

Phylogeny of whiteflies (Hemiptera: Sternorrhyncha: Aleyrodoidea) based on the morphology of fossil and modern insects.

The whiteflies Aleyrodidae Westwood, 1840 constitute family of sap-sucking phytophages within the Hemiptera. They are small inconspicuous bugs, often overlooked on the host plant despite their abundance on the lower surface of leaves. Their name “whitefly” is derived from the white appearance of adults of most species due to the deposition of wax on the body and wings. The world’s described whitefly fauna currently comprises over 1700 species belong to four subfamilies: Aleurodicinae Quaintance et Baker, 1913, Aleyrodinae Westwood, 1840, Udamoselinae Enderlein, 1909 and Berneinae Shcherbakov, 2000. The last one known only from Jurassic fossils, while the subfamily Udamoselinae also known as “giant whiteflies” includes only 2 contemporary, Neotropical species. Subfamilies Aleurodicinae and Aleyrodinae consist of fossil and modern whiteflies. The taxonomic status of the subfamilies and species belonging to them are still disputed. The classification of the contemporary whitefly taxa has been based on features found in the last larval stage, the so-called puparium. Characteristics of the adult stages for most whitefly species have not been known, and for a few cases, when imago was described, morphology hasn’t been detailed compared and used to understand the relationship between taxa. According to taphonomy data, whiteflies known from fossil material are represented (except one species) by adult morphs.

The main aim of the proposed project is to examine the morphology imago of whiteflies, both: exist and fossil, and additionally analyse the inclusions of the last larval stage. Morphological analyses will be supplemented by analysis of amber from different deposits of Lebanon, China, Burma, France, Poland, Germany, Denmark, Ukraine and India. It is planned to analyse over 200 whiteflies inclusions from mentioned deposits, from Lower Cretaceous, Barremian; 129.4-125 Ma (Lebanon) to Late Neogene, Pliocene 5,33-2,58 Ma (India). The species of all known subfamilies will be included in the analyses. The results will be used to construct a feature matrix that will in turn provide the basis for inferring the affinity of the species being studied through the presentation of a phylogenetic tree. The purpose of this is to trace the evolution of these structures and their importance in the classification of whiteflies.