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Secondary pollen presentation on petals of *Dombeya cacuminum* HOCHR. (*Sterculiaceae*)

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Abstract: PRENNER G. (2002): Secondary pollen presentation on petals of *Dombeya cacuminum* HOCHR. (*Sterculiaceae*). — Stapfia **80**: 323-326.

In this communication a new mode of pollen presentation is reported for the genus *Dombeya*. Until now, secondary pollen presentation in *Dombeya* is only known on the staminodes and residual pollen on petals is regarded as not important for pollination. During an excursion to Madeira in 1997, observations of *Dombeya cacuminum* in the Botanical Garden of Madeira indicated, that pollen is clearly presented on the petals, while the staminodes are free of pollen. This phenomenon is seen as the last and most specialised link in secondary pollen presentation in the genus *Dombeya*.

Zusammenfassung: PRENNER G. (2002): Sekundäre Pollenpräsentation an den Kronblättern von *Dombeya cacuminum* HOCHR. (*Sterculiaceae*). — Stapfia **80**: 323-326.

In der vorliegenden Arbeit wird eine neue Form der Pollenpräsentation für die Gattung *Dombeya* vorgestellt. Bis jetzt ist sekundäre Pollenpräsentation in dieser Gattung lediglich an den Staminodien bekannt und Pollenreste an der Krone werden als für die Bestäubung nicht wichtig erachtet. Während einer Exkursion nach Madeira im Jahre 1997 zeigten Beobachtungen an *Dombeya cacuminum* HOCHR. im Botanischen Garten Funchal, dass Pollen eindeutig auf den Kronzipfeln präsentiert wird, während die Staminodien frei von Pollen bleiben. Dies wird als letzte und spezialisierteste Form sekundärer Pollenpräsentation in der Gattung *Dombeya* angesehen.

Key words: *Dombeya cacuminum*, *Sterculiaceae*, secondary pollen presentation.

Introduction

The genus *Dombeya* is with more than 300 described species the largest genus in the *Sterculiaceae*. Nonetheless, as WHITE (in SEYANI 1991: 157) quotes “virtually nothing is known about pollination [of *Dombeya* species], which no one appears to have studied”. However, there have been several reports on pollination in *Dombeya*, which are worth discussing:

MASTERS (quoted in HOOKER 1867) observed movements of the staminodes in *Dombeya mastersii* (= *D. burgessiae* sensu SEYANI 1991) during the opening of the flower and that these staminodes contact the anthers. In this process pollen is deposited on the staminodes and secondarily presented by them. Staminodes and stigmas are finally at the same level so that Hooker (1867) considered a mode of selfing. Besides this observation, WHITE (in SEYANI 1991: 157) quotes an observation by SEYANI on *D. burgessiae*, where rapid rhythmic movements of the petals and the androecium are documented. In another species, *D. lastii*, SEYANI (1991: 92) considers

ornithophily due to the blood red color and the unusual shape and disposition of the petals. For *D. tiliacea* TEPPNER (1992: 320) states secondary pollen presentation on the five staminodes. The staminodes are about as long as the longer anthers in the bud, whereas they are quite longer than the anthers at anthesis, and carry pollen on the hairy indumentum. According to TEPPNER (1992: 320) pollen is presented primarily by the anthers in *D. longicuspis*. YEO (1993: 24-29) mentions MASTERS' observation on *Dombeya mastersii* and own observations on *D. burgessiae*. Here a very large amount of pollen was found in the anthers, on the outer, convex surface of the staminodes and some on the petals. He states that the effect of secondary pollen presentation is to bring some of the pollen near to the stigmas and greatly to extend the distribution of pollen on the long axis of the flower. About the pollen on the petals he states that "although a few hairs are present on the petals at the point where these bear pollen, I suspect that the pollen presented here is lost from the plant's life-cycle". Observations on a third unidentified species do not significantly differ in floral form or pollen presentation from *D. burgessiae*. HUMEAU, PAILLER & THOMPSON 1999 discussed cryptic dioecy and leaky dioecy in some *Dombeya* species, endemic on La Reunion.

Here, new observations on a cultivated *Dombeya cacuminum* HOCHR. and a summary of literature on the topic of pollen presentation in the genus *Dombeya* are provided.



Fig. 1: *Dombeya cacuminum*: a. Inflorescence b. Flower with secondary pollen presentation on the tip of each petal, androecium withered, staminodes free of pollen.

Material and Methods

Dombeya cacuminum was cultivated in the Botanical Garden of Madeira, near Funchal (Jardim Botanico da Madeira). Inflorescences and flowers were photographed with a Nikon F70 on 08.02.1997 during an excursion from the Institute of Plant Physiology, Karl-Franzens-University Graz.

Results and Discussion

The flowers of *D. cacuminum* are arranged in pendulous umbel-like inflorescences (Fig. 1a). The perianth consists of 5 sepals and 5 pink coloured petals, which are somewhat irregular and up to 4 cm long. In the androecium there are 15 fertile stamens which are basally fused with 5 sterile staminodes. Five carpels form the hypogynous, syncarpous gynoecium. The single style overarches the corolla clearly and splits apically into five stigma lobes (Fig. 1b).

Release of pollen occurs already in the bud, so the flowers are strictly proterandrous. Pollen is deposited on the apical end of each of the five petals, so that each pink petal shows a yellow swab on its tip (Fig. 1b). The fertile stamens wither and are inconspicuous at anthesis and the five staminodes remain free of pollen. Due to lack of material no exact morphological studies on the precise mode of pollen presentation can be given at the moment.

The style and the five stigma lobes overarch the corolla so that pollen carried by a nectar seeking pollinator is deposited first on the stigma before new pollen from the tips of the petals is loaded on the pollinator. The yellow swabs on the pink petals make a good contrast and thus secondary pollen presentation is paired with increased visual attraction of the flower.

Besides the four functions of secondary pollen presentation listed by YEO (1993: 1), which are

1. harmonization of sites of presentation and reception of pollen in the flower,
2. protection of pollen against robbery,
3. placement of the pollen on the vector so that the latter cannot misuse it and
4. the issue of pollen in separate doses,

the improvement of visual attraction can be added to the list of functions of secondary pollen presentation. Further functions of secondary pollen presentation in *D. cacuminum* are harmonization of sites of presentation and reception of pollen in the flower and probably placement of the pollen on the vector so that the latter cannot misuse it.

Secondary pollen presentation on the tips of the corolla in *D. cacuminum* is seen as the most advanced state of pollen presentation in the genus. Notes on species where pollen is deposited primarily on the staminodes and where small amounts of pollen can be found on the corolla can be seen as transition to the final mode of secondary pollen presentation exclusively on the petals.

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