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NOMENCLATURAL CHANGES IN POLEMONIACEAE

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Abstract

Recent molecular phylogenetic analyses of nuclear, chloroplast and mitochondrial DNA of Polemoniaceae have prompted a reexamination of morphological data and a reassessment of current taxonomy. These studies prompt several nomenclatural changes in the family. Eight taxa formerly included in Gilia section Giliastrum are transferred to the genus Giliastrum. In addition, two new tribes of Polemoniaceae are recognized.

Key words: Gilia, Giliastrum, Polemoniaceae, taxonomy, tribes.

Introduction

Quantitative phylogenetic analyses of the Polemoniaceae based on morphological (Porter 1993; unpubl.) and molecular data, including nuclear ribosomal ITS (Porter 1993, 1996), chloroplast matK (Johnson and Soltis 1995; Johnson et al. 1996), chloroplast trnL-trnF region (Porter and Johnson, unpubl.), and mitochondrial nad1 intron (Porter and Johnson 1998), have prompted a reexamination of the current taxonomy and classification (Grant 1959) of the family. These data unanimously provide evidence that Gilia is polyphyletic (Johnson et al. 1996; Porter 1996) and that the current tribal classification is dubiously supported. A step in ameliorating this situation is the recognition of Aliciella (Porter 1998), formerly Gilia section Gillandra, in addition to G. latifolia S. Wats. and G. ripleyi Barney. This short note proposes nomenclatural changes that will further remove disparate lineages formerly included in Gilia. In addition two new tribal names are provided, supported by multiple gene phylogenies (e.g., Johnson et al. 1996; Porter 1996), to facilitate discussion of higher-level diversification in Polemoniaceae. Even so, the genus Gilia remains a problem. Several species included in Gilia clearly do not belong in the genus, and are treated below in different tribes! This note continues, but does not complete, needed nomenclatural changes. Ongoing research should clarify the relationships and taxonomy of these Gilia species.

New Combinations in the Genus Giliastrum

In addition to Aliciella, another element formerly included in Gilia is supported as both monophyletic and a lineage distant from Gilia. This clade corresponds to Gilia section Giliastrum sensu Grant (1959), excluding Gilia tenerrima A. Gray, G. campanulata A. Gray, G. filiformis Parry, G. maculata Parish, G. palmeri S. Wats., and G. glutinosa Phil. As a generic name already has been erected by Rydberg, eight taxa are transferred to the genus Giliastrum. The monophyletic genus Giliastrum is characterized by pale to deep blue, rotate corollas, bright yellow anthers, and peritecte to semitectate pollen grains with zonate pori and spinule processes, in addition to a suite of unusual developmental characters. Both Gilia palmeri and G. glutinosa lack the characteristic pollen morphology, but may be closely related. However, until more conclusive evidence is brought to bear on the problem, they are excluded from Giliastrum.

Gilia Ruiz & Pavón subgenus Greenephila Brand section Gilias­
trum Brand in Engler, Pflanzen. IV. Fam. 250: 147. 1907. Type
species: Giliastrum rigidulum (Benth.) Rydb.

Perennial, or annual herbs, glandular puberulent, with sparse nonglandular trichomes, or glabrous. Leaves alternate, entire, toothed to pinnatifid, gradually reduced in size in the inflorescence. Flowers perfect, in dichasia. Calyx campanulate, 5-lobed or 5-cleft; the tube scarious in the sinuses and ruptured by the fruit. Corolla rotate-funnelform, the lobes much longer than the tube, abaxial (external) surface glabrous, adaxial (internal) tube pubescent or glabrous. Stamens equally inserted in the lower portion of the corolla tube, filaments pubescent, papillate or glabrous basally. Carpels 3, fused, style with 3 stigmatic lobes, apex of ovary glandular puberulent to glabrous. Fruit a loculicidal capsule, ellipsoidal or globose in shape. Seeds several per carpel, seed coat producing mucilage when wetted. n= 6, 9, 10, 12, 18 (Covas and Schnack 1946; Grant 1959; Weedin and Powell 1978, 1980; Ward and Spellenberg 1986)

1. Giliastrum foetidum (Gillies ex Benth.) J. M. Por­
ter, comb. nov.
Basionym: *Gilia foetida* Gillies ex Benth. in DC., Prodr. 9: 313. 1845.


3. *Giliastrum ludens* (Shinners) J. M. Porter, comb. nov.


5. *Giliastrum incisum* (Benth.) J. M. Porter, comb. nov.


TRIBAL TAXONOMY

Following Grant’s (1959) classification of Polemoniaceae, no nomenclatural changes have been proposed, in spite of a vast accumulation of new data (reviewed in Johnson et al. 1996; Porter 1996) and frequent calls for such change (e.g., Day and Moran 1986). Consistent phylogenetic inferences from both chloroplast and nuclear gene phylogenies provide a new insight into tribal classification. Two new tribes are proposed. These tribes correspond to clades discussed by Johnson et al. (1996) and Porter (1996). Note that several miscellaneous species of *Gilia* are included in both tribes. These species are believed to be better treated outside of the genus *Gilia*, however, the nomenclatural changes are being addressed elsewhere.

Tribe *Phlogieae* (Reichb.) J. M. Porter & L. A. Johnson, trib. nov.


*Plantae annuae vel perennes, subfruticosae; foliis oppositis vel raro alternis; corolla regulari, campanulata vel hypocrateriformi vel infundibuliformi.*

Type: *Phlox glaberrima* L.

The tribe can be phylogenetically defined as the most inclusive clade that includes *Phlox glaberrima* L., *Linanthus dichotomus* Benth., *Leptodactylon californicum* Hook. & Arn., *Linanthus liniflorus* (Benth.) Greene, *Gymnosteeris nudicaulis* (Hook. & Arn.) Greene, *Gilia filiformis* Parry, *Gilia maculata* Parish, *Gilia campanulata* A. Gray, and *Gilia inyoensis* Johnston, but not *Polemonium cernuum* L., *Gilia splendens* Dougl. or *Aliciella latifolia* (Wats.) J. M. Porter. Tribe Phlogieae can be characterized as annual and perennial herbs, or shrubs; leaves opposite, rarely alternate, leafy throughout; corollas radially symmetric, campanulate, funnelform, or salverform. Included in the tribe are the following genera and species: *Gymnosteeris*, *Linanthus*, *Leptodactylon*, *Phlox*, *Gilia filiformis*, *Gilia maculata*, *Gilia campanulata*, and *Gilia inyoensis*.

Tribe *Loeselieae* J. M. Porter & L. A. Johnson, trib. nov.

*Plantae annuae vel perennes, subfruticosae; foliis alternis vel raro oppositis; corolla interdum regulari, interdum bilabiata vel subbilabiata, rotata vel hypocrateriformi vel infundibuliformi; ovarium interdum glandulosum interdum glaberum.*

Type: *Loeselia ciliata* L.

The tribe can be phylogenetically defined as the least inclusive clade that includes *Aliciella subnuda* (A. Gray) J. M. Porter, *Ipomopsis rubra* (L.) Wherry, *Loeselia ciliata* L., *Eriastrum densifolium* (Benth.) Mason, *Gilia rigidula* Benth. and *Gilia scabra* Brandegee. Tribe Loeselieae can be characterized as annual and perennial herbs, or shrubs; leaves alternate, rarely opposite (in *Loeselia*), leafy throughout, or in some annual species with leaves much reduced in size in the inflorescence; corollas bilaterally or radially symmetrical, campanulate, funnelform, or salverform; ovary frequently glandular distally. Included in the tribe are the following genera and species: *Aliciella*, *Ipomopsis*, *Eriastrum*, *Langloisia*, *Loeseliastrum*, *Loeselia*, *Gilia scabra* Brandegee, *G. palmeri*, *G. glutinosa* and *Giliastrum* (as circumscribed above).
LITERATURE CITED


