

Secondary pollen presentation syndromes of the Asterales — a phylogenetic perspective

By

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With 39 figures

Abstract

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Dedicated to our dear colleague Professor Dr. Günther Osche, Freiburg im Breisgau (Germany), on the occasion of his 80th birthday.

Mechanisms of secondary pollen presentation in Campanulales and Asterales have evolved from two very similar, but independently originated preadaptive “basic syndromes”. In contrast to our earlier phylogenetic interpretation (Leins & Erbar 2003 a, b) in which we proposed a deposition mechanism in Campanulales (Cyphiaceae) and Asterales (Calyceraceae) as starting point, a recent extended phylogenetic analysis allows a revised, more plausible interpretation. In our new models the pump mechanism of Lobeliaceae is assumed to be basal to the other mechanisms in Campanulales s.str. (Fig. 38), and the cup mechanism of Goodeniaceae to those of Asterales s.str. (Fig. 39).

Loss of style elongation in a pump mechanism leads to the “pollen box” in *Cyphia*, out of which pollen may be transferred onto the pollinators in portions by pushing down the pollen box. Pollen portioning in Campanulaceae s.str. is achieved by a non-simultaneous retraction of stylar hairs between which pollen is deposited. Portioning by brushing (with the aid of the coherent corolla lobes) in *Phyteuma* is derived from the typical deposition mechanism in the family Campanulaceae by an incomplete hair retraction. Within the Asterales s.str. the deposition and primitive brushing mechanism of the subfamily Barnadesioideae can readily be related to the simple deposition mechanism of Calyceraceae, sister to Asteraceae.

Keywords: secondary pollen presentation, pollen portioning, Campanulales, Asterales, phylogeny.

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