ??????????????????????????????????????????????????????????????????????
isolepis         ??????????????????????????????????????????????????????????????????????
jacare           ??????????????????????????????????????????????????????????????????????
jubar            ??????????????????????????????????????????????????????????????????????
kemptoni         ??????????????????????????????????????????????????????????????????????
krugi            gcggccctattcttctcattaatttattctaagtcaaaaacaattaaagacacaacatctgcctgaacaa
laeviventris     ??????????????????????????????????????????????????????????????????????
latifrons        ??????????????????????????????????????????????????????????????????????
leachii          ??????????????????????????????????????????????????????????????????????
lemurinus        ??????????????????????????????????????????????????????????????????????
limifrons        ?????????????????????????????????????aaaacaatccaagacacaataatgacatgaacac
lineatopus       acagcaatattttgctcactaatcttatcaaaatcaaaaacaatacaagatattatgataacttgaacaa
lineatus         acagcaatgttctgcctactaatttcatccaaatcaaaaacaatccaagatacaacaacaacatgaacac
liogaster        ??????????????????????????????????????????????????????????????????????
lividus          ??????????????????????????????????????????????????????????????????????
longiceps        ??????????????????????????????????????????????????????????????????????
longitibialis    ??????????????????????????????????????????????????????????????????????
loveridgei       ??????????????????????????????????????????????????????????????????????
loysianus        acctccatatttttaacccttatttttctaactcaaaaacaatccaaaacacagcaattaattgaacac
luciae           ataacaatattttattcccttattttactaaaattaaaaacaatccaagatacatccacctcctgatcaa
lucius           acatctatatttcttttattaattttaaccaattctaaaacaattcaagacatatcaactacctgaactc
luteogularis     acatcaatatttttttacccttatcttatcaaaatctaaaacaattcaagatacaactacctcatgaacac
luteosignifer    ??????????????????????????????????????????????????????????????????????
maculiventris    ??????????????????????????????????????????????????????????????????????
marcanoi         acggccctattttcctctctaacactatctaaatcaaagacaattcaagatacatcaacaacctgaacaa
mariarum         ??????????????????????????????????????????????????????????????????????
marmoratus       ??????????????????????????????????????????????????????????????????????
maynardi         acctcaatatttctctctcttatcatccctaaatcaaaaacaatccaaaacacaacatccacctgaacac
megapholidotus   ??????????????????????????????????????????????????????????????????????
meridionalis     ??????????????????????????????????????????????????????????????????????
mestrei          ??????????????????????????????????????????????????????????????????????
micropholidotus  ??????????????????????????????????????????????????????????????????????
microtus         acagccttattttattcactaattttatcaaaaactaaaacaatccaagacacaacaacctcttgagcaa
monticola        ??????????????????????????????????????????????????????????????????????
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nebuloides                 ??????????????????????????????????????????????????????????????????????????
nebulosus                  ??????????????????????????????????????????????????????????????????????????
noblei                     ??????????????????????????????????????????????????????????????????????????
notopholis                 ??????????????????????????????????????????????????????????????????????????
nubilis                    ??????????????????????????????????????????????????????????????????????????
occultus                   acaaccgcattctgggccctaatctgcttagaatctaaaactgtaaaagacacaacaactgcctgaacaa
oculatus                   ??????????????????????????????????????????????????????????????????????????
olssoni                    acaaccatgttttataccctaattttaactaaatccaaaacaatccaagactcaaccctcacctgatcac
onca                       ??????????????????????????????????????????????????????????????????????????
opalinus                   ??????????????????????????????????????????????????????????????????????????
ophiolepis                 tctgccctatttcaagcactaattgtctctcaatcaaaaacaattcaagatacaacaatgacatgagcac
ortoni                     ??????????????????????????????????????????????????????????????????????????
oxylophus                  ??????????????????????????????????????????????????????????????????????????
Phenacosaurus_heterodermus ??????????????????????????????????????????????????????????????????????????
parvicirculatus            ??????????????????????????????????????????????????????????????????????????
paternus                   acttcaatatttttttccctaattatttctaagtcaaaaacaatccaaaacacagcagagacctgaacat
pentaprion                 ??????????????????????????????????????????????????????????????????????????
perracae                   ??????????????????????????????????????????????????????????????????????????
petersi                    ??????????????????????????????????????????????????????????????????????????
placidus                   ??????????????????????????????????????????????????????????????????????????
poecilopus                 ??????????????????????????????????????????????????????????????????????????
polylepis                  ??????????????????????????????????????????????????????????????????????????
poncencis                  ??????????????????????????????????????????????????????????????????????????
porcatus                   ??????????????????????????????????????????????????????????????????????????
proboscis                  ??????????????????????????????????????????????????????????????????????????
pulchellus                 ??????????????????????????????????????????????????????????????????????????
punctatus                  ??????????????????????????????????????????????????????????????????????????
quadriocellifer            ??????????????????????????????????????????????????????????????????????????
reconditus                 ??????????????????????????????????????????????????????????????????????????
richardi                   tccactatatttttatccctaattatactaaaaattaacacaattcaagactcctcaacctcatgaacaa
ricordi                    ??????????????????????????????????????????????????????????????????????????
roosevelti                 ??????????????????????????????????????????????????????????????????????????
roquet                     ??????????????????????????????????????????????????????????????????????????
rubribarbus                ??????????????????????????????????????????????????????????????????????????
ruizi                      ??????????????????????????????????????????????????????????????????????????
sagrei                     tcagccctattccaagcactaatttgctctaaatcaaaaacaatccaagacacaacaacaacctgagccc
semilineatus               ??????????????????????????????????????????????????????????????????????????
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sericeus                  ??????????????????????????????????????????????????????????????????????????
sheplani                  acatccaccttcttcccccctaattacttccaaatctaagacaattcaaaatataacttcaacttgaacac
shrevei                   ??????????????????????????????????????????????????????????????????????????
smallwoodi                ??????????????????????????????????????????????????????????????????????????
smaragdinus               ??????????????????????????????????????????????????????????????????????????
sminthus                  ??????????????????????????????????????????????????????????????????????????
solitarius                ??????????????????????????????????????????????????????????????????????????
spectrum                  ??????????????????????????????????????????????????????????????????????????
squamulatus               ??????????????????????????????????????????????????????????????????????????
strahmi                   acagccatattttactccctaatttttcaaaatcaaaaacaattcaagatacatcagtcacttgaacaa
stratulus                 acagccctatttttagccctaattttatctaaatcaaaaacaattcaagatacaacaaacacttgaacaa
subocularis               ??????????????????????????????????????????????????????????????????????????
taylori                   ??????????????????????????????????????????????????????????????????????????
tolimensis                ??????????????????????????????????????????????????????????????????????????
townsendi                 ??????????????????????????????????????????????????????????????????????????
transversalis             ??????????????????????????????????????????????????????????????????????????
trinitatis                ??????????????????????????????????????????????????????????????????????????
tropidogaster             ??????????????????????????????????????????????????????????????????????????
tropidolepis              ??????????????????????????????????????????????????????????????????????????
tropidonotus              ??????????????????????????????????????????????????????????????????????????
valencienni               acagccctattttactcattaattttatccaaatcaaaaactattcaagatacaacaacagcctgaa?ac
vanidicus                 acctgcatgttttgcctacttatcattacaaaatctaaaacaattcaaaactcaaccattatttgaacac
ventrimaculatus           ??????????????????????????????????????????????????????????????????????????
vermiculatus              acaaccatattttgagccctaatcttgtcaaaatccaagaccatccaagacacaacaaccacctgaacat
vociferans                ??????????????????????????????????????????????????????????????????????????
wattsi                    atggccctattttgctccctcattgtgtccaattcaaaaacaattcaggatacaacaactgcctgaacag
whitemani                 ??????????????????????????????????????????????????????????????????????????
Polychrus_acutirostris    actgcaatattcctaacactaatctctactaaatcaaaaacaatccaagatgcatctacatcatggacaa
Polychrus_marmoratus      ??????????????????????????????????????????????????????????????????????????
Leiocephalus_schreibersi  ??????????????????????????????????????????????????????????????????????????
Leiocephalus_melanochlorus ?????????????????????????????????????????????????????????????????????????
Urostrophus_vautieri      ??????????????????????????????????????????????????????????????????????????
Anisolepis_undulatus      ??????????????????????????????????????????????????????????????????????????
Enyalius_iheringi         ??????????????????????????????????????????????????????????????????????????
Phenacosaurus_nicefori    ataaccatattttactcacttattttatcaaaagctaaaacaattaaagataccaccacctcatgaacac
Diplolaemus_darwinii      tcctcaaccttctcagcacttattttatctaaatcaaaaaccatcaaagacacatccacatcactaacaa
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acutus	tatcacccactttaactattactatgatacttctgctactttcacttggtggcctgccgccccttacagg
aeneus	cctccccaatacttaccattattataatacttaccctttatcactaggaggtctacctcctcttaccgg
aequatorialis	??
agassizi	catccccaatactaacgattattatgatactaaccctcctatcactagggggcttaccccctcttacagg
ahli	tatccccaataacaaccgtcataataataattctattactctcacttggaggcctcccaccattaactgg
aliniger	tctccccaaccctaactattattataatgttatcacttctttcactaggcggacttccaccattaaccgg
allisoni	??
allogus	??
altae	??
altavelensis	??
alutaceus	tatcaccaacactaacaattaccataatactttctttactttcactaggaggactaccgccactaacagg
angusticeps	tctcacctactctaacagtttttatgttactttcactcctatctttaggtggactaccacccctaactgg
antonii	??
apollinaris	??
aquaticus	??
argenteolus	??
argillaceus	??
armouri	??
auratus	??
bahorucoensis	tctcgccagccctaactattataataatgttgtttctcctctccctagggggctacctccactaactgg
baleatus	??
barahonae	tatctccaaccattactattataataatacttacactcctgtcattagggggattacccccactcaccgg
barkeri	??
bartschi	tctcaccaacccttactattattataatactttccctcctctcactcggaggtctacccccattaaccgg
bimaculatus	cctccccaattctggttataataataatattatcactactgtcactaggaggactaccacccctaacagg
biporcatus	??
bitectus	??
bonairensis	??
brevirostris	catccccaataataactattactactgcgctctcattattatcattaggcggacttccacccctaacagg
brunneus	??
Ch._chameleonides	cttcaccagccctaaccactataataataattacactattatcactgggcggcttacccccatttaccgg
capito	??
carolinensis	tgtccccagcacttacaatcattataatactctcactcctttccttaggaggactacccccacttacagg
chloris	??
chlorocyanus	??

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christophei        tctctccaaccataaccattataactatacttacacttttatcattaggtggcctaccaccactaaccgg
chrysolepis        ??????????????????????????????????????????????????????????????????????
clivicola          ??????????????????????????????????????????????????????????????????????
cobanensis         ??????????????????????????????????????????????????????????????????????
coelestinus        tctccccaactttaacaattattataatactctcacttctctcccttggaggcttaccccccttaactgg
compressicauda     ??????????????????????????????????????????????????????????????????????
conspersus         ??????????????????????????????????????????????????????????????????????
crassulus          ??????????????????????????????????????????????????????????????????????
cristatellus       catcaccaaccctaactatcattactttactttctcttctgtcacttgggggactcccacctcttacagg
Cr._barbouri       tctcaccaaccttatctattataataatattaacgctactttcactaggagggctcccaccattaacagg
cupreus            ??????????????????????????????????????????????????????????????????????
cuprinus           ??????????????????????????????????????????????????????????????????????
cuvieri            tatctccaatattaactattattactatacttacactcttatcattagggggattaccaccactaaccgg
cyanopleurus       ??????????????????????????????????????????????????????????????????????
cybotes            ??????????????????????????????????????????????????????????????????????
darlingtoni        ??????????????????????????????????????????????????????????????????????
desechensis        ??????????????????????????????????????????????????????????????????????
distichus          tctcccccacaataactattataatgacatttctattattatcattagggggcttcccccaataacagg
dollfusianus       ??????????????????????????????????????????????????????????????????????
dunni              ??????????????????????????????????????????????????????????????????????
equestris          tatctccatccctaaccatcattataatattatcacttctctcattaggcggactaccccccctaagtgg
etheridgei         tctcaccaactctaactattattacaacacttacacttctttcactcggaggattaccccccctaaccgg
evermanni          ??????????????????????????????????????????????????????????????????????
fasciata           ??????????????????????????????????????????????????????????????????????
fowleri            ??????????????????????????????????????????????????????????????????????
fraseri            ??????????????????????????????????????????????????????????????????????
frenatus           ??????????????????????????????????????????????????????????????????????
fuscoauratus       ??????????????????????????????????????????????????????????????????????
gadovii            ??????????????????????????????????????????????????????????????????????
garmani            tttcacccacaataactattataatgataactttactcctctccctagggggcctcccaccactaactgg
gingivinus         ??????????????????????????????????????????????????????????????????????
grahami            tctcacccgcactgactgccataataataacactacttctttccctgggagggctaccaccactaacggg
granuliceps        ??????????????????????????????????????????????????????????????????????
griseus            ??????????????????????????????????????????????????????????????????????
gundlachi          ??????????????????????????????????????????????????????????????????????
hendersoni         ??????????????????????????????????????????????????????????????????????
homolechis         ??????????????????????????????????????????????????????????????????????
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humilis          tctcacccataacaacttctataataatattactatttttatcccttggaggactacccccattaactgg
insignis         ??????????????????????????????????????????????????????????????????????
insolitus        tttcaccagccttaactactataacaatactcacacttctctcattaggcggactacccccacttactgg
intermedius      ??????????????????????????????????????????????????????????????????????
isolepis         ??????????????????????????????????????????????????????????????????????
jacare           ??????????????????????????????????????????????????????????????????????
jubar            ??????????????????????????????????????????????????????????????????????
kemptoni         ??????????????????????????????????????????????????????????????????????
krugi            tatcccccaccctaactattacaataatgttaaccctttatcacttggaggattacctcccctaacagg
laeviventris     ??????????????????????????????????????????????????????????????????????
latifrons        ??????????????????????????????????????????????????????????????????????
leachii          ??????????????????????????????????????????????????????????????????????
lemurinus        ??????????????????????????????????????????????????????????????????????
limifrons        tctcacccatactaacctctataataataactttactattgtcattaggtggtttaccacctttaaccgg
lineatopus       tctcacccacccttactaccctaataataattttactcctctccctgggcggcctaccaccactaaccgg
lineatus         tatcaccaacactaacttcaatagcatcaattttacttttatccctaggaggactgccaccattaaccgg
liogaster        ??????????????????????????????????????????????????????????????????????
lividus          ??????????????????????????????????????????????????????????????????????
longiceps        ??????????????????????????????????????????????????????????????????????
longitibialis    ??????????????????????????????????????????????????????????????????????
loveridgei       ??????????????????????????????????????????????????????????????????????
loysianus        tttctccaacacttacaactattattctactttcactcctatcactaggaggactaccacccctaacagg
luciae           cctcccccacattaaccactactacaatactaacccttctctcactgggggccttcccccactcactgg
lucius           tttcaccaaccctactaattataataactaacactattatcactaggcggcctaccccctctaacagg
luteogularis     tatctccaaccctaaccatcattataatattatcacttctctcattaggcggtctaccccccctaagcgg
luteosignifer    ??????????????????????????????????????????????????????????????????????
maculiventris    ??????????????????????????????????????????????????????????????????????
marcanoi         tatcaccatatttaactattataaccatacttatacttctttcattaggcggactaccgccacttacagg
mariarum         ??????????????????????????????????????????????????????????????????????
marmoratus       ??????????????????????????????????????????????????????????????????????
maynardi         tatccccaacacttacaattattatgatactctcactcctctccttaggaggactaccccactaacagg
megapholidotus   ??????????????????????????????????????????????????????????????????????
meridionalis     ??????????????????????????????????????????????????????????????????????
mestrei          ??????????????????????????????????????????????????????????????????????
micropholidotus  ??????????????????????????????????????????????????????????????????????
microtus         cctcccccatactaacaactatcataatgcttaccctttgtcattaggaggcctacctccacttacagg
monticola        ??????????????????????????????????????????????????????????????????????
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nebuloides                 ??????????????????????????????????????????????????????????????????????
nebulosus                  ??????????????????????????????????????????????????????????????????????
noblei                     ??????????????????????????????????????????????????????????????????????
notopholis                 ??????????????????????????????????????????????????????????????????????
nubilis                    ??????????????????????????????????????????????????????????????????????
occultus                   cctcaccaaccatcactttaacacttcttatttccctcttatccctaggaggccttccccctctctctgg
oculatus                   ??????????????????????????????????????????????????????????????????????
olssoni                    tttcaccagtactaacaattattataatactaacactcctctcactaggaggactacctcccctaaccgg
onca                       ??????????????????????????????????????????????????????????????????????
opalinus                   ??????????????????????????????????????????????????????????????????????
ophiolepis                 tatcaccaaccatttccattttaaccatagcacttctactatcacttggaggcttaccaccactaacagg
ortoni                     ??????????????????????????????????????????????????????????????????????
oxylophus                  ??????????????????????????????????????????????????????????????????????
Phenacosaurus_heterodermus ??????????????????????????????????????????????????????????????????????
parvicirculatus            ??????????????????????????????????????????????????????????????????????
paternus                   tttcacccatactaacgattataatgatactttcacttctttcactagggggactaccaccactaactgg
pentaprion                 ??????????????????????????????????????????????????????????????????????
perracae                   ??????????????????????????????????????????????????????????????????????
petersi                    ??????????????????????????????????????????????????????????????????????
placidus                   ??????????????????????????????????????????????????????????????????????
poecilopus                 ??????????????????????????????????????????????????????????????????????
polylepis                  ??????????????????????????????????????????????????????????????????????
poncencis                  ??????????????????????????????????????????????????????????????????????
porcatus                   ??????????????????????????????????????????????????????????????????????
proboscis                  ??????????????????????????????????????????????????????????????????????
pulchellus                 ??????????????????????????????????????????????????????????????????????
punctatus                  ??????????????????????????????????????????????????????????????????????
quadriocellifer            ??????????????????????????????????????????????????????????????????????
reconditus                 ??????????????????????????????????????????????????????????????????????
richardi                   cctctcccatactaactattataataatattaaccctattatcactaggagggctccctcctcttactgg
ricordi                    ??????????????????????????????????????????????????????????????????????
roosevelti                 ??????????????????????????????????????????????????????????????????????
roquet                     ??????????????????????????????????????????????????????????????????????
rubribarbus                ??????????????????????????????????????????????????????????????????????
ruizi                      ??????????????????????????????????????????????????????????????????????
sagrei                     tatcaccagttattgctaccataaccatagcactattattatcattaggaggccttccaccattaactgg
semilineatus               ??????????????????????????????????????????????????????????????????????
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sericeus                  ??????????????????????????????????????????????????????????????????????????
sheplani                  tctcccccacactaattgttgttataatattatccctcctgtccttagggggcctgcccccttaactgg
shrevei                   ??????????????????????????????????????????????????????????????????????????
smallwoodi                ??????????????????????????????????????????????????????????????????????????
smaragdinus               ??????????????????????????????????????????????????????????????????????????
sminthus                  ??????????????????????????????????????????????????????????????????????????
solitarius                ??????????????????????????????????????????????????????????????????????????
spectrum                  ??????????????????????????????????????????????????????????????????????????
squamulatus               ??????????????????????????????????????????????????????????????????????????
strahmi                   cttccccatatttaatgattttaacaacattaacattactttcattaggtggacttcctcccctaacagg
stratulus                 tatcccccactttaactattattatgatacttctactcctctcacttggtggcctgcccccttaacagg
subocularis               ??????????????????????????????????????????????????????????????????????????
taylori                   ??????????????????????????????????????????????????????????????????????????
tolimensis                ??????????????????????????????????????????????????????????????????????????
townsendi                 ??????????????????????????????????????????????????????????????????????????
transversalis             ??????????????????????????????????????????????????????????????????????????
trinitatis                ??????????????????????????????????????????????????????????????????????????
tropidogaster             ??????????????????????????????????????????????????????????????????????????
tropidolepis              ??????????????????????????????????????????????????????????????????????????
tropidonotus              ??????????????????????????????????????????????????????????????????????????
valencienni               tatcacccaccctcaccactataataataattttacttctgtccttaggcggactaccaccattaacagg
vanidicus                 tatcccccacaattacaattatcataatactttcacttctttctctgggggtttaccaccacttactgg
ventrimaculatus           ??????????????????????????????????????????????????????????????????????????
vermiculatus              tttcaccatctttaaccatcattacaatactaacactcctttcacttggtggcctacccccactaactgg
vociferans                ??????????????????????????????????????????????????????????????????????????
wattsi                    cttcaccagtattaactgcctccatactacttt??cttctatcactagggggcctcccacctctaacagg
whitemani                 ??????????????????????????????????????????????????????????????????????????
Polychrus_acutirostris    cttctccaaccattaccactatatctctcctcatcctcctatcccttggaggctcccccccttaaaagg
Polychrus_marmoratus      ??????????????????????????????????????????????????????????????????????????
Leiocephalus_schreibersi  ??????????????????????????????????????????????????????????????????????????
Leiocephalus_melanochlorus ?????????????????????????????????????????????????????????????????????????
Urostrophus_vautieri      ??????????????????????????????????????????????????????????????????????????
Anisolepis_undulatus      ??????????????????????????????????????????????????????????????????????????
Enyalius_iheringi         ??????????????????????????????????????????????????????????????????????????
Phenacosaurus_nicefori    tatccccaacattaacaattattataatactcactcttctctcactagggggctcccccattaaccgg
Diplolaemus_darwinii      cctccacaacactaaccatcataataatacttatgctactatcactaggaggactcccacccctaacagg
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acutus	attttaccaaaatgattgattttagaagaattaacagcccaaaaccttctacccctggcaacaattata
aeneus	atttataccaaaatgacttattttagaagaactagcaacacaaagcctaatcatactagcaactataata
aequatorialis	??
agassizi	caacataccaaaatgactaatcctagaagaactaacaatgcaaaacctaaccctactagcacttattata
ahli	atttataccaaaatgattaattcttgaaacactaacaacccaaaactttattatagcagcagtagctata
aliniger	atttataccaaaatgattaattttagaagaattaactacccaaaagttagcccccctagctactattata
allisoni	??
allogus	??
altae	??
altavelensis	??
alutaceus	atttataccaaaatgaataattatagaagaacttattaatcaaaactttactacaattactactatgata
angusticeps	gtttattccaaaatgactagttatagaagaactaattttacaaaattttaattttccagctattttaata
antonii	??
apollinaris	??
aquaticus	??
argenteolus	??
argillaceus	??
armouri	??
auratus	??
bahorucoensis	ctttatcccaaaatgacttatcctagaagaacttactacccaaaaccttgccccactagctattattata
baleatus	??
barahonae	atttttaccaaaatgactaattctagaagaattaacatcccaaaacctaacaaccctggctataatcata
barkeri	??
bartschi	atttacaccaaaatggctgatcttagaagaactagtatttcaa???????????ctagccaccattata
bimaculatus	atttgcaccaaaatgactaattatagaagaactaattgtccaaaacctagccccaatagccaccgttata
biporcatus	??
bitectus	??
bonairensis	??
brevirostris	atttgcaccaaaatgactaattctagaagagctcactacccaaaacttaatccccatagccgctgttata
brunneus	??
Ch._chameleonides	ctttataccaaaatgaataattttagaagaattaattaaccaaaacctacttgtagtatcattaatcata
capito	??
carolinensis	acttataccgaaatgacttattatagaagaactaatcttacaagacttcaacttactagccaccataata
chloris	??
chlorocyanus	??

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christophei        gtttataccaaaatgattgatcttagaagaactaacaactcaaaacttaacctcactagctatgattatg
chrysolepis        ??????????????????????????????????????????????????????????????????????
clivicola          ??????????????????????????????????????????????????????????????????????
cobanensis         ??????????????????????????????????????????????????????????????????????
coelestinus        attcacaccaaaatgacttatcttagaagaattaaccacccaaaatctactcccccctagccactactata
compressicauda     ??????????????????????????????????????????????????????????????????????
conspersus         ??????????????????????????????????????????????????????????????????????
crassulus          ??????????????????????????????????????????????????????????????????????
cristatellus       atttttaccaaaatgactagttttagaagaaataattgtacaaaacttaaccccactcgccacaaccata
Cr._barbouri       atttttaccaaaatgactaattctagaagaacttacaactcaaaatctaaccccccctagcaattattata
cupreus            ??????????????????????????????????????????????????????????????????????
cuprinus           ??????????????????????????????????????????????????????????????????????
cuvieri            atttataccaaaatgactaattctagaagaattgacaacccaaaacttaacttcactagccgtaatcata
cyanopleurus       ??????????????????????????????????????????????????????????????????????
cybotes            ??????????????????????????????????????????????????????????????????????
darlingtoni        ??????????????????????????????????????????????????????????????????????
desechensis        ??????????????????????????????????????????????????????????????????????
distichus          atttgcaccaaaatgactaattctagaagaactcacaacccaaaatctaattcctctagctgttttaata
dollfusianus       ??????????????????????????????????????????????????????????????????????
dunni              ??????????????????????????????????????????????????????????????????????
equestris          atttataccaaaatgattaatcctagaagaact??????ccaaaatcttcccccactagccactattata
etheridgei         atttatgccaaaatgactaatcttagaagaattaacaactcaaaacttaacccccatagctattaccata
evermanni          ??????????????????????????????????????????????????????????????????????
fasciata           ??????????????????????????????????????????????????????????????????????
fowleri            ??????????????????????????????????????????????????????????????????????
fraseri            ??????????????????????????????????????????????????????????????????????
frenatus           ??????????????????????????????????????????????????????????????????????
fuscoauratus       ??????????????????????????????????????????????????????????????????????
gadovii            ??????????????????????????????????????????????????????????????????????
garmani            ctttataccaaaatga?ttattctagaagaactagttgcccaaaatcttatctcaaccgccactattata
gingivinus         ??????????????????????????????????????????????????????????????????????
grahami            ctttatgccaaaatgacttatcttagaagaactagtagcccaaaacctcaccccagccgccactgctata
granuliceps        ??????????????????????????????????????????????????????????????????????
griseus            ??????????????????????????????????????????????????????????????????????
gundlachi          ??????????????????????????????????????????????????????????????????????
hendersoni         ??????????????????????????????????????????????????????????????????????
homolechis         ??????????????????????????????????????????????????????????????????????
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humilis	atttattccaaaatgacttattttagaagaactaattacccaaaatcttgattcaatagctattattata
insignis	??
insolitus	atttatgcccaaatgactaatcctagaacaattagccagccaagacttagtgcccctagccactattata
intermedius	??
isolepis	??
jacare	??
jubar	??
kemptoni	??
krugi	atttttaccaaaatgactaatcctagaagaa??????????????cttgccccattagccaccacc?ta
laeviventris	??
latifrons	??
leachii	??
lemurinus	??
limifrons	atttataccaaaatggctaatcttacaaggactcgttgcccaaaaccttacctcagtagccattatatt?
lineatopus	atttataccaaaatgattaattctagaagaattggttgcccaaaaccttatcccaacagctactattata
lineatus	gtttgttccaaaatgattaatcctagaagaattagtaacccaaaacctaatcccaacagctattattata
liogaster	??
lividus	??
longiceps	??
longitibialis	??
loveridgei	??
loysianus	atttataccaaagtgactagttatagaagaactaattttacaaaacttctttttattagccagtataata
luciae	atttatgccaaaatgacttattttagaagagctaaccatacaaaacctagttatactagcaactataata
lucius	atttataccaaaatgattaatcttagaagagctaacaacccaaaacttaaccccactagctacccttata
luteogularis	atttataccaaaatgattaatcctagaagaactcacaacccaaaatcttacaccactagccactattata
luteosignifer	??
maculiventris	??
marcanoi	attcatcccaaaatgattagtattagaagaactagttactcaaaacctactcccactagctactattata
mariarum	??
marmoratus	??
maynardi	gtttgtaccaaaatgacttatcatagaagaactaattttgcaggacttcaacttactagccatcataata
megapholidotus	??
meridionalis	??
mestrei	??
micropholidotus	??
microtus	ctttataccaaaatgactaattctagaagaactaatgatacaaaacttagcccccctagcaattgttata
monticola	??

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nebuloides                 ??????????????????????????????????????????????????????????????????????
nebulosus                  ??????????????????????????????????????????????????????????????????????
noblei                     ??????????????????????????????????????????????????????????????????????
notopholis                 ??????????????????????????????????????????????????????????????????????
nubilis                    ??????????????????????????????????????????????????????????????????????
occultus                   attcttaccaaaatgactaatcctagaagaacttacaaaccaaaatctactaccattaaccaccactata
oculatus                   ??????????????????????????????????????????????????????????????????????
olssoni                    atttttaccaaaatgaataatcctagaagaacttactacccaaaacctaaccccactggccaccataata
onca                       ??????????????????????????????????????????????????????????????????????
opalinus                   ??????????????????????????????????????????????????????????????????????
ophiolepis                 atttatccctaaatgattaattctagaagaactagtaacccaaaacctcattccaacagcaacaataata
ortoni                     ??????????????????????????????????????????????????????????????????????
oxylophus                  ??????????????????????????????????????????????????????????????????????
Phenacosaurus_heterodermus ??????????????????????????????????????????????????????????????????????
parvicirculatus            ??????????????????????????????????????????????????????????????????????
paternus                   atttataccaaaatggctagttatagaagaattaattttacaaaattttaatcttccagctattttaata
pentaprion                 ??????????????????????????????????????????????????????????????????????
perracae                   ??????????????????????????????????????????????????????????????????????
petersi                    ??????????????????????????????????????????????????????????????????????
placidus                   ??????????????????????????????????????????????????????????????????????
poecilopus                 ??????????????????????????????????????????????????????????????????????
polylepis                  ??????????????????????????????????????????????????????????????????????
poncencis                  ??????????????????????????????????????????????????????????????????????
porcatus                   ??????????????????????????????????????????????????????????????????????
proboscis                  ??????????????????????????????????????????????????????????????????????
pulchellus                 ??????????????????????????????????????????????????????????????????????
punctatus                  ??????????????????????????????????????????????????????????????????????
quadriocellifer            ??????????????????????????????????????????????????????????????????????
reconditus                 ??????????????????????????????????????????????????????????????????????
richardi                   gtttataccaaaatgactcattctagaagaactgacaacacaaaacctaaccgtattagcaactataata
ricordi                    ??????????????????????????????????????????????????????????????????????
roosevelti                 ??????????????????????????????????????????????????????????????????????
roquet                     ??????????????????????????????????????????????????????????????????????
rubribarbus                ??????????????????????????????????????????????????????????????????????
ruizi                      ??????????????????????????????????????????????????????????????????????
sagrei                     ttttataccaaaatgactaattctagaagaactagtaacccaaaatctcattccaatagcaacagtaata
semilineatus               ??????????????????????????????????????????????????????????????????????
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sericeus                  ??????????????????????????????????????????????????????????????????????????
sheplani                  gtttattccaaagtgacttattatggaagaactaattctacaaaactttaacctatttaccactataata
shrevei                   ??????????????????????????????????????????????????????????????????????????
smallwoodi                ??????????????????????????????????????????????????????????????????????????
smaragdinus               ??????????????????????????????????????????????????????????????????????????
sminthus                  ??????????????????????????????????????????????????????????????????????????
solitarius                ??????????????????????????????????????????????????????????????????????????
spectrum                  ??????????????????????????????????????????????????????????????????????????
squamulatus               ??????????????????????????????????????????????????????????????????????????
strahmi                   atttatcccaaaatgactcgtactagaagaactaacaactcaaaatctaatccctttagccactgtcata
stratulus                 gtttttaccgaaatgattaattttagaagaactaataacccaaaaccttattccactagcaacacttata
subocularis               ??????????????????????????????????????????????????????????????????????????
taylori                   ??????????????????????????????????????????????????????????????????????????
tolimensis                ??????????????????????????????????????????????????????????????????????????
townsendi                 ??????????????????????????????????????????????????????????????????????????
transversalis             ??????????????????????????????????????????????????????????????????????????
trinitatis                ??????????????????????????????????????????????????????????????????????????
tropidogaster             ??????????????????????????????????????????????????????????????????????????
tropidolepis              ??????????????????????????????????????????????????????????????????????????
tropidonotus              ??????????????????????????????????????????????????????????????????????????
valencienni               attcatgcctaaatgacttattttagaagaactaattattcaaaaccttatcccaacagccactacttta
vanidicus                 gttcctaccaaaatgatttattgtagaagaactcattactcaaaacttaat?acagttattaccattata
ventrimaculatus           ??????????????????????????????????????????????????????????????????????????
vermiculatus              atttatgccaaaatgacttatcctagaagaattaacaacccaaaacttcactccactagcaactattata
vociferans                ??????????????????????????????????????????????????????????????????????????
wattsi                    gttcgcaccaaaatgattaatcctaaatgaactagtagcccaaaacttagttcccctagccactgcaatg
whitemani                 ??????????????????????????????????????????????????????????????????????????
Polychrus_acutirostris    ctttattccaaaatgactcattctagaagaactcttcacacaaaacctagtcccaacagcaactatcata
Polychrus_marmoratus      ??????????????????????????????????????????????????????????????????????????
Leiocephalus_schreibersi  ??????????????????????????????????????????????????????????????????????????
Leiocephalus_melanochlorus ?????????????????????????????????????????????????????????????????????????
Urostrophus_vautieri      ??????????????????????????????????????????????????????????????????????????
Anisolepis_undulatus      ??????????????????????????????????????????????????????????????????????????
Enyalius_iheringi         ??????????????????????????????????????????????????????????????????????????
Phenacosaurus_nicefori    gtttataccaaaatgacttattctagaagaactaacaattcaaaacctatgccctctagccctttgata
Diplolaemus_darwinii      ctttttaccaaagtgattagtactaaaagagctaacaatacaaggactacttattatttccacaacccta
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acutus              tcaacta?tgcgcttctcagcctattcttctacttacgcctagcttacactacaactttaacactttctc
aeneus              gcactagcatcactgctaagcctattttttacttacgactaagttatactactactcttacactgtccc
aequatorialis       ??????????????????????????????????????????????????????????????????????
agassizi            gcaatagcatcactactaagcctattcttctacttacgactaacctacacaacaacactcacactttccc
ahli                gccatttcagcactactaagcctattttttaccttcgacttacctacactacaaccctcacacttgcac
aliniger            gcagcatccgccttactcagcttattttttatctccgattagcctacactacaacactcacattttccc
allisoni            ??????????????????????????????????????????????????????????????????????
allogus             ??????????????????????????????????????????????????????????????????????
altae               ??????????????????????????????????????????????????????????????????????
altavelensis        ??????????????????????????????????????????????????????????????????????
alutaceus           gcactatcgtccttattaagcctattttttatattcgactaacatatacaacttcacttacactatccc
angusticeps         gccatgtcctccctactaagtctattttttaccttcgaattacctacacaaccacactatcgctatcac
antonii             ??????????????????????????????????????????????????????????????????????
apollinaris         ??????????????????????????????????????????????????????????????????????
aquaticus           ??????????????????????????????????????????????????????????????????????
argenteolus         ??????????????????????????????????????????????????????????????????????
argillaceus         ??????????????????????????????????????????????????????????????????????
armouri             ??????????????????????????????????????????????????????????????????????
auratus             ??????????????????????????????????????????????????????????????????????
bahorucoensis       gcaatatcagcccttcttagcctattttttatttgcgtctagcctatactacaacactaacactttctc
baleatus            ??????????????????????????????????????????????????????????????????????
barahonae           gcaatatccgccctgttaagtctgtttttttaccttcgactaacctacacaacatcactcacactttccc
barkeri             ??????????????????????????????????????????????????????????????????????
bartschi            gcactatcggctttactcagcttattttttacctacgattaacctacaccacaaccctaacaatatccc
bimaculatus         gccctctccgccctactaagcctattcttctacctacgcctaacctatacaacaacacttacactttcac
biporcatus          ??????????????????????????????????????????????????????????????????????
bitectus            ??????????????????????????????????????????????????????????????????????
bonairensis         ??????????????????????????????????????????????????????????????????????
brevirostris        gccctattctcacttcttagcttattttttacactcgcctagtttatacaacaacacttacactcccgc
brunneus            ??????????????????????????????????????????????????????????????????????
Ch._chameleonides   gtagcatctactttactaagcctattttttacttgcgactaacctacacaacctcccttactctatccc
capito              ??????????????????????????????????????????????????????????????????????
carolinensis        gctttatcctccctacttagcctattttttacttacgactagcctatataaccacacttacactatctc
chloris             ??????????????????????????????????????????????????????????????????????
chlorocyanus        ??????????????????????????????????????????????????????????????????????
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christophei      gcaatatctgctctactaagtctattttttatttacgagttacatacacaacatcactcacattatccc
chrysolepis      ??????????????????????????????????????????????????????????????????????
clivicola        ??????????????????????????????????????????????????????????????????????
cobanensis       ??????????????????????????????????????????????????????????????????????
coelestinus      gcgatatctaccctactcagcctgtttttttacttacgtttaacctataccacaacccttacattctccc
compressicauda   ??????????????????????????????????????????????????????????????????????
conspersus       ??????????????????????????????????????????????????????????????????????
crassulus        ??????????????????????????????????????????????????????????????????????
cristatellus     gcaatttccgcccttcttagtctattcttctatctacgcctaacctacaccacaacactaacattagctc
Cr._barbouri     gcaatatcaacactactcaacctattttttacctacgacttgtatatacaacaacccttacactagcac
cupreus          ??????????????????????????????????????????????????????????????????????
cuprinus         ??????????????????????????????????????????????????????????????????????
cuvieri          gcaataactgccctattaagcctttttttttacttacgactaacatacacaacaacacttacattatcac
cyanopleurus     ??????????????????????????????????????????????????????????????????????
cybotes          ??????????????????????????????????????????????????????????????????????
darlingtoni      ??????????????????????????????????????????????????????????????????????
desechensis      ??????????????????????????????????????????????????????????????????????
distichus        gcagtattttcccttcttagcctgtttttttatactcgactagcctacacaacaacacttacactatcgc
dollfusianus     ??????????????????????????????????????????????????????????????????????
dunni            ??????????????????????????????????????????????????????????????????????
equestris        gcaatatctgccctacttagcttattcttttatctacgacttacctacactactaccctaacaatctccc
etheridgei       gcaatatccaccctacttagcttattttttttacttgcgactaacctacacaacagctcttactttatccc
evermanni        ??????????????????????????????????????????????????????????????????????
fasciata         ??????????????????????????????????????????????????????????????????????
fowleri          ??????????????????????????????????????????????????????????????????????
fraseri          ??????????????????????????????????????????????????????????????????????
frenatus         ??????????????????????????????????????????????????????????????????????
fuscoauratus     ??????????????????????????????????????????????????????????????????????
gadovii          ??????????????????????????????????????????????????????????????????????
garmani          gccatatcagcactactaagcctattttttatctacgactaacctatacaacaacactaaccctatccc
gingivinus       ??????????????????????????????????????????????????????????????????????
grahami          gccatatcagcgctactaagcctgttcttctac?tgcggctaacctatacaacaacactaaccctgtccc
granuliceps      ??????????????????????????????????????????????????????????????????????
griseus          ??????????????????????????????????????????????????????????????????????
gundlachi        ??????????????????????????????????????????????????????????????????????
hendersoni       ??????????????????????????????????????????????????????????????????????
homolechis       ??????????????????????????????????????????????????????????????????????
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humilis	gccctatctacactacttaatttatacttttacttacgattaacctacacaacagccattacactatccc
insignis	???
insolitus	actatatctgccttacttagcctattttttatctacgactaacctacacaacaacacttacactatccc
intermedius	???
isolepis	???
jacare	???
jubar	???
kemptoni	???
krugi	gcaatatccgctcttctaagcctattcttttacctacgcctggcctatacaacaacactaacactttcac
laeviventris	???
latifrons	???
leachii	???
lemurinus	???
limifrons	?caatcgccaccttacttagcttattttttacttacgattagcttatacaacagccactacactttccc
lineatopus	gcaatgtcggcactcctcagcctattttttatttacgacttacctatgtaactg?acttacactctccc
lineatus	gtaatatcatcgttacttagcttattcttctacctacgactaacatatacaataaccataacactgtccc
liogaster	???
lividus	???
longiceps	???
longitibialis	???
loveridgei	???
loysianus	gccctatcatctctactcagcctattttttacctccgactaacctacactaccacactaacactttccc
luciae	gcactagcatccttactaagcctattcttctacttacgcctaagctacacaacaacccttacattatccc
lucius	gcactatcagccctattaagcttattcttttacctacgattagcttacaccacagcccttacactatctc
luteogularis	gcaacatctgccctactcagcttattttttatctacgactaacctatactaccaccctaacaatttccc
luteosignifer	???
maculiventris	???
marcanoi	gcaatagcagctctccttagtcttttcttttatttacgcctaacctatgccacagcactaacactttcac
mariarum	???
marmoratus	???
maynardi	gcaatatcctccttactaagcctattttttacttacgactaacttatgcaaccacacttacactatctc
megapholidotus	???
meridionalis	???
mestrei	???
micropholidotus	???
microtus	gca???acatcactactaagcctttttttctacctacgactaacctacacaaccacacttactctatctc
monticola	???

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nebuloides                 ??????????????????????????????????????????????????????????????????????????
nebulosus                  ??????????????????????????????????????????????????????????????????????????
noblei                     ??????????????????????????????????????????????????????????????????????????
notopholis                 ??????????????????????????????????????????????????????????????????????????
nubilis                    ??????????????????????????????????????????????????????????????????????????
occultus                   gcagtctcctccctgctaagcctgtttttttacctacgacttacctataatacaacactaacaatagccc
oculatus                   ??????????????????????????????????????????????????????????????????????????
olssoni                    gccatttcagctttactaagcctatttttttacctacgcctaacttatacaacaaccttaacactctccc
onca                       ??????????????????????????????????????????????????????????????????????????
opalinus                   ??????????????????????????????????????????????????????????????????????????
ophiolepis                 gccctatctgccttactaagccttttctttttacttacgcctaacttataccacaacactaacactatcac
ortoni                     ??????????????????????????????????????????????????????????????????????????
oxylophus                  ??????????????????????????????????????????????????????????????????????????
Phenacosaurus_heterodermus ??????????????????????????????????????????????????????????????????????????
parvicirculatus            ??????????????????????????????????????????????????????????????????????????
paternus                   gctatatcttccctactaagcctatttttctaccttcgaattacctacacagccacactctcactatcac
pentaprion                 ??????????????????????????????????????????????????????????????????????????
perracae                   ??????????????????????????????????????????????????????????????????????????
petersi                    ??????????????????????????????????????????????????????????????????????????
placidus                   ??????????????????????????????????????????????????????????????????????????
poecilopus                 ??????????????????????????????????????????????????????????????????????????
polylepis                  ??????????????????????????????????????????????????????????????????????????
poncencis                  ??????????????????????????????????????????????????????????????????????????
porcatus                   ??????????????????????????????????????????????????????????????????????????
proboscis                  ??????????????????????????????????????????????????????????????????????????
pulchellus                 ??????????????????????????????????????????????????????????????????????????
punctatus                  ??????????????????????????????????????????????????????????????????????????
quadriocellifer            ??????????????????????????????????????????????????????????????????????????
reconditus                 ??????????????????????????????????????????????????????????????????????????
richardi                   gcactagcttcactactaagcctattcttttacttacgacttagttatactacta?tcttactctatccc
ricordi                    ??????????????????????????????????????????????????????????????????????????
roosevelti                 ??????????????????????????????????????????????????????????????????????????
roquet                     ??????????????????????????????????????????????????????????????????????????
rubribarbus                ??????????????????????????????????????????????????????????????????????????
ruizi                      ??????????????????????????????????????????????????????????????????????????
sagrei                     gccctgtccgctctactaagc???tttttttatctacgcctaacatatactacaacactaacactttccc
semilineatus               ??????????????????????????????????????????????????????????????????????????
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sericeus                  ??????????????????????????????????????????????????????????????????????????
sheplani                  gccctgtcatctttattaggcctcttcttttacctacgaatagtctacttaactacacttacactttccc
shrevei                   ??????????????????????????????????????????????????????????????????????????
smallwoodi                ??????????????????????????????????????????????????????????????????????????
smaragdinus               ??????????????????????????????????????????????????????????????????????????
sminthus                  ??????????????????????????????????????????????????????????????????????????
solitarius                ??????????????????????????????????????????????????????????????????????????
spectrum                  ??????????????????????????????????????????????????????????????????????????
squamulatus               ??????????????????????????????????????????????????????????????????????????
strahmi                   gtaatagccgctctcctcagcctattttttacctacgcttagcctatactacaa?acttacactttccc
stratulus                 gcacttacagcccttcttagcttattcttttatcttcgcctagcttacacaacaaccttaacactttctc
subocularis               ??????????????????????????????????????????????????????????????????????????
taylori                   ??????????????????????????????????????????????????????????????????????????
tolimensis                ??????????????????????????????????????????????????????????????????????????
townsendi                 ??????????????????????????????????????????????????????????????????????????
transversalis             ??????????????????????????????????????????????????????????????????????????
trinitatis                ??????????????????????????????????????????????????????????????????????????
tropidogaster             ??????????????????????????????????????????????????????????????????????????
tropidolepis              ??????????????????????????????????????????????????????????????????????????
tropidonotus              ??????????????????????????????????????????????????????????????????????????
valencienni               gcagtatccacactactaagcctattttttac?tacggcttgcctacacaacaacactcaccctatccc
vanidicus                 gcactatcatctctacttagcttattcttctatatccgactagcctacactaccacactaacactttctc
ventrimaculatus           ??????????????????????????????????????????????????????????????????????????
vermiculatus              gcactatccgctttactaagcctattttttatttgcgacttacctacactacaactttaactatgtccc
vociferans                ??????????????????????????????????????????????????????????????????????????
wattsi                    gctatgtccgcattactaagtctattcttttatcttcgtctcacctatacaacaacactcacactagcac
whitemani                 ??????????????????????????????????????????????????????????????????????????
Polychrus_acutirostris    gcaatatcagccctgctaagcctattcttttatctccgactcacctacacaacaa?actcacaatagccc
Polychrus_marmoratus      ??????????????????????????????????????????????????????????????????????????
Leiocephalus_schreibersi  ??????????????????????????????????????????????????????????????????????????
Leiocephalus_melanochlorus ?????????????????????????????????????????????????????????????????????????
Urostrophus_vautieri      ??????????????????????????????????????????????????????????????????????????
Anisolepis_undulatus      ??????????????????????????????????????????????????????????????????????????
Enyalius_iheringi         ??????????????????????????????????????????????????????????????????????????
Phenacosaurus_nicefori    gcattaacatcactattaagtttatttttttacttacggctaacctacacaacaacacttacactttctc
Diplolaemus_darwinii      gccatgtcctccctcctaagcctattttttacctacgactttcatatacaacaacacttacacttgccc
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acutus	ctaacaccctacaagtaaaattcaaatgacgatttaaaccacacacaccaacttatttaataacattttc
aeneus	caaatacaactcaaacaaaacataaatgacgatttaaaccatcaaaaactacatcaatattaatactttt
aequatorialis	??
agassizi	ccaacatcacacaaacaaaacacaagtgacgattcaaaccatcaaccaacatactcccactaactattat
ahli	caaatactacacatacaaaactaaaatgacgatttaaaccaaacctgccaacctttctaatactttcttt
aliniger	caaacactacacaaacaaaattcaagtgacgatttaaactacccaacctagctcccccactaacaattac
allisoni	??
allogus	??
altae	??
altavelensis	??
alutaceus	caaacacaacccaaacgaaatttaaatgacgattttacccaaacataaaaaccacagtaattatagtctc
angusticeps	ctaatacaactcaaataaaatttaaatgacgtttttatccaaaaaccacaaccaccttatcctcttccac
antonii	??
apollinaris	??
aquaticus	??
argenteolus	??
argillaceus	??
armouri	??
auratus	??
bahorucoensis	ctaatacaacccaaataaaacctaattgacgatttaaaccactagcccaaaccaccccccctaacagctat
baleatus	??
barahonae	caaacacagtatttacaaaatttaaatgacgatataagcccatgataccaactcaaataatagtaacttt
barkeri	??
bartschi	caaacaccataaaaacaaaattcaaatgacggtttaaatccctaacaacaacattaccactagcaatatt
bimaculatus	caaacacaacccaagcaaaatttaaatggcgactaaaagcacagcaatgcccaccccgatcacaacagtc
biporcatus	??
bitectus	??
bonairensis	??
brevirostris	ctagcacacttcaaacaaaatttaaatgacgatttaaacaggccccaccaacctcaccaataacaatttc
brunneus	??
Ch._chameleonides	ccaatacaacccaaacaaaatttaaatgacgacttaaaccaaacatacacacctctttaataataataat
capito	??
carolinensis	caaatacaacccaaacaaaatttaaatgacgattttacccaaacacaccaaccgtctttctatctatccc
chloris	??
chlorocyanus	??

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christophei      ctaatacagtccaaacaaaatttaaatgacgatttaaaccattaataccaactcatctaattttaatttc
chrysolepis      ??????????????????????????????????????????????????????????????????????
clivicola        ??????????????????????????????????????????????????????????????????????
cobanensis       ??????????????????????????????????????????????????????????????????????
coelestinus      caaacactacacatacaaaatttaaatgacgattcaagtcaactaatttaacaataccactaacacttac
compressicauda   ??????????????????????????????????????????????????????????????????????
conspersus       ??????????????????????????????????????????????????????????????????????
crassulus        ??????????????????????????????????????????????????????????????????????
cristatellus     caaacaccctacaaataaactttaaatgacggtttaaaccaaccacatcatttattctaataaccctttc
Cr._barbouri     caaacaccacacaagcaaaactcaaatgacgatttaaaccaaacttttcaacccctacaactttaatttt
cupreus          ??????????????????????????????????????????????????????????????????????
cuprinus         ??????????????????????????????????????????????????????????????????????
cuvieri          caaacacaacacaaacaaaatttaaatgacgatttaaaccaaatttacctacatatttactaataatctc
cyanopleurus     ??????????????????????????????????????????????????????????????????????
cybotes          ??????????????????????????????????????????????????????????????????????
darlingtoni      ??????????????????????????????????????????????????????????????????????
desechensis      ??????????????????????????????????????????????????????????????????????
distichus        ccaatacactaca?a?aaaatttaaatgacgattcaaacaaaccctatcaacttcactaatagtaacttt
dollfusianus     ??????????????????????????????????????????????????????????????????????
dunni            ??????????????????????????????????????????????????????????????????????
equestris        ctaataccttacaaactaaatttaaatgacgattcaaacctacgacctcaaccctaccaataataatctt
etheridgei       caaacaccatacaaacaaagcttaaatgacgatttaaactaaaccaaccaactcagctaataatgactac
evermanni        ??????????????????????????????????????????????????????????????????????
fasciata         ??????????????????????????????????????????????????????????????????????
fowleri          ??????????????????????????????????????????????????????????????????????
fraseri          ??????????????????????????????????????????????????????????????????????
frenatus         ??????????????????????????????????????????????????????????????????????
fuscoauratus     ??????????????????????????????????????????????????????????????????????
gadovii          ??????????????????????????????????????????????????????????????????????
garmani          cgaacacta?acaaacaaagtttaaatgacgatttaaaccaaaccgtacaacacccgttattggggcctc
gingivinus       ??????????????????????????????????????????????????????????????????????
grahami          caaataccactcaaacaaaacttaaatgacgatttaagccaaaccacacaacacttctcatagggcctc
granuliceps      ??????????????????????????????????????????????????????????????????????
griseus          ??????????????????????????????????????????????????????????????????????
gundlachi        ??????????????????????????????????????????????????????????????????????
hendersoni       ??????????????????????????????????????????????????????????????????????
homolechis       ??????????????????????????????????????????????????????????????????????
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humilis	caaacatattacaaacagaatttaaatgacgactaaaaccgaaatttacacacactgttattagtaacct
insignis	??
insolitus	ctaacactacacaaacaaaatttaaatgacgatttaaactaaaccaacctacccaactaacaacaaccac
intermedius	??
isolepis	??
jacare	??
jubar	??
kemptoni	??
krugi	caaatacacttcaaataaaatttaaatgacgatttaaaccaaccactacaccaccactaataatcttttc
laeviventris	??
latifrons	??
leachii	??
lemurinus	??
limifrons	caaagc?attacaaacaaaactcaaatgacgattaaaaccaatattaccaacattacttgtggcagcctc
lineatopus	caaacacagcacaaacaaaattcaaatgacgacttaaaccaaactcaccaaaactgttcataatagcttc
lineatus	ctaacacaacacaaacaacatttaaatgacgatctaaccctaactttaactcttcattaattataatttc
liogaster	??
lividus	??
longiceps	??
longitibialis	??
loveridgei	??
loysianus	caaacacaacacaaacaaaatttaaatgacgattttaccctaacacaaa?acaaccccaataataatctc
luciae	caaataccatccaaacaaaacataaatgacgatttaaatcaccaaccaccacacacccactaattacact
lucius	caaacacactacaaacaaaatttaaatgacgatttacccaaaatatagcaacaccaacaacaattattac
luteogularis	ctaataccttacaaactaaatttaaatgacgattcaaacctaacacctcaaccctaccaataataatctt
luteosignifer	??
maculiventris	??
marcanoi	cgaatacaatacaaactaaatttaaatgacgatttaaacctaatcacccatccgcaacaacagcactaac
mariarum	??
marmoratus	??
maynardi	caaatacaacccaaacaaaatttaaatgacgattttacccaagcacaccaaccatctttctacctattcc
megapholidotus	??
meridionalis	??
mestrei	??
micropholidotus	??
microtus	caaatacagtacaaacaaaacacaaatgacgatttaaaccttcaactaccatacttccactaaccatcat
monticola	??

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nebuloides                 ??????????????????????????????????????????????????????????????????????????????
nebulosus                  ??????????????????????????????????????????????????????????????????????????????
noblei                     ??????????????????????????????????????????????????????????????????????????????
notopholis                 ??????????????????????????????????????????????????????????????????????????????
nubilis                    ??????????????????????????????????????????????????????????????????????????????
occultus                   caaacacaatacaaacaaaattcaagtgacgatttaaacctaataacccacccttattattaacagctac
oculatus                   ??????????????????????????????????????????????????????????????????????????????
olssoni                    caaacacaatacaaacaaaactcaaatggcgatttaaattaaataaaccaacaacacttatactaataac
onca                       ??????????????????????????????????????????????????????????????????????????????
opalinus                   ??????????????????????????????????????????????????????????????????????????????
ophiolepis                 caaacacaactactacaaaatttaaatgacgacttaaaccaaatcaacctacacaacccatacttattgc
ortoni                     ??????????????????????????????????????????????????????????????????????????????
oxylophus                  ??????????????????????????????????????????????????????????????????????????????
Phenacosaurus_heterodermus ??????????????????????????????????????????????????????????????????????????????
parvicirculatus            ??????????????????????????????????????????????????????????????????????????????
paternus                   ctaatacaactcaaataaaattcaaatgacgattttacccaaaaactacaaccaccttaacctcttccac
pentaprion                 ??????????????????????????????????????????????????????????????????????????????
perracae                   ??????????????????????????????????????????????????????????????????????????????
petersi                    ??????????????????????????????????????????????????????????????????????????????
placidus                   ??????????????????????????????????????????????????????????????????????????????
poecilopus                 ??????????????????????????????????????????????????????????????????????????????
polylepis                  ??????????????????????????????????????????????????????????????????????????????
poncencis                  ??????????????????????????????????????????????????????????????????????????????
porcatus                   ??????????????????????????????????????????????????????????????????????????????
proboscis                  ??????????????????????????????????????????????????????????????????????????????
pulchellus                 ??????????????????????????????????????????????????????????????????????????????
punctatus                  ??????????????????????????????????????????????????????????????????????????????
quadriocellifer            ??????????????????????????????????????????????????????????????????????????????
reconditus                 ??????????????????????????????????????????????????????????????????????????????
richardi                   caaatacaactca?a?aa?acataaatgacggttccaaccattaacaactacatccccactaataatttt
ricordi                    ??????????????????????????????????????????????????????????????????????????????
roosevelti                 ??????????????????????????????????????????????????????????????????????????????
roquet                     ??????????????????????????????????????????????????????????????????????????????
rubribarbus                ??????????????????????????????????????????????????????????????????????????????
ruizi                      ??????????????????????????????????????????????????????????????????????????????
sagrei                     caaacacaaccgctacaaaatttaaatggcgacttaaactaaaccaacctacaccactaatgctaattac
semilineatus               ??????????????????????????????????????????????????????????????????????????????
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sericeus	??
sheplani	caaacgtggcccaaacaaaattcaaatgacgattttatccaaatacgacaaccaactttttctcagcatt
shrevei	??
smallwoodi	??
smaragdinus	??
sminthus	??
solitarius	??
spectrum	??
squamulatus	??
strahmi	caaacacaa?acaaactaaatttaaatgacgatttaaacctaacattaaaaccccccctaataactgcaac
stratulus	caaacacactacaaataaagtttaaatgacgatttaaaccagccaccaaggcctacctaatattattttc
subocularis	??
taylori	??
tolimensis	??
townsendi	??
transversalis	??
trinitatis	??
tropidogaster	??
tropidolepis	??
tropidonotus	??
valencienni	caaacactattcagacaaaatttaaatgacgatttaaattaaaatttacaacatttttataatgccact
vanidicus	ctaatacaacccaaacaaagttcaagtgacgattttaccctaacacaaaatctaccacaattataatccc
ventrimaculatus	??
vermiculatus	caaacaccacaaaaaccaaatttaaatgacgatttaaaccatcaataataacaccactactaacaataac
vociferans	??
wattsi	caaacacaacacaaataaaatttaaatgacgactttatccagcaacatttacaccagttttaacaatttc
whitemani	??
Polychrus_acutirostris	caaacacaactccaacaaaatacaagtgacgattcaaaatctccgcaccaaaacttctaacaataactac
Polychrus_marmoratus	??
Leiocephalus_schreibersi	??
Leiocephalus_melanochlorus	??
Urostrophus_vautieri	??
Anisolepis_undulatus	??
Enyalius_iheringi	??
Phenacosaurus_nicefori	caaacaccattttaacaaaacacaaatgacgatttaaaccaataactataacaacccccataacaatttt
Diplolaemus_darwinii	caaatacactactaataaaacacaaatgacgattcaaaccaatatcaaaaacacttttaatatctacatc

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acutus              taccttttgccatttttctcttaccattagcaccactaattttacta---t-----aaaaactttaggat--
aeneus              aactcctctaactatatttctattaccgataacaccaatagtactattat-----agaaactttaggat--
aequatorialis       ??????????????????????????????????????????????????????????????????????????
agassizi            aaccccaacaaccctattactcctaccaataaccccttaatcatccatt-----agaaactttaggat--
ahli                ttctaccacttcaatatttgccctaccacttatgcctctcataacacaat-----aaaaactttaggaa--
aliniger            cacccccctaactatttttcttctcccccttacaccattaattttagcata----agaaatttaggat--
allisoni            ??????????????????????????????????????????????????????????????????????????
allogus             ??????????????????????????????????????????????????????????????????????????
altae               ??????????????????????????????????????????????????????????????????????????
altavelensis        ??????????????????????????????????????????????????????????????????????????
alutaceus           tacaacagtcacaatttttatattaccgatacttccaataattttgatat-----aaaaactttaggat--
angusticeps         cgcaacaataacaaccctccttcttccacttacaccactaattttgttat-----aaaaactttaggat--
antonii             ??????????????????????????????????????????????????????????????????????????
apollinaris         ??????????????????????????????????????????????????????????????????????????
aquaticus           ??????????????????????????????????????????????????????????????????????????
argenteolus         ??????????????????????????????????????????????????????????????????????????
argillaceus         ??????????????????????????????????????????????????????????????????????????
armouri             ??????????????????????????????????????????????????????????????????????????
auratus             ??????????????????????????????????????????????????????????????????????????
bahorucoensis       gacccccctatctattttttactcccacttatgcctttaattttatact-----agaaactttaggat--
baleatus            ??????????????????????????????????????????????????????????????????????????
barahonae           tactattatatctatctttttacttccactcgccccactaatattattat-----aaagactttaggat--
barkeri             ??????????????????????????????????????????????????????????????????????????
bartschi            taccccctataaccatctttttattacccataacaccactaatattaatata----agaaactttaggat--
bimaculatus         ccaacaacagttacagtacttttattaccccttataccccattctgtcat-----aaa?actttaggat--
biporcatus          ??????????????????????????????????????????????????????????????????????????
bitectus            ??????????????????????????????????????????????????????????????????????????
bonairensis         ??????????????????????????????????????????????????????????????????????????
brevirostris        atcaacagcagccatctttcttctgcctttagtacctctaatgttgatat-----aaaaactttaggat--
brunneus            ??????????????????????????????????????????????????????????????????????????
Ch._chameleonides   attttcaataacaatatttatacttccactaaccccactaattttattat-----aaa?actttaggat--
capito              ??????????????????????????????????????????????????????????????????????????
carolinensis        tgctacaatttctattttcttactacccctaacccctctaatcttactat-----aaagactttaggat--
chloris             ??????????????????????????????????????????????????????????????????????????
chlorocyanus        ??????????????????????????????????????????????????????????????????????????
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christophei        aactacaacagctattttttacttcccctcaccccgctaatatttctat-----aaagacttaggat--
chrysolepis        ??????????????????????????????????????????????????????????????????????
clivicola          ??????????????????????????????????????????????????????????????????????
cobanensis         ??????????????????????????????????????????????????????????????????????
coelestinus        agcacccctgagcgtcctcttacttcctttagtcccgctaattatagtata----agaaatttaggat--
compressicauda     ??????????????????????????????????????????????????????????????????????
conspersus         ??????????????????????????????????????????????????????????????????????
crassulus          ??????????????????????????????????????????????????????????????????????
cristatellus       aactatgaccattttttactacctctcataccactaacccttata---t-----aaaaacttaggat--
Cr._barbouri       aattacattaacaatctttttacacccccctaaccccactaatattacaat-----aaaaatttaggtt--
cupreus            ??????????????????????????????????????????????????????????????????????
cuprinus           ??????????????????????????????????????????????????????????????????????
cuvieri            ctctacaacaaccatcttacttcttccactaaccccccttaataatttact-----aaaaacttaggtt--
cyanopleurus       ??????????????????????????????????????????????????????????????????????
cybotes            ??????????????????????????????????????????????????????????????????????
darlingtoni        ??????????????????????????????????????????????????????????????????????
desechensis        ??????????????????????????????????????????????????????????????????????
distichus          atcaacaatagctatttttcttctaccacttacacccttaatgttaatat-----aaaaacttaggat--
dollfusianus       ??????????????????????????????????????????????????????????????????????
dunni              ??????????????????????????????????????????????????????????????????????
equestris          taccccattaactatttttatgttaccactaacaccaataatcatcatat-----agaaacttaggtt--
etheridgei         ttctacaataacaattttttttacttcctcttacacccttactcacattat-----aaaaacttaagtt--
evermanni          ??????????????????????????????????????????????????????????????????????
fasciata           ??????????????????????????????????????????????????????????????????????
fowleri            ??????????????????????????????????????????????????????????????????????
fraseri            ??????????????????????????????????????????????????????????????????????
frenatus           ??????????????????????????????????????????????????????????????????????
fuscoauratus       ??????????????????????????????????????????????????????????????????????
gadovii            ??????????????????????????????????????????????????????????????????????
garmani            agctactatctcaattttcctactccctataaccccattaatacttctat-----aaagacttaggat--
gingivinus         ??????????????????????????????????????????????????????????????????????
grahami            ctccacaatctcaatctttctactccccatgaccccccttaatacttctat-----aaaaacttaggat--
granuliceps        ??????????????????????????????????????????????????????????????????????
griseus            ??????????????????????????????????????????????????????????????????????
gundlachi          ??????????????????????????????????????????????????????????????????????
hendersoni         ??????????????????????????????????????????????????????????????????????
homolechis         ??????????????????????????????????????????????????????????????????????
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humilis          catcctcaatatctattttttttcttccctaataccactaattttattat-----aaaaacttaggtt--
insignis         ??????????????????????????????????????????????????????????????????????
insolitus        tattacaatagcaaccttattactacccatactaccaatgctcacactat-----aaaaacttaagtt--
intermedius      ??????????????????????????????????????????????????????????????????????
isolepis         ??????????????????????????????????????????????????????????????????????
jacare           ??????????????????????????????????????????????????????????????????????
jubar            ??????????????????????????????????????????????????????????????????????
kemptoni         ??????????????????????????????????????????????????????????????????????
krugi            atctatagccgtttttttactaccacttacacctttaatcttattg---t-----aaaaacttaggataa
laeviventris     ??????????????????????????????????????????????????????????????????????
latifrons        ??????????????????????????????????????????????????????????????????????
leachii          ??????????????????????????????????????????????????????????????????????
lemurinus        ??????????????????????????????????????????????????????????????????????
limifrons        atctataata?gccaccttttttcttcctatacccccctatttttactat-----aaaaatttaggtt--
lineatopus       ctccagcaatatcaatatttttacttccctaaccccccttatattactat-----aaaaacttaggat--
lineatus         atcaacaatatcgatctttttacttccaataaccccattaatactactat-----aaaaacttaggtt--
liogaster        ??????????????????????????????????????????????????????????????????????
lividus          ??????????????????????????????????????????????????????????????????????
longiceps        ??????????????????????????????????????????????????????????????????????
longitibialis    ??????????????????????????????????????????????????????????????????????
loveridgei       ??????????????????????????????????????????????????????????????????????
loysianus        agctacaatctctattttccttctaccactaaccccactcattttatcat-----aaa?acttaggat--
luciae           aatccctataactacccttatactaccactaacaccaacaatactatcat-----agaaacttaggac--
lucius           cactacaataacaattttttgctccctttaacacctcttatactctcat-----aaaaacttaggat--
luteogularis     taccccattaactattctcatattaccattaacaccaataatacttatat-----aga?acttaggat--
luteosignifer    ??????????????????????????????????????????????????????????????????????
maculiventris    ??????????????????????????????????????????????????????????????????????
marcanoi         ttgtacaatcgccatttttttactcccaataaccccctcttattttgctat-----aaaaacttaggat--
mariarum         ??????????????????????????????????????????????????????????????????????
marmoratus       ??????????????????????????????????????????????????????????????????????
maynardi         tgctgcaatctccatcttcctactcccccctaaccccactaattttgttat-----aaaaacttaggat--
megapholidotus   ??????????????????????????????????????????????????????????????????????
meridionalis     ??????????????????????????????????????????????????????????????????????
mestrei          ??????????????????????????????????????????????????????????????????????
micropholidotus  ??????????????????????????????????????????????????????????????????????
microtus         aacacccgcaaccctacttctattaccaataacacccctagttatttgct-----aga?acttaggat--
monticola        ??????????????????????????????????????????????????????????????????????
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nebuloides                 ??????????????????????????????????????????????????????????????????????????
nebulosus                  ??????????????????????????????????????????????????????????????????????????
noblei                     ??????????????????????????????????????????????????????????????????????????
notopholis                 ??????????????????????????????????????????????????????????????????????????
nubilis                    ??????????????????????????????????????????????????????????????????????????
occultus                   tgccccactaaccactctactactcccgcttacacctcttatattaatat-----agaaacttagatt--
oculatus                   ??????????????????????????????????????????????????????????????????????????
olssoni                    ttctacaattaccaccttcttactcccccctatcaccactcattttaatat-----aaaaacttaggtt--
onca                       ??????????????????????????????????????????????????????????????????????????
opalinus                   ??????????????????????????????????????????????????????????????????????????
ophiolepis                 taccacaacctctatccttctacttccactagcaccactcatgcttatataaaataaaaacttaggat--
ortoni                     ??????????????????????????????????????????????????????????????????????????
oxylophus                  ??????????????????????????????????????????????????????????????????????????
Phenacosaurus_heterodermus ??????????????????????????????????????????????????????????????????????????
parvicirculatus            ??????????????????????????????????????????????????????????????????????????
paternus                   cacaacaataacaatcttcctcctaccacttacacccataattttattat-----aaaaacttaggat--
pentaprion                 ??????????????????????????????????????????????????????????????????????????
perracae                   ??????????????????????????????????????????????????????????????????????????
petersi                    ??????????????????????????????????????????????????????????????????????????
placidus                   ??????????????????????????????????????????????????????????????????????????
poecilopus                 ??????????????????????????????????????????????????????????????????????????
polylepis                  ??????????????????????????????????????????????????????????????????????????
poncencis                  ??????????????????????????????????????????????????????????????????????????
porcatus                   ??????????????????????????????????????????????????????????????????????????
proboscis                  ??????????????????????????????????????????????????????????????????????????
pulchellus                 ??????????????????????????????????????????????????????????????????????????
punctatus                  ??????????????????????????????????????????????????????????????????????????
quadriocellifer            ??????????????????????????????????????????????????????????????????????????
reconditus                 ??????????????????????????????????????????????????????????????????????????
richardi                   aacccctataaccattctattactaccaataacaccaataatattattat-----agaaacttaagat--
ricordi                    ??????????????????????????????????????????????????????????????????????????
roosevelti                 ??????????????????????????????????????????????????????????????????????????
roquet                     ??????????????????????????????????????????????????????????????????????????
rubribarbus                ??????????????????????????????????????????????????????????????????????????
ruizi                      ??????????????????????????????????????????????????????????????????????????
sagrei                     tgctacaacctctattcttttacttccactaacaccactaatacttctat-----aaaaacttaggat--
semilineatus               ??????????????????????????????????????????????????????????????????????????
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sericeus                  ??????????????????????????????????????????????????????????????????????????
sheplani                  tttcttaatttctacccttcttcttcccctcacaccactaattttaatat-----aaaaacttaggat--
shrevei                   ??????????????????????????????????????????????????????????????????????????
smallwoodi                ??????????????????????????????????????????????????????????????????????????
smaragdinus               ??????????????????????????????????????????????????????????????????????????
sminthus                  ??????????????????????????????????????????????????????????????????????????
solitarius                ??????????????????????????????????????????????????????????????????????????
spectrum                  ??????????????????????????????????????????????????????????????????????????
squamulatus               ??????????????????????????????????????????????????????????????????????????
strahmi                   ccttgtggtttcaatatttttacttccaatatccccaatacttctacttt-----aaagacttaggat--
stratulus                 aaccctagctatttttcttttaccacttacaccactaattttacta---t-----aaaaacttaggat--
subocularis               ??????????????????????????????????????????????????????????????????????????
taylori                   ??????????????????????????????????????????????????????????????????????????
tolimensis                ??????????????????????????????????????????????????????????????????????????
townsendi                 ??????????????????????????????????????????????????????????????????????????
transversalis             ??????????????????????????????????????????????????????????????????????????
trinitatis                ??????????????????????????????????????????????????????????????????????????
tropidogaster             ??????????????????????????????????????????????????????????????????????????
tropidolepis              ??????????????????????????????????????????????????????????????????????????
tropidonotus              ??????????????????????????????????????????????????????????????????????????
valencienni               ttccacaatttcaattcttctccttcctcttaccccgctaatactattat-----aaaaacttaggat-?
vanidicus                 tgcaataattactatcttcatactacccttaacaccaacaatcttaatat-----aaagacttaggat--
ventrimaculatus           ??????????????????????????????????????????????????????????????????????????
vermiculatus              cacaccaatgactattttttttcttcctctaacacccttatcttaatat-----agaaacttaggat-t
vociferans                ??????????????????????????????????????????????????????????????????????????
wattsi                    aaccacactagccgcgcttcttctaccaataaccccgctaatcttattat-----aagaacttaggat--
whitemani                 ??????????????????????????????????????????????????????????????????????????
Polychrus_acutirostris    ccccatagcgctccttctactaccaataaccccccctactcacttca---t-----agaaccttaggct--
Polychrus_marmoratus      ??????????????????????????????????????????????????????????????????????????
Leiocephalus_schreibersi  ??????????????????????????????????????????????????????????????????????????
Leiocephalus_melanochlorus ?????????????????????????????????????????????????????????????????????????
Urostrophus_vautieri      ??????????????????????????????????????????????????????????????????????????
Anisolepis_undulatus      ??????????????????????????????????????????????????????????????????????????
Enyalius_iheringi         ??????????????????????????????????????????????????????????????????????????
Phenacosaurus_nicefori    aatcccactaacaatacttatactaccaataacaccaataataatctctt-----agaaatttaggct--
Diplolaemus_darwinii      aacaccactagccctaatattactaccaataaccccactaatatta---ta----agagacttaggct--
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acutus              -aaaata-ataaaccaagagccttcaaagtccaaaataagggcgcaatccccttagtttttg------ta
aeneus              -taaata----aaccaagagccttcaaagccctaaatatgagtctaactctcatagtttctg------ta
aequatorialis       ??????????????????????????????????????????????????????????????????????
agassizi            aaaatta----aaccaagagccttcaaagcttaaaatatgagttaacc-ctcatagtttctg------ca
ahli                -taacta----aaccaaaggccttcaaagccctaaataagggtgcaatccccttagtttttg------ta
aliniger            aatatta----aaccaaggaccttcaaagtccaagacatgggcgaaaccccataatttctg------ca
allisoni            ??????????????????????????????????????????????????????????????????????
allogus             ??????????????????????????????????????????????????????????????????????
altae               ??????????????????????????????????????????????????????????????????????
altavelensis        ??????????????????????????????????????????????????????????????????????
alutaceus           -aaacta----aaccaagagccttcaaagctcaaaaaaggggtgtaaccccccctagtttttg------ta
angusticeps         aaaatta----aaccaagggccttcaaagcccaagacatgggttaaactcccatagtttttg------ta
antonii             ??????????????????????????????????????????????????????????????????????
apollinaris         ??????????????????????????????????????????????????????????????????????
aquaticus           ??????????????????????????????????????????????????????????????????????
argenteolus         ??????????????????????????????????????????????????????????????????????
argillaceus         ??????????????????????????????????????????????????????????????????????
armouri             ??????????????????????????????????????????????????????????????????????
auratus             ??????????????????????????????????????????????????????????????????????
bahorucoensis       aacctcaa---aaccaagagccttcaaagctcaaaatatgggtgaaaccccccgtagtttctg-----cca
baleatus            ??????????????????????????????????????????????????????????????????????
barahonae           --aacta----aaccaagagccttcaaagctccaaataggaatgagaacctcctagtttttg------ta
barkeri             ??????????????????????????????????????????????????????????????????????
bartschi            aaactta----aaccaagagccttcaaagctcaaaatgtgggtgaaaccccccatagtctctg------ca
bimaculatus         --aacca----aaccgagaaccttcaaagttcaaaatacgggtgaaaccccccatagtttttg-----tta
biporcatus          ??????????????????????????????????????????????????????????????????????
bitectus            ??????????????????????????????????????????????????????????????????????
bonairensis         ??????????????????????????????????????????????????????????????????????
brevirostris        ---aataa---aaccgagagccttcaaagctttaaaaaaagggtgtaaaccccttagtttttg------ta
brunneus            ??????????????????????????????????????????????????????????????????????
Ch._chameleonides   -aaatta----aaccaagagccttcaaagctcaaaataggagtttaaatctcctagtttttg------ta
capito              ??????????????????????????????????????????????????????????????????????
carolinensis        -aaacta----aaccaagagccttcaaagctcaaaataggagttaaaaccccctagtttttg------ca
chloris             ??????????????????????????????????????????????????????????????????????
chlorocyanus        ??????????????????????????????????????????????????????????????????????
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christophei        -aacata----aaccaagagccttcaaagctcaaaatatgggagaaaccccccctagtttttg------ta
chrysolepis        ??????????????????????????????????????????????????????????????????????
clivicola          ??????????????????????????????????????????????????????????????????????
cobanensis         ??????????????????????????????????????????????????????????????????????
coelestinus        aatatta----aaccaagagccttcaaagctcaaaatacgggtgaaaccccccataatttctg------ta
compressicauda     ??????????????????????????????????????????????????????????????????????
conspersus         ??????????????????????????????????????????????????????????????????????
crassulus          ??????????????????????????????????????????????????????????????????????
cristatellus       -aacata----aaccaagaaccttcaaagttcagaataagggtgtaaaccccttagtttttg------ca
Cr._barbouri       -taacta----aaccaggggccttcaaagcccacaaaaagggtgtaaaccccttaatttttg------ta
cupreus            ??????????????????????????????????????????????????????????????????????
cuprinus           ??????????????????????????????????????????????????????????????????????
cuvieri            -aacata----aaccgagagccttcaaagctcaaaacaggagtcaaaaactcttagtttttg------ta
cyanopleurus       ??????????????????????????????????????????????????????????????????????
cybotes            ??????????????????????????????????????????????????????????????????????
darlingtoni        ??????????????????????????????????????????????????????????????????????
desechensis        ??????????????????????????????????????????????????????????????????????
distichus          ---attaa---aaccaagggccttcaaagccctaaaaaagggtgcaaaccccttagtttttg------ta
dollfusianus       ??????????????????????????????????????????????????????????????????????
dunni              ??????????????????????????????????????????????????????????????????????
equestris          -taaata----aaccaagagccttcaaagctcaaaatatggatgaaaaccccatagtttctg-----cta
etheridgei         -taacta----aactaagagccttcaaagcccaaaatatgggtaaaaccccccatagtttttg------ta
evermanni          ??????????????????????????????????????????????????????????????????????
fasciata           ??????????????????????????????????????????????????????????????????????
fowleri            ??????????????????????????????????????????????????????????????????????
fraseri            ??????????????????????????????????????????????????????????????????????
frenatus           ??????????????????????????????????????????????????????????????????????
fuscoauratus       ??????????????????????????????????????????????????????????????????????
gadovii            ??????????????????????????????????????????????????????????????????????
garmani            --aatta----aaccaagggccttcaaagccctaaataagggccatactcccttagtttttg------ta
gingivinus         ??????????????????????????????????????????????????????????????????????
grahami            --aatta----aaccaacggccttcaaagccctaaataaggccaccatcccccttagtttt?g------ta
granuliceps        ??????????????????????????????????????????????????????????????????????
griseus            ??????????????????????????????????????????????????????????????????????
gundlachi          ??????????????????????????????????????????????????????????????????????
hendersoni         ??????????????????????????????????????????????????????????????????????
homolechis         ??????????????????????????????????????????????????????????????????????
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humilis          --attta----aaccaagggccttcaaagccctaaataaggacac-cagcccttagtttttg-----ata
insignis         ??????????????????????????????????????????????????????????????????????
insolitus        -aaacca----aactaagagccttcaaagctcaaaataagggtagaaccccttagtttttg------ta
intermedius      ??????????????????????????????????????????????????????????????????????
isolepis         ??????????????????????????????????????????????????????????????????????
jacare           ??????????????????????????????????????????????????????????????????????
jubar            ??????????????????????????????????????????????????????????????????????
kemptoni         ??????????????????????????????????????????????????????????????????????
krugi            gataata----aaccaagaaccttcaaagttcaaaataagggtgaaagtcccttagtttttg------ta
laeviventris     ??????????????????????????????????????????????????????????????????????
latifrons        ??????????????????????????????????????????????????????????????????????
leachii          ??????????????????????????????????????????????????????????????????????
lemurinus        ??????????????????????????????????????????????????????????????????????
limifrons        --aacta----aaccaagggcctttaaaaccctaaataaggacactcacccccttaatttttg-----ata
lineatopus       --aatta----aaccaagggccttcaaagccctaaacaagggcactaccccccttagtttttg------ta
lineatus         -aacaca----aaccaagggccttcaaagccctaaataaggatgacctcccccttagtttttg------ta
liogaster        ??????????????????????????????????????????????????????????????????????
lividus          ??????????????????????????????????????????????????????????????????????
longiceps        ??????????????????????????????????????????????????????????????????????
longitibialis    ??????????????????????????????????????????????????????????????????????
loveridgei       ??????????????????????????????????????????????????????????????????????
loysianus        --aaacaa---aaccaagagccttcaaagctcaaaataggagtgcaatcccccctagtttttg------ta
luciae           -taacca----aaccaagagccttcaaagccctaaacatgagtctaaccctcatagtttctg------ta
lucius           -aattca----aaccaagggccttcaaagcccaaaataaggg-ctaatcccccttagtttttg------ca
luteogularis     -taaata----aaccaagagccttcaaagctcaaaatatggatgaaaaccccatagtttctg-----cta
luteosignifer    ??????????????????????????????????????????????????????????????????????
maculiventris    ??????????????????????????????????????????????????????????????????????
marcanoi         --aaaca----aaccaagggccttcaaagcccgaaataagggtgcaagtcccctagtttttg------ta
mariarum         ??????????????????????????????????????????????????????????????????????
marmoratus       ??????????????????????????????????????????????????????????????????????
maynardi         -caacta----aaccaagagccttcaaagctcaaaatagggatgaaaaccccctagtttttg------ta
megapholidotus   ??????????????????????????????????????????????????????????????????????
meridionalis     ??????????????????????????????????????????????????????????????????????
mestrei          ??????????????????????????????????????????????????????????????????????
micropholidotus  ??????????????????????????????????????????????????????????????????????
microtus         aaaccta----aaccaagagccttcaaagctcaa?atatgaactagcc-ctcatagtttctg------ca
monticola        ??????????????????????????????????????????????????????????????????????
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nebuloides                 ??????????????????????????????????????????????????????????????????????????
nebulosus                  ??????????????????????????????????????????????????????????????????????????
noblei                     ??????????????????????????????????????????????????????????????????????????
notopholis                 ??????????????????????????????????????????????????????????????????????????
nubilis                    ??????????????????????????????????????????????????????????????????????????
occultus                   -taaaca----aaccaagagccttcaaagctcaaaatatgggtgtaacccccatagtttctg------ta
oculatus                   ??????????????????????????????????????????????????????????????????????????
olssoni                    -taacca----aaccaagagccttcaaagctcaaaataagggtcaaacacccttagtttttg------ta
onca                       ??????????????????????????????????????????????????????????????????????????
opalinus                   ??????????????????????????????????????????????????????????????????????????
ophiolepis                 -aaccta----aaccaagggccttcaaagccctaaataagggatagaccccttagtttttg------ta
ortoni                     ??????????????????????????????????????????????????????????????????????????
oxylophus                  ??????????????????????????????????????????????????????????????????????????
Phenacosaurus_heterodermus ??????????????????????????????????????????????????????????????????????????
parvicirculatus            ??????????????????????????????????????????????????????????????????????????
paternus                   -taaata----aaccaagggccttcaaagcccaaaatatgggttaaacacccatagtttttg------ta
pentaprion                 ??????????????????????????????????????????????????????????????????????????
perracae                   ??????????????????????????????????????????????????????????????????????????
petersi                    ??????????????????????????????????????????????????????????????????????????
placidus                   ??????????????????????????????????????????????????????????????????????????
poecilopus                 ??????????????????????????????????????????????????????????????????????????
polylepis                  ??????????????????????????????????????????????????????????????????????????
poncencis                  ??????????????????????????????????????????????????????????????????????????
porcatus                   ??????????????????????????????????????????????????????????????????????????
proboscis                  ??????????????????????????????????????????????????????????????????????????
pulchellus                 ??????????????????????????????????????????????????????????????????????????
punctatus                  ??????????????????????????????????????????????????????????????????????????
quadriocellifer            ??????????????????????????????????????????????????????????????????????????
reconditus                 ??????????????????????????????????????????????????????????????????????????
richardi                   --taata----aactaaggaccttcaaagccctaaatatgagttcaactctcatagtttctg------ta
ricordi                    ??????????????????????????????????????????????????????????????????????????
roosevelti                 ??????????????????????????????????????????????????????????????????????????
roquet                     ??????????????????????????????????????????????????????????????????????????
rubribarbus                ??????????????????????????????????????????????????????????????????????????
ruizi                      ??????????????????????????????????????????????????????????????????????????
sagrei                     -aaccta----aaccaagggccttcaaagccctaaataagctagacg--cccttagtttttg------ta
semilineatus               ??????????????????????????????????????????????????????????????????????????
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sericeus                  ??????????????????????????????????????????????????????????????????????
sheplani                  --aaata----aaccaagagccttcaaagctcaaaacatgggtaaaacccccatagtttttg------ta
shrevei                   ??????????????????????????????????????????????????????????????????????
smallwoodi                ??????????????????????????????????????????????????????????????????????
smaragdinus               ??????????????????????????????????????????????????????????????????????
sminthus                  ??????????????????????????????????????????????????????????????????????
solitarius                ??????????????????????????????????????????????????????????????????????
spectrum                  ??????????????????????????????????????????????????????????????????????
squamulatus               ??????????????????????????????????????????????????????????????????????
strahmi                   --aattaa---aaccaagagccttcaaagctcaaaataagggtgcaaccccccttagtttttg------ta
stratulus                 aatctta----aaccaagagccttcaaagttcaaaataagggtgcgattcccttagtttttg------ta
subocularis               ??????????????????????????????????????????????????????????????????????
taylori                   ??????????????????????????????????????????????????????????????????????
tolimensis                ??????????????????????????????????????????????????????????????????????
townsendi                 ??????????????????????????????????????????????????????????????????????
transversalis             ??????????????????????????????????????????????????????????????????????
trinitatis                ??????????????????????????????????????????????????????????????????????
tropidogaster             ??????????????????????????????????????????????????????????????????????
tropidolepis              ??????????????????????????????????????????????????????????????????????
tropidonotus              ??????????????????????????????????????????????????????????????????????
valencienni               ??????a----aaccaagggccttcaaagccctaaataaggg?cccaccccccttagtttttg------ta
vanidicus                 --aaaca----aaccaagagccttcaaagctccaaacaagggtgcaaccccccttagtttttg------ta
ventrimaculatus           ??????????????????????????????????????????????????????????????????????
vermiculatus              aatatta----aaccaagggccttcaaagcccaaaatatgggtataacacccatagtttctg------ca
vociferans                ??????????????????????????????????????????????????????????????????????
wattsi                    --aacta----aaccaagagccttcaaagcccaaaataggggtgaaactcccccagttcttg-----cta
whitemani                 ??????????????????????????????????????????????????????????????????????
Polychrus_acutirostris    --aatca----aaccttggaccttcaaagtccaaaataggagtgcaaaccccctagtttctg------ca
Polychrus_marmoratus      ??????????????????????????????????????????????????????????????????????
Leiocephalus_schreibersi  ??????????????????????????????????????????????????????????????????????
Leiocephalus_melanochlorus ?????????????????????????????????????????????????????????????????????
Urostrophus_vautieri      ??????????????????????????????????????????????????????????????????????
Anisolepis_undulatus      ??????????????????????????????????????????????????????????????????????
Enyalius_iheringi         ??????????????????????????????????????????????????????????????????????
Phenacosaurus_nicefori    aacatta----aaccaagagccttcaaagctcaaaatatggactata--cccataatttctg------ta
Diplolaemus_darwinii      --aactaaccaaaccaagggccttcaaagcccaa?atagagatgaaaaccctctagtttctga-----ta
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acutus	agacttgtaaaatactaatttacatctcatgaatgcaactcaagcgcttttattaagccaaagcctca--
aeneus	agacttgtgaaatattaatccacatcctctgaatgcaactcaaccactttaattaagctaaaatcttt--
aequatorialis	??
agassizi	agacttgtgaaatattattacacatcttctgaatgcaactcaaacactttaattaagctaaagcctct--
ahli	agacttgtgggag-ctaacccacatctcctgaatgcaactcaaatgcttttattaaactaaagcctt---
aliniger	agacttgtaaaacattaatttacatctcctgaatgcaactcaagcacttttattaagctaaagcctct--
allisoni	??
allogus	??
altae	??
altavelensis	??
alutaceus	agacttgtaaaatactaatttacatctcttgaatgcaacttaaacactttaattaagctaaaacctta--
angusticeps	agacttgtgaaacattattacacatctcctgaatgcaactcaagcacttttattaagccaaagcctca--
antonii	??
apollinaris	??
aquaticus	??
argenteolus	??
argillaceus	??
armouri	??
auratus	??
bahorucoensis	aaacttgtgaaactttaattcacatctgctgaatgcaactcaaacacttttattaagctaaagcctca--
baleatus	??
barahonae	agacttgtaaaacattaatttacatctcttgaatgcaaatcaagcactttaattaagctaaagccttc--
barkeri	??
bartschi	agacttgtgaaatattaatccacatctcatgaatgcaactcaaacactttaattaagctaaagcctcc--
bimaculatus	agacctgtaaaactctaatttacatcttctgaatgcaactcaaataccttaattaagctaaggcctct--
biporcatus	??
bitectus	??
bonairensis	??
brevirostris	agacttgtgagagactaacccacatcttctgaatgcaacccaaacactttaattaagctaaagccttc--
brunneus	??
Ch._chameleonides	agacttgtaaaattctaatttacatctattgaatgcaactcaaacactttaattaagctaaagcctta--
capito	??
carolinensis	agacttgtgaaacattattacacatctcctgaatgcaactcaagcactttaattaagctaaagcctct--
chloris	??
chlorocyanus	??

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christophei        agacttgtaaaatattaatttacatctcctgaatgcaa?tcaagcacttttattaagctaaaaccttt--
chrysolepis        ??????????????????????????????????????????????????????????????????????
clivicola          ??????????????????????????????????????????????????????????????????????
cobanensis         ??????????????????????????????????????????????????????????????????????
coelestinus        agacttgtgaaatactaatccacatctcatgaatgcaactcaagcacttttattaagctaaagccttt--
compressicauda     ??????????????????????????????????????????????????????????????????????
conspersus         ??????????????????????????????????????????????????????????????????????
crassulus          ??????????????????????????????????????????????????????????????????????
cristatellus       agacttgtaa?a?attaatttacatctcatgaatgcaactcaagcgcttttattaagctaaagcctct--
Cr._barbouri       agacttgtgaaatactaatacacatctcatgaatgcaactcaagcacttttattaagctaaagcctct--
cupreus            ??????????????????????????????????????????????????????????????????????
cuprinus           ??????????????????????????????????????????????????????????????????????
cuvieri            agacttgtaaaatactaatttacatcttctgaatgcaactcaaacactttaattaagctaaagcctac--
cyanopleurus       ??????????????????????????????????????????????????????????????????????
cybotes            ??????????????????????????????????????????????????????????????????????
darlingtoni        ??????????????????????????????????????????????????????????????????????
desechensis        ??????????????????????????????????????????????????????????????????????
distichus          agacttgtgaaacactaatccacatcttctgaatgcaacccaaacgctttcattaagctaaagccttt--
dollfusianus       ??????????????????????????????????????????????????????????????????????
dunni              ??????????????????????????????????????????????????????????????????????
equestris          agacttgtaaaatactaatttacatctcctgaatgcaactcaaatgcttttattaagctaaagccttc--
etheridgei         agacttgtgaaatactatttcacatctcttgaatgcaactcaagcacttttattaagctaaagccttc--
evermanni          ??????????????????????????????????????????????????????????????????????
fasciata           ??????????????????????????????????????????????????????????????????????
fowleri            ??????????????????????????????????????????????????????????????????????
fraseri            ??????????????????????????????????????????????????????????????????????
frenatus           ??????????????????????????????????????????????????????????????????????
fuscoauratus       ??????????????????????????????????????????????????????????????????????
gadovii            ??????????????????????????????????????????????????????????????????????
garmani            agacttatgagggactatcccatatctcctgaatgcaactcaagcacttttattaagctaaagcctta-t
gingivinus         ??????????????????????????????????????????????????????????????????????
grahami            agact?atgggtaactaccccatatctcctgaatg?aactcaaacactttattaagctaaagcctt-at
granuliceps        ??????????????????????????????????????????????????????????????????????
griseus            ??????????????????????????????????????????????????????????????????????
gundlachi          ??????????????????????????????????????????????????????????????????????
hendersoni         ??????????????????????????????????????????????????????????????????????
homolechis         ??????????????????????????????????????????????????????????????????????
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humilis          agacttatgggaaactaacccacatcttttgaatgcaacccaaacacttttattaagctaaagcctc--t
insignis         ????????????????????????????????????????????????????????????????????
insolitus        agacttgtgaaacactaactcacatctcctgaatgcaactcagacacttttattaagctaaaaccttc--
intermedius      ????????????????????????????????????????????????????????????????????
isolepis         ????????????????????????????????????????????????????????????????????
jacare           ????????????????????????????????????????????????????????????????????
jubar            ????????????????????????????????????????????????????????????????????
kemptoni         ????????????????????????????????????????????????????????????????????
krugi            agacttgtgaaacattaattcacatctcatgaatgcaactcaagcacttttattaagctaaagcctcc--
laeviventris     ????????????????????????????????????????????????????????????????????
latifrons        ????????????????????????????????????????????????????????????????????
leachii          ????????????????????????????????????????????????????????????????????
lemurinus        ????????????????????????????????????????????????????????????????????
limifrons        agacctataaatgacttatttatatctcctgaatgcaa???aacaactttcattaagctaaagcctc--t
lineatopus       agacttatggacaactacaccatatcttctgaatgcaactcaaacactttaattaagctaaagcctct-t
lineatus         agacttatgaaaa-ctacttcatatcttctgattgcaactcaaacacttttattaagctaaagccttcac
liogaster        ????????????????????????????????????????????????????????????????????
lividus          ????????????????????????????????????????????????????????????????????
longiceps        ????????????????????????????????????????????????????????????????????
longitibialis    ????????????????????????????????????????????????????????????????????
loveridgei       ????????????????????????????????????????????????????????????????????
loysianus        agacctgtgaaatactattacacatcttctgaatgcaactcaaacacttttattaagctaaagcctcc--
luciae           agacttgtgagatactaacccacatctaatgaatgcaactcaaacactttaattaagctaaagccttc--
lucius           agactcatgtaatattaatacacatctcctgaatgcaactcaaacactttaattaagctagagcctct--
luteogularis     agacttgtaaaatactaatttacatctcctgaatgcaactcaaatgcttttattaagctaaagccttc--
luteosignifer    ????????????????????????????????????????????????????????????????????
maculiventris    ????????????????????????????????????????????????????????????????????
marcanoi         aaacttgtactatactatagcacatctcttgaatgcaactcaagcacttttattaagctaaagcctcc--
mariarum         ????????????????????????????????????????????????????????????????????
marmoratus       ????????????????????????????????????????????????????????????????????
maynardi         agacttgtgaaatattataacacatctcctgaatgcaactcaagcactttaattaagctaaagcctct--
megapholidotus   ????????????????????????????????????????????????????????????????????
meridionalis     ????????????????????????????????????????????????????????????????????
mestrei          ????????????????????????????????????????????????????????????????????
micropholidotus  ????????????????????????????????????????????????????????????????????
microtus         agacttgtgaaacattaacacacatctcttgaatgcaactcaagcactttaattaagctaaagcctct--
monticola        ????????????????????????????????????????????????????????????????????
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nebuloides                 ??????????????????????????????????????????????????????????????????????????????
nebulosus                  ??????????????????????????????????????????????????????????????????????????????
noblei                     ??????????????????????????????????????????????????????????????????????????????
notopholis                 ??????????????????????????????????????????????????????????????????????????????
nubilis                    ??????????????????????????????????????????????????????????????????????????????
occultus                   acacttacaaaactttaatttacatcttttgattgcaactcaaacacttttattaagctaaagcctcc--
oculatus                   ??????????????????????????????????????????????????????????????????????????????
olssoni                    agacttgtgaaatactaatacacatcttctgaatgcaactcaaacactttaattaagctaaagcctct--
onca                       ??????????????????????????????????????????????????????????????????????????????
opalinus                   ??????????????????????????????????????????????????????????????????????????????
ophiolepis                 agacttgtgaaatattaattcacatctcatgaatgcaactcaagcacttttattaagctaaagccttt--
ortoni                     ??????????????????????????????????????????????????????????????????????????????
oxylophus                  ??????????????????????????????????????????????????????????????????????????????
Phenacosaurus_heterodermus ??????????????????????????????????????????????????????????????????????????????
parvicirculatus            ??????????????????????????????????????????????????????????????????????????????
paternus                   agacttgtgaaa?actattacacatctcctgaatgcaactcaagcacttttattaagctaaagcctca--
pentaprion                 ??????????????????????????????????????????????????????????????????????????????
perracae                   ??????????????????????????????????????????????????????????????????????????????
petersi                    ??????????????????????????????????????????????????????????????????????????????
placidus                   ??????????????????????????????????????????????????????????????????????????????
poecilopus                 ??????????????????????????????????????????????????????????????????????????????
polylepis                  ??????????????????????????????????????????????????????????????????????????????
poncencis                  ??????????????????????????????????????????????????????????????????????????????
porcatus                   ??????????????????????????????????????????????????????????????????????????????
proboscis                  ??????????????????????????????????????????????????????????????????????????????
pulchellus                 ??????????????????????????????????????????????????????????????????????????????
punctatus                  ??????????????????????????????????????????????????????????????????????????????
quadriocellifer            ??????????????????????????????????????????????????????????????????????????????
reconditus                 ??????????????????????????????????????????????????????????????????????????????
richardi                   agacttgtgaaatattaattcacatcctctgaatgcaactcaactactttaattaagctaaagcctttt--
ricordi                    ??????????????????????????????????????????????????????????????????????????????
roosevelti                 ??????????????????????????????????????????????????????????????????????????????
roquet                     ??????????????????????????????????????????????????????????????????????????????
rubribarbus                ??????????????????????????????????????????????????????????????????????????????
ruizi                      ??????????????????????????????????????????????????????????????????????????????
sagrei                     agacttgtgaaaaactaattcacatctcatgaatgcaactcaagcactttattaagctaaagcctt---
semilineatus               ??????????????????????????????????????????????????????????????????????????????
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sericeus                  ??????????????????????????????????????????????????????????????????????????
sheplani                  agacctgt-acatactattatacatctcctgaatgcaactcaagcactttaattaagctaaagcctct--
shrevei                   ??????????????????????????????????????????????????????????????????????????
smallwoodi                ??????????????????????????????????????????????????????????????????????????
smaragdinus               ??????????????????????????????????????????????????????????????????????????
sminthus                  ??????????????????????????????????????????????????????????????????????????
solitarius                ??????????????????????????????????????????????????????????????????????????
spectrum                  ??????????????????????????????????????????????????????????????????????????
squamulatus               ??????????????????????????????????????????????????????????????????????????
strahmi                   agacttgcaccatactataatgcatctcctgaatgcaactcaagcgatttaattaaactaaagcttta--
stratulus                 agacttgtaaaatactaatttacatctcatgaatgcaactcaagcgcttttattaaactaaagcctcc--
subocularis               ??????????????????????????????????????????????????????????????????????????
taylori                   ??????????????????????????????????????????????????????????????????????????
tolimensis                ??????????????????????????????????????????????????????????????????????????
townsendi                 ??????????????????????????????????????????????????????????????????????????
transversalis             ??????????????????????????????????????????????????????????????????????????
trinitatis                ??????????????????????????????????????????????????????????????????????????
tropidogaster             ??????????????????????????????????????????????????????????????????????????
tropidolepis              ??????????????????????????????????????????????????????????????????????????
tropidonotus              ??????????????????????????????????????????????????????????????????????????
valencienni               agacttatgggtgtctactccatatctcctgaatgcaaatcaaacacttttattaagctaaagccttga-
vanidicus                 agacctgt-aaatactaatttacatctcctgaatgcaactcaagcgctttaattaagccaagacctaa--
ventrimaculatus           ??????????????????????????????????????????????????????????????????????????
vermiculatus              agacctgtgaaatactaattcacatcttatgaatgcaactcaaacactttaattaagctaaagcctta--
vociferans                ??????????????????????????????????????????????????????????????????????????
wattsi                    agacctgtgaaattttaattcacatcttctgaatgcaactcaaacaccttcattaggctaagacctta--
whitemani                 ??????????????????????????????????????????????????????????????????????????
Polychrus_acutirostris    agacctgcgaaccattaaaacgcatcctctgaatgcaactcagtcactttaattaagctaaggcctcc--
Polychrus_marmoratus      ??????????????????????????????????????????????????????????????????????????
Leiocephalus_schreibersi  ??????????????????????????????????????????????????????????????????????????
Leiocephalus_melanochlorus ?????????????????????????????????????????????????????????????????????????
Urostrophus_vautieri      ??????????????????????????????????????????????????????????????????????????
Anisolepis_undulatus      ??????????????????????????????????????????????????????????????????????????
Enyalius_iheringi         ??????????????????????????????????????????????????????????????????????????
Phenacosaurus_nicefori    agacttgtaaaatattaatttacatctcatgaatgcaactcaagcactttaattaagctaaaatctacc-
Diplolaemus_darwinii      agacctgtgtaatactaaaacacatctcctgaatgcaacccagacactttaattaagctaaggcctcc--
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acutus	ctgaataggcgggccttgatcccacgacaa--gttaattaacagctaactgccctaaccagcgggcttct
aeneus	ctaagtaggcgggctttgatcccacgacaa--attaattaacagctaactacccaaaccagcgggcttct
aequatorialis	??
agassizi	ctgaataggcgggccttgatcccacgatat--attaattaacagctaactgcccaaaccagcgggcttct
ahli	cca?acaggtgggccttgatcccacaaaaa---ctagttaacagctagttacccaagccagcgggcttct
aliniger	ctgaataagcgggcctcgatcccgcgacaa--attagttaacagctaataacccaaaccagcgggcttct
allisoni	??
allogus	??
altae	??
altavelensis	??
alutaceus	ctgaataggcgggcttttaacccacgaaaa--attaattaacagctaatttcccaaaccaacgggcttct
angusticeps	ctgaataggcgggccttgatcccacgacaa--attaattaacagctaaatacccaaaccagcgggcttct
antonii	??
apollinaris	??
aquaticus	??
argenteolus	??
argillaceus	??
armouri	??
auratus	??
bahorucoensis	ctgaataggcgggctttgatcccacaacaa--attagttaacagctaaacacccaatccagcgggcttct
baleatus	??
barahonae	ctgaataggcgggctttgatcccgcgacaa--attaattaacagctaactacccaaaccagcgggcttct
barkeri	??
bartschi	ctgaacaggcgggcctcgatcccacgataa--attaattaacagctaattacccaaaccagcgggcttct
bimaculatus	ctgaataggcgggccttgatcccacaacaa--attaattaacagctaattacccaaaccagcgggcttct
biporcatus	??
bitectus	??
bonairensis	??
brevirostris	atgaataggcgggccttgatcccacgaaaa--tttaattaacagctaactgccctagccagcgggcttct
brunneus	??
Ch._chameleonides	ctgaataag?gggccttgatcccgcgagaa--attaattaacagctaactgcccaaaccagcgggctttt
capito	??
carolinensis	ctgaataggcgggccttgatcccacaacaa--attaattaacagctaattacccaaaccaacgggcttct
chloris	??
chlorocyanus	??

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christophei        ctgaataggtgggccttgatcccacga?aa--atcaattaacagctaattaccctaaccagcgggcttct
chrysolepis        ??????????????????????????????????????????????????????????????????????
clivicola          ??????????????????????????????????????????????????????????????????????
cobanensis         ??????????????????????????????????????????????????????????????????????
coelestinus        ctgaataggcgggcctcgagcccacgacaa--attagttaacagctaattacccaaaccagcgggcttct
compressicauda     ??????????????????????????????????????????????????????????????????????
conspersus         ??????????????????????????????????????????????????????????????????????
crassulus          ??????????????????????????????????????????????????????????????????????
cristatellus       ctgaataggcgggccttgatcccacgataa--attaattaacagctaattacccaaaccagcgggcttct
Cr._barbouri       ctgaataagcgggcctcgatcccacgacaa--attaattaacagctaattacccaaaccagcgggcttct
cupreus            ??????????????????????????????????????????????????????????????????????
cuprinus           ??????????????????????????????????????????????????????????????????????
cuvieri            ctgaataggcgggccttgatcccacgacaa--attaattaacagctaattacccaaaccagcgggcttct
cyanopleurus       ??????????????????????????????????????????????????????????????????????
cybotes            ??????????????????????????????????????????????????????????????????????
darlingtoni        ??????????????????????????????????????????????????????????????????????
desechensis        ??????????????????????????????????????????????????????????????????????
distichus          ctgaataggcgggccttgatcccgcgataa--attaattaacagctaattaccctaaccagcgggcttct
dollfusianus       ??????????????????????????????????????????????????????????????????????
dunni              ??????????????????????????????????????????????????????????????????????
equestris          ctgaataggagggccttgatcccacaataa--attaattaacagctaattacccaaaccagcgggcttct
etheridgei         ctgaataggcgggccttgatcccgcgataa--attaattaacagctaactaccctagccagcgggcctct
evermanni          ??????????????????????????????????????????????????????????????????????
fasciata           ??????????????????????????????????????????????????????????????????????
fowleri            ??????????????????????????????????????????????????????????????????????
fraseri            ??????????????????????????????????????????????????????????????????????
frenatus           ??????????????????????????????????????????????????????????????????????
fuscoauratus       ??????????????????????????????????????????????????????????????????????
gadovii            ??????????????????????????????????????????????????????????????????????
garmani            ctaaataggcgggccttgatcccacaaaaa---ctagttaacagctaattacccaatccagcgggcttct
gingivinus         ??????????????????????????????????????????????????????????????????????
grahami            ctaaa?????????????????????aaaaa---ttagttaacagctaattacccaatccacggg?cttct
granuliceps        ??????????????????????????????????????????????????????????????????????
griseus            ??????????????????????????????????????????????????????????????????????
gundlachi          ??????????????????????????????????????????????????????????????????????
hendersoni         ??????????????????????????????????????????????????????????????????????
homolechis         ??????????????????????????????????????????????????????????????????????
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humilis	cggagcaagtgggccttgatcccacaaaaa---ttagttaacagctaattaccctaaccagcgggcttct
insignis	??
insolitus	atgaataagtgggccttgatcccacaacaa--attaattaacagctaactaccctaaccagcgggctttt
intermedius	??
isolepis	??
jacare	??
jubar	??
kemptoni	??
krugi	ctgaataggcgggctttgatcccacgaaaa--attaattaacagctaactacccattccagcgggcttct
laeviventris	??
latifrons	??
leachii	??
lemurinus	??
limifrons	ctgagaaacgg??ccttga??????aaaaa---ttagttaacacctaattaccctaacccacgggcttct
lineatopus	ccaaataggggggccttgatcccacaataa--actagttaacagctaatcgcccaagccagcgggcttct
lineatus	ctgaacaggagggcctcgatcccacaaaaa---ttagttaacagctaattacccaaaccagcgggcttct
liogaster	??
lividus	??
longiceps	??
longitibialis	??
loveridgei	??
loysianus	ctgaataggcgggccttgatcccacgacaa--attaattaacagctaattaccctaaccagcgggcttct
luciae	ctgagtaagcgggccttgatcccgcgatat--attaattaacagctaactacccaaaccagcgggcttct
lucius	ctgaataggcgggccttgatcccgcgacaa--atcaattaacagctaattacccaaaccagcgggcttct
luteogularis	ctgaataggagggcctcgatcccacaataa--attaattaacagctaattacccaaaccagcgggcttct
luteosignifer	??
maculiventris	??
marcanoi	ctgaacagacgggcctcgatcccgcgacaa--attaattaacagctaactgcccaaaccagcgggcttca
mariarum	??
marmoratus	??
maynardi	ctgaacaggcgggccttgatcccacaaaaa--attaattaacagctaattacccaaaccagcgggcttct
megapholidotus	??
meridionalis	??
mestrei	??
micropholidotus	??
microtus	ctgaataggcgggccttgatcccacgatat--attaattaacagctaactacccaaaccagcgggcttct
monticola	??

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nebuloides                ??????????????????????????????????????????????????????????????????????????
nebulosus                 ??????????????????????????????????????????????????????????????????????????
noblei                    ??????????????????????????????????????????????????????????????????????????
notopholis                ??????????????????????????????????????????????????????????????????????????
nubilis                   ??????????????????????????????????????????????????????????????????????????
occultus                  ttgaatagtcgggcttcgatcccacgacaa--attaattaacagctaactgcccaaaccagcgggcttct
oculatus                  ??????????????????????????????????????????????????????????????????????????
olssoni                   ctgaataggcgggcctcgatcccgcgacaa--attaattaacagctaactacccaaaccagcgggcttct
onca                      ??????????????????????????????????????????????????????????????????????????
opalinus                  ??????????????????????????????????????????????????????????????????????????
ophiolepis                aggaatgggcgggccttgatcccgcaaaaa--attaattaacagctaattacccaaaccagcgggcttcc
ortoni                    ??????????????????????????????????????????????????????????????????????????
oxylophus                 ??????????????????????????????????????????????????????????????????????????
Phenacosaurus_heterodermus ?????????????????????????????????????????????????????????????????????????
parvicirculatus           ??????????????????????????????????????????????????????????????????????????
paternus                  ctgaataggcgggctttgatcccacgacaa--attaattaacagctaattacccaaaccagcgggcttct
pentaprion                ??????????????????????????????????????????????????????????????????????????
perracae                  ??????????????????????????????????????????????????????????????????????????
petersi                   ??????????????????????????????????????????????????????????????????????????
placidus                  ??????????????????????????????????????????????????????????????????????????
poecilopus                ??????????????????????????????????????????????????????????????????????????
polylepis                 ??????????????????????????????????????????????????????????????????????????
poncencis                 ??????????????????????????????????????????????????????????????????????????
porcatus                  ??????????????????????????????????????????????????????????????????????????
proboscis                 ??????????????????????????????????????????????????????????????????????????
pulchellus                ??????????????????????????????????????????????????????????????????????????
punctatus                 ??????????????????????????????????????????????????????????????????????????
quadriocellifer           ??????????????????????????????????????????????????????????????????????????
reconditus                ??????????????????????????????????????????????????????????????????????????
richardi                  ctaagtaggcgggctttgatcccacgacaa--attaattaacagctaactacccaaaccagcgggcttct
ricordi                   ??????????????????????????????????????????????????????????????????????????
roosevelti                ??????????????????????????????????????????????????????????????????????????
roquet                    ??????????????????????????????????????????????????????????????????????????
rubribarbus               ??????????????????????????????????????????????????????????????????????????
ruizi                     ??????????????????????????????????????????????????????????????????????????
sagrei                    atgaatgagcgggcctcgatcccacaaaaa--attaattaacagctaattacccaaaccagcgggcttcc
semilineatus              ??????????????????????????????????????????????????????????????????????????
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sericeus                 ??????????????????????????????????????????????????????????????????????????????
sheplani                 ctaagtaggcgggctttgatcccgcgacaa--attaattaacagctaactacccaaaccagcgggcttct
shrevei                  ??????????????????????????????????????????????????????????????????????????????
smallwoodi               ??????????????????????????????????????????????????????????????????????????????
smaragdinus              ??????????????????????????????????????????????????????????????????????????????
sminthus                 ??????????????????????????????????????????????????????????????????????????????
solitarius               ??????????????????????????????????????????????????????????????????????????????
spectrum                 ??????????????????????????????????????????????????????????????????????????????
squamulatus              ??????????????????????????????????????????????????????????????????????????????
strahmi                  ctgaacaggcgggcctcgatcccacgataa--attaattaacagctaattacccaaaccagcgggcttca
stratulus                ctgaacaggcgggccttgatcccacgacaa--attaattaacagctaactgccctaaccagcgggcttct
subocularis              ??????????????????????????????????????????????????????????????????????????????
taylori                  ??????????????????????????????????????????????????????????????????????????????
tolimensis               ??????????????????????????????????????????????????????????????????????????????
townsendi                ??????????????????????????????????????????????????????????????????????????????
transversalis            ??????????????????????????????????????????????????????????????????????????????
trinitatis               ??????????????????????????????????????????????????????????????????????????????
tropidogaster            ??????????????????????????????????????????????????????????????????????????????
tropidolepis             ??????????????????????????????????????????????????????????????????????????????
tropidonotus             ??????????????????????????????????????????????????????????????????????????????
valencienni              ccaaataggtgggccttgatccc??aaaaa---ttagttaacagctaattacccaaaccagagggcttcc
vanidicus                ctgaatagacgggcttcgatcccgcgataa--gttaattaacagctaaccacccaaaccagcgggcttca
ventrimaculatus          ??????????????????????????????????????????????????????????????????????????????
vermiculatus             ctgaataggcgggccttgatcccacaacaa--attaattaacagctaattacctaaaccagcgggcttct
vociferans               ??????????????????????????????????????????????????????????????????????????????
wattsi                   ctgaataggcgggccttgatcccacaacaa--attaattaacagctaattaccctagccagcgggcttct
whitemani                ??????????????????????????????????????????????????????????????????????????????
Polychrus_acutirostris   ctagacaggcgggccttgatcccgcaaaa---attagttaacagctaattacccaaaccagcgggcttcc
Polychrus_marmoratus     ??????????????????????????????????????????????????????????????????????????????
Leiocephalus_schreibersi ??????????????????????????????????????????????????????????????????????????????
Leiocephalus_melanochlorus ????????????????????????????????????????????????????????????????????????????
Urostrophus_vautieri     ??????????????????????????????????????????????????????????????????????????????
Anisolepis_undulatus     ??????????????????????????????????????????????????????????????????????????????
Enyalius_iheringi        ??????????????????????????????????????????????????????????????????????????????
Phenacosaurus_nicefori   ataagtaggcgggctttgatcccacgacat--attaattaacagctaactacccaaaccagcgggcttct
Diplolaemus_darwinii     ctagatagggggctttgatcccacgaaac--tttagttaacagctaaacacccaaaccagcgggcttct
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acutus	attcg-cttctcccgtacgggag-aagccccggagcccctta--gggctcttcttcaaacttgcattttg
aeneus	actcg-cttctcccgtacgggag-aagccccggagcctttta--gggctcgtctttaaatttgcatttta
aequatorialis	??
agassizi	attcg-cttctcccgtacgggag-aagccccggagcccttct--gggctcgtcttcaaatttgcattttg
ahli	attcg-cttctcccgtacgggag-aagccccggagccctttt--gggctcatcttcaaacttgcattttg
aliniger	attcg-cttctcccgtacgggag-aagccccggagcccttta--gggctcttcttcaaacttgcattttg
allisoni	??
allogus	??
altae	??
altavelensis	??
alutaceus	attcg-cttcccccgtacgggag-aagccccggagcc-tttaa-gggctcttcttcaaacttgcaatttg
angusticeps	attcg-cttctcccgtacgggag-aagcc?ccgagcc-ttta--gggctcctcttcagacttgcattttg
antonii	??
apollinaris	??
aquaticus	??
argenteolus	??
argillaceus	??
armouri	??
auratus	??
bahorucoensis	attcg-cttctcccgtacgggag-aagccccggagccttttta-gggctcctcttcaaacttgcattttg
baleatus	??
barahonae	attcg-cttctcccgtacgggag-aagccccggagcccttttt--gggctctttttcaaatttgcattttg
barkeri	??
bartschi	attcg-cttctcccgtacgggag-aagccccgagccc-ctta--gggctcttcttcaaacttgcattttg
bimaculatus	attcg-cttctcccgtacgggag-aagccccggagcccctta--gggctctttctcaaacttgcattttg
biporcatus	??
bitectus	??
bonairensis	??
brevirostris	attcg-cttctcccgtacgggag-aagccccggagcctatt--ggggctcttcttcaaacttgcattttg
brunneus	??
Ch._chameleonides	attct-cttctcccgtacgggag-aaaccccggagcctttta--gggctcttcttcaaatttgcactttg
capito	??
carolinensis	attcg-cttctcccg?acgggag--aa??caacgagcctta--gggctcctcttcaaacttgcattttg
chloris	??
chlorocyanus	??

christophei	attcg-cttctcccgtacgggag-aag?ccggagccctttat-gggctctttctca?acttgcattttg
chrysolepis	??
clivicola	??
cobanensis	??
coelestinus	attcg-cttctcccgtacgggag-aagccccggagcccttta--gggctcttcttcaaacttgcattttg
compressicauda	??
conspersus	??
crassulus	??
cristatellus	attcg-cttctcccgtacgggag-aagccccggagccaata?--gggct?gctttcaaa?ttgcattttg
Cr._barbouri	attcg-cttctcccgtacgggag-aa??cccggagcctttta--gggctcttctttaaacttgcatttta
cupreus	??
cuprinus	??
cuvieri	attcg-cttctcccgtacgggag-aaggcccggagccctttt--gggctcttcttcaaatttgcattttg
cyanopleurus	??
cybotes	??
darlingtoni	??
desechensis	??
distichus	attcg-cttctcccgtacgggag-aagccccggagcccttt--gggctcttcttcaaacttgcattttg
dollfusianus	??
dunni	??
equestris	attcg-cttctcccgtacgggag-aagccccggagccctatt-ggggctctttttcaaacttgcattttg
etheridgei	attcg-cttctcccgtacgggag-aagccccggagccctttgt-gggctctttttcaaacttgcattttg
evermanni	??
fasciata	??
fowleri	??
fraseri	??
frenatus	??
fuscoauratus	??
gadovii	??
garmani	ctttagcttctcccgtacgggag-aagcccc?gggcccttta--gggctctttttcaaacttgcattttg
gingivinus	??
grahami	atttagcttctcccgtacggga--aag?cccggagcccttta--gggctctttttcaaacttgcattttg
granuliceps	??
griseus	??
gundlachi	??
hendersoni	??
homolechis	??

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nebuloides                 ??????????????????????????????????????????????????????????????????????????????
nebulosus                  ??????????????????????????????????????????????????????????????????????????????
noblei                     ??????????????????????????????????????????????????????????????????????????????
notopholis                 ??????????????????????????????????????????????????????????????????????????????
nubilis                    ??????????????????????????????????????????????????????????????????????????????
occultus                   actcg-cttctcccgtacgggag-aagccccggagcc-tttt-ggggctccttttcaaacttgcattttg
oculatus                   ??????????????????????????????????????????????????????????????????????????????
olssoni                    actcg-cttctcccgtacgggag-aagccccggagccgttt--ggggctcttcttcaaacttgcattttg
onca                       ??????????????????????????????????????????????????????????????????????????????
opalinus                   ??????????????????????????????????????????????????????????????????????????????
ophiolepis                 attcg-cttctcccgtacgggag-aagccccggagcctttta--gggctcctcttcaaacttgcattttg
ortoni                     ??????????????????????????????????????????????????????????????????????????????
oxylophus                  ??????????????????????????????????????????????????????????????????????????????
Phenacosaurus_heterodermus ??????????????????????????????????????????????????????????????????????????????
parvicirculatus            ??????????????????????????????????????????????????????????????????????????????
paternus                   attcg-cttctcccgtacgggag-aagccccggagcc-ttta--gggctcttcttcaaacttgcattttg
pentaprion                 ??????????????????????????????????????????????????????????????????????????????
perracae                   ??????????????????????????????????????????????????????????????????????????????
petersi                    ??????????????????????????????????????????????????????????????????????????????
placidus                   ??????????????????????????????????????????????????????????????????????????????
poecilopus                 ??????????????????????????????????????????????????????????????????????????????
polylepis                  ??????????????????????????????????????????????????????????????????????????????
poncencis                  ??????????????????????????????????????????????????????????????????????????????
porcatus                   ??????????????????????????????????????????????????????????????????????????????
proboscis                  ??????????????????????????????????????????????????????????????????????????????
pulchellus                 ??????????????????????????????????????????????????????????????????????????????
punctatus                  ??????????????????????????????????????????????????????????????????????????????
quadriocellifer            ??????????????????????????????????????????????????????????????????????????????
reconditus                 ??????????????????????????????????????????????????????????????????????????????
richardi                   actcg-cttctcccgtacgggag-aagccccggagcctttta--gggctcatctttaaatttgcatttta
ricordi                    ??????????????????????????????????????????????????????????????????????????????
roosevelti                 ??????????????????????????????????????????????????????????????????????????????
roquet                     ??????????????????????????????????????????????????????????????????????????????
rubribarbus                ??????????????????????????????????????????????????????????????????????????????
ruizi                      ??????????????????????????????????????????????????????????????????????????????
sagrei                     attcg-cttctcccgtacgggag-aa????cggagcctttta--gggctcctttcaaacttgcattttg
semilineatus               ??????????????????????????????????????????????????????????????????????????????
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sericeus                  ??????????????????????????????????????????????????????????????????????????
sheplani                  acttg-cttctcccgtacgggag-aagccccggagcc-ttta--tggctctttttcaaacttgcattttg
shrevei                   ??????????????????????????????????????????????????????????????????????????
smallwoodi                ??????????????????????????????????????????????????????????????????????????
smaragdinus               ??????????????????????????????????????????????????????????????????????????
sminthus                  ??????????????????????????????????????????????????????????????????????????
solitarius                ??????????????????????????????????????????????????????????????????????????
spectrum                  ??????????????????????????????????????????????????????????????????????????
squamulatus               ??????????????????????????????????????????????????????????????????????????
strahmi                   attcg-cttctcccgtacgggag-aagccccggagcctttta--gggctcatctttaaacttgcatttta
stratulus                 attcg-cttctcccgtacgggag-aagccccggagcc-ttta--aggctcttcttcaaacttgcattttg
subocularis               ??????????????????????????????????????????????????????????????????????????
taylori                   ??????????????????????????????????????????????????????????????????????????
tolimensis                ??????????????????????????????????????????????????????????????????????????
townsendi                 ??????????????????????????????????????????????????????????????????????????
transversalis             ??????????????????????????????????????????????????????????????????????????
trinitatis                ??????????????????????????????????????????????????????????????????????????
tropidogaster             ??????????????????????????????????????????????????????????????????????????
tropidolepis              ??????????????????????????????????????????????????????????????????????????
tropidonotus              ??????????????????????????????????????????????????????????????????????????
valencienni               atttg-cttctcccgtacgggag-aacccc?ggagcctttca--gggctcattttcaaacttgcattttg
vanidicus                 attctgcttctcccgtacgggag-aagccccggagcc-ttta-ggggctcttcttcaaacttgcaatttg
ventrimaculatus           ??????????????????????????????????????????????????????????????????????????
vermiculatus              attcg-cttctcccgtacgggag-aagcccc??gacccttta--gggctcttcttcaaacttgcattttg
vociferans                ??????????????????????????????????????????????????????????????????????????
wattsi                    attcg-cttctcccgtacgggag-aagccccggagccctttt--gggctctttctcaaacttgcattttg
whitemani                 ??????????????????????????????????????????????????????????????????????????
Polychrus_acutirostris    atccg-cttctcccgtacgggag-aagccccggagcccttta-ggggctcttctccgaatttgcacttcg
Polychrus_marmoratus      ??????????????????????????????????????????????????????????????????????????
Leiocephalus_schreibersi  ??????????????????????????????????????????????????????????????????????????
Leiocephalus_melanochlorus ?????????????????????????????????????????????????????????????????????????
Urostrophus_vautieri      ??????????????????????????????????????????????????????????????????????????
Anisolepis_undulatus      ??????????????????????????????????????????????????????????????????????????
Enyalius_iheringi         ??????????????????????????????????????????????????????????????????????????
Phenacosaurus_nicefori    actcg-cttctcccgcacgggag-aagccccggagcctttta--gggctcttcttcaaatttgcattttg
Diplolaemus_darwinii      atccg-cttctcccgcacgggag-aa??cccggagccctttat-gggctc---ttcaaatttgcattttg
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acutus              acgtga---aaacactacagagcttct----agtaaagaaagggattaaaccaatgtaaataagtttaca
aeneus              atgtgg---aaacacttcaggactgt-----gataaagaaaggaattaaacctctataaataggactaca
aequatorialis       ??????????????????????????????????????????????????????????????????????
agassizi            acgtga----aacacctcggggctgt-----gataaagagaggaatcaaccccccttagataggactaca
ahli                atgtgg----gtcacttcgggacttt-----gataaagaaaggaattaaaccaatgtaagtaggactaca
aliniger            acgtgg----aacaccccgggacttt-----gataaagaggggaattaaaccccctattaatgggtctaca
allisoni            ??????????????????????????????????????????????????????????????????????
allogus             ??????????????????????????????????????????????????????????????????????
altae               ??????????????????????????????????????????????????????????????????????
altavelensis        ??????????????????????????????????????????????????????????????????????
alutaceus           acgtaaatcacttacttcggggctt------gataaagaaaggaattaaaccaatgtgaataggactaca
angusticeps         acgtgaa---aacacttcgggactttt----gataaagaaaggaattaaacctgtgtaagtaggtctaca
antonii             ??????????????????????????????????????????????????????????????????????
apollinaris         ??????????????????????????????????????????????????????????????????????
aquaticus           ??????????????????????????????????????????????????????????????????????
argenteolus         ??????????????????????????????????????????????????????????????????????
argillaceus         ??????????????????????????????????????????????????????????????????????
armouri             ??????????????????????????????????????????????????????????????????????
auratus             ??????????????????????????????????????????????????????????????????????
bahorucoensis       acgtga----aacaccccgggactgcat---gataaggaagggaattgagcccctataaataggactaca
baleatus            ??????????????????????????????????????????????????????????????????????
barahonae           atgtgga----acacttcgagacttt-----gataaataaaggaattaaaccaatgtaagtaggactaca
barkeri             ??????????????????????????????????????????????????????????????????????
bartschi            acgtga----aacacctcgaggctgt-----gataagaaagggaattaaacccctgtaaacaggactaca
bimaculatus         acgtga----????ctacgtggctgt-----gataaagaaaggaattaaa???????aataggtctaca
biporcatus          ??????????????????????????????????????????????????????????????????????
bitectus            ??????????????????????????????????????????????????????????????????????
bonairensis         ??????????????????????????????????????????????????????????????????????
brevirostris        acgtaa----aacacctcgaggctat-----gataaagaaaggacttgaaccaatatgggtaggtttaca
brunneus            ??????????????????????????????????????????????????????????????????????
Ch._chameleonides   atgtga----aatacttcaggacttt-----ggtaaagaaaggaattaaaccaatgtaaataggactaca
capito              ??????????????????????????????????????????????????????????????????????
carolinensis        acgtgaa----acacttcggggctt------gataaagaaaggaattaaaccaatgtaaataggactaca
chloris             ??????????????????????????????????????????????????????????????????????
chlorocyanus        ??????????????????????????????????????????????????????????????????????
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christophei        atgtga----aacacttcgggacttt-----gataaagaaaggaattaaa??aatgtaagtaggactaca
chrysolepis        ??????????????????????????????????????????????????????????????????????
clivicola          ??????????????????????????????????????????????????????????????????????
cobanensis         ??????????????????????????????????????????????????????????????????????
coelestinus        atgtgg----aacaccccaggactt------gatgaggaagggaattaaaccccctgttaatgagtctaca
compressicauda     ??????????????????????????????????????????????????????????????????????
conspersus         ??????????????????????????????????????????????????????????????????????
crassulus          ??????????????????????????????????????????????????????????????????????
cristatellus       acgtga----aatactacaggactcgt----agtaaagaaagggtttaaa?caatataaa?agatttaca
Cr._barbouri       atgtga----aacacttcgggaccct-----gataaagaaaggagttaaaccaatgttagtaggactaca
cupreus            ??????????????????????????????????????????????????????????????????????
cuprinus           ??????????????????????????????????????????????????????????????????????
cuvieri            acgtgaa----acacttcaggacttt-----gataaagaagggaattaaaccaatgtaagtaggactaca
cyanopleurus       ??????????????????????????????????????????????????????????????????????
cybotes            ??????????????????????????????????????????????????????????????????????
darlingtoni        ??????????????????????????????????????????????????????????????????????
desechensis        ??????????????????????????????????????????????????????????????????????
distichus          acgtaa----aacacctcgaggcttt-----gataaagaaagggcttcaaccaatataaataagtttaca
dollfusianus       ??????????????????????????????????????????????????????????????????????
dunni              ??????????????????????????????????????????????????????????????????????
equestris          acgtga----aacacttcagggcttt-----gataagaaaaggaattaaacctat??????aggactaca
etheridgei         atgtga----aacacttcgggacttt-----aataaagaaaggaattaaaccaatgtaaataggactaca
evermanni          ??????????????????????????????????????????????????????????????????????
fasciata           ??????????????????????????????????????????????????????????????????????
fowleri            ??????????????????????????????????????????????????????????????????????
fraseri            ??????????????????????????????????????????????????????????????????????
frenatus           ??????????????????????????????????????????????????????????????????????
fuscoauratus       ??????????????????????????????????????????????????????????????????????
gadovii            ??????????????????????????????????????????????????????????????????????
garmani            atgtga----atcacttcagagctgt-----gataaagaaaggaattaaaccaatgtaaa??ggtctaca
gingivinus         ??????????????????????????????????????????????????????????????????????
grahami            atgtgg----atcacttcagggctgt-----gataaagaaaggaattaaaccaatgtaaataggactaca
granuliceps        ??????????????????????????????????????????????????????????????????????
griseus            ??????????????????????????????????????????????????????????????????????
gundlachi          ??????????????????????????????????????????????????????????????????????
hendersoni         ??????????????????????????????????????????????????????????????????????
homolechis         ??????????????????????????????????????????????????????????????????????
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humilis          atgtaa----gtcactgcggaggctct----gataaagaaaggagttaaaccaatgtgtgcaggactact
insignis         ??????????????????????????????????????????????????????????????????????
insolitus        acgtga----agcacttcgggacttt-----gataaagaaaggaattaaaccaatgtaaataggactaca
intermedius      ??????????????????????????????????????????????????????????????????????
isolepis         ??????????????????????????????????????????????????????????????????????
jacare           ??????????????????????????????????????????????????????????????????????
jubar            ??????????????????????????????????????????????????????????????????????
kemptoni         ??????????????????????????????????????????????????????????????????????
krugi            acgtga--aagccacttcaaggctgt-----gacaaagaaaggattcaaaccaatataagtaagtttaca
laeviventris     ??????????????????????????????????????????????????????????????????????
latifrons        ??????????????????????????????????????????????????????????????????????
leachii          ??????????????????????????????????????????????????????????????????????
lemurinus        ??????????????????????????????????????????????????????????????????????
limifrons        acgtaa----ttcacttcga?gcttt-----gataaagaaaggaattaaaccaatgt?tacaggactaca
lineatopus       atgtga----atcacttcggggctgt-----gataaagaaaggaattaaaccaatgtaaataggactaca
lineatus         acgtga----atcacttcgggacttt-----gataaagaaaggaattaaaccaatgtgaataggtctaca
liogaster        ??????????????????????????????????????????????????????????????????????
lividus          ??????????????????????????????????????????????????????????????????????
longiceps        ??????????????????????????????????????????????????????????????????????
longitibialis    ??????????????????????????????????????????????????????????????????????
loveridgei       ??????????????????????????????????????????????????????????????????????
loysianus        acgtgaa---aacactacgagactct-----gataaagaaaggaatcaaaccagtgtaagtaggtctaca
luciae           atgtgt----aacaccccgggacctcatggtggtaaagagaggaattaaaccccttaaataggactaca
lucius           atgtaa----gtcacttcggagctgt-----gataaagaaaggagttgaaccaatgtaaataggactaca
luteogularis     acgaga----aacacttcagggcttt-----gataagaaaaggaattaaacctatgtaaataggactaca
luteosignifer    ??????????????????????????????????????????????????????????????????????
maculiventris    ??????????????????????????????????????????????????????????????????????
marcanoi         acgtat----aacacctcgggacttt-----gataaagaagggg-tttagccctcatgggtggagctaca
mariarum         ??????????????????????????????????????????????????????????????????????
marmoratus       ??????????????????????????????????????????????????????????????????????
maynardi         acgtgaa----acacttcggggctt------gataaagaagggaatta??cccctgtgaataggactaca
megapholidotus   ??????????????????????????????????????????????????????????????????????
meridionalis     ??????????????????????????????????????????????????????????????????????
mestrei          ??????????????????????????????????????????????????????????????????????
micropholidotus  ??????????????????????????????????????????????????????????????????????
microtus         acgtgg----aacaccccagggctgt-----gataaaaagaggaattaaacccctattaataggactaca
monticola        ??????????????????????????????????????????????????????????????????????
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nebuloides                 ??????????????????????????????????????????????????????????????????????
nebulosus                  ??????????????????????????????????????????????????????????????????????
noblei                     ??????????????????????????????????????????????????????????????????????
notopholis                 ??????????????????????????????????????????????????????????????????????
nubilis                    ??????????????????????????????????????????????????????????????????????
occultus                   acgtgaa---aacacttcgagacttt-----aataag?aaaggaatcaaacccc?g?aaataggactaca
oculatus                   ??????????????????????????????????????????????????????????????????????
olssoni                    atgtga----aacacttcgggacttt-----gataaagaaaggaattaaaccaatgttaataggactaca
onca                       ??????????????????????????????????????????????????????????????????????
opalinus                   ??????????????????????????????????????????????????????????????????????
ophiolepis                 atgtgg----gtcacttcggggcttt-----gataaagaaaggaattgaaccaatgttagtaggactaca
ortoni                     ??????????????????????????????????????????????????????????????????????
oxylophus                  ??????????????????????????????????????????????????????????????????????
Phenacosaurus_heterodermus ??????????????????????????????????????????????????????????????????????
parvicirculatus            ??????????????????????????????????????????????????????????????????????
paternus                   atgtgga----acacttcgggacttt-----gataaataaaggaatta?accaatgtaaataggactaca
pentaprion                 ??????????????????????????????????????????????????????????????????????
perracae                   ??????????????????????????????????????????????????????????????????????
petersi                    ??????????????????????????????????????????????????????????????????????
placidus                   ??????????????????????????????????????????????????????????????????????
poecilopus                 ??????????????????????????????????????????????????????????????????????
polylepis                  ??????????????????????????????????????????????????????????????????????
poncencis                  ??????????????????????????????????????????????????????????????????????
porcatus                   ??????????????????????????????????????????????????????????????????????
proboscis                  ??????????????????????????????????????????????????????????????????????
pulchellus                 ??????????????????????????????????????????????????????????????????????
punctatus                  ??????????????????????????????????????????????????????????????????????
quadriocellifer            ??????????????????????????????????????????????????????????????????????
reconditus                 ??????????????????????????????????????????????????????????????????????
richardi                   atgtgg----aacacttcaggactat?----gataaaaaaaggaattgaacctctataaataggactaca
ricordi                    ??????????????????????????????????????????????????????????????????????
roosevelti                 ??????????????????????????????????????????????????????????????????????
roquet                     ??????????????????????????????????????????????????????????????????????
rubribarbus                ??????????????????????????????????????????????????????????????????????
ruizi                      ??????????????????????????????????????????????????????????????????????
sagrei                     acgtgg----gtcacttcggggcttt-----gataaagaaaggaattgaaccaatgttagtaggactaca
semilineatus               ??????????????????????????????????????????????????????????????????????
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sericeus                  ??????????????????????????????????????????????????????????????????????????
sheplani                  acgagaa---accactacagggctct-----gataaagaaaggagttaaaccaatgttagcaggactaca
shrevei                   ??????????????????????????????????????????????????????????????????????????
smallwoodi                ??????????????????????????????????????????????????????????????????????????
smaragdinus               ??????????????????????????????????????????????????????????????????????????
sminthus                  ??????????????????????????????????????????????????????????????????????????
solitarius                ??????????????????????????????????????????????????????????????????????????
spectrum                  ??????????????????????????????????????????????????????????????????????????
squamulatus               ??????????????????????????????????????????????????????????????????????????
strahmi                   atgtagt---aacacttcggggcttt-----ggtacagaaaggaatt-aaccaatgtgagtaggactaca
stratulus                 acgtga---aaacactacagggctttt----agtaaagaaagggattaaaccaatgtaagtaagtttaca
subocularis               ??????????????????????????????????????????????????????????????????????????
taylori                   ??????????????????????????????????????????????????????????????????????????
tolimensis                ??????????????????????????????????????????????????????????????????????????
townsendi                 ??????????????????????????????????????????????????????????????????????????
transversalis             ??????????????????????????????????????????????????????????????????????????
trinitatis                ??????????????????????????????????????????????????????????????????????????
tropidogaster             ??????????????????????????????????????????????????????????????????????????
tropidolepis              ??????????????????????????????????????????????????????????????????????????
tropidonotus              ??????????????????????????????????????????????????????????????????????????
valencienni               atgtga----atcacttcggggct-------gataaagaaaggaattaaaccaatgtaaataggactaca
vanidicus                 acgtaa----gtcacttcggagctgt---gtgataaagaaaggaattaaaccaatattagtaggactacg
ventrimaculatus           ??????????????????????????????????????????????????????????????????????????
vermiculatus              acgtga----aacacctcgagacttt-----ggtaagaaagggaattaagcccctgtaaacaggactaca
vociferans                ??????????????????????????????????????????????????????????????????????????
wattsi                    acgtgg----atcactgcggaactgt-----gataaagaaaggaatc?aaccaatgtaagtaggactaca
whitemani                 ??????????????????????????????????????????????????????????????????????????
Polychrus_acutirostris    gcgtgtt---ctcactacagggctgt-----ggtaagcagaggaattaaacccctgtctatgagtctaca
Polychrus_marmoratus      ??????????????????????????????????????????????????????????????????????????
Leiocephalus_schreibersi  ??????????????????????????????????????????????????????????????????????????
Leiocephalus_melanochlorus ?????????????????????????????????????????????????????????????????????????
Urostrophus_vautieri      ??????????????????????????????????????????????????????????????????????????
Anisolepis_undulatus      ??????????????????????????????????????????????????????????????????????????
Enyalius_iheringi         ??????????????????????????????????????????????????????????????????????????
Phenacosaurus_nicefori    atatgg----aacacctcagggcttt-----gataaa-tgaggaatttaacccct-tgtgtaggactaca
Diplolaemus_darwinii      acgtgct---tacaccacaggacttt-----gataaaaagaggagttaaacccctgtaaataggactaca
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acutus              gcttaccgcct-aacactcggccactttacctgtgtttatta??????????????????????????
aeneus              gcctactgcc??????????????????????????????????????????cc?ttttgaaagcccaat?a
aequatorialis       ????????????????????????????????????????????????????????????????????????
agassizi            gcctactgcct-aacattcggccactttacctgtgtttatcaatcgat?????????????????????
ahli                gcctat gcct-aacactcggccaatttacctgtgtcaactaatcgttga?????????????????????
aliniger            gcccaccgcct-aacattcggccaccctacctgtgtctattaatcgttga?????????????????????
allisoni            ????????????????????????????????????????????????????????????????????????
allogus             ????????????????????????????????????????????????????????????????????????
altae               ????????????????????????????????????????????????????????????????????????
altavelensis        ????????????????????????????????????????????????????????????????????????
alutaceus           gcctaccgcct-accattcggccactttacctgtgtttattaatcgttga?????????????????????
angusticeps         gcctactgcct-aacactcggccactttacctgtgtttattaaccgttga?????????????????????
antonii             ????????????????????????????????????????????????????????????????????????
apollinaris         ????????????????????????????????????????????????????????????????????????
aquaticus           ????????????????????????????????????????????????????????????????????????
argenteolus         ????????????????????????????????????????????????????????????????????????
argillaceus         ????????????????????????????????????????????????????????????????????????
armouri             ????????????????????????????????????????????????????????????????????????
auratus             ????????????????????????????????????????????????????????????????????????
bahorucoensis       gcctaccacct-agcattcggtcaccttacctgtgtccattaatcgttga?????????????????????
baleatus            ????????????????????????????????????????????????????????????????????????
barahonae           gcctactgcct-aacattcggccactttacctgtgtc???????????????????????????????????
barkeri             ????????????????????????????????????????????????????????????????????????
bartschi            gcctgacacct-agacttcggccaccttacctgtgtccattaatcgttga?????????????????????
bimaculatus         gcctaccgcct-aacactcggccactttacctgtgtc???????????????????????????????????
biporcatus          ????????????????????????????????????????????????????????????????????????
bitectus            ????????????????????????????????????????????????????????????????????????
bonairensis         ??????????????????????????????????????????????cc?ttttgaaagcccaatta
brevirostris        gcctaccacct-aaacctcggtcactttacctgtgtctattaatcgttga?????????????????????
brunneus            ????????????????????????????????????????????????????????????????????????
Ch._chameleonides   gcctactgcct-aacactcggccaatttacctatgtctgttaatcgtta?????????????????????
capito              ????????????????????????????????????????????????????????????????????????
carolinensis        gcctactgcct-aacactcggccactttaccagtgtttttagtcgttaa?????????????????????
chloris             ????????????????????????????????????????????????????????????????????????
chlorocyanus        ????????????????????????????????????????????????????????????????????????
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christophei        gcctactgcct-atcattcgg??actttacctgtgtctattaagcgttga??????????????????
chrysolepis        ??????????????????????????????????????????????????????????????????????
clivicola          ??????????????????????????????????????????????????????????????????????
cobanensis         ??????????????????????????????????????????????????????????????????????
coelestinus        gctcaccacct-aacactcggccaccttacctgtgtcta??????????????????????????????
compressicauda     ??????????????????????????????????????????????????????????????????????
conspersus         ??????????????????????????????????????????????????????????????????????
crassulus          ??????????????????????????????????????????????????????????????????????
cristatellus       ?gctaccgcct-aa?agtcagccactttacctgtgtccattaagcgttaa??????????????????
Cr._barbouri       gcctactgcct-??cactcggccactttacctgagtttatta??????????????????????????
cupreus            ??????????????????????????????????????????????????????????????????????
cuprinus           ??????????????????????????????????????????????????????????????????????
cuvieri            gcctaccgcct-aacattcggccactttacctgtgtttattaatcgttga??????????????????
cyanopleurus       ??????????????????????????????????????????????????????????????????????
cybotes            ??????????????????????????????????????????????????????????????????????
darlingtoni        ??????????????????????????????????????????????????????????????????????
desechensis        ??????????????????????????????????????????????????????????????????????
distichus          acttaccgcct-aaatttcggccactttacctgtgttcattaatcgttga??????????????????
dollfusianus       ??????????????????????????????????????????????????????????????????????
dunni              ??????????????????????????????????????????????????????????????????????
equestris          gcctaccgcct-aacactcagccatcttacctgtgtctattaaccgtta??????????????????
etheridgei         gcctaccgcct-aacactcggccactttacctgtgtttatcaagcgttga??????????????????
evermanni          ??????????????????????????????????????????????????????????????????????
fasciata           ??????????????????????????????????????????????????????????????????????
fowleri            ??????????????????????????????????????????????????????????????????????
fraseri            ??????????????????????????????????????????????????????????????????????
frenatus           ??????????????????????????????????????????????????????????????????????
fuscoauratus       ??????????????????????????????????????????????????????????????????????
gadovii            ??????????????????????????????????????????????????????????????????????
garmani            gcctaccgcct-aacattcggccactttacctgtgtctattaatcgtt???????????????????
gingivinus         ??????????????????????????????????????????????????????????????????????
grahami            gcctaccgcct--acattcggccactttacctgtgttcattaatcgtt???????????????????
granuliceps        ??????????????????????????????????????????????????????????????????????
griseus            ??????????????????????????????????????????????cc?ttttgaaagcccaatt?
gundlachi          ??????????????????????????????????????????????????????????????????????
hendersoni         ??????????????????????????????????????????????????????????????????????
homolechis         ??????????????????????????????????????????????????????????????????????
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humilis          gcctgccgcct-aacactcggccactttacctg?gtttattagccgttat??????????????????
insignis         ????????????????????????????????????????????????????????????????????
insolitus        gcctaccgcct-agcactcggccactttacctgtgtttatt????????????????????????????
intermedius      ????????????????????????????????????????????????????????????????????
isolepis         ????????????????????????????????????????????????????????????????????
jacare           ????????????????????????????????????????????????????????????????????
jubar            ????????????????????????????????????????????????????????????????????
kemptoni         ????????????????????????????????????????????????????????????????????
krugi            gcctaccgcct-aatattcggccactttacctgtgtctattaatc?????????????????????????
laeviventris     ????????????????????????????????????????????????????????????????????
latifrons        ????????????????????????????????????????????????????????????????????
leachii          ????????????????????????????????????????????????????????????????????
lemurinus        ????????????????????????????????????????????????????????????????????
limifrons        gcctgccgcct-tacactcggccactttacctgtgtttattaatcgttga??????????????????
lineatopus       gcctaccgcct-accattcggccactttacctgtgtttattaatcgttga??????????????????
lineatus         gcctaccgcct-ctcattcggccactttacctgtgtctattaatcgtta???????????????????
liogaster        ????????????????????????????????????????????????????????????????????
lividus          ????????????????????????????????????????????????????????????????????
longiceps        ????????????????????????????????????????????????????????????????????
longitibialis    ????????????????????????????????????????????????????????????????????
loveridgei       ????????????????????????????????????????????????????????????????????
loysianus        gcctaccgcct-aacattcggccactttacctgtgtttatttaccgttga??????????????????
luciae           gcctaccacct-agcattc?????????????????????????????cc?ttttgaaagcccaatta
lucius           gcctaccgcct-atcagtcggccactttacctgtgtttattaatcgttga??????????????????
luteogularis     gcctaccgcct-aacactcggccatcttacctgtgtctatcaatcgttga??????????????????
luteosignifer    ????????????????????????????????????????????????????????????????????
maculiventris    ????????????????????????????????????????????????????????????????????
marcanoi         agccaccgcct-attattcggccactttacctgtgtttttactcgttga???????????????????
mariarum         ????????????????????????????????????????????????????????????????????
marmoratus       ????????????????????????????????????????????????????????????????????
maynardi         gcctactgcct-gacactcggccactttacctgtg?????????????????????????????????
megapholidotus   ????????????????????????????????????????????????????????????????????
meridionalis     ????????????????????????????????????????????????????????????????????
mestrei          ????????????????????????????????????????????????????????????????????
micropholidotus  ????????????????????????????????????????????????????????????????????
microtus         gcctactgcct-tacattcggccactttacctgtgtttattaatcgctga??????????????????
monticola        ????????????????????????????????????????????????????????????????????
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nebuloides                 ??????????????????????????????????????????????????????????????????????
nebulosus                  ??????????????????????????????????????????????????????????????????????
noblei                     ??????????????????????????????????????????????????????????????????????
notopholis                 ??????????????????????????????????????????????????????????????????????
nubilis                    ??????????????????????????????????????????????????????????????????????
occultus                   gcctaccgcct-aacactcggccaccttacctgtgtctattaatcgtta??????????????????????
oculatus                   ??????????????????????????????????????????????????????????????????????
olssoni                    gcctactgcct-atcattcggccactttacctgtgttcattaat????????????????????????????
orca                       ??????????????????????????????????????????????????????????????????????
opalinus                   ??????????????????????????????????????????????????????????????????????
ophiolepis                 gcctaccgcct-attactcagccactttacctgtgtctattaatcgttga??????????????????????
ortoni                     ??????????????????????????????????????????????????????????????????????
oxylophus                  ??????????????????????????????????????????????????????????????????????
Phenacosaurus_heterodermus ??????????????????????????????????????????????????????????????????????
parvicirculatus            ??????????????????????????????????????????????????????????????????????
paternus                   gcctactgcct-aacactcggctactttacccgtgtttattaaccgttat??????????????????????
pentaprion                 ??????????????????????????????????????????????????????????????????????
perracae                   ??????????????????????????????????????????????????????????????????????
petersi                    ??????????????????????????????????????????????????????????????????????
placidus                   ??????????????????????????????????????????????????????????????????????
poecilopus                 ??????????????????????????????????????????????????????????????????????
polylepis                  ??????????????????????????????????????????????????????????????????????
poncencis                  ??????????????????????????????????????????????????????????????????????
porcatus                   ??????????????????????????????????????????????????????????????????????
proboscis                  ??????????????????????????????????????????????????????????????????????
pulchellus                 ??????????????????????????????????????????????????????????????????????
punctatus                  ??????????????????????????????????????????????????????????????????????
quadriocellifer            ??????????????????????????????????????????????????????????????????????
reconditus                 ??????????????????????????????????????????????????????????????????????
richardi                   gcctactgcct-aacactcggccattttacct??????????????????cc?ttttgaaagcccaatt?
ricordi                    ??????????????????????????????????????????????????????????????????????
roosevelti                 ??????????????????????????????????????????????????????????????????????
roquet                     ?????????????????????????????????????????????????cc?ttttgaaagc--attt?
rubribarbus                ??????????????????????????????????????????????????????????????????????
ruizi                      ??????????????????????????????????????????????????????????????????????
sagrei                     gcctaccgcct-atcactcggccactttacctgtgtctattaatcgttga??????????????????????
semilineatus               ??????????????????????????????????????????????????????????????????????
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sericeus                  ??????????????????????????????????????????????????????????????????????
sheplani                  gcctgccgcct-tacactcggccactttacctgtgtttattacccgttga??????????????????????
shrevei                   ??????????????????????????????????????????????????????????????????????
smallwoodi                ??????????????????????????????????????????????????????????????????????
smaragdinus               ??????????????????????????????????????????????????????????????????????
sminthus                  ??????????????????????????????????????????????????????????????????????
solitarius                ??????????????????????????????????????????????????????????????????????
spectrum                  ??????????????????????????????????????????????????????????????????????
squamulatus               ??????????????????????????????????????????????????????????????????????
strahmi                   gcctaccgcct-gacattcggccactatacctgtgtaccttaatcgttga??????????????????????
stratulus                 gcttaccgcct-aacactcagccactttacctgtgtttattaatcgttga??????????????????????
subocularis               ??????????????????????????????????????????????????????????????????????
taylori                   ??????????????????????????????????????????????????????????????????????
tolimensis                ??????????????????????????????????????????????????????????????????????
townsendi                 ??????????????????????????????????????????????????????????????????????
transversalis             ??????????????????????????????????????????????????????????????????????
trinitatis                ?????????????????????????????????????????????????cc?ttttgaaagcccaat?a
tropidogaster             ??????????????????????????????????????????????????????????????????????
tropidolepis              ??????????????????????????????????????????????????????????????????????
tropidonotus              ??????????????????????????????????????????????????????????????????????
valencienni               gcctaccgcct-accattcggccacttt????????????????????????????????????????????
vanidicus                 gcctaccgcct-atcattcggccactttaccagtgtttattaatcgttga??????????????????????
ventrimaculatus           ??????????????????????????????????????????????????????????????????????
vermiculatus              gcctgacacct-at-gctcggccaccttacctgtgtccattaatcgttga??????????????????????
vociferans                ??????????????????????????????????????????????????????????????????????
wattsi                    gcctactgcct-agcactcggccactttacctgtgtctattaatcgttga??????????????????????
whitemani                 ??????????????????????????????????????????????????????????????????????
Polychrus_acutirostris    gcccaccgcctaaacactcggccaccttacctgtgttcatcacacgttac??????????????????????
Polychrus_marmoratus      ??????????????????????????????????????????????????????????????????????
Leiocephalus_schreibersi  ??????????????????????????????????????????????????????????????????????
Leiocephalus_melanochlorus ?????????????????????????????????????????????????????????????????????
Urostrophus_vautieri      ??????????????????????????????????????????????????????????????????????
Anisolepis_undulatus      ??????????????????????????????????????????????????????????????????????
Enyalius_iheringi         ??????????????????????????????????????????????????????????????????????
Phenacosaurus_nicefori    aactactgcct-tacgttcggccattttacctgtgtttcttaatcgat??????????????????????
Diplolaemus_darwinii      gcctacctcctaaacgctcggccattttacctgtgtttattaa?????????????????????????????
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acutus	??
aeneus	ggc?cact-attag-gagcatgcttaattacacaaatctttacaggattatttttaggcaatacattaca
aequatorialis	??
agassizi	??
ahli	??
aliniger	??
allisoni	??
allogus	??
altae	??
altavelensis	??
alutaceus	??
angusticeps	??
antonii	??
apollinaris	??
aquaticus	??
argenteolus	??
argillaceus	??
armouri	??
auratus	??
bahorucoensis	??
baleatus	??
barahonae	??
barkeri	??
bartschi	??
bimaculatus	??
biporcatus	??
bitectus	??
bonairensis	aaggccct-tatag-gagcatgcttaatcacacaaatcgtaacaggattatttttaagcaatacattata
brevirostris	??
brunneus	??
Ch._chameleonides	??
capito	??
carolinensis	??
chloris	??
chlorocyanus	??

christophei	??
chrysolepis	??
clivicola	??
cobanensis	??
coelestinus	??
compressicauda	??
conspersus	??
crassulus	??
cristatellus	??
Cr._barbouri	??
cupreus	??
cuprinus	??
cuvieri	??
cyanopleurus	??
cybotes	??
darlingtoni	??
desechensis	??
distichus	??
dollfusianus	??
dunni	??
equestris	??
etheridgei	??
evermanni	??
fasciata	??
fowleri	??
fraseri	??
frenatus	??
fuscoauratus	??
gadovii	??
garmani	??
gingivinus	??
grahami	??
granuliceps	??
griseus	?ggaccct-tatag-gagcatgcttaattatacaaatcttaacaggactattttaggcaatacattata
gundlachi	??
hendersoni	??
homolechis	??

humilis	??
insignis	??
insolitus	??
intermedius	??
isolepis	??
jacare	??
jubar	??
kemptoni	??
krugi	??
laeviventris	??
latifrons	??
leachii	??
lemurinus	??
limifrons	??
lineatopus	??
lineatus	??
liogaster	??
lividus	??
longiceps	??
longitibialis	??
loveridgei	??
loysianus	??
luciae	aagaccct-tatag-gagcatgcttaatcaaacaaatcgtaacaggactattttaggcaatacattata
lucius	??
luteogularis	??
luteosignifer	??
maculiventris	??
marcanoi	??
mariarum	??
marmoratus	??
maynardi	??
megapholidotus	??
meridionalis	??
mestrei	??
micropholidotus	??
microtus	??
monticola	??

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nebuloides                 ??????????????????????????????????????????????????????????????????????????
nebulosus                  ??????????????????????????????????????????????????????????????????????????
noblei                     ??????????????????????????????????????????????????????????????????????????
notopholis                 ??????????????????????????????????????????????????????????????????????????
nubilis                    ??????????????????????????????????????????????????????????????????????????
occultus                   ??????????????????????????????????????????????????????????????????????????
oculatus                   ??????????????????????????????????????????????????????????????????????????
olssoni                    ??????????????????????????????????????????????????????????????????????????
onca                       ??????????????????????????????????????????????????????????????????????????
opalinus                   ??????????????????????????????????????????????????????????????????????????
ophiolepis                 ??????????????????????????????????????????????????????????????????????????
ortoni                     ??????????????????????????????????????????????????????????????????????????
oxylophus                  ??????????????????????????????????????????????????????????????????????????
Phenacosaurus_heterodermus ??????????????????????????????????????????????????????????????????????????
parvicirculatus            ??????????????????????????????????????????????????????????????????????????
paternus                   ??????????????????????????????????????????????????????????????????????????
pentaprion                 ??????????????????????????????????????????????????????????????????????????
perracae                   ??????????????????????????????????????????????????????????????????????????
petersi                    ??????????????????????????????????????????????????????????????????????????
placidus                   ??????????????????????????????????????????????????????????????????????????
poecilopus                 ??????????????????????????????????????????????????????????????????????????
polylepis                  ??????????????????????????????????????????????????????????????????????????
poncencis                  ??????????????????????????????????????????????????????????????????????????
porcatus                   ??????????????????????????????????????????????????????????????????????????
proboscis                  ??????????????????????????????????????????????????????????????????????????
pulchellus                 ??????????????????????????????????????????????????????????????????????????
punctatus                  ??????????????????????????????????????????????????????????????????????????
quadriocellifer            ??????????????????????????????????????????????????????????????????????????
reconditus                 ??????????????????????????????????????????????????????????????????????????
richardi                   ?ggaccct-tatag-gagcatgcttaattatacaaatcttaacaggactatttttaggcaatacattata
ricordi                    ??????????????????????????????????????????????????????????????????????????
roosevelti                 ??????????????????????????????????????????????????????????????????????????
roquet                     aaggccctat?ttgagtgcatgtttcaatacacaaatcctaacaggattattcttaggcaatacattaca
rubribarbus                ??????????????????????????????????????????????????????????????????????????
ruizi                      ??????????????????????????????????????????????????????????????????????????
sagrei                     ??????????????????????????????????????????????????????????????????????????
semilineatus               ??????????????????????????????????????????????????????????????????????????
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sericeus                  ??????????????????????????????????????????????????????????????????????
sheplani                  ??????????????????????????????????????????????????????????????????????
shrevei                   ??????????????????????????????????????????????????????????????????????
smallwoodi                ??????????????????????????????????????????????????????????????????????
smaragdinus               ??????????????????????????????????????????????????????????????????????
sminthus                  ??????????????????????????????????????????????????????????????????????
solitarius                ??????????????????????????????????????????????????????????????????????
spectrum                  ??????????????????????????????????????????????????????????????????????
squamulatus               ??????????????????????????????????????????????????????????????????????
strahmi                   ??????????????????????????????????????????????????????????????????????
stratulus                 ??????????????????????????????????????????????????????????????????????
subocularis               ??????????????????????????????????????????????????????????????????????
taylori                   ??????????????????????????????????????????????????????????????????????
tolimensis                ??????????????????????????????????????????????????????????????????????
townsendi                 ??????????????????????????????????????????????????????????????????????
transversalis             ??????????????????????????????????????????????????????????????????????
trinitatis                aaagcact-aatag-gagcatgcttaatcacacaaatgtttacaggattatttttaggcaatacactaca
tropidogaster             ??????????????????????????????????????????????????????????????????????
tropidolepis              ??????????????????????????????????????????????????????????????????????
tropidonotus              ??????????????????????????????????????????????????????????????????????
valencienni               ??????????????????????????????????????????????????????????????????????
vanidicus                 ??????????????????????????????????????????????????????????????????????
ventrimaculatus           ??????????????????????????????????????????????????????????????????????
vermiculatus              ??????????????????????????????????????????????????????????????????????
vociferans                ??????????????????????????????????????????????????????????????????????
wattsi                    ??????????????????????????????????????????????????????????????????????
whitemani                 ??????????????????????????????????????????????????????????????????????
Polychrus_acutirostris    ??????????????????????????????????????????????????????????????????????
Polychrus_marmoratus      ??????????????????????????????????????????????????????????????????????
Leiocephalus_schreibersi  ??????????????????????????????????????????????????????????????????????
Leiocephalus_melanochlorus ?????????????????????????????????????????????????????????????????????
Urostrophus_vautieri      ??????????????????????????????????????????????????????????????????????
Anisolepis_undulatus      ??????????????????????????????????????????????????????????????????????
Enyalius_iheringi         ??????????????????????????????????????????????????????????????????????
Phenacosaurus_nicefori    ??????????????????????????????????????????????????????????????????????
Diplolaemus_darwinii      ??????????????????????????????????????????????????????????????????????
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1776-

acutus	??
aeneus	cagcagatgtatcttcagctttttcatctatcgcacatatttcacgagacgtccaatatggctgattaat
aequatorialis	??
agassizi	??
ahli	??
aliniger	??
allisoni	??
allogus	??
altae	??
altavelensis	??
alutaceus	??
angusticeps	??
antonii	??
apollinaris	??
aquaticus	??
argenteolus	??
argillaceus	??
armouri	??
auratus	??
bahorucoensis	??
baleatus	??
barahonae	??
barkeri	??
bartschi	??
bimaculatus	??
biporcatus	??
bitectus	??
bonairensis	cagcagatgtatcttcagctttttcatccattgcgcacataacacgagaagttcaatatgggtgactaat
brevirostris	??
brunneus	??
Ch._chameleonides	??
capito	??
carolinensis	??
chloris	??
chlorocyanus	??

christophei	??
chrysolepis	??
clivicola	??
cobanensis	??
coelestinus	??
compressicauda	??
conspersus	??
crassulus	??
cristatellus	??
Cr._barbouri	??
cupreus	??
cuprinus	??
cuvieri	??
cyanopleurus	??
cybotes	??
darlingtoni	??
desechensis	??
distichus	??
dollfusianus	??
dunni	??
equestris	??
etheridgei	??
evermanni	??
fasciata	??
fowleri	??
fraseri	??
frenatus	??
fuscoauratus	??
gadovii	??
garmani	??
gingivinus	??
grahami	??
granuliceps	??
griseus	cagcagatgtctcttcagccttttcatccattgcacacatcacacgtgatgttcaatatggctgactaat
gundlachi	??
hendersoni	??
homolechis	??

humilis	??
insignis	??
insolitus	??
intermedius	??
isolepis	??
jacare	??
jubar	??
kemptoni	??
krugi	??
laeviventris	??
latifrons	??
leachii	??
lemurinus	??
limifrons	??
lineatopus	??
lineatus	??
liogaster	??
lividus	??
longiceps	??
longitibialis	??
loveridgei	??
loysianus	??
luciae	cagcagatgtgtcttcagctttttcatccattgcgcacatcacacgagaagttcaatatgggtgactaat
lucius	??
luteogularis	??
luteosignifer	??
maculiventris	??
marcanoi	??
mariarum	??
marmoratus	??
maynardi	??
megapholidotus	??
meridionalis	??
mestrei	??
micropholidotus	??
microtus	??
monticola	??

nebuloides	??
nebulosus	??
noblei	??
notopholis	??
nubilis	??
occultus	??
oculatus	??
olssoni	??
onca	??
opalinus	??
ophiolepis	??
ortoni	??
oxylophus	??
Phenacosaurus_heterodermus	??
parvicirculatus	??
paternus	??
pentaprion	??
perracae	??
petersi	??
placidus	??
poecilopus	??
polylepis	??
poncencis	??
porcatus	??
proboscis	??
pulchellus	??
punctatus	??
quadriocellifer	??
reconditus	??
richardi	cagcagatgtctcttcagccttttcatccattgcacacatcacacgtgaagttcaatatgggtgactaat
ricordi	??
roosevelti	??
roquet	cagcagatgtctcctcagctttttcatctattgcacacatcgcacgagatgtccaatatggttgactaat
rubribarbus	??
ruizi	??
sagrei	??
semilineatus	??

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sericeus                  ??????????????????????????????????????????????????????????????????????????
sheplani                  ??????????????????????????????????????????????????????????????????????????
shrevei                   ??????????????????????????????????????????????????????????????????????????
smallwoodi                ??????????????????????????????????????????????????????????????????????????
smaragdinus               ??????????????????????????????????????????????????????????????????????????
sminthus                  ??????????????????????????????????????????????????????????????????????????
solitarius                ??????????????????????????????????????????????????????????????????????????
spectrum                  ??????????????????????????????????????????????????????????????????????????
squamulatus               ??????????????????????????????????????????????????????????????????????????
strahmi                   ??????????????????????????????????????????????????????????????????????????
stratulus                 ??????????????????????????????????????????????????????????????????????????
subocularis               ??????????????????????????????????????????????????????????????????????????
taylori                   ??????????????????????????????????????????????????????????????????????????
tolimensis                ??????????????????????????????????????????????????????????????????????????
townsendi                 ??????????????????????????????????????????????????????????????????????????
transversalis             ??????????????????????????????????????????????????????????????????????????
trinitatis                cagcagatgtatcttcagcattttcatccattgcacagatctcacgagacgtccaatatggttgactaat
tropidogaster             ??????????????????????????????????????????????????????????????????????????
tropidolepis              ??????????????????????????????????????????????????????????????????????????
tropidonotus              ??????????????????????????????????????????????????????????????????????????
valencienni               ??????????????????????????????????????????????????????????????????????????
vanidicus                 ??????????????????????????????????????????????????????????????????????????
ventrimaculatus           ??????????????????????????????????????????????????????????????????????????
vermiculatus              ??????????????????????????????????????????????????????????????????????????
vociferans                ??????????????????????????????????????????????????????????????????????????
wattsi                    ??????????????????????????????????????????????????????????????????????????
whitemani                 ??????????????????????????????????????????????????????????????????????????
Polychrus_acutirostris    ??????????????????????????????????????????????????????????????????????????
Polychrus_marmoratus      ??????????????????????????????????????????????????????????????????????????
Leiocephalus_schreibersi  ??????????????????????????????????????????????????????????????????????????
Leiocephalus_melanochlorus ?????????????????????????????????????????????????????????????????????????
Urostrophus_vautieri      ??????????????????????????????????????????????????????????????????????????
Anisolepis_undulatus      ??????????????????????????????????????????????????????????????????????????
Enyalius_iheringi         ??????????????????????????????????????????????????????????????????????????
Phenacosaurus_nicefori    ??????????????????????????????????????????????????????????????????????????
Diplolaemus_darwinii      ??????????????????????????????????????????????????????????????????????????
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1846-

acutus	??
aeneus	tcgtaacatacatgccaatggagcatctatattttttatctgcatttatcttcatattggacgaggcctt
aequatorialis	??
agassizi	??
ahli	??
aliniger	??
allisoni	??
allogus	??
altae	??
altavelensis	??
alutaceus	??
angusticeps	??
antonii	??
apollinaris	??
aquaticus	??
argenteolus	??
argillaceus	??
armouri	??
auratus	??
bahorucoensis	??
baleatus	??
barahonae	??
barkeri	??
bartschi	??
bimaculatus	??
biporcatus	??
bitectus	??
bonairensis	gcgtaatatacatgccaacggagcctctattttgtttatttgtatttatctccatattggtcgagggcta
brevirostris	??
brunneus	??
Ch._chameleonides	??
capito	??
carolinensis	??
chloris	??
chlorocyanus	??

christophei	??
chrysolepis	??
clivicola	??
cobanensis	??
coelestinus	??
compressicauda	??
conspersus	??
crassulus	??
cristatellus	??
Cr._barbouri	??
cupreus	??
cuprinus	??
cuvieri	??
cyanopleurus	??
cybotes	??
darlingtoni	??
desechensis	??
distichus	??
dollfusianus	??
dunni	??
equestris	??
etheridgei	??
evermanni	??
fasciata	??
fowleri	??
fraseri	??
frenatus	??
fuscoauratus	??
gadovii	??
garmani	??
gingivinus	??
grahami	??
granuliceps	??
griseus	ccgtaatatacatgccaacggagcctctatatttttatttgtatttatcttcacattggacgaggacta
gundlachi	??
hendersoni	??
homolechis	??

humilis	??
insignis	??
insolitus	??
intermedius	??
isolepis	??
jacare	??
jubar	??
kemptoni	??
krugi	??
laeviventris	??
latifrons	??
leachii	??
lemurinus	??
limifrons	??
lineatopus	??
lineatus	??
liogaster	??
lividus	??
longiceps	??
longitibialis	??
loveridgei	??
loysianus	??
luciae	gcgtaatatacatgccaacggagcctctatattgtttatttgtatttatctccatattggacgagggcta
lucius	??
luteogularis	??
luteosignifer	??
maculiventris	??
marcanoi	??
mariarum	??
marmoratus	??
maynardi	??
megapholidotus	??
meridionalis	??
mestrei	??
micropholidotus	??
microtus	??
monticola	??

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nebuloides                 ??????????????????????????????????????????????????????????????????????????
nebulosus                  ??????????????????????????????????????????????????????????????????????????
noblei                     ??????????????????????????????????????????????????????????????????????????
notopholis                 ??????????????????????????????????????????????????????????????????????????
nubilis                    ??????????????????????????????????????????????????????????????????????????
occultus                   ??????????????????????????????????????????????????????????????????????????
oculatus                   ??????????????????????????????????????????????????????????????????????????
olssoni                    ??????????????????????????????????????????????????????????????????????????
onca                       ??????????????????????????????????????????????????????????????????????????
opalinus                   ??????????????????????????????????????????????????????????????????????????
ophiolepis                 ??????????????????????????????????????????????????????????????????????????
ortoni                     ??????????????????????????????????????????????????????????????????????????
oxylophus                  ??????????????????????????????????????????????????????????????????????????
Phenacosaurus_heterodermus ??????????????????????????????????????????????????????????????????????????
parvicirculatus            ??????????????????????????????????????????????????????????????????????????
paternus                   ??????????????????????????????????????????????????????????????????????????
pentaprion                 ??????????????????????????????????????????????????????????????????????????
perracae                   ??????????????????????????????????????????????????????????????????????????
petersi                    ??????????????????????????????????????????????????????????????????????????
placidus                   ??????????????????????????????????????????????????????????????????????????
poecilopus                 ??????????????????????????????????????????????????????????????????????????
polylepis                  ??????????????????????????????????????????????????????????????????????????
poncencis                  ??????????????????????????????????????????????????????????????????????????
porcatus                   ??????????????????????????????????????????????????????????????????????????
proboscis                  ??????????????????????????????????????????????????????????????????????????
pulchellus                 ??????????????????????????????????????????????????????????????????????????
punctatus                  ??????????????????????????????????????????????????????????????????????????
quadriocellifer            ??????????????????????????????????????????????????????????????????????????
reconditus                 ??????????????????????????????????????????????????????????????????????????
richardi                   ccgtaatatacatgccaacggagcctctatatttttttatttgtatttatcttcacattggacgagggcta
ricordi                    ??????????????????????????????????????????????????????????????????????????
roosevelti                 ??????????????????????????????????????????????????????????????????????????
roquet                     tcgtaacatacatgctaatggagcatctatatttttttatctgcatttatcttcatattggacgaggctta
rubribarbus                ??????????????????????????????????????????????????????????????????????????
ruizi                      ??????????????????????????????????????????????????????????????????????????
sagrei                     ??????????????????????????????????????????????????????????????????????????
semilineatus               ??????????????????????????????????????????????????????????????????????????
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sericeus                  ??????????????????????????????????????????????????????????????????????
sheplani                  ??????????????????????????????????????????????????????????????????????
shrevei                   ??????????????????????????????????????????????????????????????????????
smallwoodi                ??????????????????????????????????????????????????????????????????????
smaragdinus               ??????????????????????????????????????????????????????????????????????
sminthus                  ??????????????????????????????????????????????????????????????????????
solitarius                ??????????????????????????????????????????????????????????????????????
spectrum                  ??????????????????????????????????????????????????????????????????????
squamulatus               ??????????????????????????????????????????????????????????????????????
strahmi                   ??????????????????????????????????????????????????????????????????????
stratulus                 ??????????????????????????????????????????????????????????????????????
subocularis               ??????????????????????????????????????????????????????????????????????
taylori                   ??????????????????????????????????????????????????????????????????????
tolimensis                ??????????????????????????????????????????????????????????????????????
townsendi                 ??????????????????????????????????????????????????????????????????????
transversalis             ??????????????????????????????????????????????????????????????????????
trinitatis                tcgtaatatgcatgccaatggagcatctatatttttatatgcatttatgttcatattggacgaggcctt
tropidogaster             ??????????????????????????????????????????????????????????????????????
tropidolepis              ??????????????????????????????????????????????????????????????????????
tropidonotus              ??????????????????????????????????????????????????????????????????????
valencienni               ??????????????????????????????????????????????????????????????????????
vanidicus                 ??????????????????????????????????????????????????????????????????????
ventrimaculatus           ??????????????????????????????????????????????????????????????????????
vermiculatus              ??????????????????????????????????????????????????????????????????????
vociferans                ??????????????????????????????????????????????????????????????????????
wattsi                    ??????????????????????????????????????????????????????????????????????
whitemani                 ??????????????????????????????????????????????????????????????????????
Polychrus_acutirostris    ??????????????????????????????????????????????????????????????????????
Polychrus_marmoratus      ??????????????????????????????????????????????????????????????????????
Leiocephalus_schreibersi  ??????????????????????????????????????????????????????????????????????
Leiocephalus_melanochlorus ?????????????????????????????????????????????????????????????????????
Urostrophus_vautieri      ??????????????????????????????????????????????????????????????????????
Anisolepis_undulatus      ??????????????????????????????????????????????????????????????????????
Enyalius_iheringi         ??????????????????????????????????????????????????????????????????????
Phenacosaurus_nicefori    ??????????????????????????????????????????????????????????????????????
Diplolaemus_darwinii      ??????????????????????????????????????????????????????????????????????
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1916-

acutus	??
aeneus	tattatggctcttacatatttaaagaaacttgaaatctaggcgtaattcttctacttctagttatagcta
aequatorialis	??
agassizi	??
ahli	??
aliniger	??
allisoni	??
allogus	??
altae	??
altavelensis	??
alutaceus	??
angusticeps	??
antonii	??
apollinaris	??
aquaticus	??
argenteolus	??
argillaceus	??
armouri	??
auratus	??
bahorucoensis	??
baleatus	??
barahonae	??
barkeri	??
bartschi	??
bimaculatus	??
biporcatus	??
bitectus	??
bonairensis	tattatggttcttatatatttaaagacacctgaaatatgggtgtcattcttttacttctagtcatagctc
brevirostris	??
brunneus	??
Ch._chameleonides	??
capito	??
carolinensis	??
chloris	??
chlorocyanus	??

christophei	??
chrysolepis	??
clivicola	??
cobanensis	??
coelestinus	??
compressicauda	??
conspersus	??
crassulus	??
cristatellus	??
Cr._barbouri	??
cupreus	??
cuprinus	??
cuvieri	??
cyanopleurus	??
cybotes	??
darlingtoni	??
desechensis	??
distichus	??
dollfusianus	??
dunni	??
equestris	??
etheridgei	??
evermanni	??
fasciata	??
fowleri	??
fraseri	??
frenatus	??
fuscoauratus	??
gadovii	??
garmani	??
gingivinus	??
grahami	??
granuliceps	??
griseus	tattatggttcttacatatttaaagaaacttgaaatatcggggtcattctattacttctagtcatagctg
gundlachi	??
hendersoni	??
homolechis	??

humilis	??
insignis	??
insolitus	??
intermedius	??
isolepis	??
jacare	??
jubar	??
kemptoni	??
krugi	??
laeviventris	??
latifrons	??
leachii	??
lemurinus	??
limifrons	??
lineatopus	??
lineatus	??
liogaster	??
lividus	??
longiceps	??
longitibialis	??
loveridgei	??
loysianus	??
luciae	tattatggttcttatatatttaaagacacttgaaatatgggtgtcattcttttacttctagtcatagctc
lucius	??
luteogularis	??
luteosignifer	??
maculiventris	??
marcanoi	??
mariarum	??
marmoratus	??
maynardi	??
megapholidotus	??
meridionalis	??
mestrei	??
micropholidotus	??
microtus	??
monticola	??

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nebuloides                 ??????????????????????????????????????????????????????????????????????
nebulosus                  ??????????????????????????????????????????????????????????????????????
noblei                     ??????????????????????????????????????????????????????????????????????
notopholis                 ??????????????????????????????????????????????????????????????????????
nubilis                    ??????????????????????????????????????????????????????????????????????
occultus                   ??????????????????????????????????????????????????????????????????????
oculatus                   ??????????????????????????????????????????????????????????????????????
olssoni                    ??????????????????????????????????????????????????????????????????????
onca                       ??????????????????????????????????????????????????????????????????????
opalinus                   ??????????????????????????????????????????????????????????????????????
ophiolepis                 ??????????????????????????????????????????????????????????????????????
ortoni                     ??????????????????????????????????????????????????????????????????????
oxylophus                  ??????????????????????????????????????????????????????????????????????
Phenacosaurus_heterodermus ??????????????????????????????????????????????????????????????????????
parvicirculatus            ??????????????????????????????????????????????????????????????????????
paternus                   ??????????????????????????????????????????????????????????????????????
pentaprion                 ??????????????????????????????????????????????????????????????????????
perracae                   ??????????????????????????????????????????????????????????????????????
petersi                    ??????????????????????????????????????????????????????????????????????
placidus                   ??????????????????????????????????????????????????????????????????????
poecilopus                 ??????????????????????????????????????????????????????????????????????
polylepis                  ??????????????????????????????????????????????????????????????????????
poncencis                  ??????????????????????????????????????????????????????????????????????
porcatus                   ??????????????????????????????????????????????????????????????????????
proboscis                  ??????????????????????????????????????????????????????????????????????
pulchellus                 ??????????????????????????????????????????????????????????????????????
punctatus                  ??????????????????????????????????????????????????????????????????????
quadriocellifer            ??????????????????????????????????????????????????????????????????????
reconditus                 ??????????????????????????????????????????????????????????????????????
richardi                   tattatggttcttatatatttaaagacacttgaaatatcggggtcattctattacttgtagtcatagctg
ricordi                    ??????????????????????????????????????????????????????????????????????
roosevelti                 ??????????????????????????????????????????????????????????????????????
roquet                     tattatggctcatacatatttaaagaaacctgaaatctaggtgtagttcttctacttttagtaatagcta
rubribarbus                ??????????????????????????????????????????????????????????????????????
ruizi                      ??????????????????????????????????????????????????????????????????????
sagrei                     ??????????????????????????????????????????????????????????????????????
semilineatus               ??????????????????????????????????????????????????????????????????????
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sericeus                  ??????????????????????????????????????????????????????????????????????????
sheplani                  ??????????????????????????????????????????????????????????????????????????
shrevei                   ??????????????????????????????????????????????????????????????????????????
smallwoodi                ??????????????????????????????????????????????????????????????????????????
smaragdinus               ??????????????????????????????????????????????????????????????????????????
sminthus                  ??????????????????????????????????????????????????????????????????????????
solitarius                ??????????????????????????????????????????????????????????????????????????
spectrum                  ??????????????????????????????????????????????????????????????????????????
squamulatus               ??????????????????????????????????????????????????????????????????????????
strahmi                   ??????????????????????????????????????????????????????????????????????????
stratulus                 ??????????????????????????????????????????????????????????????????????????
subocularis               ??????????????????????????????????????????????????????????????????????????
taylori                   ??????????????????????????????????????????????????????????????????????????
tolimensis                ??????????????????????????????????????????????????????????????????????????
townsendi                 ??????????????????????????????????????????????????????????????????????????
transversalis             ??????????????????????????????????????????????????????????????????????????
trinitatis                tattatggctcatatatatttaaacaaacatgaaatctaggagtaattcttctacttgtagttatagcta
tropidogaster             ??????????????????????????????????????????????????????????????????????????
tropidolepis              ??????????????????????????????????????????????????????????????????????????
tropidonotus              ??????????????????????????????????????????????????????????????????????????
valencienni               ??????????????????????????????????????????????????????????????????????????
vanidicus                 ??????????????????????????????????????????????????????????????????????????
ventrimaculatus           ??????????????????????????????????????????????????????????????????????????
vermiculatus              ??????????????????????????????????????????????????????????????????????????
vociferans                ??????????????????????????????????????????????????????????????????????????
wattsi                    ??????????????????????????????????????????????????????????????????????????
whitemani                 ??????????????????????????????????????????????????????????????????????????
Polychrus_acutirostris    ??????????????????????????????????????????????????????????????????????????
Polychrus_marmoratus      ??????????????????????????????????????????????????????????????????????????
Leiocephalus_schreibersi  ??????????????????????????????????????????????????????????????????????????
Leiocephalus_melanochlorus ?????????????????????????????????????????????????????????????????????????
Urostrophus_vautieri      ??????????????????????????????????????????????????????????????????????????
Anisolepis_undulatus      ??????????????????????????????????????????????????????????????????????????
Enyalius_iheringi         ??????????????????????????????????????????????????????????????????????????
Phenacosaurus_nicefori    ??????????????????????????????????????????????????????????????????????????
Diplolaemus_darwinii      ??????????????????????????????????????????????????????????????????????????
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1986-

acutus	??
aeneus	cagctttcgtcggctatgttcttccatgaggccaaatatcattctgaggagcaaccgttatcacaaacct
aequatorialis	??
agassizi	??
ahli	??
aliniger	??
allisoni	??
allogus	??
altae	??
altavelensis	??
alutaceus	??
angusticeps	??
antonii	??
apollinaris	??
aquaticus	??
argenteolus	??
argillaceus	??
armouri	??
auratus	??
bahorucoensis	??
baleatus	??
barahonae	??
barkeri	??
bartschi	??
bimaculatus	??
biporcatus	??
bitectus	??
bonairensis	cagcatttgtaggctaggttcttccatggggtcaaatatccttctgaggagcaactgtcattacaaatct
brevirostris	??
brunneus	??
Ch._chameleonides	??
capito	??
carolinensis	??
chloris	??
chlorocyanus	??

christophei	??
chrysolepis	??
clivicola	??
cobanensis	??
coelestinus	??
compressicauda	??
conspersus	??
crassulus	??
cristatellus	??
Cr._barbouri	??
cupreus	??
cuprinus	??
cuvieri	??
cyanopleurus	??
cybotes	??
darlingtoni	??
desechensis	??
distichus	??
dollfusianus	??
dunni	??
equestris	??
etheridgei	??
evermanni	??
fasciata	??
fowleri	??
fraseri	??
frenatus	??
fuscoauratus	??
gadovii	??
garmani	??
gingivinus	??
grahami	??
granuliceps	??
griseus	ctgcctttgtaggctatgttcttccatgaggtcaaatatcattctgaggagcaactgtcatcacaaatct
gundlachi	??
hendersoni	??
homolechis	??

humilis	??
insignis	??
insolitus	??
intermedius	??
isolepis	??
jacare	??
jubar	??
kemptoni	??
krugi	??
laeviventris	??
latifrons	??
leachii	??
lemurinus	??
limifrons	??
lineatopus	??
lineatus	??
liogaster	??
lividus	??
longiceps	??
longitibialis	??
loveridgei	??
loysianus	??
luciae	ctgcatttgtaggctaggttcttccatggggtcaaatatcattctgaggagcaactgtcattacaaaact
lucius	??
luteogularis	??
luteosignifer	??
maculiventris	??
marcanoi	??
mariarum	??
marmoratus	??
maynardi	??
megapholidotus	??
meridionalis	??
mestrei	??
micropholidotus	??
microtus	??
monticola	??

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nebuloides                 ??????????????????????????????????????????????????????????????????????
nebulosus                  ??????????????????????????????????????????????????????????????????????
noblei                     ??????????????????????????????????????????????????????????????????????
notopholis                 ??????????????????????????????????????????????????????????????????????
nubilis                    ??????????????????????????????????????????????????????????????????????
occultus                   ??????????????????????????????????????????????????????????????????????
oculatus                   ??????????????????????????????????????????????????????????????????????
olssoni                    ??????????????????????????????????????????????????????????????????????
onca                       ??????????????????????????????????????????????????????????????????????
opalinus                   ??????????????????????????????????????????????????????????????????????
ophiolepis                 ??????????????????????????????????????????????????????????????????????
ortoni                     ??????????????????????????????????????????????????????????????????????
oxylophus                  ??????????????????????????????????????????????????????????????????????
Phenacosaurus_heterodermus ??????????????????????????????????????????????????????????????????????
parvicirculatus            ??????????????????????????????????????????????????????????????????????
paternus                   ??????????????????????????????????????????????????????????????????????
pentaprion                 ??????????????????????????????????????????????????????????????????????
perracae                   ??????????????????????????????????????????????????????????????????????
petersi                    ??????????????????????????????????????????????????????????????????????
placidus                   ??????????????????????????????????????????????????????????????????????
poecilopus                 ??????????????????????????????????????????????????????????????????????
polylepis                  ??????????????????????????????????????????????????????????????????????
poncencis                  ??????????????????????????????????????????????????????????????????????
porcatus                   ??????????????????????????????????????????????????????????????????????
proboscis                  ??????????????????????????????????????????????????????????????????????
pulchellus                 ??????????????????????????????????????????????????????????????????????
punctatus                  ??????????????????????????????????????????????????????????????????????
quadriocellifer            ??????????????????????????????????????????????????????????????????????
reconditus                 ??????????????????????????????????????????????????????????????????????
richardi                   ctgcctttataggctatgttcttccatgaggtcaaatatcattctgaggagcaactgtcatcacaaagct
ricordi                    ??????????????????????????????????????????????????????????????????????
roosevelti                 ??????????????????????????????????????????????????????????????????????
roquet                     cagctttcgttggttatgtacttccatgaggacaaatatcattctgaggagcaactgttattacaaacct
rubribarbus                ??????????????????????????????????????????????????????????????????????
ruizi                      ??????????????????????????????????????????????????????????????????????
sagrei                     ??????????????????????????????????????????????????????????????????????
semilineatus               ??????????????????????????????????????????????????????????????????????
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sericeus                  ??????????????????????????????????????????????????????????????????????????
sheplani                  ??????????????????????????????????????????????????????????????????????????
shrevei                   ??????????????????????????????????????????????????????????????????????????
smallwoodi                ??????????????????????????????????????????????????????????????????????????
smaragdinus               ??????????????????????????????????????????????????????????????????????????
sminthus                  ??????????????????????????????????????????????????????????????????????????
solitarius                ??????????????????????????????????????????????????????????????????????????
spectrum                  ??????????????????????????????????????????????????????????????????????????
squamulatus               ??????????????????????????????????????????????????????????????????????????
strahmi                   ??????????????????????????????????????????????????????????????????????????
stratulus                 ??????????????????????????????????????????????????????????????????????????
subocularis               ??????????????????????????????????????????????????????????????????????????
taylori                   ??????????????????????????????????????????????????????????????????????????
tolimensis                ??????????????????????????????????????????????????????????????????????????
townsendi                 ??????????????????????????????????????????????????????????????????????????
transversalis             ??????????????????????????????????????????????????????????????????????????
trinitatis                cagcttacgtcggctatgttcttccatgaggccaaatatcattctcaggagcaactgttatcacacatct
tropidogaster             ??????????????????????????????????????????????????????????????????????????
tropidolepis              ??????????????????????????????????????????????????????????????????????????
tropidonotus              ??????????????????????????????????????????????????????????????????????????
valencienni               ??????????????????????????????????????????????????????????????????????????
vanidicus                 ??????????????????????????????????????????????????????????????????????????
ventrimaculatus           ??????????????????????????????????????????????????????????????????????????
vermiculatus              ??????????????????????????????????????????????????????????????????????????
vociferans                ??????????????????????????????????????????????????????????????????????????
wattsi                    ??????????????????????????????????????????????????????????????????????????
whitemani                 ??????????????????????????????????????????????????????????????????????????
Polychrus_acutirostris    ??????????????????????????????????????????????????????????????????????????
Polychrus_marmoratus      ??????????????????????????????????????????????????????????????????????????
Leiocephalus_schreibersi  ??????????????????????????????????????????????????????????????????????????
Leiocephalus_melanochlorus ?????????????????????????????????????????????????????????????????????????
Urostrophus_vautieri      ??????????????????????????????????????????????????????????????????????????
Anisolepis_undulatus      ??????????????????????????????????????????????????????????????????????????
Enyalius_iheringi         ??????????????????????????????????????????????????????????????????????????
Phenacosaurus_nicefori    ??????????????????????????????????????????????????????????????????????????
Diplolaemus_darwinii      ??????????????????????????????????????????????????????????????????????????
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2156-

acutus	??
aeneus	cctatcagctattccttacattgggacaaccatggtagaatgaatctgggggggtttcaagttgataa
aequatorialis	??
agassizi	??
ahli	??
aliniger	??
allisoni	??
allogus	??
altae	??
altavelensis	??
alutaceus	??
angusticeps	??
antonii	??
apollinaris	??
aquaticus	??
argenteolus	??
argillaceus	??
armouri	??
auratus	??
bahorucoensis	??
baleatus	??
barahonae	??
barkeri	??
bartschi	??
bimaculatus	??
biporcatus	??
bitectus	??
bonairensis	tctatctgcgattccctatagtggtacaaccatagtagattgtatctgaggaggcttatcaagtagacaa
brevirostris	??
brunneus	??
Ch._chameleonides	??
capito	??
carolinensis	??
chloris	??
chlorocyanus	??

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christophei        ??????????????????????????????????????????????????????????????????????????
chrysolepis        ??????????????????????????????????????????????????????????????????????????
clivicola          ??????????????????????????????????????????????????????????????????????????
cobanensis         ??????????????????????????????????????????????????????????????????????????
coelestinus        ??????????????????????????????????????????????????????????????????????????
compressicauda     ??????????????????????????????????????????????????????????????????????????
conspersus         ??????????????????????????????????????????????????????????????????????????
crassulus          ??????????????????????????????????????????????????????????????????????????
cristatellus       ??????????????????????????????????????????????????????????????????????????
Cr._barbouri       ??????????????????????????????????????????????????????????????????????????
cupreus            ??????????????????????????????????????????????????????????????????????????
cuprinus           ??????????????????????????????????????????????????????????????????????????
cuvieri            ??????????????????????????????????????????????????????????????????????????
cyanopleurus       ??????????????????????????????????????????????????????????????????????????
cybotes            ??????????????????????????????????????????????????????????????????????????
darlingtoni        ??????????????????????????????????????????????????????????????????????????
desechensis        ??????????????????????????????????????????????????????????????????????????
distichus          ??????????????????????????????????????????????????????????????????????????
dollfusianus       ??????????????????????????????????????????????????????????????????????????
dunni              ??????????????????????????????????????????????????????????????????????????
equestris          ??????????????????????????????????????????????????????????????????????????
etheridgei         ??????????????????????????????????????????????????????????????????????????
evermanni          ??????????????????????????????????????????????????????????????????????????
fasciata           ??????????????????????????????????????????????????????????????????????????
fowleri            ??????????????????????????????????????????????????????????????????????????
fraseri            ??????????????????????????????????????????????????????????????????????????
frenatus           ??????????????????????????????????????????????????????????????????????????
fuscoauratus       ??????????????????????????????????????????????????????????????????????????
gadovii            ??????????????????????????????????????????????????????????????????????????
garmani            ??????????????????????????????????????????????????????????????????????????
gingivinus         ??????????????????????????????????????????????????????????????????????????
grahami            ??????????????????????????????????????????????????????????????????????????
granuliceps        ??????????????????????????????????????????????????????????????????????????
griseus            tctatctgcaattccctatattggtacaactatagtagaatgaatctgaggagggttctcaagtagacaa
gundlachi          ??????????????????????????????????????????????????????????????????????????
hendersoni         ??????????????????????????????????????????????????????????????????????????
homolechis         ??????????????????????????????????????????????????????????????????????????
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humilis	??
insignis	??
insolitus	??
intermedius	??
isolepis	??
jacare	??
jubar	??
kemptoni	??
krugi	??
laeviventris	??
latifrons	??
leachii	??
lemurinus	??
limifrons	??
lineatopus	??
lineatus	??
liogaster	??
lividus	??
longiceps	??
longitibialis	??
loveridgei	??
loysianus	??
luciae	tctatctgcgattccctatagtggtacaaccatagtagaatgtatctgaggaggcttatcaagtagacaa
lucius	??
luteogularis	??
luteosignifer	??
maculiventris	??
marcanoi	??
mariarum	??
marmoratus	??
maynardi	??
megapholidotus	??
meridionalis	??
mestrei	??
micropholidotus	??
microtus	??
monticola	??

nebuloides	??
nebulosus	??
noblei	??
notopholis	??
nubilis	??
occultus	??
oculatus	??
olssoni	??
onca	??
opalinus	??
ophiolepis	??
ortoni	???
oxylophus	??
Phenacosaurus_heterodermus	??
parvicirculatus	??
paternus	??
pentaprion	??
perracae	??
petersi	??
placidus	??
poecilopus	??
polylepis	??
poncencis	??
porcatus	??
proboscis	??
pulchellus	??
punctatus	??
quadriocellifer	??
reconditus	??
richardi	tctatctgcaattccctatattggtacaactatagtagaatgaatctgaggagggttctcaagtagacaa
ricordi	??
roosevelti	??
roquet	tttatctgccattccttacattggaacaaccatagtagaatgaatctggggtggattttcaagta?ataa
rubribarbus	??
ruizi	??
sagrei	??
semilineatus	??

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sericeus                  ??????????????????????????????????????????????????????????????????????????
sheplani                  ??????????????????????????????????????????????????????????????????????????
shrevei                   ??????????????????????????????????????????????????????????????????????????
smallwoodi                ??????????????????????????????????????????????????????????????????????????
smaragdinus               ??????????????????????????????????????????????????????????????????????????
sminthus                  ??????????????????????????????????????????????????????????????????????????
solitarius                ??????????????????????????????????????????????????????????????????????????
spectrum                  ??????????????????????????????????????????????????????????????????????????
squamulatus               ??????????????????????????????????????????????????????????????????????????
strahmi                   ??????????????????????????????????????????????????????????????????????????
stratulus                 ??????????????????????????????????????????????????????????????????????????
subocularis               ??????????????????????????????????????????????????????????????????????????
taylori                   ??????????????????????????????????????????????????????????????????????????
tolimensis                ??????????????????????????????????????????????????????????????????????????
townsendi                 ??????????????????????????????????????????????????????????????????????????
transversalis             ??????????????????????????????????????????????????????????????????????????
trinitatis                cctatcagctattccttacattggaacaaccatggtacaatgaaactgaggcggattttcaagtagataa
tropidogaster             ??????????????????????????????????????????????????????????????????????????
tropidolepis              ??????????????????????????????????????????????????????????????????????????
tropidonotus              ??????????????????????????????????????????????????????????????????????????
valencienni               ??????????????????????????????????????????????????????????????????????????
vanidicus                 ??????????????????????????????????????????????????????????????????????????
ventrimaculatus           ??????????????????????????????????????????????????????????????????????????
vermiculatus              ??????????????????????????????????????????????????????????????????????????
vociferans                ??????????????????????????????????????????????????????????????????????????
wattsi                    ??????????????????????????????????????????????????????????????????????????
whitemani                 ??????????????????????????????????????????????????????????????????????????
Polychrus_acutirostris    ??????????????????????????????????????????????????????????????????????????
Polychrus_marmoratus      ??????????????????????????????????????????????????????????????????????????
Leiocephalus_schreibersi  ??????????????????????????????????????????????????????????????????????????
Leiocephalus_melanochlorus ?????????????????????????????????????????????????????????????????????????
Urostrophus_vautieri      ??????????????????????????????????????????????????????????????????????????
Anisolepis_undulatus      ??????????????????????????????????????????????????????????????????????????
Enyalius_iheringi         ??????????????????????????????????????????????????????????????????????????
Phenacosaurus_nicefori    ??????????????????????????????????????????????????????????????????????????
Diplolaemus_darwinii      ??????????????????????????????????????????????????????????????????????????
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2226-

acutus	??
aeneus	cgcaactttaacacgatttttttactttccatttttttactaccatttatttgtagcaggaggtaaccatta
aequatorialis	??
agassizi	??
ahli	??
aliniger	??
allisoni	??
allogus	??
altae	??
altavelensis	??
alutaceus	??
angusticeps	??
antonii	??
apollinaris	??
aquaticus	??
argenteolus	??
argillaceus	??
armouri	??
auratus	??
bahorucoensis	??
baleatus	??
barahonae	??
barkeri	??
bartschi	??
bimaculatus	??
biporcatus	??
bitectus	??
bonairensis	cccaactttaagacgatttttttactttgcacttcttactcccatttatatattgtaagtggtgactatta
brevirostris	??
brunneus	??
Ch._chameleonides	??
capito	??
carolinensis	??
chloris	??
chlorocyanus	??

christophei	??
chrysolepis	??
clivicola	??
cobanensis	??
coelestinus	??
compressicauda	??
conspersus	??
crassulus	??
cristatellus	??
Cr._barbouri	??
cupreus	??
cuprinus	??
cuvieri	??
cyanopleurus	??
cybotes	??
darlingtoni	??
desechensis	??
distichus	??
dollfusianus	??
dunni	??
equestris	??
etheridgei	??
evermanni	??
fasciata	??
fowleri	??
fraseri	??
frenatus	??
fuscoauratus	??
gadovii	??
garmani	??
gingivinus	??
grahami	??
granuliceps	??
griseus	tccaactttaacacgatttttactttcacttcttactcccatttatttattgtaagtggtaactatta
gundlachi	??
hendersoni	??
homolechis	??

humilis	??
insignis	??
insolitus	??
intermedius	??
isolepis	??
jacare	??
jubar	??
kemptoni	??
krugi	??
laeviventris	??
latifrons	??
leachii	??
lemurinus	??
limifrons	??
lineatopus	??
lineatus	??
liogaster	??
lividus	??
longiceps	??
longitibialis	??
loveridgei	??
loysianus	??
luciae	cccaactttaagacgatttttttactttgcacttcttactcccatttatatattgtaagtggtgactatta
lucius	??
luteogularis	??
luteosignifer	??
maculiventris	??
marcanoi	??
mariarum	??
marmoratus	??
maynardi	??
megapholidotus	??
meridionalis	??
mestrei	??
micropholidotus	??
microtus	??
monticola	??

nebuloides	??
nebulosus	??
noblei	??
notopholis	??
nubilis	??
occultus	??
oculatus	??
olssoni	??
onca	??
opalinus	??
ophiolepis	??
ortoni	??
oxylophus	??
Phenacosaurus_heterodermus	??
parvicirculatus	??
paternus	??
pentaprion	??
perracae	??
petersi	??
placidus	??
poecilopus	??
polylepis	??
poncencis	??
porcatus	??
proboscis	??
pulchellus	??
punctatus	??
quadriocellifer	??
reconditus	??
richardi	tccaactttaacacgatttttactttcacttcttactcccatttatttattgtaagtggtaactatta
ricordi	??
roosevelti	??
roquet	tgcaactttaacacgatttttcactttccatttttactaccatctatttgtagcaggtggtaaccatta
rubribarbus	??
ruizi	??
sagrei	??
semilineatus	??

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sericeus                  ??????????????????????????????????????????????????????????????????????????
sheplani                  ??????????????????????????????????????????????????????????????????????????
shrevei                   ??????????????????????????????????????????????????????????????????????????
smallwoodi                ??????????????????????????????????????????????????????????????????????????
smaragdinus               ??????????????????????????????????????????????????????????????????????????
sminthus                  ??????????????????????????????????????????????????????????????????????????
solitarius                ??????????????????????????????????????????????????????????????????????????
spectrum                  ??????????????????????????????????????????????????????????????????????????
squamulatus               ??????????????????????????????????????????????????????????????????????????
strahmi                   ??????????????????????????????????????????????????????????????????????????
stratulus                 ??????????????????????????????????????????????????????????????????????????
subocularis               ??????????????????????????????????????????????????????????????????????????
taylori                   ??????????????????????????????????????????????????????????????????????????
tolimensis                ??????????????????????????????????????????????????????????????????????????
townsendi                 ??????????????????????????????????????????????????????????????????????????
transversalis             ??????????????????????????????????????????????????????????????????????????
trinitatis                cgcaactttcacacgatttttttactttccatttttttacttccatttatgtgtagcaggtggtaaccatta
tropidogaster             ??????????????????????????????????????????????????????????????????????????
tropidolepis              ??????????????????????????????????????????????????????????????????????????
tropidonotus              ??????????????????????????????????????????????????????????????????????????
valencienni               ??????????????????????????????????????????????????????????????????????????
vanidicus                 ??????????????????????????????????????????????????????????????????????????
ventrimaculatus           ??????????????????????????????????????????????????????????????????????????
vermiculatus              ??????????????????????????????????????????????????????????????????????????
vociferans                ??????????????????????????????????????????????????????????????????????????
wattsi                    ??????????????????????????????????????????????????????????????????????????
whitemani                 ??????????????????????????????????????????????????????????????????????????
Polychrus_acutirostris    ??????????????????????????????????????????????????????????????????????????
Polychrus_marmoratus      ??????????????????????????????????????????????????????????????????????????
Leiocephalus_schreibersi  ??????????????????????????????????????????????????????????????????????????
Leiocephalus_melanochlorus ?????????????????????????????????????????????????????????????????????????
Urostrophus_vautieri      ??????????????????????????????????????????????????????????????????????????
Anisolepis_undulatus      ??????????????????????????????????????????????????????????????????????????
Enyalius_iheringi         ??????????????????????????????????????????????????????????????????????????
Phenacosaurus_nicefori    ??????????????????????????????????????????????????????????????????????????
Diplolaemus_darwinii      ??????????????????????????????????????????????????????????????????????????
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2296-

acutus	??
aeneus	ttcatctactatttttacatgaaacaggatctaataacccaactgggcctacaatccaactcagataaa
aequatorialis	??
agassizi	??
ahli	??
aliniger	??
allisoni	??
allogus	??
altae	??
altavelensis	??
alutaceus	??
angusticeps	??
antonii	??
apollinaris	??
aquaticus	??
argenteolus	??
argillaceus	??
armouri	??
auratus	??
bahorucoensis	??
baleatus	??
barahonae	??
barkeri	??
bartschi	??
bimaculatus	??
biporcatus	??
bitectus	??
bonairensis	ttcacctagtattttaacatgaaacaggttctaagaacccaactgggcctacaatctaacacagagaaa
brevirostris	??
brunneus	??
Ch._chameleonides	??
capito	??
carolinensis	??
chloris	??
chlorocyanus	??

christophei	??
chrysolepis	??
clivicola	??
cobanensis	??
coelestinus	??
compressicauda	??
conspersus	??
crassulus	??
cristatellus	??
Cr._barbouri	??
cupreus	??
cuprinus	??
cuvieri	??
cyanopleurus	??
cybotes	??
darlingtoni	??
desechensis	??
distichus	??
dollfusianus	??
dunni	??
equestris	??
etheridgei	??
evermanni	??
fasciata	??
fowleri	??
fraseri	??
frenatus	??
fuscoauratus	??
gadovii	??
garmani	??
gingivinus	??
grahami	??
granuliceps	??
griseus	ttcacctactatttttacacgaaacaggttctaataacccaaccgggcctacaatctaactcagataaa
gundlachi	??
hendersoni	??
homolechis	??

humilis	??
insignis	??
insolitus	??
intermedius	??
isolepis	??
jacare	??
jubar	??
kemptoni	??
krugi	??
laeviventris	??
latifrons	??
leachii	??
lemurinus	??
limifrons	??
lineatopus	??
lineatus	??
liogaster	??
lividus	??
longiceps	??
longitibialis	??
loveridgei	??
loysianus	??
luciae	ttcacctagtatttttacatgaaacaggttctaagaacccaactgggcctacaatctaacacagataaa
lucius	??
luteogularis	??
luteosignifer	??
maculiventris	??
marcanoi	??
mariarum	??
marmoratus	??
maynardi	??
megapholidotus	??
meridionalis	??
mestrei	??
micropholidotus	??
microtus	??
monticola	??

nebuloides	???
nebulosus	???
noblei	???
notopholis	???
nubilis	???
occultus	???
oculatus	???
olssoni	???
onca	???
opalinus	???
ophiolepis	???
ortoni	???
oxylophus	???
Phenacosaurus_heterodermus	???
parvicirculatus	???
paternus	???
pentaprion	???
perracae	???
petersi	???
placidus	???
poecilopus	???
polylepis	???
poncencis	???
porcatus	???
proboscis	???
pulchellus	???
punctatus	???
quadriocellifer	???
reconditus	???
richardi	ttcacctactatttttacacgaaacaggttctaataacccaaccgggcctacaatctaactcagataaa
ricordi	???
roosevelti	???
roquet	ttcacttactatttttacacgaaacagggtctaattacccaactgggcctacaatccaattcagacaaa
rubribarbus	???
ruizi	???
sagrei	???
semilineatus	???

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sericeus                  ??????????????????????????????????????????????????????????????????????????
sheplani                  ??????????????????????????????????????????????????????????????????????????
shrevei                   ??????????????????????????????????????????????????????????????????????????
smallwoodi                ??????????????????????????????????????????????????????????????????????????
smaragdinus               ??????????????????????????????????????????????????????????????????????????
sminthus                  ??????????????????????????????????????????????????????????????????????????
solitarius                ??????????????????????????????????????????????????????????????????????????
spectrum                  ??????????????????????????????????????????????????????????????????????????
squamulatus               ??????????????????????????????????????????????????????????????????????????
strahmi                   ??????????????????????????????????????????????????????????????????????????
stratulus                 ??????????????????????????????????????????????????????????????????????????
subocularis               ??????????????????????????????????????????????????????????????????????????
taylori                   ??????????????????????????????????????????????????????????????????????????
tolimensis                ??????????????????????????????????????????????????????????????????????????
townsendi                 ??????????????????????????????????????????????????????????????????????????
transversalis             ??????????????????????????????????????????????????????????????????????????
trinitatis                ttcacttactatttttacatgaaccaggatctaacaacccgactgggcctacaatccaactcagataaa
tropidogaster             ??????????????????????????????????????????????????????????????????????????
tropidolepis              ??????????????????????????????????????????????????????????????????????????
tropidonotus              ??????????????????????????????????????????????????????????????????????????
valencienni               ??????????????????????????????????????????????????????????????????????????
vanidicus                 ??????????????????????????????????????????????????????????????????????????
ventrimaculatus           ??????????????????????????????????????????????????????????????????????????
vermiculatus              ??????????????????????????????????????????????????????????????????????????
vociferans                ??????????????????????????????????????????????????????????????????????????
wattsi                    ??????????????????????????????????????????????????????????????????????????
whitemani                 ??????????????????????????????????????????????????????????????????????????
Polychrus_acutirostris    ??????????????????????????????????????????????????????????????????????????
Polychrus_marmoratus      ??????????????????????????????????????????????????????????????????????????
Leiocephalus_schreibersi  ??????????????????????????????????????????????????????????????????????????
Leiocephalus_melanochlorus ?????????????????????????????????????????????????????????????????????????
Urostrophus_vautieri      ??????????????????????????????????????????????????????????????????????????
Anisolepis_undulatus      ??????????????????????????????????????????????????????????????????????????
Enyalius_iheringi         ??????????????????????????????????????????????????????????????????????????
Phenacosaurus_nicefori    ??????????????????????????????????????????????????????????????????????????
Diplolaemus_darwinii      ??????????????????????????????????????????????????????????????????????????
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2366-

acutus	????????????????????????
aeneus	aattccatttccacccttactt?
aequatorialis	????????????????????????
agassizi	????????????????????????
ahli	????????????????????????
aliniger	????????????????????????
allisoni	????????????????????????
allogus	????????????????????????
altae	????????????????????????
altavelensis	????????????????????????
alutaceus	????????????????????????
angusticeps	????????????????????????
antonii	????????????????????????
apollinaris	????????????????????????
aquaticus	????????????????????????
argenteolus	????????????????????????
argillaceus	????????????????????????
armouri	????????????????????????
auratus	????????????????????????
bahorucoensis	????????????????????????
baleatus	????????????????????????
barahonae	????????????????????????
barkeri	????????????????????????
bartschi	????????????????????????
bimaculatus	????????????????????????7
biporcatus	????????????????????????
bitectus	????????????????????????
bonairensis	aatccctttgccacccctattt?
brevirostris	????????????????????????
brunneus	????????????????????????
Ch._chameleonides	????????????????????????
capito	????????????????????????
carolinensis	????????????????????????1
chloris	????????????????????????
chlorocyanus	????????????????????????

christophei	????????????????????????
chrysolepis	????????????????????????
clivicola	????????????????????????
cobanensis	????????????????????????
coelestinus	????????????????????????
compressicauda	????????????????????????
conspersus	????????????????????????
crassulus	????????????????????????
cristatellus	?????????????????????????5
Cr._barbouri	????????????????????????
cupreus	????????????????????????
cuprinus	????????????????????????
cuvieri	?????????????????????????2
cyanopleurus	????????????????????????
cybotes	?????????????????????????3
darlingtoni	????????????????????????
desechensis	????????????????????????
distichus	????????????????????????
dollfusianus	????????????????????????
dunni	????????????????????????
equestris	????????????????????????
etheridgei	????????????????????????
evermanni	?????????????????????????6
fasciata	????????????????????????
fowleri	????????????????????????
fraseri	????????????????????????
frenatus	????????????????????????
fuscoauratus	????????????????????????
gadovii	????????????????????????
garmani	????????????????????????
gingivinus	????????????????????????
grahami	????????????????????????
granuliceps	????????????????????????
griseus	aatcccatttccacccctattt?
gundlachi	????????????????????????
hendersoni	????????????????????????
homolechis	????????????????????????

humilis	????????????????????????
insignis	????????????????????????
insolitus	????????????????????????
intermedius	????????????????????????
isolepis	????????????????????????
jacare	????????????????????????
jubar	????????????????????????
kemptoni	????????????????????????
krugi	????????????????????????
laeviventris	????????????????????????
latifrons	????????????????????????
leachii	????????????????????????
lemurinus	????????????????????????
limifrons	????????????????????????
lineatopus	????????????????????????
lineatus	????????????????????????
liogaster	????????????????????????
lividus	????????????????????????
longiceps	????????????????????????
longitibialis	????????????????????????
loveridgei	????????????????????????
loysianus	????????????????????????
luciae	aatcccattgccacccctattt?
lucius	????????????????????????
luteogularis	????????????????????????
luteosignifer	????????????????????????
maculiventris	????????????????????????
marcanoi	????????????????????????
mariarum	????????????????????????
marmoratus	????????????????????????
maynardi	????????????????????????
megapholidotus	????????????????????????
meridionalis	????????????????????????
mestrei	????????????????????????
micropholidotus	????????????????????????
microtus	????????????????????????
monticola	????????????????????????

nebuloides	????????????????????????
nebulosus	????????????????????????
noblei	????????????????????????
notopholis	????????????????????????
nubilis	????????????????????????
occultus	????????????????????????
oculatus	????????????????????????
olssoni	????????????????????????
onca	????????????????????????
opalinus	????????????????????????
ophiolepis	????????????????????????
ortoni	????????????????????????
oxylophus	????????????????????????
Phenacosaurus_heterodermus	????????????????????????
parvicirculatus	????????????????????????
paternus	????????????????????????
pentaprion	????????????????????????
perracae	????????????????????????
petersi	????????????????????????
placidus	????????????????????????
poecilopus	????????????????????????
polylepis	????????????????????????
poncencis	????????????????????????
porcatus	????????????????????????
proboscis	????????????????????????
pulchellus	????????????????????????
punctatus	????????????????????????
quadriocellifer	????????????????????????
reconditus	????????????????????????
richardi	aatcccatttccacccctattt?
ricordi	????????????????????????
roosevelti	????????????????????????
roquet	aatcccattcccacccctattt8
rubribarbus	????????????????????????
ruizi	????????????????????????
sagrei	????????????????????????
semilineatus	????????????????????????

sericeus	????????????????????????
sheplani	????????????????????????
shrevei	????????????????????????
smallwoodi	????????????????????????
smaragdinus	????????????????????????
sminthus	????????????????????????
solitarius	????????????????????????
spectrum	????????????????????????
squamulatus	????????????????????????
strahmi	????????????????????????
stratulus	????????????????????????
subocularis	????????????????????????
taylori	????????????????????????
tolimensis	????????????????????????
townsendi	????????????????????????
transversalis	????????????????????????
trinitatis	aattccatttccacccttactt?
tropidogaster	????????????????????????
tropidolepis	????????????????????????
tropidonotus	????????????????????????
valencienni	????????????????????????4
vanidicus	????????????????????????
ventrimaculatus	????????????????????????
vermiculatus	????????????????????????
vociferans	????????????????????????
wattsi	????????????????????????
whitemani	????????????????????????
Polychrus_acutirostris	????????????????????????
Polychrus_marmoratus	????????????????????????
Leiocephalus_schreibersi	????????????????????????
Leiocephalus_melanochlorus	????????????????????????
Urostrophus_vautieri	????????????????????????
Anisolepis_undulatus	????????????????????????
Enyalius_iheringi	????????????????????????
Phenacosaurus_nicefori	????????????????????????
Diplolaemus_darwinii	????????????????????????

Appendix 2.1

THE NUMBER OF FOUR-TAXON TREES

One of the commoner investigator biases in simulation studies is testing over a set of branch lengths that favor (or disfavor) particular methods (Huelsenbeck, 1995a). For example Yang (1996, 1997) selected trees specifically to demonstrate regions where likelihood under a simpler model performed better than likelihood under the model with which the data were generated, and Huelsenbeck and Hillis (1993; subsequent papers) examined a particular case of two independently varied sets of branch lengths because this branch space included the "Felsenstein Zone" where phylogenetic methods are expected to have difficulty recovering the true topology (Felsenstein, 1978). Although Yang and Huelsenbeck clearly have been cognizant of and explicit about these biases, their results have sometimes been over- or misinterpreted, i.e. as evidence for the favorability of likelihood or parsimony methods in general. Both of these authors have been criticized for presenting results from a biased sample of four-taxon branch lengths (Nei et al., 1995; Siddal, 1998; Bruno and Halpern, 1999).

Criticisms like these could be partially allayed by presenting results from a comprehensive sample of branch lengths. A truly comprehensive treatment is not feasible because branch lengths vary continuously. However, if this parameter space is treated using discrete approximations,

the problem becomes tractable. We can enumerate the possible combinations of from one to five branch lengths for an unrooted bifurcating four-taxon tree. Figure 2.6 shows the 1 (A), 10 (B), 30 (C), 36 (D), and 15 (E) respective ways to combine one, two, three, four, or five branch lengths. If branch lengths are drawn from a pool of t possibilities, the number of branch length combinations for an unrooted resolved four-taxon tree is

$$\begin{aligned} \mathrm{BLC}(t) &= t + 10\binom{t}{2} + 30\binom{t}{3} + 36\binom{t}{4} + 15\binom{t}{5} \\ &= \frac{t^5 + 2t^4 + 3t^3 + 2t^2}{8} \end{aligned}$$

Thus, if we want to divide branch lengths into $t = 2$ types (e.g., long and short), there are 12 possible branch length combinations. Likewise using the equation, there are 63 possible combinations for $t = 3$, 220 combinations for $t = 4$, and 600 combinations for $t = 5$. For any given internal branch length there are $\mathrm{BLC}(t)/t$ combinations.

In this paper, I examined trees of five branch lengths with an internal branch of length zero, so the number of distinct trees is BLC(5)/5 = 600/5 = 120 trees. Because the middle branch is eliminated, the actual number of distinct treeshapes is 70, not 120. However in order to measure bias towards or away from a hypothetical true resolved tree, all 120 trees are evaluated.

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VITA

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