PHYLOGENY AND SUBFAMILIAL CLASSIFICATION OF THE GRASSES

(POACEAE)[1]

Grass Phylogeny Working Group[2, 3]

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ABSTRACT

A large collaborative effort has yielded a comprehensive study of the phylogeny and a new subfamilial classification of the grass family (Poaceae/Gramineae). The study was conducted on an integrated and representative set of 62 grasses (0.6% of the species and ca. 8% of the genera) plus four outgroup taxa using six molecular sequence data sets (*ndhF*, *rbcL*, *rpoC2*, *phyB*, *ITS-II*, and GBSSI or *waxy*), chloroplast restriction site data,

and morphological data. A parsimony analysis using 2143 informative characters (the combined analysis) resulted in a single most parsimonious tree of 8752 steps with an RI of 0.556 and bootstrap support of >90% for more than half of the internal nodes. Significant relationships that appear consistently in all analyses of all data sets and are strongly supported by the combined analysis include the following: Joinvilleaceae is sister to a monophyletic Poaceae; the earliest diverging lineages of the Poaceae are Anomochlooideae, Pharoideae, and Puelioideae, respectively; and all remaining grasses form a clade. A number of monophyletic clades were recovered, including Bambusoideae s. s., Ehrhartoideae, Pooideae s. l., Aristidoideae, Danthonioideae s. s., Chloridoideae s. s., Chloridoideae s. l., Panicoideae, Parianeae, Olyreae s. s., Oryzeae, Stipeae, Meliceae, *Lygeum + Nardus*, and *Molinia + Phragmites*. The PACCAD Clade is monophyletic, containing Aristidoideae, Danthonioideae, Arundinoideae s. s., Chloridoideae s. l., Centothecoideae, Panicoideae, *Eriachne*, *Micraira*, and *Gynerium*. Based on the phylogeny, a classification of eleven previously published subfamilies (Anomochlooideae, Pharoideae, Puelioideae, Bambusoideae, Ehrhartoideae, Pooideae, Aristidoideae, Arundinoideae, Chloridoideae, Centothecoideae, and Panicoideae) and one new subfamily (Danthonioideae) is proposed. Several changes in the circumscription of traditionally recognized subfamilies are included. Previous phylogenetic work and classifications are reviewed in relation to this classification and circumscription, and major characteristics of each subfamily are discussed and described. The matrix, trees, and corollary data are available at
http://www.virtualherbarium.org/grass/gpwg/default.htm