

polyploid *S. cernua* and both diploids but not between the diploid taxa. *S. cernua* reaches peak flowering 2 weeks before *S. ochroleuca* and *S. magnicamporum* which flower simultaneously. *S. cernua* occurs over a range of soil pH, but often in relatively moist soil. *S. ochroleuca* and *S. magnicamporum* are both characteristic of relatively dry sites but the former is restricted to acid substrates while the latter favors alkaline soil. The 3 species correspondingly differ in cover values of associated species. The presence of morphological, phenological and ecological differences in a region of sympatry and the fact that these patterns are consistent over a much broader geographic area, supports specific rank for the 3 taxa.

CURTIS CLARK* and DONALD W. KYHOS. Department of Botany, University of California, Davis CA 95616.--Origin of species by hybridization in *Encelia* (Compositae--Heliantheae).

Evidence suggests that species may have arisen in *Encelia* by the formation of fertile diploid hybrids in areas of contact between existing species, and subsequent reproductive stabilization and expansion of these hybrids into new environments created by climatic change. The hybrid *E. laciniata* is an example of the first stage; it is a result of hybridization between coastal *E. ventorum* and inland *E. palmeri*, and commonly occupies intermediate habitats. *Encelia asperifolia* may represent the end-product of the process; it appears to be a stabilized hybrid of *E. frutescens* of the Colorado Desert and *E. californica* of the coastal sage scrub, which could have formed when these species were in closer proximity in central Baja California during glacial times, and subsequently expanded into the new habitats created by postglacial changes in climate.

W. DENNIS CLARK and GREGORY K. BROWN. Department of Botany and Microbiology, Arizona State University, Tempe, Arizona 85281. - Problems concerning the use of involucre shape as a taxonomic character in South American *Haplopappus* (Compositae).

The involucre shapes among South American *Haplopappus* species (sensu Hall) have not been practical for separating sections due to the seemingly high variability of this character. However, field observations reveal that three basic trends are evident which can be useful in distinguishing groups: hemispheric (sections *Haplopappus* and *Steriphe*), campanulate (section *Polyphylla*) and cylindrical (section *Xylolepis*). This discrepancy has been due in part to a reliance on pressed herbarium specimens in earlier treatments. We have observed that the involucre shapes of fresh specimens are considerably altered when pressed.

DANIEL J. CRAWFORD, Department of Botany, Ohio State University, Columbus, Ohio 43210. - Allozyme studies in *Chenopodium incanum*: infraspecific variation and comparison with *C. fremontii*.

Allozymes coded by 13 genes were examined by starch gel electrophoresis in populations of the three varieties of *Chenopodium incanum*, a species of widespread occurrence in the western United States. With the exception of two alleles in very low frequencies in *C. incanum* var. *elatum*, no unique alleles were encountered in any one variety. Genetic distances among the varieties indicate that each variety

is differentiated. The enzyme data correlate with small but consistent morphological differences and provide further support for taxonomic recognition of the subspecific entities. Morphologically, *C. incanum* is closest to *C. fremontii* and the two have been treated as conspecific and distinct only at the varietal level. Allozyme data indicate considerable genetic divergence between the two species, with the genetic distance between *C. fremontii* and the varieties of *C. incanum* being much greater than the distance between the varieties themselves. Enzyme data lend no support to the hypothesis that *C. fremontii* and *C. incanum* hybridize in certain parts of their geographic ranges.

THEODORE J. CROVELLO* and DOUGLAS C. MILLER. Department of Biology, University of Notre Dame, Notre Dame, Indiana 46556 - Floristic analysis of the Brassicaceae of The Soviet Union.

The Soviet Union encompasses 15 percent of the world's land surface, so taxonomists and biogeographers seek an understanding of taxa found there. The purposes of this paper are: to present floristic analyses of the Brassicaceae of The Soviet Union; to understand the distribution of species restricted to parts of The Soviet Union; and to describe how computers helped obtain a fast and economical understanding of many floristic properties of a large family in a vast geographic area. Data for analyses were obtained from published works, especially from the 1939 treatment of the family by Bush in The Flora Of The USSR. Results covered four areas of interest to systematists: taxonomy; ecology and biosystematics; phytogeography; and geographically restricted species. Perhaps the most valuable, longterm result is the computerized data base of this information. Maintained at the University of Notre Dame, it is available for searching by interested workers. Phytogeographic results were of two kinds: those describing relations among taxa or Operational Taxonomic Units (OTU's); and those describing relations among regions, or Operational Geographic Units (OGU's). In both cases the use of ordination techniques and three dimensional computer graphics provided deep insights into relationships. Geographically restricted species showed both high absolute and relative frequency in The Caucasus and Soviet Middle Asia. In the Arctic only the relative frequency of restricted species was high. Integrated computer systems that can provide meaningful information retrieval, statistical analysis, and computer graphics can be very valuable in systematic work.

L. J. Davenport. Department of Biology, University of Alabama, University, AL 35486. - Adaptive significance of morphometric variation in *Potamogeton nodosus* Poiret (Potamogetonaceae).

Species of *Potamogeton* have long been noted for marked morphological variability. This variability has generally been considered to be an effect of the microenvironment acting on a rather plastic phenotype--a phenomenon which has resulted in much taxonomic confusion. In this study, a correlation coefficient matrix was generated involving 11 morphological characters and 8 climatic factors for 52 populations of *Potamogeton nodosus*. Significant negative correlations were obtained between peduncle and spike characters and temperature, indicating that longer and stouter peduncles and spikes were produced by plants occupying colder climates. These results suggest that individual plants with long peduncles and spikes would have a selective advantage in colder areas. Such plants would be able to buoy the flowers up above the water surface for a greater portion of the shortened growing season, maximizing the chances of effective fertilization.