

Abstract

The paleoecology of plant – arthropod herbivory associations constitute very important source of knowledge about the phylogeny and co-evolution of both groups. The traces of herbivory interactions between plants and arthropods on the fossil leaves are preserved as so called damaged types (DTs) clustered into distinct functional feeding groups (FFGs). The diversity and frequency of these damage traces also seem to have been strongly influenced by environmental and climatic conditions. This research has been focused on rich fossil plant assemblages from the area of the Most Basin in the north-western Bohemia. The undergoing work has comprised the diagnosis of the individual damages on the basis of their specific morphological traits as their number, size, shape and distributional pattern on the leaf surface. The next issue has involved the statistical analyses concerning the differences in the frequency and diversity of the types of damage and functional feeding groups between two separate fossiliferous layers, namely those of the stratigraphically older Bílina Delta and younger Břešťany Clay. Significant differences were confirmed in this regard, especially in connection with achieved frequency and proportional occurrences of distinct functional feeding groups in the Bílina Delta. The galls were the only exception, being much more frequent in Břešťany Clay. The obtained differences concerning the damage diversity were less significant. These circumstances indicate possibly a little bit warmer climatic condition in the Bílina Delta, but certainly the drier one in Břešťany Clay.

The observed individual taxa also show significant differences in frequencies of various functional feeding groups and the diversity of the distinct damage types. Among individual functional feeding groups, those of hole feeding, followed by margin feeding and galling are the most common. Arboreal deciduous elements, such as *Populus zaddachii* and *Carya* sp., seem to be the most affected. Taxa with chartaceous leaf texture (*Acer*, *Alnus*, *Fraxinus*, *Nyssa* and *Populus*) also attain the highest diversity of distinct damage types. On the other hand, *Quercus rhenana*, with its coriaceous texture of foliage, shows also fairly high diversity of damage. Otherwise, the comparison of the DT diversity among these individual taxa provides rather uniform outputs. There is no substantial difference with the exception of the few taxa with extreme values. Comparing how the diversity of DTs depends on DT frequency confirms a slight increase in tendency, although this correlation appears to be very weak. Corresponding results are also recorded for the different types of arthropod galls.

Taxonomic attribution of some possible causers has been also made in especially suitable cases, allowing the setting of a certain palaeoenvironmental conditions due to their known ecological requirements. The most important findings are represented by various cynipid wasps (Hymenoptera) and cecidomyid flies (Diptera) galls, nepticulid moths (Lepidoptera) leaf mine, odonatan (probably Lestidae) oviposition on the willow leaf and a spectacular impression of the scale insect (Hemiptera: Coccoidea) on the leaf of ash. One remarkable non-herbivore plant-arthropod interaction was newly characterized by several records of caddisfly cases (immature stage of the family Psychidae (Lepidoptera) can be the alternative explanation) built exclusively of needles of *Taxodium*. The other interesting specimens show for instance the presence of fungal apothecia (Pyrenomycetes) on the fossilized bark surface and the other ones on the unidentified leaf surface, indicating progressive decaying processes.