



Epimedium tianmenshanensis (Berberidaceae), a new species from Hunan, China

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Abstract

A distinctive, previously undescribed species of *Epimedium* (Berberidaceae), which we propose naming *E. tianmenshanensis*, was found during a floristic survey in Hunan, China. It is similar to *E. baojingense* and *E. franchetii*, but has smaller flowers and petals with a short, blunt spur. We determined the phylogenetic position of the new species using DNA sequences of nuclear ITS and two chloroplast regions (*atpB-rbcL* intergenic spacer and *matK*). Molecular evidence indicates that *E. tianmenshanensis* occupies a distinct group related to *E. baojingense*.

Keywords: Berberidaceae, *Epimedium tianmenshanensis*, phylogeny

Introduction

Epimedium Linnaeus (1753: 117; barrenwort) is the largest and most morphologically diverse genus of the herbaceous Berberidaceae (Ying *et al.* 2011). Members of the genus occur in woodland or scrub in temperate hilly or mountain areas, from the Mediterranean region, through western Asia into China and Japan (Ying 2002, Zhang *et al.* 2007). As currently circumscribed, the genus comprises more than 60 species, of which 52 taxa are endemic to China (Guo *et al.* 2008, Ying 2001, 2002). Furthermore, accounts of several new species from China have been published in recent years (Guo *et al.* 2007, He & Xu 2003, Zhang & Li 2009, He *et al.* 2010, Sheng & Tian 2011). Plants of *Epimedium* are used in traditional Chinese medicine and are reported to be effective in strengthening the kidneys, curing rheumatism and treating osteoporosis, hypertension, and coronary heart disease (Guo & Xiao 1999, Sun *et al.* 2005), as well as strengthening immunity and preventing dementia (Sheng & Tian 2011).

Species delimitation in *Epimedium* has been problematic because of high levels of morphological variation (Sun *et al.* 2005). With the recent publications of additional species, determining the infrageneric relationships in *Epimedium* has become a great challenge (Sun *et al.* 2005). Floral characters, such as petal type, the form and relative size of the petals and inner sepals, and flower dimension are important for the delimitation of species in *Epimedium*.

Based on the presence/absence of cauline leaves, the genus has been divided into two subgenera, namely *Epimedium* subg. *Epimedium* and *E.* subg. *Rhizophyllum* (Fischer & Meyer) Stearn (2002: 164); the former is divided into four sections (*E.* sects. *Diphyllon* (Komarov) Stearn (2002: 48), *Epimedium*, *Macroceras* C. Morren & Decaisne (1834: 349) and *Polyphyllon* Stearn (2002: 154)) with geographical determinants (Stearn 2002). Species native to China have been grouped within *E.* subg. *Epimedium* sect. *Diphyllon*, characterized by having two opposite cauline leaves usually with three leaflets.

During field investigations and herbarium studies of the “Wuling Mountains National Nature Reserve Group”, we found an unusual isolated population of *Epimedium* from Tianmenshan National Geological Park, Zhangjiajie City in northwestern Hunan. Subsequent taxonomic studies revealed that plants of this population could be morphologically assigned to *E.* subg. *Epimedium* sect. *Diphyllon*, but differed substantially from all known species of *Epimedium*. Based on a review of the taxonomic literature, including the Flora of China (Ying *et al.* 2011), as well as comparisons