

the portions of the corolla. The results are compared with data on the variation of ray-floret length in *Senecio vulgaris* L.. The use of ray-floret size in identification and classification of ligulate members of the Asteraceae is questioned.

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- A biosystematic study of Rocky Mountain populations of *Sisyrinchium* section *Bermudianae*.

Since the early 1900's, when Bicknell and Greene described many of the North American species of *Sisyrinchium* (Iridaceae), only the Pacific Northwestern members of the genus have received a biosystematic treatment. As a result, much confusion still exists regarding the taxonomy of other populations. A biosystematic study of the Rocky Mountain populations was made to discover and define discontinuities with taxonomic value. Detailed morphological examinations were supplemented with chromosome counts, flavonoid chromatographic patterns, breeding system studies, and artificial hybridizations. Based on data gathered from these areas, five groups were defined. Three of these correspond to *S. idahoense* (including *S. heterocarpum* and *S. juncellum*), *S. montanum* (including *S. alpestre* and *S. heterocarpum*), and *S. septentrionale*. A fourth group, *S. radicum*, is tentatively being separated from the closely related *S. demissum*. The fifth represents a new species: *S. pallidum* Cholewa sp. nov. ined., which is characterized, in part, by pale blue flowers.

CHUANG, T. I.\* and L. R. HECKARD. Department of Biological Sciences, Illinois State University Normal, IL 61761 and Jepson Herbarium, Department of Botany, University of California, Berkeley, CA 94720. - Systematic significance of seed-surface features in *Orthocarpus* (Scrophulariaceae).

Scanning electron microscope and light microscope examination of seed-coat features of 26 species of *Orthocarpus* have allowed recognition of many species-level differences (summarized in a key) and of three seed-coat types that parallel taxonomic subgroups but support realignments at generic and infrageneric levels. Type 1 seeds (subg. *Orthocarpus*, sect. *Orthocarpus*) have a lateral hilum, sculptured inner tangential seed-coat walls, and a tightly fitting outer seed coat. They are very similar to seeds of *Cordylanthus*. Seeds of Types 2 and 3 have a terminal hilum and membranous inner tangential cell walls. Type 2 seeds (subg. *Orthocarpus*, sects. *Castillejoidea* and *Cordylanthoides*, with one exception) have a net-like, loosely fitting outer seed coat that shows close relationship to seeds of *Castilleja*. Inner tangential walls of Type 2 seeds normally rupture. Type 3 seeds (subg. *Triphysaria*, with two exceptions) have a tightly fitting outer seed coat and inner tangential walls are always retained. Seed features support evidence from floral morphology and chromosome numbers that *Orthocarpus* as currently recognized is not a monophyletic lineage.

CLARK, CURTIS. Biological Sciences, California State Polytechnic University, Pomona CA 91768. - Systematics and biogeography of the *Encelia frutescens* alliance (Asteraceae: Heliantheae). *Encelia frutescens* and three other taxa comprise a monophyletic group diagnosed by

a scant strigose leaf pubescence of short, broad multicellular hairs, and reduced or missing rays. The taxonomy of the group has been confused by inadequate collection, interspecific hybridization, and misinterpretation of the importance of raylessness. Recent treatments lump all four taxa plus one distantly related species and two hybrids in a single polymorphic species. Cladistic analysis provides an hypothesis of relationships among the taxa. *Encelia resinosa*, the sister taxon of the other three, has the most northern distribution, in the deserts of the Colorado Plateau. *E. "Grand Canyon"*, sister taxon to the remaining two, occurs only in its namesake. The two remaining taxa, *E. frutescens* and *E. "San Felipe"*, may represent a single evolutionary species; the former is widespread in the northern Sonoran and Mojave deserts and the latter inhabits northeastern Baja California. From vegetation records preserved in ancient woodrat nests, it is evident that as recently as 8000 yr b.p. the region was too cold to support the species in their present form. The older species have moved north into areas of new desert, and newly derived species now occupy the harsher deserts to the south.

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- Bud morphology in *Chusquea* (Poaceae: Bambusoideae).

*Chusquea*, the largest genus of bamboos, with over 100 species, is distinguished by its solid culms, multiple independent buds per node and chromosome number of  $2n=40$ . The bud complement in *Chusquea*, consisting of one primary bud subtended by 2- numerous smaller independent subsidiary buds, apparently is unique among bamboos. The bud morphology of approximately 50 species of *Chusquea* was investigated using dried bulky specimens or material fixed in FAA. Two types of primary buds were found within *Chusquea*. One, the "triangular" type, is much more common and like those of other bamboos. The other, the "circular" type, to date has been found in only nine species of *Chusquea*. The arrangement of the subsidiary buds is highly variable, and appears to be species-specific. Among the species studied, 10 basic patterns of bud arrangement are recognized, with individual variation in the prophyllum, size of buds and other characters occurring according to species. These bud patterns appear to be important in determining evolutionary trends within the genus.

CLEMANTS, STEVEN E. Herbarium, New York Botanical Garden, Bronx NY 10458. - Flavonoids of *Befaria*. The genus *Befaria* (Ericaceae: Rhododendroideae), the only member of the tribe *Befarieae*, was surveyed for leaf flavonoids. Quercetin glycosides are found throughout the genus. Of more limited distribution and thus more interesting taxonomically, are myricetin glycosides, 3,5-O-dimethylquercetin (Caryotin) and 5-O-methylflavonol glycosides. Flavonol aglycones are also present in some species. The *Befarieae* is often placed near the *Cladothamneae* because they are both polypetalous, however the *Cladothamneae* lack 5-O-methylflavonols and Caryotin. The *Rhodoreae*, also considered closely related to the *Befarieae*, have 5-O-methylflavonols and Carotin