

## The masked bee *Hylaeus punctulatissimus* SMITH, 1842 (Hymenoptera: Apidae): not strictly oligolectic!

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### Abstract

Contrary to prevailing opinion, this paper provides evidence that the masked bee species *Hylaeus punctulatissimus* SMITH, 1842 is not strictly oligolectic on *Allium* pollen. A female individual was photographed on *Sempervivum* sp., and Crassulaceae pollen was found in its crop content.

**Key words:** *Hylaeus punctulatissimus*, Apidae, Colletinae, pollen preferences.

### Zusammenfassung

Es wird gezeigt, dass die Maskenbienenart *Hylaeus punctulatissimus* SMITH, 1842 – im Gegensatz zur bisher vorherrschenden Meinung – nicht streng oligolektisch auf Laucharten (*Allium* spp.) Pollen sammelt. Ein weibliches Tier wurde beim Sammeln auf *Sempervivum* sp. fotografiert. Anschließend wurde Pollen der Familie Crassulaceae in dessen Kropf-inhalt nachgewiesen.

### Introduction

In contrast to most other solitary bees, female masked bees (*Hylaeus* spp.) do not have an exterior scopa, but the pollen is swallowed and transported in a crop located in the front part of the metasoma. At the nest a mixture of pollen and nectar is regurgitated (JANVIER 2012, AMIET & KREBS 2014). Because the analysis of the pollen composition requires either the finding of freshly provisioned nests or the dissection of individuals, relatively few studies have dealt with *Hylaeus* (DATHE et al. 2016).

Most species of *Hylaeus* are deemed to be polylectic, collecting pollen from two or more plant families. Only four Central European species are known to be oligolectic, collecting pollen from a single plant genus. Whereas *H. signatus* (PANZER, 1798) collects only on *Reseda* and *H. nigrinus* (FABRICIUS, 1798) on Asteraceae, *H. bifasciatus* (JURINE, 1807) and *H. punctulatissimus* SMITH, 1842 collect on *Allium* (WESTRICH 1990, SCHEUCHL & WILLNER 2016). However, this paper shows evidence that *H. punctulatissimus* is not necessarily strictly oligolectic.

### Material and methods

Observations of several female *H. punctulatissimus* were made on July 16, 2017 in Jois, Burgenland, Austria (47°57.5'N, 16°47.5'E). One individual was caught for further study (leg. H. Wiesbauer). Photographic images by the second author show the female collecting on *Sempervivum* sp. (Crassulaceae).



Fig. 1: A female of *H. punctulatissimus* collecting pollen on *Sempervivum* sp. © H. Wiesbauer.

To confirm the observations, a pollen analysis was carried out by the first author. For this approach, the metasoma of the pin-mounted specimen was cut off and dissected to remove the pollen from the crop. The pollen was placed on an object slide together with glycerin gelatin and fuchsin dye. The pollen preparation was studied under a light microscope. After pollen identification with help of PalDat (Palynological Database) and literature (BEUG 2004, HESSE et al. 2009), percentages of each pollen type were calculated by counting pollen grains.

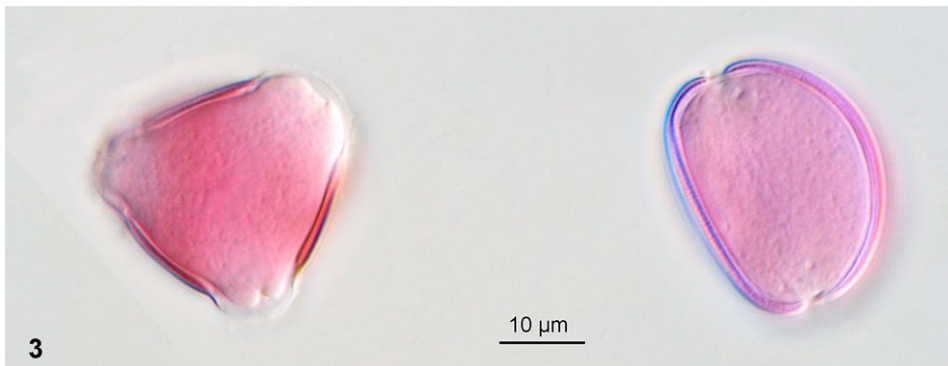
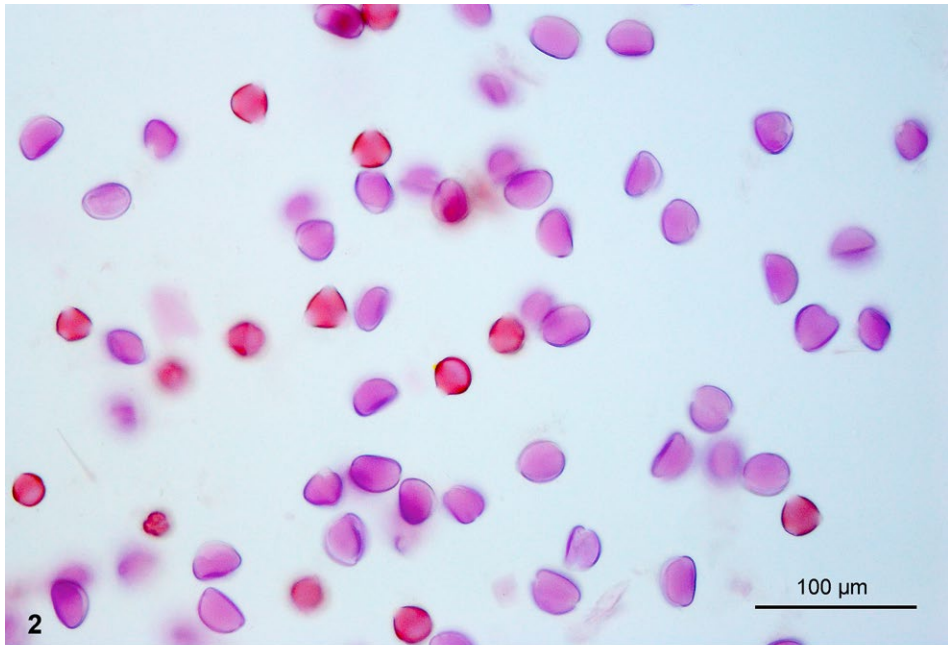
## Results

The photographic images (e.g., Fig. 1) show an observed *H. punctulatissimus* female collecting pollen on *Sempervivum* sp.

Out of 348 counted pollen grains 242 (69.5%) were determined as *Allium* pollen (Amaryllidaceae) and 105 (30.2%) as Crassulaceae pollen. While in *Allium* pollen the aperture is a sulcus, Crassulaceae pollen are tricolporate and can therefore easily be distinguished (Fig. 3). One pollen grain could not be placed in a specific plant family or genus.

## Discussion

In contrast to the former assumption that *H. punctulatissimus* collects only on *Allium* (WESTRICH 1990), this paper provides evidence that the species is not strictly oligolectic. In the investigated specimen, almost a third of the crop content was not *Allium* pollen, but pollen from a different plant family: Crassulaceae. As the *H. punctulatissimus* individuals were photographed on *Sempervivum* sp. it can be assumed that the pollen is of this



Figs. 2–3: (2) Pollen extracted from the crop of a *H. punctulatissimus* female. (3) Pollen grains of Crassulaceae (left) and *Allium* sp. (right). © S. Schoder.

genus. However, by means of light microscopy a further differentiation was not possible in this plant family.

Possibly, the *H. punctulatissimus* females used Crassulaceae as a pollen source because *Allium* was almost withered at this time, or because it was too far away from their nests, as *Allium* was flowering in a remote location of the big garden. However, to clarify this, further investigations would be necessary.

Pollen grains representing less than 1 % of the total amount – like the undetermined one – can either result from accidental collection by the bees while drinking nectar from this plant (RADMACHER & STROHM 2010), or from contamination of the pollen sample (ELTZ et al. 2001, MACLVOR et al. 2013).

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