Abstract

This work is focused on the study of physiology and proteome of the the mite *Varroa destructor* and on comparison with the honeybee *Apis mellifera*. *Varroa* is currently a major problem for beekeeping, because infects most of the colonies. The control of the mite can not be done without residues both in the hive and for example in the honey or other resources used by the man. Another problem can also be the simultaneously discussed issue of the connection with the Colony Collapse Disorder.

The internal anatomy of *V. destructor* was studied by using paraffin histology. On histological sections stained using hematoxylin and PAS was possible to observe the mite digestive system, but also egg, ovaries or brain.

The primary aim of this study was to identify the proteins of mite *V. destructor* and bee *A. mellifera* as a host of this parasite. For the electrophoretic separation was used two-dimensional gel electrophoresis, where the second dimension was carried out using 12% and 15% SDS-PAGE. The most abundant spots were selected for analysis using MALDI TOF/TOF mass spectrometry. The most abundant protein identified in samples of *V. destructor* was hexamerin, arginine kinase or hemelipoglycoprotein precursor. Hexamerins were also identified as the major proteins in the pupae samples. On the contrary the main proteins identified in the larvae samples were major royal jelly proteins.

One of the partial aims was enzymatic analysis using zymographic technique. Determined trypsin and chitinases activity in the pupal stage well corresponded to metamorphosis. The major enzymatic activity in larva was α-glucosidase and chymotrypsin; these activities were simile in pupa. However larval stage as well as Varroa lacked these activities. The mite samples exhibited β-glucosidase and cathepsin D activities, which were absent in A. mellifera samples.

The results of this thesis contributed to our understanding of the biology of V. destructor and A. mellifera. At the same time helped us to orientate in the internal anatomy of the mite, proteome and enzymes both mites and bees. The results can be used in the future to deal with the parasite and to determine the causes of bee colonies collapse.