



Simplifying the Jargon of Community Ecology: A Conceptual Approach

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NOTES AND COMMENTS

SIMPLIFYING THE JARGON OF COMMUNITY ECOLOGY: A
CONCEPTUAL APPROACH

The fields of ecology and evolution are frequently criticized for teleological arguments and inexact language (Popper 1974; Peters 1976; Thorpe 1986; Mills et al. 1993; Frazier 1994). While some of this criticism may be misdirected (Stebbins 1977), imprecise language has led to the virtual synonymy of important terms that should retain distinct usages (see, e.g., Gould 1977; Janzen 1980; Mills et al. 1993). Clarifying ecological terminology is important not only because it facilitates clear communication but also because it makes explicit the assumptions that underlie concepts and directs attention to those in need of empirical verification. Here we focus on four key terms that are widely synonymized, ignored, or otherwise misused in the literature of community ecology: "community," "guild," "assemblage," and "ensemble." Using a Venn diagram, we provide operationally defined and distinct meanings for these often misapplied terms.

We approached this problem by considering the ways that researchers commonly limit the organisms that they study, and then we defined the resulting units as subsets of the biological world. Some researchers restrict themselves to studying groups of phylogenetically related species; these are defined by their respective taxa, as arrayed in the classical Linnean nested hierarchy, and are represented by set A in figure 1. Other researchers confine their studies to a particular physical area; these are defined by geography alone and are depicted as set B in figure 1. Others study groups of species, without regard to phylogeny or geographic distribution, that exploit the same resource. Such resource-bounded but nonphylogenetically circumscribed groups are represented by set C (fig. 1).

With these three overlapping sets—delineated by phylogeny, geography, and resources—described, it is a simple exercise to match them and their intersections with the appropriate terms (fig. 1). Set A contains taxonomic units clustered according to common descent, from populations through more inclusive groups such as families, orders, and so forth. Most researchers recognize the species as the fundamental unit of taxonomy; a variety of operational definitions for this

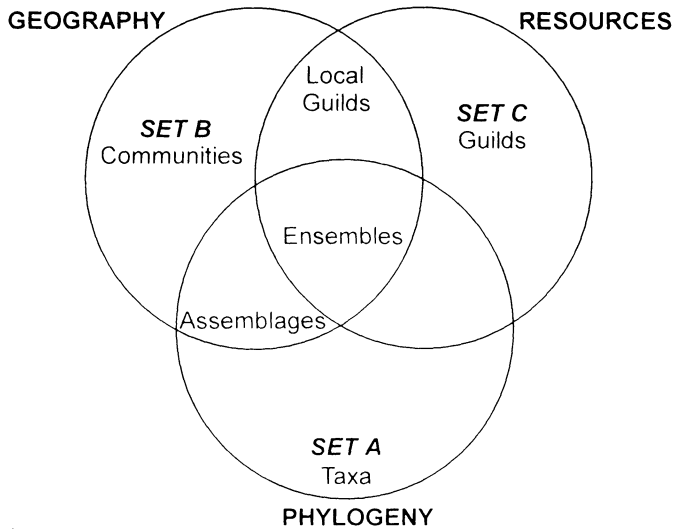


FIG. 1.—Populations under study may be divided into three distinct sets: those defined by phylogeny (*SET A*), geography (*SET B*), and resources (*SET C*). In this model, ecological “communities” are merely groups of organisms living in the same place at the same time. If we apply this meaning of community, the intersections of these sets provide operational definitions for the terms “assemblage,” “ensemble,” and “guild,” as explained in the text. The intersection of guilds and taxa denotes an entity for which no term exists, but such phylogenetically restricted groups using a common resource in different communities are generally referred to by a compound descriptor defining resource and taxon, e.g., pond-breeding salamanders.

term have been advanced in recent years, such as the biological, phylogenetic, and evolutionary species concepts (reviewed in Frost and Hillis 1990). Set B contains “communities,” which are simply defined as a collection of species occurring in the same place at the same time. This is one common (but not the only) definition of a “community” (see appendix; see also Schoener 1986). We chose this definition for its simplicity and flexibility; so long as a researcher can place boundaries around her or his study site, a community can be circumscribed easily. The boundaries may be natural (e.g., serpentine soil communities) or arbitrary (all organisms within a 1-m² plot of lawn). The main point is that, in order to constitute a community, the organisms under study must not be restricted further by phylogeny or resource use. Otherwise, a more precise term is available (see below). Set C is based on resource use and constitutes a “guild.” This is faithful to Root’s (1967, p. 335) definition of a guild as a group of species “without regard for taxonomic position” that “exploit the same class of environmental resources in a similar way.” We interpret “in a similar way” to mean in a consumptive fashion; that is, use of the resource by one species potentially makes it unavailable for use by others. Such resource-bounded but nontaxonomically circumscribed sets (e.g., foliage gleaners and cavity nesters) have generally been studied by the comparative method.

Phylogenetically related groups within a community—the intersection of set A and set B—are aptly termed “assemblages.” This conforms to common ecological usage and removes this term from synonymy with community (fig. 1). Species that share a common resource and occur in the same community—the intersection of set B and set C—comprise a “local guild.” This parallels Root’s (1967, p. 335) description of the birds on his study area as “local members of the foliage-gleaning guild.” Phylogenetically related species that exploit the same class of resources in a similar fashion, but not necessarily in the same community—the intersection of set A and set C—are commonly referred to with a compound descriptor, for example, pond-breeding salamanders. Finally, the intersection of all three sets is an “ensemble” (fig. 1) as described by Istock (1973, p. 535) as “local, taxonomically circumscribed species assemblages . . . viewed in an operational sense as collections of ecologically similar species.” Although Istock did not use the term guild in describing his notion of an ensemble, we suggest that similarity of resource use was implicit in his characterization of ecologically similar species. An ensemble is thus a phylogenetically bounded group of species that use a similar set of resources within a community. This definition conforms with prior usage (Istock 1973) and eliminates synonymy with assemblage, community, and guild. Ensembles require descriptors clarifying resource, taxon, and geography, such as the ensemble of seed-eating Mojave desert insects. Given the above definitions, the model assumes only that taxa, geography, and resources are described at a common time.

The advantages of this framework are twofold. First, no new terms are introduced. Second, it provides clear, operational definitions of important terms that have been misused so egregiously that popular textbooks either do not agree on a common definition (appendix) or do not provide one (e.g., Colinvaux 1993). In the primary literature one need only examine recent papers in any major journal to uncover numerous incongruences. Using our Venn diagram, it should be simple to identify and communicate exactly what one is studying. We suggest that closer scrutiny of the ecological lexicon will foster more precise communication and expose the assumptions hidden in colloquial meanings, thereby furthering the advance of ecology.

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APPENDIX

TABLE A1

DEFINITIONS OF "COMMUNITY" IN SEVERAL ECOLOGY TEXTBOOKS

Set Boundaries	Definition	Source
Space, time	The species that occur together in space and time.	Begon et al. 1990
Space, time, interactions	An association of interacting populations, usually defined by the nature of their interaction or the place in which they live.	Ricklefs 1990
	A group of organisms that live alongside one another, and in which the different species and individuals interact with one another.	Tudge 1991
Space, time, interactions, phylogeny	A group of interacting plants and animals inhabiting a given area.	Smith 1992
	An assemblage of interacting plants and animals on a shared site.	Freedman 1989
	Group of populations of plants and animals in a given place; ecological unit used in a broad sense to include groups of various sizes and degrees of integration.	Krebs 1985

NOTE.—All definitions are direct quotations from the glossary.

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