

GÖTEBORG UNIVERSITY
FACULTY OF SCIENCE

RELATIONSHIPS BETWEEN NOMENCLATURE, PHYLOGENETICS AND SYSTEMATICS

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Abstract: Systematists have become increasingly aware of the limits imposed by the current system of nomenclature for accurately representing evolutionary relationships and managing efficiently names associated with clades. In reaction, a new system of nomenclature, the PhyloCode is being developed that fully recognizes the historical nature of taxonomy and the importance of the cladistics revolution. As a consequence, questions emerge about the new historical entities of systematics, questions that can be apprehended through the lens of epistemology, philosophy of language and metaphysics.

What is the ontological nature of entities that lack any other essential features besides spatiotemporal properties? How to depart from the fixed realm of immutable and transcendental essence into a worldview wherein all biological entities are characterized by their temporality and materiality? What are the consequences of nomenclatural decisions on other sectors of biology? With the ever growing sequencing capacity and tree reconstructing abilities, our conceptualization of phylogenetic relationships is changing at an unprecedented pace. Then it begs the question, what prevents communication break down when the references of clades' names are changing almost on a daily basis. These are some of the fundamental issues I am tackling in the present work.

Addressing the ontological issue, I argue that species and clades are best perceived as mereological sums of individuals, which means that each biological individual is the unique individual composed of all its less inclusive individuals and nothing more.

I propose to separate the meanings of “clade” and “monophyletic group”. I suggest to use “monophyletic” for an epithet referring to a defining property of a set (a natural kind) and “clade” for a noun which corresponds to a historical entity (an individual) resulting from evolutionary process. I present the idea that a phylename is not attached to a single clade but to a natural kind containing as members the clades that would be selected in counterfactual phylogenies. The defining properties of this natural kind are provided by the phylogenetic definition.

Finally I stress that taxonomists are also driven by the will to narrate the same sort of history, when they adjust the reference of names in light of new phylogenetic data, which leads me to submit that taxa can also be perceived as narratives.

Keywords: PhyloCode, philosophy, systematics, individuality, natural kind, possible worlds, causal theory of reference

LIST OF ORIGINAL PUBLICATIONS AND MANUSCRIPTS

This thesis is based on the following papers:

ARTICLE 1: BERTRAND, Y., PLEIJEL, F., & G.R., ROUSE, 2006. Taxonomic surrogacy in biodiversity assessments, and the meaning of Linnaean ranks. *Systematics and Biodiversity*, 4: 149-159.

ARTICLE 2: BERTRAND, Y., & M., HÄRLIN, 2006. Stability and universality in the application of taxon names in phylogenetic nomenclature. *Systematic Biology*, 55: 848-858.

ARTICLE 3: BERTRAND, Y. Species individuality and integration. Manuscript.

ARTICLE 4: BERTRAND, Y. 2008. Contrasting the general with the particular in phylogenetics - a proposal to keep the meanings of mono/paraphyletic and clade/grade separated, *Taxon*, 57: 705-708.

ARTICLE 5: BERTRAND, Y., & M., HÄRLIN, 2008 .Phylogenetic hypotheses, taxonomic sameness and the reference of taxon names. *Zoologica Scripta*, 37: 337-347.

ARTICLE 6: BERTRAND, Y., & M., HÄRLIN. Historicism and essentialism in phylogenetic biology. Manuscript.