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New Results in Floral Biology of *Asclepiadoideae* (*Apocynaceae*)

By

Sigrid LIEDE-SCHUMANN*)

Recent progress in the phylogeny of *Apocynaceae* and, in particular, *Asclepiadoideae* (LIEDE 2001, LIEDE & TAUBER 2002, LIEDE & al. 2002a, b, LIEDE-SCHUMANN & al. 2005, MEVE & LIEDE 2002, RAPINI & al. 2003, VERHOEVEN & al. 2003) allows for better understanding of pollination patterns and the correlated morphological and chemical features. Despite the complex floral structure of the *Asclepiadoideae*, self-pollination is known for the genera *Vincetoxicum* WOLF and *Tylophora* R. BR., highly derived genera of the tribe *Asclepiadeae*. The hypothesis that self-pollination is an important prerequisite for the invasive character of some *Vincetoxicum* species in USA and Canada has been put forward (LUMER & YOST 1995). In addition, indigenous herbivores probably avoid *Vincetoxicum* for its alkaloids, which are absent from other American *Asclepiadoideae*. Sapro-miophily is the most frequent mode of pollination, and has been evolved at least three times independently in *Periplocoideae*, *Asclepiadoideae-Ceropegieae* and *Asclepiadoideae-Asclepiadeae-Gonolobinae*. The composition of various scent bouquets associated with sapromiophily has been analyzed and four different main compositions have been identified (JÜRGENS & al. 2006). These compositions are not phylogenetically determined, but associated with certain floral structures, and thus possibly highly adaptive to particular pollinators. Micromiophilous flowers (e.g. in *Brachystelma* SIMS and *Ceropegia* L.) have their own special bouquets, in which fresh-fruity components (e.g., Geraniol) and foetid components are balanced to attract fruit flies and related small diptera.

Wasp pollination is possibly important. This frequently overlooked mode of pollination is discussed. Night-flowering is more common in *Asclepiadoideae* than hitherto assumed. For all pollination patterns,

*) Prof. Dr. Sigrid LIEDE-SCHUMANN, Department of Plant Systematics, University of Bayreuth, 95440 Bayreuth, Germany, Europe; e-mail: sigrid.liede@uni-bayreuth.de

striking morphological similarities among only distantly related species are encountered. Such homologies have been confusing *Asclepiadoideae* systematics for centuries and is demonstrated with some examples [*Wattakaka sinensis* (HEMSL.) STAPF – *Funastrum cynanchoides* (DECNE.) SCHLTR.; *Oxystelma bournouense* R. BR. – *Philibertia gracilis* D. DON. – *Cynanchum insigne* (N.E. BR.) LIEDE & MEVE; *Telosma accedens* (BLUME) BACKER – *Tylophora parviflora* WIGHT].

The paucity of comparative pollination studies in *Apocynaceae* are probably caused by the twining habit, the small flowers and the scattered distribution in tropical countries of most species. The only exception is the genus *Asclepias* L., an erect herb with medium-sized flowers, that predominantly occurs in patches in North America. A few recent examples of successful pollination studies are available (VIEIRA & SHEPHERD 1999: *Oxypetalum* in Brazil; OLLERTON & al. 2003: *Asclepiadinae* in South African grasslands; WOLFF & al., submitted: *Asclepiadeae* in Ecuadorian montane forest). More studies of this kind are needed to understand the pressures pollinators exert on the complex *Asclepiadoideae* flowers.

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Autor(en)/Author(s): Liede Sigrid

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