

Empirical and Philosophical Problems with the Subspecies Rank

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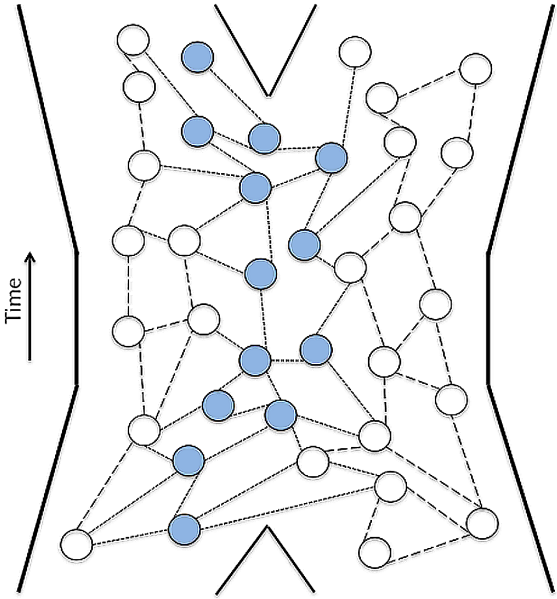
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Abstract

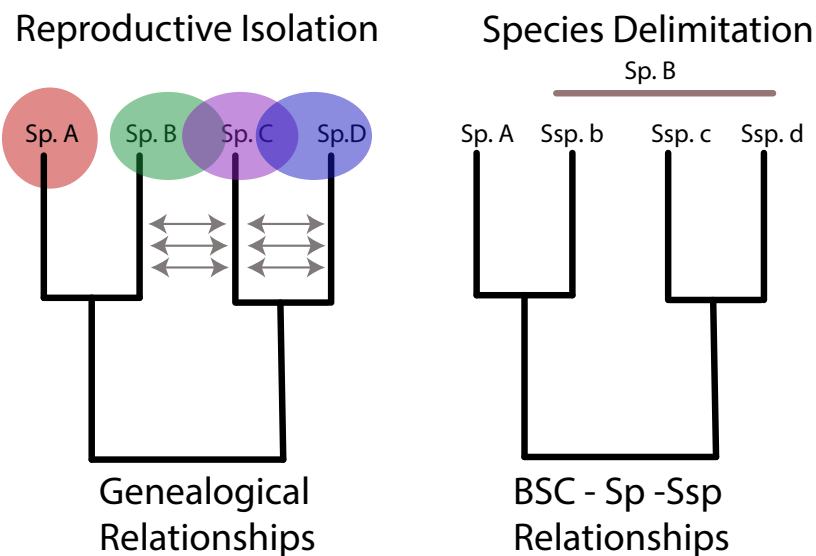
Species-level taxonomy is derived from methodological sources (data and techniques) that assess the existence of spatio-temporal evolutionary lineages via various species concepts. These concepts determine if observed lineages are independent given a particular methodology supposedly connected to ontology, which relates the metaphysical concept to what “kind” of thing a species is. Often, species concepts fail to link methodology and practice back to ontology. This lack of coherence is in part responsible for the persistence of the rank of subspecies, which in modern usage often functions as a placeholder between the evolutionary events of divergence or collapse. Thus, prospective events like lineage merger or collapse determine if a subspecies is subsumed into an existing species, or achieves species rank given unknowable future information. This is conditioned on evidence that the lineage already has a detectably distinct evolutionary history. Ranking these lineages as subspecies seems attractive given the observation that many lineages do not exhibit intrinsic reproductive isolation. We argue that the use of subspecies is indefensible on philosophical and empirical grounds. Ontologically, the rank of subspecies is either identical to that of species or undefined in the context of evolutionary lineages representing spatio-temporally defined individuals. Some species concepts more inclined to consider subspecies, like the Biological Species Concept, are disconnected from ontology and do not consider genealogical history. Even if ontology is ignored, methods addressing reproductive isolation are often indirect and fail to capture the range of scenarios linking gene flow to species identity over space and time. The use of subspecies and reliance on reproductive isolation as a basis for an operational species concept can also conflict with ethical issues governing the protection of species. We provide a way forward for recognizing and naming species that links theoretical and operational species concepts regardless of the magnitude of reproductive isolation.

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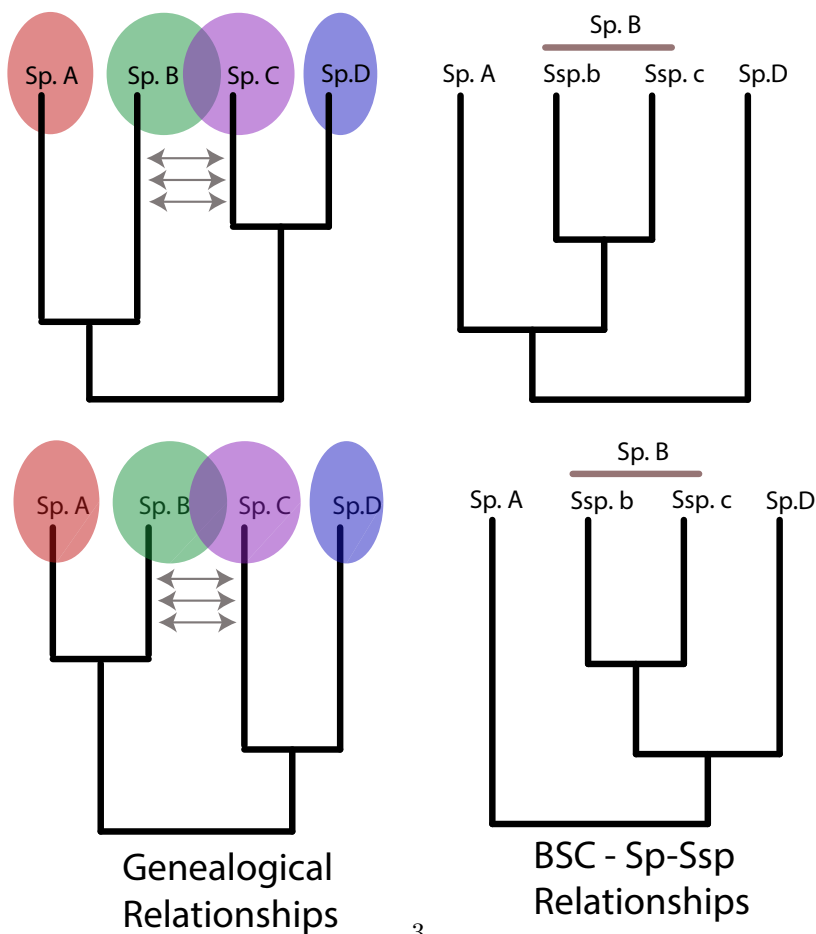
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A) Paraphyletic Outcome



B) Polyphyletic Outcome



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