



Jena, den 16. November 2016

Report on the Ph.D thesis
of Mgr. Kateřina Jůzová, with the topic:

“Strepsiptera and their host specialization”

The Ph.D thesis of Kateřina Jůzová is a broad-based and ambitious cumulative doctoral dissertation. It has a phylogenetic focus as well as taxonomic and morphological components. The methodological focus is clearly on molecular phylogenetic techniques. It is, however, very positive that Mrs Jůzová has also intensively dealt with methods of integrative taxonomy using DNA sequences and morphology.

The twisted-wing parasites (Strepsiptera) are an insect order parasitizing in other insects with about 600 described species. In over 97 % of the species (Stylopodia), the female remains permanently in the abdomen of the host and only protrudes the cephalothorax from intersegmental membranes of the abdomen of their hosts. The highest diversity is found in the Stylopidae, parasites of bees. The largest genus in this family is *Stylops* with more than 110 available species names. In North America and Japan, most of the species were described on the assumption of a single host association, whereas in contrast Kinzelbach (1978) used a supergeneralistic concept in which he synonymized all recognized species of the Western Palearctic region with *Stylops melittae*. This grouping was a large existing problem in the phylogeny and taxonomy of the strepsipterans. The relationships of the species of this genus until recently were largely unexplored. It was therefore a very challenging task to clarify the taxonomy and host-parasitic associations.

In the introduction, the candidate presents the problem in a very concise and competent way. Here Mrs Jůzová shows her extremely profound knowledge of the matter. She has undoubtedly dealt intensively with the extensive literature. The detailed and clear

presentation of the objectives of the work is also very positive. The methods are not discussed in detail. However, they are described in detail in the publications. Strepsiptera are hard to collect. The compiling of the material (among others from Japan, Tunisia and Canada) already is a great achievement.

In the first and most important publication published in the very renowned journal *Zoological Journal of the Linnean Society* (Paper 1, Jůzová first author of three) the first phylogenetic analysis of two mitochondrial genes and one nuclear gene of a very impressive amount of 130 *Stylops* individuals from 70 *Andrena* host species and 20 strepsipteran individuals as outgroups are presented to clarify the concept of host specialisation in this genus. The data clearly shows a close relationship between *Stylops* and the host: One species of *Stylops* parasitize one or a few host species of *Andrena* bees generally from a single subgenus. Additionally, in a few *Stylops*, a reasonable generalistic strategy is also likely. The results clearly refute the species concept of Kinzelbach (1978) who synonymised all described *Stylops* species with *Stylops melittae* in one single species.

In the second publication (Paper 2, Jůzová second author of three) published in *Acta Entomologica Musei Nationalis Pragae* is based on Paper 1 and the alpha taxonomy and nomenclature of species of the genus *Stylops* (a “taxonomic nightmare”) is evaluated and a new division of this genus into species by means of an integrative taxonomic approach is proposed. Again, this is an excellent contribution.

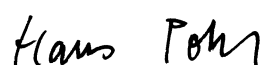
In the third publication (Paper 3, Jůzová third author of six) published in *ZooKeys* a revised taxonomic status of a rediscovered *Stylops* parasitizing *Andrena savigny* is presented. It is a profound and well-illustrated taxonomic contribution.

The fourth publication (Paper 4, Jůzová second author of three) published in *ZooKeys* again is a taxonomic contribution, the description of a new strepsipteran genus with three new species. This contribution is also a very thorough and exemplarily illustrated treatment.

The chapter “Discussion and conclusion” is well written and go into the various parts and aspects of her work in a profound way.

Formally the work leaves nothing to be desired. The work also satisfies high demands on language apart from a few careless mistakes.

On the basis of what I stated above I strongly consider that the thesis of Kateřina Jůzová is best suited for award of a Ph.D.



(PD Dr. Hans Pohl)

Questions to the defendant:

1. "Strepsiptera are parasitic castrators ..." (p 15). Is this always the case?
2. In your work, you have mainly studied females and first instar larvae. Do the males of *Stylops* species differ morphologically?
3. Of how many segments consist the cephalothorax and the abdomen of females of Stylopida? It is possible that the four-segmented abdomen of *Rozenia* is a preparation artefact?
4. The females of Stylopida form a functional complex with their puparia. Should the mature females be used for genus or species descriptions?
5. Is morphological similarity an indication of close phylogenetic relationships?
6. Why it is problematic to describe a new genus without a phylogenetic hypothesis?
7. Can you define a genus?