CONSERVATION OF STINGLESS BEES AND STUDIES ON THEIR BIOLOGY AND UTILISATION AS POLLINATORS OF CROP PLANTS

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Introduction

This study covered the rearing of Malayan stingless bees obtained from their forest habitat. As a means to conservation, studies on their biology and potential as producers of honey and pollen as well as crop pollinators were studied on those species, which can be domesticated.

Materials and Methods

Feral colonies of trigona bees species are collected from nearby forests and reared in various types of man made hives. Studies on their life cycle and social organisation and foraging habits were carried out with a view to mass-producing colonies for use as pollination agents of crop plants.

Results and Discussion

Of the 29 species of Malayan trigona bees listed by Schwarz (1939), 16 species were collected so far. Five species have been successfully reared in man-made hives made of wood or aluminum. The process of colony multiplication was time consuming, where the small sized species require a build up period interval of 3 months while the larger sized species took at least 6 months. Successful colony production also depended on the presence of ripe queen cells and the availability of drones to mate with the virgin queens. This is because of the long pre-adult development period of the queen that unlike that of stinging honeybees is longer than that of the worker bee.

Trigonids are poor wax producers and they largely used plant resins for nest building. A mixture of wax and resin called cerumen is used to build the nest. Some species used brittle cerumen to contruct the outer regions (involucrum) of the nest while the brood area is of soft pliable cerumen. Since the sticky nature of the nest entrance serves as defense against intruders, these trigonid species tend to be more aggressive. Other species constructed the nest of soft pliable cerumen and these species tended to be less aggressive. Stingless bees defended themselves by biting and pulling of hair of the intruder or by immobilising the intruder by smearing it with sticky resin. *Trigona canifrons* workers most aggressive and its bite is painful enough to keep human beings away. Less aggressive defence was used by the largest species *T. thoracica* whose workers use a threatening flight in front of the intruder to effectively drive it away.

All species of trigonids have relatively small population numbers. These range from a few hundreds (*T. melina, T. pendleburyi, T. terminata, T. ventralis*) to a few thousands (*T. throcica, T. itama, T. apicalis, T. canifrons, T. fuscobalteata, T. pagdeni, T. erythrogastra, T. atripes, T. confusella). Trigona thoracica* was reported to reach a population of 100,000 bees (Schwarz, 1937) but colonies here varied from 4-5 thousand workers. The laying capacity of the *T. thoracica* queen is approximately 80 eggs per day and because of the long development period of the pre-adult stage could not give rise to large worker populations.

All trigonids species produced small amounts of dilute honey in comparison to the stinging bees, *Apis* spp. Besides the small worker populations, all the trigonids unlike *Apis* bees, did not use a communication system during foraging. It appears that trigonids are well adapted to scarce nectar resources in the Malaysian tropical forests by foraging individually. The small amounts of dilute honey found in the trigonid hives reduce its economic value as a honey producer. However, honey from stingless bees usually fetches a higher price because it is believed to have medicinal value.

Despite small colony populations, Malaysian trigonids are voracious pollen collectors. This characteristic renders them as good pollinators. Studies are being conducted to determine their efficacy in pollinating specific crops which are essentially cloned material and may largely require cross pollination. For herbaceous crops such as the chili, Capsicum spp. trigonids are very good pollinators effecting almost 100-percentage success in preliminary studies.

Conclusions

This study shows that among the many species of stingless bees collected so far, only 5 (31%) species can be 'domesticated'. The remaining species need to be protected within protected forests. Those species, which can be reared in man made hives, can easily be proliferated. The advantage to keeping stingless bees is that they are harmless to people within the neighbourhood. Although honey and pollen production by the bees are low they are ideal for hobbyists who can obtain small quantities of the hive products as food supplements.

References

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