

# When monophyly is not enough: Exclusivity as the key to defining a phylogenetic species concept

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## Abstract

A natural starting place for developing a phylogenetic species concept is to examine monophyletic groups of organisms. Proponents of "the" Phylogenetic Species Concept fall into one of two camps. The first camp denies that species even could be monophyletic and groups organisms using character traits. The second groups organisms using common ancestry and requires that species must be monophyletic. I argue that neither view is entirely correct. While monophyletic groups of organisms exist, they should not be equated with species. Instead, species must meet the more restrictive criterion of being genealogically exclusive groups where the members are more closely related to each other than to anything outside the group. I carefully spell out different versions of what this might mean and arrive at a working definition of exclusivity that forms groups that can function within phylogenetic theory. I conclude by arguing that while a phylogenetic species concept must use exclusivity as a grouping criterion, a variety of ranking criteria are consistent with the requirement that species can be placed on phylogenetic trees.

**Keywords:** genealogical exclusivity; monophyly; phylogenetic species concept; phylogenetic systematics; species

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