

Evolutionary Ecology

Eric R. Pianka

*For this generation
who must confront the
shortsightedness of their ancestors*



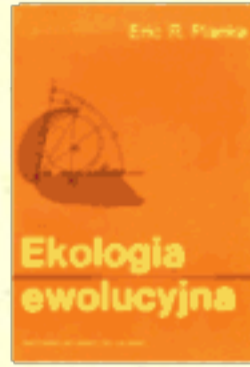
1974



1978



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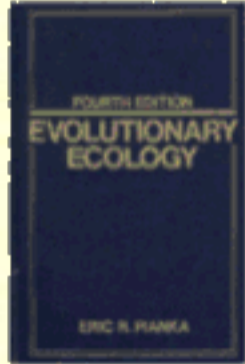
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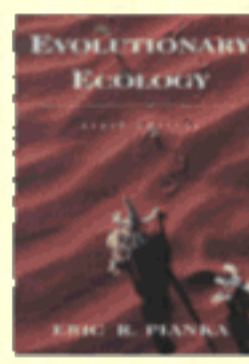
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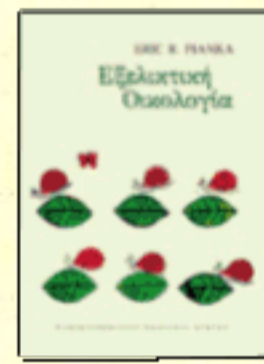
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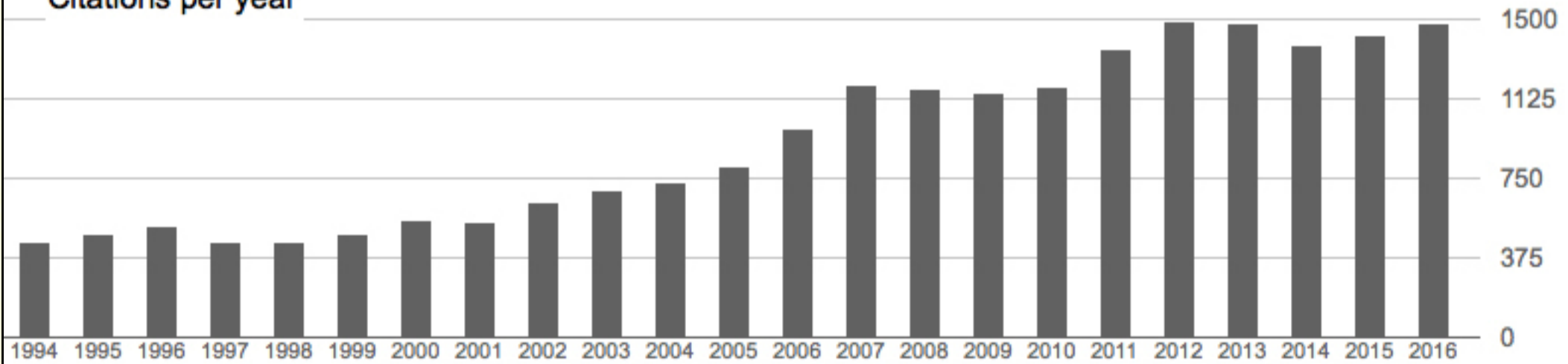


2006



2011

Citations per year



[Citation Classic](#), [Book Review](#)

Sixth Edition out of print but available used

Seventh Edition - eBook available from [Google](#)

Read On Line Here (use Safari --(other browsers may not work):

Chapter 1 - Background

Definitions and Groundwork, anthropocentrism, the importance of wild organisms in pristine natural environments, scaling and the hierarchical structure of biology, levels of approach in biology, domain of ecology, the scientific method, models, simple versus multiple causality, environment, limiting factors, tolerance limits, the principle of allocation, natural selection, self-replicating molecular assemblages, levels of selection, the urgency of basic ecological research

Chapter 2 - Classical Biogeography

Self-replicating molecular assemblages, geological past, classical biogeography, plate tectonics and continental drift

Chapter 3 - Meteorology

Major determinants of climate, local perturbations, variations in time and space, global weather modification

Chapter 4 - Climate and Vegetation

Plant life forms and biomes, microclimate, primary production and evapotranspiration, soil formation and primary succession, ecotones, classification of natural communities, interface between climate and vegetation, aquatic systems

Chapter 5 - Resource Acquisition and Allocation

Limiting factors, physiological optima and tolerance curves, energetics of metabolism and movement, resource and energy budgets, the principle of allocation, leaf tactics, foraging tactics and feeding efficiency, energetics of metabolism and movement, adaptation and deterioration of environment, heat budgets and thermal ecology, water economy in desert organisms, other limiting materials, sensory capacities and environmental cues, adaptive suites and design constraints.

Chapter 6 - Rules of Inheritance

Mendelian Genetics, nature versus nurture, selfish genes, population Genetics, Hardy-Weinberg equilibria, maintenance of variability, units of selection, genetic engineering

Chapter 7 - Evolution and Natural Selection

Agents of Evolution, Gene Flow, Genetic Drift, Segregation Distortion, Mutation, Differential Reproductive Success, types of natural selection, ecological genetics, speciation, reproductive isolating mechanisms, Galapagos finches

Chapter 8 - Vital Statistics of Populations

Individuals versus populations, population parameters, life tables and schedules of reproduction, net reproductive rate, reproductive value, generation time, stable age distribution, Leslie matrices, intrinsic rate of increase, demographic and environmental stochasticity, evolution of reproductive tactics, reproductive effort (parental investment), expenditure per progeny, patterns in avian clutch sizes, evolution of death rates and old age, joint evolution of rates of reproduction and mortality

Chapter 9 - Population Growth and Regulation

Population growth, population regulation, Pearl-Verhulst logistic equation, density dependence and independence, opportunistic versus equilibrium populations, r and K selection, population "cycles," cause

and effect, metapopulations

Chapter 10 - Sociality

Use of space, home range and territoriality, evolution of sex, sex ratio, sexual selection and mating systems, fitness and the individual's status in the population, social behavior and kin selection, reciprocal altruism, parent-offspring conflict and group selection, game theory and evolutionary stable strategies, evolution of self-deceit

Chapter 11 - Interactions Between Populations

Direct versus indirect interactions, complex examples of population interactions, mutualistic interactions and symbiotic relationships, indirect mutualisms and trophic cascades

Chapter 12 - Competition

Mechanisms of competition, Lotka-Volterra competition equations, competitive exclusion, balance between intraspecific and interspecific competition, evolutionary consequences of competition, laboratory experiments and evidence from nature, character displacement and limiting similarity, future prospects

Chapter 13 - The Ecological Niche

History and definitions, the hypervolume model, fundamental versus realized niche, resource matrices, niche breadth and overlap, niche dynamics, niche dimensions, evolution of niches, periodic tables of niches

Chapter 14 - Experimental Ecology

Design of experiments, controls, replicates, pseudoreplication, rocky intertidal experiments, other examples

Chapter 15 - Predation and Parasitism

Predation, predator-prey oscillations, "prudent" predation and optimal yield, theory of predation, functional and numerical responses, selected experiments and observations, evolutionary consequences of predation: predator escape tactics, aspect diversity and escape tactic diversity, parasitism, epidemiology, Darwinian medicine, microbiomes, coevolution, plant apparency theory, evolution of pollination mechanisms, symbiotic relationships

Chapter 16 - Phylogenetics in Ecology

Phylogeny, classification and systematics, phylogenetic systematics, vicariance biogeography, independent contrasts, the comparative method, evolutionary ecomorphology, ecological equivalents and convergent evolution

Chapter 17 - Community and Ecosystem Ecology

Systems and macrodescriptors, complex networks of interacting species, community organization, compartmentation, guild structure, trophic levels and food webs, biogeochemical cycles, principles of thermodynamics, secondary succession, transition matrices, the community matrix, pyramids of numbers, biomass, and energy, energy flow and ecological energetics, evolutionary convergence and ecological equivalents, ecotones, vegetational continua, pseudocommunities, landscape ecology and macroecology, evolution of communities

Chapter 18 - Biodiversity and Community Stability

Saturation with individuals and with species, species diversity and species richness, equitability, latitudinal

gradients in species diversity, diversity of lowland rainforest trees, types of stability, community stability

[Chapter 19 - Island Biogeography and Conservation Biology](#)

Classical biogeography, biogeographic "rules," species-area relationships, equilibrium theory of island biogeography, compression hypothesis, islands as ecological experiments: Krakatau, Galapagos finches and other examples, the taxon cycle, metapopulations, experimental biogeography, conservation biology, human impacts on natural ecosystems, hot spots of biodiversity, applied biogeography and the design of nature preserves

[References](#)

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