

Taxonomic Revisiting and Phylogenetic Placement of Two Endangered Plant Species: *Silene leucophylla* Boiss. and *Silene schimperiana* Boiss. (Caryophyllaceae)

Abstract

The genus *Silene* L. is one of the largest genera in Caryophyllaceae, and is distributed in the Northern Hemisphere and South America. The endemic species *Silene leucophylla* and the near-endemic *S. schimperiana* are native to the Sinai Peninsula, Egypt. They have reduced population size and are endangered on national and international scales. These two species have typically been disregarded in most studies of the genus *Silene*. This research integrates the Scanning Electron Microscope (SEM), species micromorphology, and the phylogenetic analysis of four DNA markers: ITS, *matK*, *rbcL* and *psb-A/trn-H*. Trichomes were observed on the stem of *Silene leucophylla*, while the *S. schimperiana* has a glabrous stem. Irregular epicuticle platelets with sinuate margin were found in *S. schimperiana*. Oblong, bone-shaped, and irregularly arranged epidermal cells were present on the leaf of *S. leucophylla*, while *Silene schimperiana* leaf has “tetra-, penta-, hexa-, and polygonal” epidermal cells. *Silene leucophylla* and *S. schimperiana* have amphistomatic stomata. The Bayesian phylogenetic analysis of each marker individually or in combination represented the first phylogenetic study to reveal the generic and sectional classification of *S. leucophylla* and *S. schimperiana*. Two *Silene* complexes are proposed based on morphological and phylogenetic data. The *Leucophylla* complex was allied to section *Siphonomorpha* and the *Schimperiana* complex was related to section *Sclerocalycinae*. However, these two complexes need further investigation and more exhaustive sampling to infer their complex phylogenetic relationships.