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## Introduction

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## INTRODUCTION

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Within the systematics community there have been murmurings of late. At first, merely sporadic whispers, but more recently a low but steady drone of discontent. All of this regarding our hierarchy of classification, the so-called Linnean hierarchy. As the concept of monophyly plays an increasingly important role in evolutionary study, some systematists are asking why it does not play the central role in classification (e.g., de Queiroz and Gauthier 1992, 1994). The Twelfth Annual Southwestern Botanical Systematics Symposium, *The Linnean Hierarchy: Past, Present and Future*, examines the varied perspectives on the Linnean hierarchy. We probe the origin of the hierarchy and historical changes. We investigate the current role it plays and the seeds of dissatisfaction it has sown. Finally, we explore future prospects for the Linnean hierarchy and make suggestions for a new hierarchy.

The history of the Linnean hierarchy is insightfully reviewed by Daniel H. Nicholson (1997). Our current system, the Linnean hierarchy (actually the work of A. de Jussieu), has survived, but it has not remained static. It has changed subtly in some respects and substantively in others. The original underlying assumptions of continuous variation by Divine Creation have gradually been replaced by assumptions of discontinuous variation caused by lineages evolving through time. Even so, the ranks (i.e., family, genus, species) have remained essentially the same. Nicholson relates his perspective on the classification dilemma. The present classification hierarchy is a paradox. It cannot accommodate all of the information we desire; however, like a good book it is difficult to set aside (. . . better the Devil that you know).

The limitations of the current system of classification are illustrated by Peter R. Crane and Paul Kenrick (1997). As our understanding of the pattern of diversification of "green plants" improves, there is a growing will to give recognition to monophyletic groups (clades) in order to simplify scientific discussion. A conflict arises between incorporating our improved understanding of relationships into classifications and maintaining nomenclatural stability, as prescribed in the International Code of Botanical Nomenclature (1994). Crane and Kenrick discuss the problems as-

sociated with attempting to develop a phylogenetic classification while at the same time adhering to the Code. Three alternative phylogenetic systems of classification of the higher green plants are contrasted, some of which abandon rank while retaining hierarchy. Particularly important are the node-based definitions of monophyletic groups (e.g., Embryobiontes, Stomatophytes, Moniliformopses, etc.).

Kathleen A. Kron (1997) takes an important step in the consideration of a broader array of alternate systems of classification to the Linnean hierarchy, using Ericales as an example. Her underlying philosophy is to accurately depict evolutionary relationships in a classification. These alternate classifications range from modifications of the present system of classification, to numerical methods (i.e., Hennig 1966) and hierarchical rank-free classifications (de Queiroz and Gauthier 1992). Kron shows that nearly all of these methods are either awkward and difficult to convey or may lead to confusion in that names from the current system are used but with greatly different definitions. Instead, Kron argues that use of the de Queiroz and Gauthier approach, coupled with the application of universal name endings, avoids most of these problems.

A counterpoint is provided by Todd F. Stuessy (1997). Providing a perspective on the recent origin of cladistics, he voices a word of caution regarding the use of cladograms as a basis for classification. Stuessy argues that cladistic methods, specifically parsimony-based analysis and holophyly, are not apropos models of evolutionary diversification upon which to base systems of classification. It is suggested this is due in part to reticulate evolution and the unparsimonious course of evolution. Stuessy indicates that new methods of reconstructing phylogeny, as well as polythetic approaches to classification are still needed.

In our final paper, a phylogenetic system of classification, emphasizing common descent, is discussed in reference to nomenclature. Kevin de Queiroz (1997) points out the long-standing confusion between taxa and categories within a classification. "Linnean" nomenclature conflates this problem because the rules for names of taxonomic categories are not based upon the

taxa but the rank. As a result, if a taxon is moved from one rank to another, the name must change even though the taxon remains the same. This, de Queiroz argues, leads to ambiguity and removes a one-to-one relationship between a taxon name and the taxon to which it refers. It is suggested that use of ancestor-based definitions of taxa and a phylogenetic hierarchy that avoids ranks will ultimately “promote unambiguous, universal, and stable nomenclature for evolutionary taxa.”

Classification is essential for communication regarding biological diversity. Because diversification is ultimately an evolutionary process, our classifications must reflect evolutionary history, common descent. This goal is now being attempted at a more extensive scale than ever before. As a result, conflicts between this endeavor and classification based on the “Linnean” hierarchy are more evident. Rancho Santa Ana Botanic Garden’s Twelfth Annual Southwestern Botanical Systematics Symposium, *The Linnean Hierarchy: Past, Present and Future*, represents part of the scientific dialog that critically assesses goals and methods of classifying life. We gratefully thank the speakers and authors for their valuable and thoughtful con-

tributions and their willingness to speak heresy. We also thank the participants who contributed in discussion and sensed the winds of change.

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