

Influence of symbionts in the biology of Heteropteran insects

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Although bacterial associations occur within animals and plants, insects are considered to be the largest group that has substantial advantages of these associations. This close relationship between both, microorganisms and insects usually provide innumerable advantages for both. Symbionts can provide some essential nutrients and/or help in the insect digestion, which is really important since insects feed in a poor diet such as many important agricultural pests and disease vectors within Heteroptera. In this suborder, symbionts can be found extracellularly in their midgut. Transmission mechanism of symbionts by the heteropteran insects occurs in different manners (vertical or horizontal routes) within the families, however several families need to be investigated. As many heteropteran symbionts are not cultured outside their hosts, it is being used the phylogenetic placement of the gene 16S RNA of the symbionts to show that some symbionts have coevolved with stink bugs to the point that host fitness is impacted with the elimination or alteration of their symbiont, and others symbionts are more diverse indicating multiple evolutionary origins of the symbiotic associations and/or frequent horizontal transmission of the symbiotic bacteria. The notable collection of the genomic information of the symbionts allied to the recent advanced sequencing methods will facilitate the analysis of the host and symbiont genome which will allow a better understanding of the heteropteran/symbiont associations, and their ecological and physiological features. Additionally, the more we know about the evolutionary and biological aspects of these associations the development of alternative techniques for effective heteropteran pest control will become just a matter of time.