
Patterns of food plant utilization: Auchenorrhyncha on central European trees

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Woody plants support a significant part of the Auchenorrhyncha fauna in temperate and tropical latitudes of humid and semihumid climates. Conversely, Auchenorrhyncha form a major component of the arboricolous fauna. However, due to sampling difficulties, the knowledge of their guild composition and abundance is very poor. Moreover, possible functional effects on competitive interactions between trees, e.g. by tissue damage or transmission of plant pathogens, have not been studied so far. The following major questions arise from this situation:

What are the patterns shown by Auchenorrhyncha on woody plants in central Europe?

Why do some tree species support more insect species than others?

What determines host specificity?

Are there top-down effects on plants?

Insect-plant relationships have been explained by (i) plant chemistry and plant defence, (ii) temporal and spatial plant appearance, (iii) habitat persistence, (iv) nitrogen availability, (v) interspecific competition and (vi) other ecological factors.

In general, purely arboricolous species are only found in Cicadomorpha, notably among Macropsinae, Idiocerinae and Typhlocybinae, as well as in Ledrinae, Iassinae, Agalliinae, Cicadellinae and Deltocephalinae. All these species are macropterous. Most overwinter as egg, some as adult, and only a few as nymph. Phloem and mesophyll feeding is common, xylem feeding is rare. The degree of host specificity is very high, with monophagy prevailing.

Another favoured strategy includes a post-emergence shift from the soil or herb layer up to the tree layer, mainly found in Cixiidae, Cicadoidea, Cercopidae and some Deltocephalinae. Adults are also macropterous. Overwintering takes place mainly in the nymphal or egg stage. Most species feed on phloem, a few on xylem, but none on mesophyll. Monophagy is rare, but may have been overlooked in some cases due to cryptic nymphal habits.

From an evolutionary point of view, purely arboricolous habits in Auchenorrhyncha may have to be considered as a derived attribute, although they must have evolved independently in many subgroups.