POSTER 4

The Model Case *Nepenthes bicalcarata* HOOK. f. - Structure and Function of the Nectaries of a Carnivorous Ant-Plant

Marlis A. Merbach, Georg Zizka; Botanik/Paläobotanik, J.W.Goethe-Universität und Forschungsinstitut Senckenberg, Senckenberganlage 25, 60325 Frankfurt am Main, Germany
<merbach@zoology.uni-frankfurt.de>, <gzizka@sngkw.uni-frankfurt.de>

Ulrich Maschwitz: Fachbereich Biologie, Zoologisches Institut, J.W.Goethe-Universität, Postfach 111932, 60054 Frankfurt am Main, Germany <maschwitz@zoology.uni-frankfurt.de>

Brigitte Fiala; Universität Würzburg, Zoologie III. Am Hubland, 97074 Würzburg, Germany <fiala@biozentrum.uni-wuerzburg.de>

Extrafloral nectaries (EFN) occur in species of *Nepenthes* in all parts of the plant above ground. Unique nectar secreting structures are found in *Nepenthes bicalcarata* where the upper part of the peristome is enlarged forming two thornlike structures. Their function is up to now unclear. The following explanations have been discussed: role in attracting/trapping of prey (Clarke 1993), protecting against pitcher exploiting animals (Burbidge 1880) and no specific function (Dodd, C. 1982). Our studies revealed that the structure of the thorns and the patterns of nectar secretion are extraordinary in the genus *Nepenthes*. An interpretation of these nectaries seems only possible in the context of the system *N. bicalcarata* - *Camponotus schmitzi* STÄRKE.

Temporal and spatial pattern of nectar secretion in *Nepenthes bicalcarata*

The amount of nectar secreted proved to be extraordinary high in *N. bicalcarata*. Even more striking was the temporal and spatial pattern of secretion observed in the leaves of this species. Nectar is secreted in large amounts and for a considerable time before the pitcher is opened, and in parts of the leaf distant from the pitcher. In other words, a large amount of "costly" nectar is secreted without direct connection to prey trapping. We regard this feature - occurring only in *Nepenthes bicalcarata* - as additional evidence for the presence of a myrmecophytic system in *N. bicalcarata* and *C. schmitzi* (see also Fiala, Linsenmair & Maschwitz 1994). This hypothesis was confirmed by field studies. The nectaries are regularly visited by *C. schmitzi* and various other ant species. While the formers only very exceptionally get trapped in the pitchers, other observed ants form an important part of the trapped prey. So far, the relationship of *N. bicalcarata* and ants is by no means clear. The plant produces large amounts of nectar, which is harvested by *C. schmitzi* and several other species. While the advantages to *C. schmitzi* are quite obvious, the benefits to *N. bicalcarata* are still questionable.

Nectary types in *Nepenthes bicalcarata*

3 principal types of EFN occur in *Nepenthes*. *N. bicalcarata* is unique in having 4 nectary types: by far the largest single nectaries are located in each of the two thornlike peristome structures. The latter secrete considerable amount of nectar, often visible as droplets hanging from the tip of the teeth. The function of these structures is difficult to interpret. Keeping their energetic costs in mind, an exclusively protective function (against animals exploiting traps, Burbidge 1880) or no function at all (Dodd 1982) can be excluded. The only convincing explanation is that the structures are of importance for attracting prey or/and for the *N. bicalcarata* - *C. schmitzi* interaction. We regard the latter as especially important, for these structures have only evolved within one species obviously in combination with myrmecophyty.

References


