

Pteromalids (Chalcidoidea: Pteromalidae) dominate microhymenoptera in flowering rapeseed fields (*Brassica napus*) in Bulgaria

Ivaylo Todorov, Teodora Teofilova, Milka Elshishka, Vlada Peneva
 Institute of Biodiversity and Ecosystem Research, Bulgarian Academy of Sciences, 2 Y. Gagarin Street, 1113 Sofia, Bulgaria

Abstract: In this work we aimed to assess the abundance of the potential parasitoids of some rapeseed pests in Bulgaria. Ten flowering rapeseed fields were sampled to collect microhymenopterans. We found an overall dominance of pteromalids not only among the all chalcidoids, but also among the small-sized Hymenoptera. Eleven parasitoid families were represented in the samples – Braconidae, Ichneumonidae, Figitidae (Eucoilinae), Platygasteridae, Scelionidae, Encyrtidae, Eulophidae, Eupelmidae, Perilampidae, Pteromalidae and Torymidae. The most abundant ones were Pteromalidae (49%) and Braconidae (28%). All other microhymenopterans comprised a small part (23%) of the material. Only one pteromalid species – *Mesopolobus morys*, is clearly dominant in studied fields. It counts 82% of all Pteromalidae and 40% of all Hymenoptera and was found in 7 of 10 rape fields. Although *M. morys* is polyphagous and attacks some major pests in rape fields, its dominance could be considered as surprising to some extent. The other pteromalids we swept were *Cyrtogaster vulgaris*, *Halticoptera patellana*, *Macroglenes penetrans*, *Mesopolobus incultus*, *Pteromalus cf. chlorospilus*, *Pteromalus puparum* and *Pteromalus sequester*.

Results

As it is depicted on fig. 2, we found an unusual dominance of Pteromalidae and Braconidae among the other taxa swept from the *Brassica napus* flowers. Some diverse groups as Ichneumonidae, Encyrtidae and Eulophidae are obviously less abundant. On the other hand, the pteromalid material is represented only by a few species with a great number of *M. morys* specimens among them (Fig. 3). With the exception of *Macroglenes penetrans*, the other pteromalids are represented with one individual only.

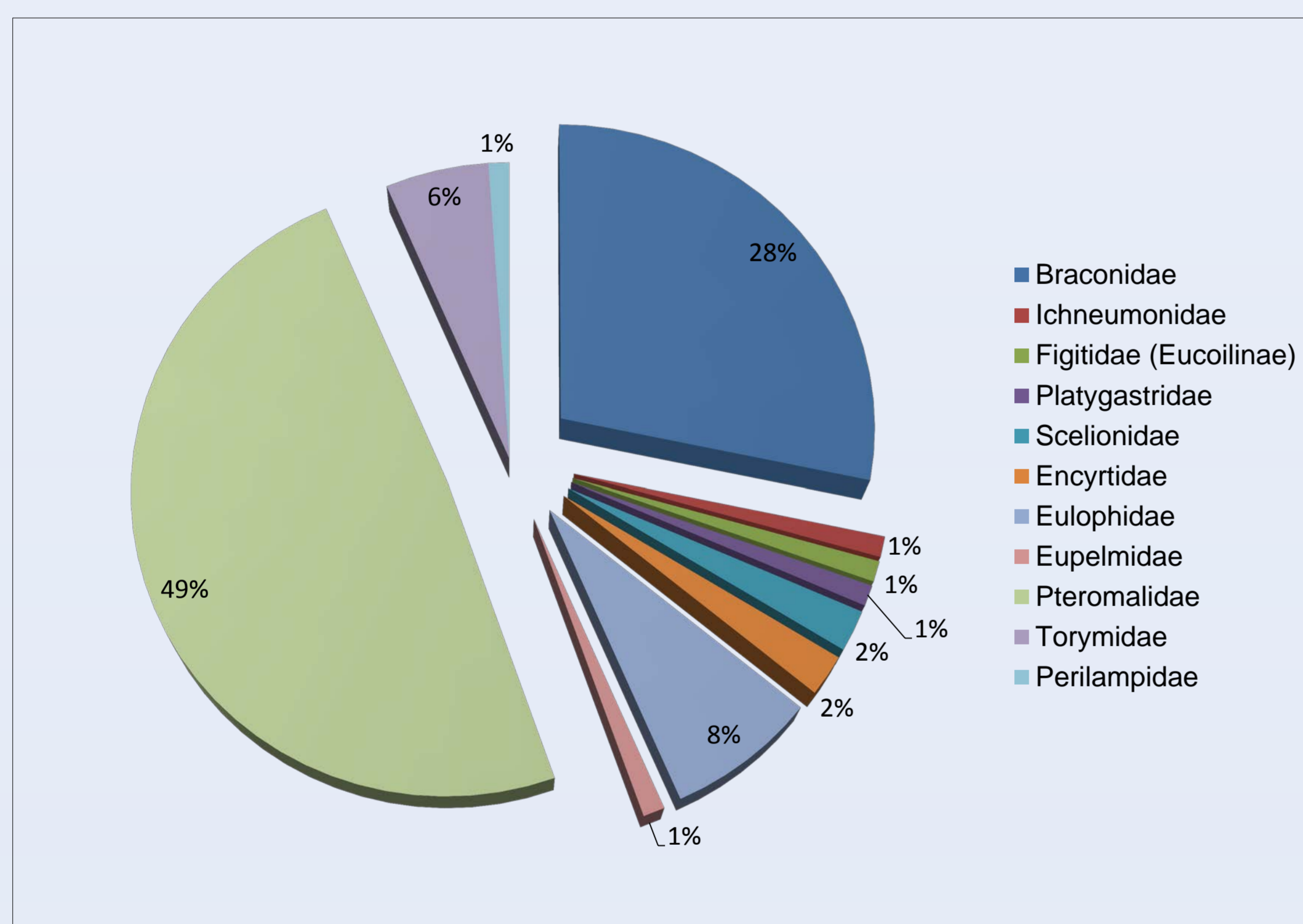


Fig. 2. Comparative abundance of microhymenopterans in our samples during the studied period.

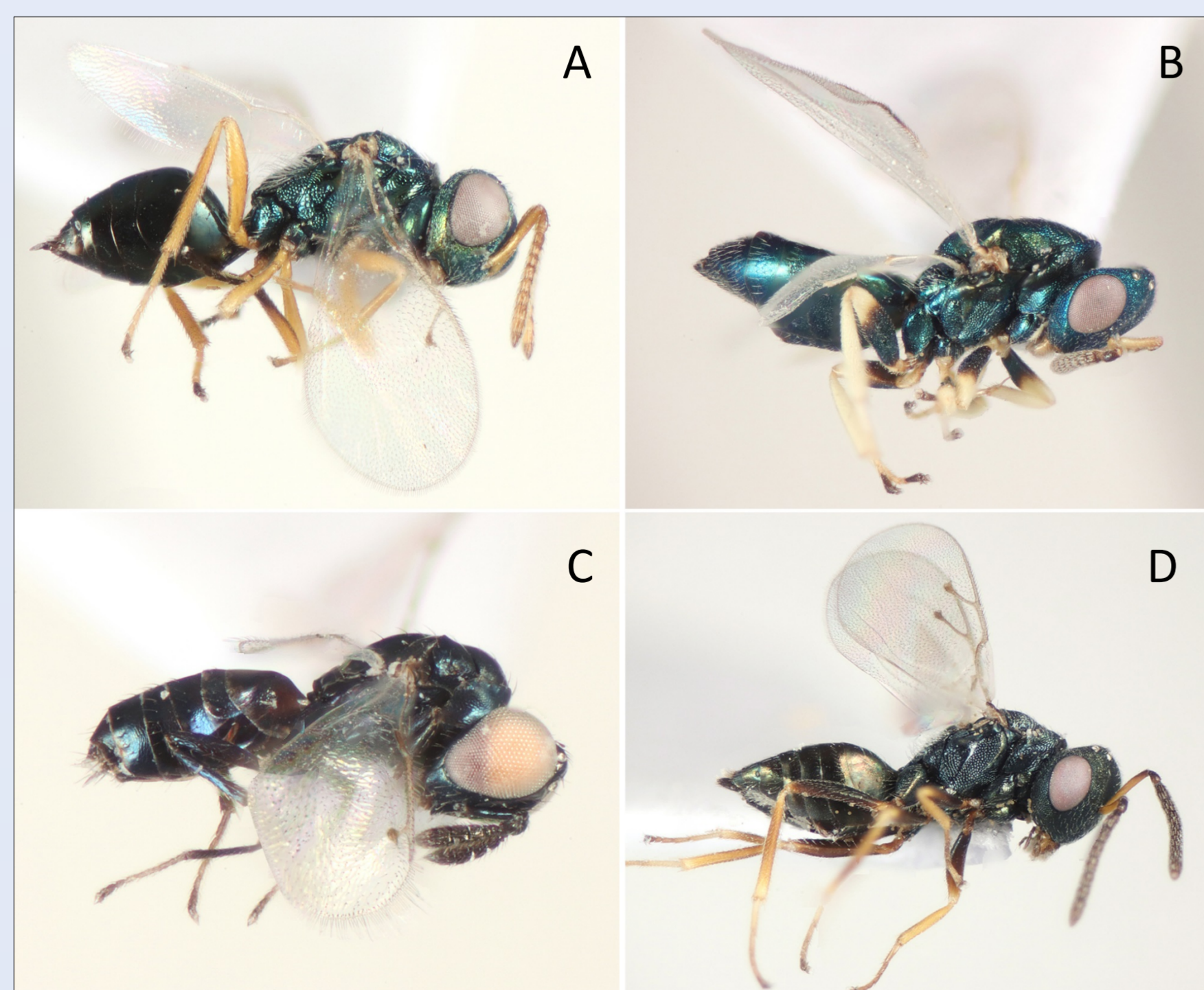


Fig. 4. Some pteromalids, collected from the rapeseed in Bulgaria: A. *Cyrtogaster vulgaris*, female; B. *Mesopolobus morys* – female; C. *Macroglenes penetrans*, male; D. *Pteromalus puparum*, female.

Methods
 During the end of the second decade and the beginning of the third decade of April, 2018, we visited 10 rapeseed fields in the Thracian lowland (Plovdiv and Dimitrovgrad areas). At least 3 samples along a 200m transect at each field were taken using standard sweep net and aspirator. Samples were taken in the starting point, in the middle and in the ending point, making 20 movements and walking 10 meters for every sample. Collected materials were stored in 70 % ethanol and mounted on glue boards for later identification.



Fig. 1. Typical flowering rapeseed field on the land of Zelenikovo village, at the foot of Surnena Gora Mts., Central Bulgaria.

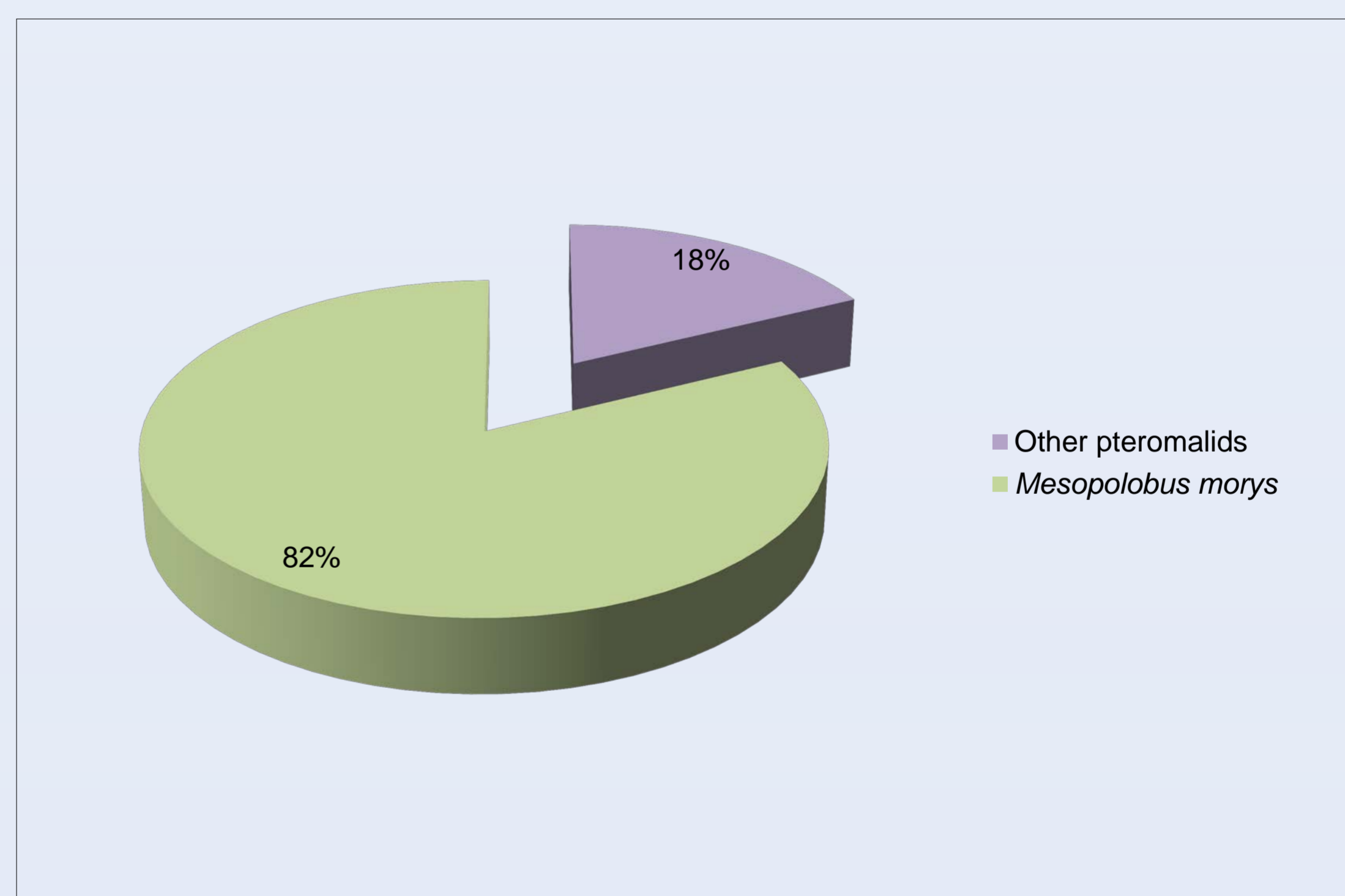


Fig. 3. Abundance of *Mesopolobus morys* compared to all other Pteromalidae in our samples.

Discussion

A general conclusion concerning the observed dominance of *M. morys* in the samples from rapeseed flowers could not be drawn at this time. Actually, one of the possible reason could be the association with some pests of *Brassica napus*, such as *Ceutorhynchus assimilis* (cabbage seed weevil) (Curculionidae, Coleoptera) and *Dasineura brassicae* (brassica pod midge) (Diptera: Cecidomyiidae). Also, *M. morys* is not so opportunistic as, for example, *P. puparum* and *C. vulgaris* are. However, although the great number of potential and known hosts, these two species are not typically associated with rapeseed (for complete list of hosts - see Noyes 2018). A better resistance to some insecticides used in agricultural practices is also a possible physiological feature which can give more chance for survival of *M. morys* compared to the other pteromalids.

Acknowledgements

This study was fully supported by the project STACCATO (www.staccato-project.net/, BiodivERsa Program). We are also very thankful to Dr. Boyan Zlatkov (IBER, BAS) for his useful comments and help in taking the pteromalid images on fig. 4.