

Cluster analysis of eight Caryophyllids using structural and pigment characters

G. L. T. Godagedara and S. P. Senanayake

Department of Botany, University of Kelaniya, Sri Lanka,

Caryophyllidae is a subclass of three orders; Caryophyllales, Polygonales and Plumbaginales and includes familiar ornamentals (carnations, champions) and agricultural plants (beets, spinach). The pollen morphology, specific P-type sieve-element plastids, embryological features and the distributional pattern of pigments are the important taxonomic characters used in the previous classifications of the subclass.

Selected morphological, stem and leaf anatomical characters of eight taxa; *Gomphrena globosa*, *Celosia argentea*, *Amaranthus spinosus*, *Amaranthus viridis*, *Talinum paniculatum*, *Mirabilis jalapa*, *Antigonon leptopus* and *Plumbago auriculata* representing three orders, were observed and photomicrographs were prepared. Pigment distribution in their leaves and floral parts were studied using paper chromatography in solvent systems; BAW (Butanol-Acetic-acid-Water), forestal (acetic acid: Conc. HCl: H₂O: 30: 3: 10) and 15% acetic acid. The variations were evaluated based on population samples obtained from their natural habitats. Multi access key was developed using DDescription Language TAXonomy (DELTA) package.

To study the phenetic relationships among the eight taxa, a set of 65 characters; 35 pigment characters and 30 structural characters, were analyzed using SYNTAX 2000 package. The cluster analysis indicated that the orders Polygonales and Plumbaginales have deviations with the order Caryophyllales with respect to their floral and leaf flavonoid distribution while the similarities of these orders were observed in structural characters. The main supportive evidence for deviation is the presence of anthocyanins in Polygonales and Plumbaginales and betalains in Caryophyllales. The present findings are in agreement with the view of Cronquist (1981) and Dahlgren (1983) which indicated the close relationship between order Caryophyllales and anthocyanin producing orders; Polygonales and Plumbaginales.