



## Pollen morphology of *Youngia* and six related genera (Asteraceae: Cichorieae) and its systematic significance

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### Abstract

The pollen morphology of 15 species representing four sections of *Youngia* and 11 species from six other genera of the tribe Cichorieae was investigated. Measurements and observations were conducted through scanning electron microscopy. This study aims to provide new and useful information regarding the extent of pollen morphological diversity within the genus *Youngia* and related genera in the tribe Cichorieae and thus to contribute to a better understanding of the taxonomy and evolution of these groups. Six pollen types, distinguished primarily by the number of apertures and spines in the polar region, are described. Palynological characters are not useful for the delimitation of *Youngia* and its closely related genera *Crepidiastrum*, *Ixeridium*, and *Crepis* at the generic level, and did not fully resolve the relationships between the groups. The distinction of *Faberia* from the other members of the subtribe Crepidinae is supported by the pollen characters. Pollen morphology also did not support that *Youngia* sect. *Desiphylum* sensu Babcock and Stebbins may be separated at the generic level either as *Tibetoseris* or *Pseudoyoungia*. Four pollen types were found in *Youngia* s.l., i.e. *Y. racemifera* type, *Y. japonica* type, *Y. prattii* type and *Y. sericea* type, which partly reflect the sectional classification of *Youngia* sensu Babcock and Stebbins. The systematic position of *Y. racemifera* should be reconsidered according to pollen characters. The pollen data suggest that *Y.* sect. *Mesomeris* is not monophyletic, and the relationships of its species require further examination.

### Introduction

The circumscription of the genus *Youngia* Cassini (1831: 88) (Asteraceae: Cichorieae) remains controversial, and the genus has traditionally been difficult to delimit from the other genera of the tribe Cichorieae, such as *Crepis* Linnaeus (1753: 805), *Paraixeris* Nakai (1920: 155), *Faberia* Hemsley (1888: 479), and *Prenanthes* Linnaeus (1753: 797) s.l. (incl. *Nabalus* Cassini (1825: 94)) (Babcock & Stebbins 1937, Kitamura 1942, Shih 1993, 1997, Shih & Kilian 2011). *Youngia* as a genus was first described by Cassini (1831: 84) and later was treated as a section under *Crepis* (Bentham 1873: 163). Babcock & Stebbins (1937) restored the generic status of *Youngia* and subdivided this genus into six sections.

The genus *Youngia* has not been completely revised yet. However, several papers included partial revisions and descriptions of new species. Sennikov & Illarionova (2008) changed the circumscription of *Youngia* on the basis of carpological analysis. They separated three genera from *Youngia*, namely *Tibetoseris* Sennikov in Sennikov & Illarionova (2008: 96) (syn. *Youngia* sect. *Desiphylum* Babcock & Stebbins (1937: 25)), *Sonchella* Sennikov in Sennikov & Illarionova (2008: 96) (syn. *Youngia* sect. *Stenophytum* Babcock & Stebbins (1937: 25)), and *Crepidifolium* Sennikov in Sennikov & Illarionova (2008: 96) (syn. *Youngia* sect.