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A NEW LIZARD OF THE GENUS *NOROPS* (SAURIA: IGUANIDAE) FROM THE CLOUD FOREST OF HIDALGO, MÉXICO

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ABSTRACT: A new species of lizard, *Norops naufragus*, is described from the humid Atlantic versant of Hidalgo, México. This species is placed in the *schiedii* group and is easily diagnosed from its congeners on the basis of morphological and allozymic characters. The composition and interspecific relationships of members of the *schiedii* group are discussed.

Key words: Reptilia; Sauria; Iguanidae; *Norops naufragus* new species; Hidalgo, México

THE cool, damp, upland forests covering the windward slopes of tropical America remain some of the most poorly known regions on earth. The land mass covered by these so-called cloud forests is relatively small. Leopold (1950) estimated that only about 0.5% of the total area of México was characterized by this vegetation. Nevertheless, species richness and endemism are high in this habitat. Among the herpetofaunal components of these forests are members of the genus *Norops* [= *Anolis* (in part), sensu lato]; for the recent partitioning of this group of lizards, see Guyer and Savage (1987). A few species of *Norops* occurring in cloud forest have relatively wide distributions (e.g., *N. petersi*), but many species are known only from the vicinity of their respective type localities. In particular, a number of closely related species often referred to as the *schiedii* group appear to be restricted to small regions of cloud forest in México and northern Central America. Several species placed in this group have been described in the last 20 yr (Smith, 1968; Smith and Paulson, 1968; Wilson and McCranie, 1982).

While exploring the mountainous re-

gion of the northeastern portion of Hidalgo, we discovered several specimens of an undescribed small anoline lizard. We propose that this species be known subsequently as:

Norops ***naufragus*** sp. nov.

Holotype.—The University of Texas at Arlington (UTA) R-11514 (original number JAC 8490), an adult male, from 10.1 km NE Tlanchinol, 1237 m, Hidalgo, Municipio de Tlanchinol, México, collected by J. A. Campbell, D. M. Hillis, and W. W. Lamar on 16 July 1983.

Paratypes.—UTA R-11513, a juvenile, from 43.6 km SW Huejutla, 1372 m, Municipio de Tlanchinol, Hidalgo, México, on 16 July 1983; UTA R-18658–59, both adult females, from 5.1 km SW Tlanchinol, 1469 m, Municipio de Tlanchinol, on 18 July 1984.

Diagnosis.—A species of the *schiedii* group of *Norops*; this group is characterized by having smooth ventral scales (weakly keeled in the thoracic region, particularly in females, in some species), a sharply defined *canthus rostralis*, and heavily keeled supraocular scales. *Norops naufragus* may be distinguished from all other members of this group by the combination of (1) a relatively long tibia that is 1.08–1.15 times longer than the head length; (2) the body covered with relatively small scales: 54–62 ventrals and 79–96 dorsals, counted between level of axilla and groin; and (3) unicarinate scales on the lateral surface of the antebranchium.

Description of holotype.—Dorsal head scales in frontal and prefrontal areas rugose; a deep prefrontal cavity; nine internasals; nine postrostrals contacting rostral between first supralabials; 10 scales across snout (minimum count) at widest point in front of supraorbital semicircles; most of scales comprising supraorbital semicircles larger than largest supraocular; two scales between the supraocular semicircles and three and four scales between right and left supraocular semicircle, respectively, and interparietal; interparietal irregular in outline, longer than wide, and not more than one fourth the size of auditory meatus; about four rows of irregularly arranged supraoculars, rugose, most with single keel; all supraoculars, except one, separated from supraorbital semicircles by circumorbitals (Fig. 1A); about five large canthals per side, about 10 canthals from in front of eye to nasal scale; 8–10 rows of loreals on right and left sides, respectively, all longer than high; 11/10 supralabials and 9/9 infralabials to level below middle of eye (Fig. 1B); dewlap reaching to thoracic region past level of insertion of foreleg; gular scales obtusely keeled; subocular separated from supralabials by a single row of scales; dorsal body scales keeled; middorsal scales not enlarged or noticeably different from adjacent scales; 90 scales along vertebral midline between levels of axilla and groin, 54 contained in one head length; tiny, conical laterals merging gradually with dorsal scales; ventral body scales smooth, not weakly keeled in thoracic region; 62 scales along midventral line between levels of axilla and groin, 48 contained in one head length; axillary pocket shallow; preanals not keeled; no enlarged postanals; basal cau-

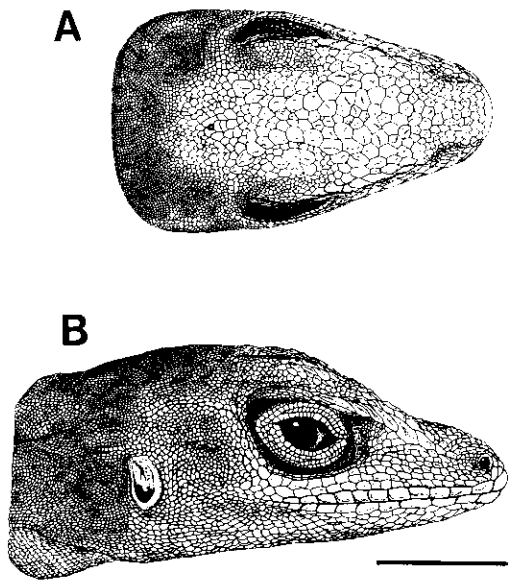

FIG. 1.—(A) Dorsal and (B) lateral aspects of the head of *Norops naufragus*, holotype, UTA R-11514. Horizontal line = 5 mm.

FIG. 2.—*Norops naufragus*, holotype, UTA R-11514, an adult male, 49 mm SVL.

dals keeled; largest scales of body on anterior surface of thigh and lateral surface of antebranchium; most scales on lateral surface of antebranchium unicarinate; 28 subdigital lamellae on fourth toe, exclusive of ultimate phalanx; toe pads between two and three times width of terminal phalanx.

In life, ground color pale brown; irregular transverse dark brown to black markings across dorsum and down sides of body; dark brown band across top of head above eyes; a dark brown subocular bar; dark irregular markings extending posteriorly from upper posterior edge of eye to parietal region and from lower posterior edge of eye to midline of body at level above forelimbs; a pair of dark crossbands on the thigh; tail with dark bands (Fig. 2); dewlap orange-red; iris copper colored; pupil with a thin gold ring.

Snout–vent length (SVL) 49 mm; tail 98 mm; head length (from tip of snout to anterior border of ear) 13.4 mm; head width 8.6 mm; tibia length 15.4 mm; fourth toe length, excluding claw, 10.7 mm; a distinct nuchal crest.

Variation.—In addition to the holotype, an adult male, there are two adult females and a juvenile among the paratypes. The adult females are 49–53 mm SVL and the juvenile is 28 mm. The ranges of variation for various ratios are as follows: tail length/SVL, 1.92–2.04; head length/SVL, 0.27–0.29; tibia length/head length, 1.08–1.15; fourth toe length/head length, 0.74–0.85. The ventral scales in the male holotype and juvenile paratype are entirely smooth; those of the two adult female paratypes are mostly smooth, except in the thoracic region, where they are weakly keeled. The dewlap of the adult females is small and confined to the throat region. A pair of dorsolateral swellings, about 4 mm in diameter, are present on the neck of UTA R-18658 and apparently are greatly enlarged endolymphatic sacs.

Color notes, taken in life from UTA R-18658, state that this specimen was "rusty brown dorsally, grading to olive green posteriorly. Darker dorsal stripe; dark flank stripes (on each side). Legs reddish brown. Venter dark cream. Iris golden brown. Dewlap orange-red; dewlap scales cream to black. Rear legs with faint crossbars. Labials orange." The juvenile specimen (UTA R-11513) had a yellowish brown ground color with indistinct dark mottling on the sides; four distinct dark brown mid-

dorsal spots are present from the level above the forelimbs to above hindlimbs. A broad dark brown interorbital band is present and a dark brown band extends from behind the eye to the midline in the parietal region. A pair of crossbars is present on both the forearm and tibia (Fig. 3).

There are 8–9 postmentals; 1–2 scales between the supraorbital semicircles; 2–4 scales between the supraorbital semicircles and interparietal; 7–10 canthals from front of eye to nasal scale; 8–11 supralabials and 7–10 intralabials; 79–96 dorsal and 54–62 ventral scales along midline between levels of axilla and groin; 51–64 dorsal and 39–48 ventral scales contained in a head length; and 26–31 subdigital lamellae on fourth toe, exclusive of distal phalanx.

Etymology.—The name *naufragus* is derived from the Latin *naufragium*, meaning "remnants" or "remains," and is used in allusion to the relictual and isolated distribution of this species, a common pattern for members of the *schiedii* group.

Comparisons and relationships.—*Norops naufragus* differs from *N. breedlovei*, *N. duellmani*, *N. milleri*, and *N. polyrhachis* in having a relatively longer tibia (lower leg); in the former species the tibia is at least 1.08 times longer than the head length. *Norops duellmani* and *N. parvicirculatus* differ from *N. naufragus* in usually having ventral scales mostly keeled and entirely smooth, respectively. The number of ventral scales from the level of the axilla to groin is higher in *N. naufragus* (54–62) than in *N. breedlovei* (44–53) and *N. duellmani* (42–54). The number of dorsal scales from level of axilla to groin is higher in *N. naufragus* (79–96) than any other member of the group except *N. milleri* (59–96) and *N. polyrhachis* (74–81). The number of internasals is higher in *N. naufragus* (8–9) than in other species of the group except *N. cobanensis*, *N. milleri*, and *N. parvicirculatus*. *Norops naufragus* may be distinguished from *N. breedlovei*, *N. milleri*, and *N. polyrhachis* by having unicarinate rather than multicarinate scales on the foreleg. The number of subdigital lamellae on the fourth toe of *N. naufragus* is higher (26–31) than is known for *N. breedlovei* (23–25), *N. duellmani* (19–22), or *N. parvicirculatus* (21–22). *Norops johnmeyeri* of Honduras reaches a larger adult length (62–67 mm SVL) than *N. naufragus*, and has a relatively shorter tail/SVL ratio (1.51), tibia/head length ratio (0.85–0.97; $\bar{x} = 0.92$), and fourth toe/head length ratio (0.52–0.65; $\bar{x} = 0.60$). Additionally, *N. johnmeyeri* has entirely smooth ventrals in both sexes, 50–66 ($\bar{x} = 58.7$) dorsal and 47–49 ($\bar{x} = 48.0$) ventral scales from the level of axilla to groin; 35–43 ($\bar{x} = 39.0$) dorsal and 36–39 ($\bar{x} = 37.3$) ventral scales contained in a head length; 5–6 internasals; and a dewlap with a large blue spot.

FIG. 3.—*Norops naufragus*, paratype, UTA R-11513, a juvenile, 28 mm SVL.

We have not had the opportunity to examine the type of *N. schiedii* and have relied on the original description by Wiegmann (1834), the description and illustration provided by Duméril et al. (1870–1909), and unpublished notes kindly supplied to us by C. S. Lieb to distinguish this species from *N. naufragus*. These materials indicate that *N. schiedii* differs from *N. naufragus* in several prominent characteristics, including having smooth scales covering the prefrontal depression, larger ventral scales (35 to a head length), a relatively shorter tibia (tibia/head length, 1.02), and more subdigital lamellae on the fourth toe (33). Additional characters distinguishing *N. naufragus* from some of the species of *Norops* occurring along the Atlantic versant of northern Middle America are given in Table 1.

A number of species of anoles have been

TABLE 1.—Comparison of various features of selected species of *Norops* occurring along the Atlantic versant of northern Middle America. For measurements and morphometric ratios, only data from adults are given. Numbers within parentheses represent means.

Character	*N. naufragus* (*n* = 4)	*N. breedlovei* (*n* = 5)	*N. cobanensis* (*n* = 8)	*N. duellmani* (*n* = 4)	*N. milleri* (*n* = 15)	*N. parvicirculatus* (*n* = 3)	*N. polyrhachis* (*n* = 3)
Adult SVL							
Male	49 mm	51–54 mm	45–47 mm	35–37 mm	45–50 mm	49–50 mm	—
Female	49–53 mm	52 mm	45–50 mm	—	45–57 mm	50 mm	41–50 mm
Tail length/SVL	1.92–2.04 (1.99)	2.04–2.22 (2.13)	1.96–2.51 (2.28)	1.49	1.83–2.11 (1.97)	1.62–1.86 (1.74)	1.98–2.05 (2.02)
Head length/SVL	0.27–0.29 (0.28)	0.27–0.29 (0.28)	0.27–0.29 (0.28)	0.27–0.28 (0.27)	0.25–0.28 (0.27)	0.26–0.30 (0.28)	0.26–0.27 (0.27)
Tibia length/head length	1.08–1.15 (1.11)	0.99–1.05 (1.02)	1.04–1.18 (1.12)	0.96–1.00 (0.99)	0.82–0.93 (0.89)	1.08–1.12 (1.09)	0.85–0.88 (0.86)
4th toe length/head length	0.74–0.85 (0.80)	0.65–0.81 (0.75)	0.80–0.91 (0.83)	0.51–0.65 (0.60)	0.71–0.82 (0.76)	0.53–0.54 (0.53)	0.75–0.81 (0.77)
Ventral scale shape	smooth*	smooth*	smooth*	keeled	smooth*	smooth	smooth*
No. ventral scales:							
Axilla–groin	54–62 (57.5)	44–53 (48.8)	54–79 (58.0)	42–54 (48.8)	44–60 (52.4)	59–63 (60.3)	54–61 (58.0)
Contained in HL	39–48 (42.0)	25–35 (32.6)	35–48 (41.0)	29–40 (33.3)	21–38 (30.5)	38–52 (46.3)	32–38 (35.3)
No. dorsal scales:							
Axilla–groin	76–96 (90.0)	54–60 (58.0)	66–79 (73.6)	40–46 (43.0)	59–96 (76.9)	63–68 (65.3)	74–81 (77.0)
Contained in HL	51–64 (56.3)	33–40 (36.4)	43–53 (45.9)	25–29 (27.3)	34–56 (44.3)	36–48 (42.3)	42–44 (43.3)

TABLE 1.—Continued.

Character	*N. naufragus* (*n* = 4)	*N. breedlovei* (*n* = 5)	*N. cobanensis* (*n* = 8)	*N. duellmani* (*n* = 4)	*N. milleri* (*n* = 15)	*N. parvicirculatus* (*n* = 3)	*N. polyrhachis* (*n* = 3)
Internasals	8–9 (8.5)	5–7 (6.2)	6–8 (6.6)	6–7 (6.3)	6–9 (7.4)	7–9 (8.0)	5–6 (5.7)
Postrostrals	7–9 (8.0)	6–8 (7.0)	7–8 (7.1)	5–7 (5.8)	6–10 (7.6)	8–9 (8.7)	7 (7.0)
Circumorbital series complete	no	no	variable	no	no	yes	no
Scales between supraorbital semicircles	1–2 (1.8)	2 (2.0)	1–3 (2.0)	1–2 (1.5)	1–2 (1.6)	2 (2.0)	1 (1.0)
Scales between supraorbital semicircles and interparietal	2–4 (3.0)	3–4 (3.2)	2–4 (3.3)	3 (3.0)	2–4 (3.2)	3–4 (3.3)	2 (2.0)
Loreal rows	8–11 (9.3)	6–8 (7.0)	7–9 (8.0)	6–8 (7.1)	7–9 (7.9)	7–9 (8.5)	7–8 (7.7)
Supralabials**	8–11 (9.4)	6–9 (7.7)	7–8 (7.6)	8–9 (8.5)	7–10 (8.2)	8–10 (9.3)	7–8 (7.5)
Infralabials**	7–10 (8.5)	7–9 (8.0)	7–8 (7.8)	8–9 (8.5)	6–9 (7.7)	9–11 (10.0)	7–8 (7.5)
Postmentals	5–8 (6.8)	4–6 (4.6)	4–5 (4.3)	4–6 (5.0)	4–7 (4.7)	6 (6.0)	4 (4.0)
Scales on foreleg	unicarinate	multicarinate	variable	unicarinate	multicarinate	unicarinate	multicarinate
Subdigital lamellae on 4th toe	26–31 (28.8)	23–25 (24.2)	26–28 (26.5)	19–22 (20.0)	25–31 (27.9)	21–22 (21.7)	27–30 (29.0)
Male dewlap color	orange-red	rose colored	purple	rose-red	purplish pink	orange with red spot	purple

* Except in thoracic region where scales are weakly keeled.
** To level directly below middle of eye.

TABLE 2.—Loci examined, abbreviations used, Enzyme Commission numbers (Bielka et al., 1984), and buffer systems.

Locus	Abbreviation	E.C. no.	Buffer system
Acid phosphatase	AP	3.1.3.2	TC 6.7
Aspartate aminotransferase	AAT	2.6.1.1	TBE 9.1
Glucose-phosphate isomerase	GPI	5.3.1.9	TBE 9.1
Glyceraldehyde-3-phosphate dehydrogenase	G-3-PD	1.2.1.12	TBE 9.1
α-Glycerophosphate dehydrogenase	GPD	1.1.1.8	TBE 9.1
Lactate dehydrogenase-1	LDH-1	1.1.1.27	TBE 9.1
Lactate dehydrogenase-2	LDH-2	1.1.1.27	TBE 9.1
Malate dehydrogenase-1	MDH-1	1.1.1.37	TBE 9.1
Malate dehydrogenase-2	MDH-2	1.1.1.37	TBE 9.1
Malate dehydrogenase-3 (NADP+)	MDH-3	1.1.1.40	TC 6.7
Mannose-phosphate isomerase-1	MPI-1	5.3.1.8	TC 6.7
Mannose-phosphate isomerase-2	MPI-2	5.3.1.8	TC 6.7
Mannose-phosphate isomerase-3	MPI-3	5.3.1.8	TC 6.7
Superoxide dismutase-1	SOD-1	1.15.1.1	TBE 9.1
Superoxide dismutase-2	SOD-2	1.15.1.1	TBE 9.1

placed in the *schiedii* group. This group was considered, in part, by Smith and Laufe (1945), Smith (1968), and Smith and Paulson (1968), although relationships among several members of the group were suggested earlier (Stuart, 1942). Species within this group are usually characterized as having relatively small dorsals, weakly keeled or smooth; rather large ventrals; and some of the supraoculars contacting the semicircles. Barbour (1934), who examined the type of *N. schiedii*, stated that it was identical with specimens from Cobán, Guatemala, no doubt in reference to what was later named *N. cobanensis*. Smith (1968) suggested that *schiedii, polyrhachis, milleri, breedlovei*, and *cobanensis* were closely related to one another and formed the *schiedii* group. Several other species occasionally have been suggested to be members of the group, including *N. matudai, N. rodriguezii*, and *N. laeviventris* (Smith and Laufe, 1945), but current consensus is that these species are not in the *schiedii* group. A comparison of *N. matudai* with other species in the *schiedii* group was provided by Smith and Kerster (1955), and a description of the species was given by Smith (1956). *Norops parvicirculata* and *N. matudai* were suggested to be in the *heteropholidotus* (= *sminthus*, fide Meyer and Wilson, 1971) group by Alvarez del Toro and Smith (1956) and Smith (1956). The relationship of members of the *heteropholidotus* group may be close to those species currently recognized in the *schiedii* group. Stuart (1942) recognized the similarities between *N. cobanensis* and *N. schiedii* and suggested they were closely related. Later, Stuart (1955) suggested a close relationship among *N. cobanensis*, the species that was later named *N. matudai*, and *N. heteropholidotus*. The composition of the *schiedii* group was most recently reviewed by Wilson and McCranie (1982), who added to it yet another species, *N. johnmeyeri*, from Honduras. Fitch and Henderson (1973) reviewed comparative data on a number of other little-known anoles from México and unknown provenance, including *baccatus, cymbops, damulus*, and *guntheri*, and they described a new species, *N. duellmani*, from the Volcán San Martín Tuxtla in southern Veracruz. The relationships and, in some instances, the validity of these species are not known. *Norops milleri*, until recently, was known only from the type (Smith and Laufe, 1945; Smith and Taylor, 1950). Campbell (in press) reported on a series of 15 additional specimens and suggested that this species was closely related to *N. polyrhachis*.

We question the purported relationships of *N. johnmeyeri* to the *schiedii* group as suggested by Wilson and McCranie (1982). It differs from all other members of the *schiedii* group in a number of features,

TABLE 3.—Frequencies of electromorphs observed among four species in the *Norops schiedii* group. The "x" allele for *N. cobanensis* at SOD-1 indicates that this locus was not expressed in this species.

		naufragus (n = 2)	*polyrhachis* (n = 2)	*milleri* (n = 5)	*cobanensis* (n = 8)
AP	a		1.0	0.9	
	b	1.0			
	c				1.0
	d			0.1	
AAT	a				0.06
	b	1.0	1.0	1.0	0.94
GPI	a		1.0	1.0	1.0
	b	1.0			
G-3-PD	a	1.0	1.0	1.0	
	b				1.0
GPD	a	1.0			
	b		1.0	1.0	
	c				1.0
LDH-1	a				1.0
	b		1.0	1.0	
	c	1.0			
LDH-2	a	1.0			
	b		1.0	1.0	1.0
MDH-1	a	1.0	1.0	1.0	1.0
MDH-2	a				0.56
	b			0.9	0.44
	c			0.1	
	d	1.0	1.0		
MDH-3	a	1.0			
	b				1.0
	c			0.1	
	d		1.0	0.9	
MPI-1	a			1.0	1.0
	b	1.0	0.5		
	c		0.5		
MPI-2	a	1.0			
	b		1.0	1.0	1.0
MPI-3	a	1.0			
	b				0.56
	c		1.0	1.0	0.44
SOD-1	a	1.0	1.0	1.0	
	x				1.0
SOD-2	a	1.0	1.0	1.0	0.67
	b				0.33

including the possession of a prominent dorsal ridge, at least in some specimens, extending from the level above the axilla to the base of the tail; a well developed dewlap with a large central blue spot in both males and females, reaching the level of the axilla in females and extending well onto the chest in males; a well developed parietal depression, bounded posteriorly by converging parietal ridges; and a relatively large adult size (62–67 mm SVL in males). Conversely, it might be argued that these characters are autapomorphies, in which case *Norops johnmeyeri* would be the most highly derived member of the group.

TABLE 4.—Genetic distances and average heterozygosities (along diagonals) among four species in the *Norops schiedii* group.

	N. naufragus	*N. polyrhachis*	*N. milleri*	*N. cobanensis*
N. naufragus	0.00	0.81	1.10	1.65
N. polyrhachis		0.03	0.14	0.83
N. milleri			0.03	0.61
N. cobanensis				0.10

We collected tissues for allozymic analysis from 18 specimens of four species of the *N. schiedii* group (see Appendix I). Although tissue samples of several species in the group were unavailable, a comparison of these four species provided an indication of the genetic distinctiveness of

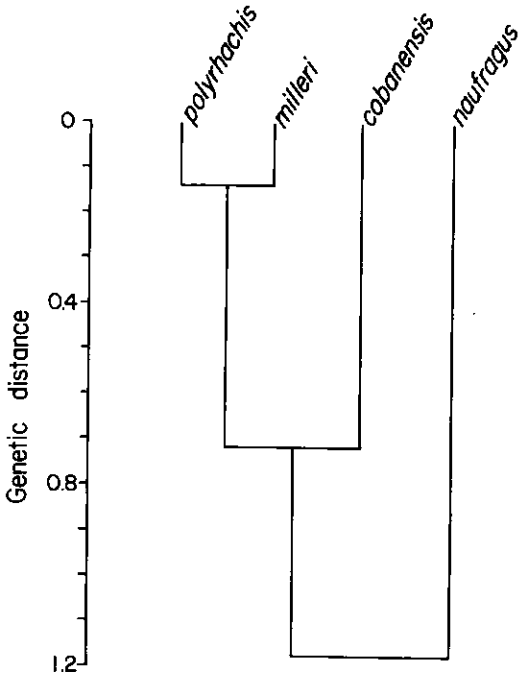

FIG. 4.—UPGMA phenogram (Sneath and Sokol, 1973) of genetic distances among four species of the *Norops schiedii* group.

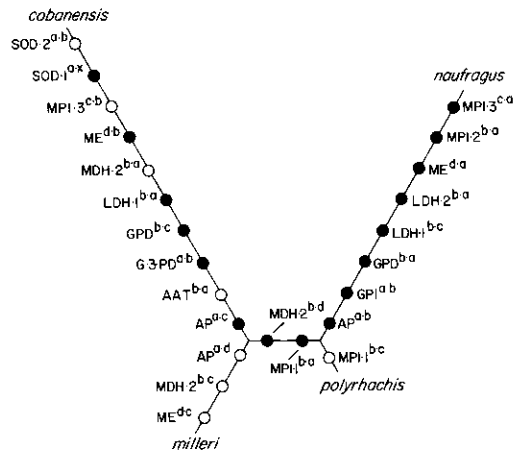

FIG. 5.—Unrooted minimum length network showing allelic changes among four species of the *Norops schiedii* group. Superscript letters designate allelic changes. Solid circles indicate allelic fixation; open circles indicate polymorphic alleles.

N. naufragus. Methods of allozymic analysis were the same as described in Hillis (1985). Loci examined and buffer systems used are given in Table 2. Variation at 15 allozymic loci is shown in Table 3, and corrected Nei's genetic distances (Hillis, 1984) and average heterozygosities are shown in Table 4.

Norops naufragus is genetically the most distinct of the four species examined (Fig. 4, Table 4). It was not possible to construct a rooted cladogram from the allozymic data, because no information on appropriate outgroups is available. Instead, we constructed a minimum length unrooted network from the data (Fig. 5). The root of this network could fall along any of the five branches. If the root falls between *N. naufragus* and the other species, then the new anole is the sister species to the rest of the group. The other likely positions for the root would place *N. naufragus* and *N. polyrhachis* as sister species. Despite the fact that *N. polyrhachis* and *N. milleri* are genetically very similar (Fig. 4), no possible rooting of the network in Fig. 5 would suggest that these two taxa are sister species.

It is interesting that the distances along the network in Fig. 5 closely reflect the geographic distribution of the species (Fig. 6). The four species are separated genetically in a nearly linear pathway (because *N. polyrhachis* and *N. milleri* have only a few polymorphic autapomorphies), and the

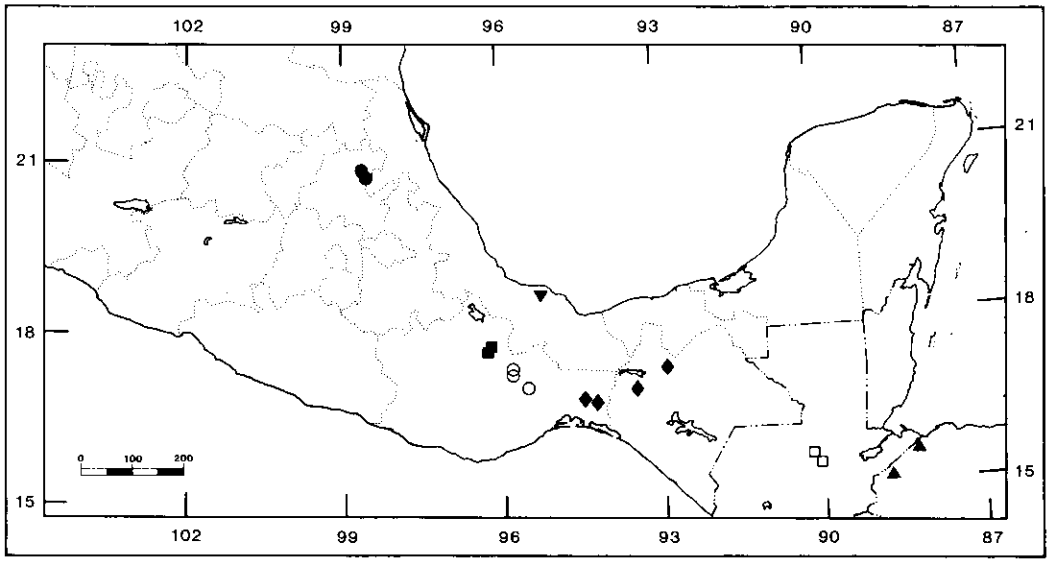

FIG. 6.—Distributions of the members of the *Norops schiedii* group. The symbols represent the following species: solid circles = *naufragus*; inverted triangle = *duellmani*; solid squares = *polyrhachis*; open circles = *milleri*; diamonds = *breedlovei*; open squares = *cobanensis*; triangles = *johnmeyeri*. In instances where several localities are in close proximity to one another, a single symbol is used.

geographic distances are closely proportional to these path-length distances (Figs. 5, 6). This pattern could have resulted if an ancestral species were widespread in relatively continuous mesic montane forests along the Atlantic versant (with north-south clinal variation), and became fragmented along with its habitat. Such a scenario would result in genetic variation like that seen in these species: geographically close species would be genetically similar, but two species in the middle of the continuum would not share any derived alleles. Furthermore, genetic distances would be expected to conform closely to geographic separation, as is seen in the four examined species.

Habitat.—*Norops naufragus* is probably restricted to the cloud forest covering the Atlantic drainages of northeastern Hidalgo, although possibly it ranges into parts of Veracruz and Puebla. The known vertical distribution of this species is from 1237–1469 m. Individuals of the type series were taken from extremely steep hillsides on the ground or low vegetation within the splash zones of small waterfalls. All specimens were taken on overcast days except UTA R-11513 which was taken at about 2330 h. The original vegetation at and around the type locality had been almost completely removed by May 1987. Because of the recent destruction of its limited habitat, this species may be at risk of extinction.

Resumen

Una nueva especie de largartija, *Norops naufragus*, se describe del vertiente húmido Atlántico de Hidalgo, México. Dicha especie conforme con el grupo "*schiedii*" y se la distingue facilmente de sus congéneres basándose en caracteres de morfología y aspectos bioquímicos. Se discute la composición y las afinidades interespecíficos de los miembros del grupo "*schiedii*." Debido a la recién destrucción de su medioambiente, se recomienda que *N. naufragus* ser considerada como potencial especie en peligro.

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Literature Cited

Alvarez Del Toro, M., and H. M. Smith. 1956. Notulae Herpetologicae Chiapasiae I. Herpetologica 12:3–15.

Barbour, T. 1934. The anoles II. The mainland species from Mexico southward. Bull. Mus. Comp. Zool. 77:121–155.

Bielka, H., H. B. F. Dixon, P. Karlson, C. Liebecq, N. Sharon, E. J. Van Lenten, S. F. Velick, J. F. G. Vliegenthart, and E. C. Webb. 1984. Enzyme Nomenclature 1984. Academic Press, Orlando, Florida.

Campbell, J. A. 1989. Rediscovery of a rare Mexican lizard, *Norops milleri* (Sauria: Iguanidae). Southwest. Nat.:In press.

Duméril, A., M. Bocourt, and F. Mocquard. 1870–1909. Etudes sur les reptiles. Mission scientifique au Mexique et dans l'Amérique Centrale, Recherches Zoologiques. Imprimerie Nationale, Paris.

Fitch, H. S., and R. W. Henderson. 1973. A new anole (Reptilia: Iguanidae) from southern Veracruz, México. J. Herpetol. 7:125–128.

Guyer, C., and J. M. Savage. 1987 "1986". Cladistic relationships among anoles (Sauria: Iguanidae). Syst. Zool. 35:509–531.

Hillis, D. M. 1984. Misuse and modification of Nei's genetic distance. Syst. Zool. 33:238–240.

———. 1985. Evolutionary genetics of the Andean lizard genus *Pholidobolus* (Sauria: Gymnophthalmidae): Phylogeny, biogeography, and a comparison of tree construction techniques. Syst. Zool. 34: 109–126.

Leopold, A. S. 1950. Vegetation zones of Mexico. Ecology 31:507–518.

Meyer, J. R., and L. D. Wilson. 1971. Taxonomic studies and notes on some Honduran amphibians and reptiles. Bull. S. California Acad. Sci. 70:106–114.

Smith, H. M. 1956. A new anole (Reptilia: Squamata) from Chiapas, Mexico. Herpetologica 12:1–2.

———. 1968. Another new lizard from Mexico of the *schiedi* group of *Anolis*. Southwest. Nat. 13: 368–370.

Smith, H. M., and H. W. Kerster. 1955. New and noteworthy Mexican lizards of the genus *Anolis*. Herpetologica 11:193–201.

Smith, H. M., and L. E. Lauff. 1945. Notes on a herpetological collection from Oaxaca. Herpetologica 3:1–13.

Smith, H. M., and D. R. Paulson. 1968. A new lizard of the *schiedi* group of *Anolis* from Mexico. Southwest. Nat. 13:365–368.

Smith, H. M., and E. H. Taylor. 1950. An annotated checklist and key to the reptiles of Mexico exclusive of the snakes. Bull. U.S. Natl. Mus. 199: 1–253.

Sneath, P. H. A., and R. R. Sokol. 1973. Nu-

merical Taxonomy: The Principles and Practice of Numerical Classification. W. H. Freeman, San Francisco.

STUART, L. C. 1942. Comments on several species of *Anolis* from Guatemala, with descriptions of three new forms. Occas. Pap. Mus. Zool. Univ. Michigan 464:1–10.

———. 1955. A brief review of the Guatemalan lizards of the genus *Anolis*. Misc. Publ. Mus. Zool. Univ. Michigan 91:1–31.

WIEGMANN, A. F. A. 1834. Herpetologica Mexicana seu descriptio amphibiorum Novae Hispaniae, Pars prima. Saurorum species. Lüderitz, Berlin.

WILSON, L. D., AND J. R. MCCRANIE. 1982. A new cloud forest *Anolis* (Sauria: Iguanidae) of the *schiedei* group from Honduras. Trans. Kansas Acad. Sci. 85:133–141.

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APPENDIX I

Specimens Examined

Those specimens used in allozymic analysis are marked with an asterisk. Abbreviations for institutional collections are as follows: KU, Museum of Natural History, University of Kansas; UTA, University of Texas at Arlington; UTEP, Laboratory for Environmental Biology, University of Texas at El Paso.

Norops breedlovei.—MEXICO: Chiapas: south slope of Cerro Baúl (UTA R-11489–93); Colonia Rodulfo Figueroa, 19 km NW Rizo de Oro, 1524 m (UTA R-11494).

Norops cobanensis.—GUATEMALA: Baja Verapaz: Sierra de las Minas, 5.6 km SE Purulhá, 1554 m (UTA R-18241–47*).

Norops duellmani.—MEXICO: Veracruz: south slope Volcán San Martín Tuxtla, 800–1150 m (KU 59531–34—type series).

Norops johnmeyeri.—HONDURAS: Cortés: Cerro Cusuco, 1560 m (KU 192623); Copán: Quebrada Grande, 1340 m (KU 192624–25).

Norops milleri.—MEXICO: Oaxaca: Sierra Mixe, Totontepec (UTA R-14538–41, 18232–36*, 18237, 18238–39); 4.2 km S Totontepec (UTA R-14542–44).

Norops naufragus.—MEXICO: Hidalgo: 10.1 km NE Tlanchinol, 1237 m (UTA R-11514—holotype); 43.6 km SW Huejutla, 1372 m (UTA R-11513—paratype); 5.1 km SW Tlanchinol, 1469 m (UTA R-18658–59*—paratypes).

Norops parvicirculatus.—MEXICO: Chiapas: Municipio Berriozabal: 5 mi. N Berriozabal (UTEP 7976); 12 km (by road) N Berriozabal (UTEP 8213); 7.5 mi. NW Berriozabal (UTEP 8222).

Norops polyrhachis.—MEXICO: Oaxaca: Sierra Juárez, 8.0 km S Vista Hermosa, 1701 m (UTA R-11501); 10.9 km WSW La Esperanza (UTA R-14545*); 2.4 km S La Esperanza, 1615 m (UTA R-18231*).