World Academy of Science, Engineering and Technology
International Journal of Bioengineering and Life Sciences
Vol:9, No:12, 2015

Level of Sociality and Sting Autotomy

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Abstract : Members of aculeate Hymenoptera exhibit different levels of sociality. While Chrysidoidea are primarily parasitic and use their sting only for the purpose parasitizing the host and never for defense, all vespoid and apoid (sphecid) wasps use their sting for paralysing their prey as well as for defending themselves from predators and intruders. Though most apoid bees use their sting for defending themselves, a few bees (Apis spp.) use their sting exclusively for defending their colonies and the brood. A preliminary study conducted on the comparative morphology of stings of apoid bees and wasps and that of vespid wasps, indicated that the backward projected barbs are more pronounced only in the genus Apis, which is considered as the reason why a honey bee worker, loses its sting and dies when it stings a higher animal. This raises an important question: How barbs on lancets of Apis bees evolved? Supposing the barbs had not been strong, the worker bee would have been more efficient in defending the colony instead of only once in its lifetime! Some arguments in favour of worker altruistic behaviour, mention that in highly social insects, the colony size is large, workers are closely related among themselves and a worker sacrificing its life for the colony is beneficial for the colony. However, in colonies with a queen that has mated multiple times, the coefficient of relatedness among workers gets reduced and still the workers continue to exhibit the same behaviour. In this paper, we have tried to compare the morphology of stings of aculeate Hymenoptera and have attempted to relate sting morphology with social behaviour. Species examined for sting morphology are A. cerana, Apis dorsata, A. florea, Amegilla violacea, A. zonata, Megachile anthracina, M. Disjuncta, Liris aurulentus, Tachysphex bengalensis. Our studies indicate that occurrence of barbs on lancets correlates with the degree of sociality and sting autotomy is more pronounced in swarm-founding species than in haplometrotic species. The number of barbs on the lancets varied from 0 to 11. Additionally SEM images also revealed interesting characters of barbs.

Keywords : altruistic, barbs, sociality, sting autotomy
Conference Title : ICE 2015 : International Conference on Entomology
Conference Location : Penang, Malaysia
Conference Dates : December 03-04, 2015

Open Science Index, Bioengineering and Life Sciences Vol:9, No:12, 2015 publications.waset.org/abstracts/29572.pdf