Międzynarodowa Środowiskowa Szkoła Doktorska
przy Centrum Studiów Polarnych
w Uniwersytecie Śląskim w Katowicach

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Title of PhD project: "Morphological and ultrastructural characterisation of the sensory structures of aphids from the subfamily Thelaxinae (Hemiptera: Aphididae)".

The leading unit: University of Silesia in Katowice

Requirements:

1. Completed master's degree studies in biology, biotechnology or related. Knowledge of research topics related to insect morphology and molecular biology,
2. Knowledge of entomological issues (characters, biology and importance of insects, characters of hemiptera, features and biology of aphids),
3. Knowledge of field research methods and willingness to work in the field,
4. Knowledge of morphological research methods (light microscopy, fluorescence microscopy, scanning electron microscopy),
5. Basic knowledge of material preparation for ultrastructural studies – transmission electron microscopy (TEM), serial block scanning technique (SBFSEM),
6. Knowledge of English enabling communication, reading and writing scientific papers.

Tasks description:

1. Morphometric analyses of materials from entomological collections,
2. Morphological analyses using scanning electron microscopy (SEM),
3. Structural (fluorescence microscopy) and ultrastructural (TEM, SBFSEM) analyses,
4. Preparation of scientific articles and conference presentations;
5. Regular reporting of work progress;
6. Assistance in the daily scientific, didactic and organizational tasks of the unit, including joint care of measurement equipment.

Summary of a doctoral project:

The subfamily Thelaxinae (Hemiptera: Aphididae) is a small group of dendrophilous aphids that feed on various species of trees from the families Betulaceae, Fagaceae or Juglandaceae. The subfamily Thelaxinae includes four genera: *Glyphina*, *Kurisakia*, *Neothelaxes* and *Thelaxes*. The vast majority of whose species occur in the Holoarctic region. Representatives of the subfamily Thelaxinae are characterized by unique morphology, such as the fusion of the dorsal side of the head and pronotum, the arrangement of the wings of the winged morphs or the specific chaetotaxy and microsculpture of the cuticle. Despite data on the distribution and taxonomy of these aphids, nothing is known about their detailed morphological structure, with particular emphasis on sensory structures such as antennal, labial sensilla and on other parts of the body (legs and wings). Preliminary studies on

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antennal sensilla indicate that their number and distribution deviate from the generally accepted pattern known to aphids.

The aim of the proposed project is a detailed and comparative analysis of all types of sensilla (placoid, trichoid, campaniform and coeloconic) on particular body parts of apterous and alate viviparous females of the representatives of Thelaxinae. The research will be conducted using light microscopy and scanning electron microscopy (SEM). Structural and cellular analyses will be conducted using fluorescence microscopy, and their ultrastructure will be analyzed using transmission electron microscopy (TEM) and serial block face scanning (SBFSEM). The results of the project will provide completely new data on the sensory structures of insects as organs responding to environmental changes.

Other information:

The work will be carried out under supervision of: dr Mariusz Kanturski, prof. UŚ, Faculty of Natural Sciences, University of Silesia in Katowice
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