EVOLUTION OF XYLEM-FEEDING IN AUCHENORRHYNCHA, WITH EMPHASIS ON SHARPSHOOTER LEAFHOPPERS

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Auchenorrhyncha includes approximately 40,000 species of piercing-sucking "sheath feeding" herbivores, which typically seal their stylet tips into a vascular plant cell via a solid sheath made of saliva. The majority feed preferentially on phloem sap, while only cicadas (Cicadoidea), spittlebugs (Cercopoidea), and some leafhopper (Cicadellidae) lineages feed preferentially on xylem sap, notably the sharpshooters (Cicadellinae). Exceptionally, typhlocybine leafhoppers do not feed on vascular sap, but through a process called "cell rupture feeding", in which a sheath is not made and stylets move continuously or intermittently, lacerating cells, secreting watery saliva, and ingesting the resulting slurry of cell contents, usually from the mesophyll. Considering recent hypotheses of phylogenetic relationships among Auchenorrhyncha lineages, a transition to xylem sap specialization probably happened only once outside Membracoidea -- either in the ancestor of Cicadoidea + Cercopoidea or in the ancestor of Auchenorrhyncha. However, within Membracoidea this behavior was traditionally thought to be primitively retained by sharpshooters, which does not agree with current hypotheses of leafhopper phylogeny. A new combined phylogenetic analysis of morphological and 28S rDNA sequences (3,215 characters) of 139 terminal taxa, representing 87 of the 111 tribes of leafhoppers, will be presented and used to infer the number of origins of xylem specialization within Membracoidea. Unfortunately, information on feeding behavior is lacking for most leafhopper lineages, therefore assumptions on the behavior and correlated morphological characteristics will be discussed. Based on our results, it is expected that xylem-specialization originated at least twice during the evolution of this diverse group, which apparently had a phloem-specialist ancestor. Finally, another combined morphological and molecular (COI, COII, 16S rDNA, and Histone H3) phylogeny will be presented focusing on sharpshooters, the main vectors of *Xylella fastidiosa*. Changes in the higher classification of sharpshooters based on these phylogenetic results will be presented.

Financial support: NSF, CNPq