The Biology of Apis dorsata in The Philippines.

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There are four species of Apis honey bees in the world; one is European (Near Eastern) and three are Asian. Two of these, Apis mellifera, the European species, and Apis indica, build multiple comb nests usually in protected cavities; these are the bees of commerce in their respective areas and most of the world literature on honey bees is concerned with them. The remaining two species, Apis florea and Apis dorsata, build a single nest comb, usually under a tree limb which offers minimum protection. In the world literature not much over 100 papers have appeared on these two species and not more than five contain information of consequence. This paper reports on the biology of Apis dorsata in The Philippines as a result of the taking or examination of 30 nests.

In an Apis dorsata comb, honey is stored in cells which may be several times the depth of ordinary brood cells; honey is stored in the uppermost portion of the comb. Beneath the honey, and between it and the brood rearing area, pollen may be stored. Pollen cells too are often deeper than ordinary brood cells. The brood patterns in the nests taken were compact and typical of the genus; there was always a clear separation of brood and food. In queenless nests, nests which swarmed and were temporarily without a laying queen, and in some laying worker nests, nectar and pollen might be found in the brood rearing area; however, this was removed as soon as the colony became queenright. Workers and males are reared in the same size cell and drone brood was not concentrated in any single area in the comb. Queen cells were found only at the lowest point on the comb and hang in a position typical of the genus.

Apis dorsata is the most ferocious of stinging insects. It is not uncommon for five to ten per cent of a nest population to attack an intruder within a few seconds of being disturbed. The workers will pursue a disturbing man or animal for long distances; the bees will pursue enemies into shaded areas to a greater extent than other Apis. Heavy clothing, boots, veils and gloves offer good protection against stings. Smoking colonies, as is the case with other Apis, is a reasonably effective way of slowing attacks. The bees are less prone to attack during midday on bright, warm days. Observing and manipulating colonies from within screen cages is an effective method when observations are made over long periods of time.

There is only a single queen in an Apis dorsata colony. Nest populations varied from a low of 1000 to a high estimated at 70,000 in the 30 nests examined. Drone populations approximated those in Apis mellifera colonies.

Nest temperature (brood rearing temperature) is controlled in all

Apis. Apis dorsata controls its nest temperature though the actual limits were not observed and the control is probably not as rigid as in the case of Apis mellifera. Between 80 and 95 per cent of the population may be used, depending upon weather conditions, to build a curtain of bees, several bees thick, around the comb. There is a bee space, or working space, between the curtain of bees and the comb. The bees in the curtain are inactive, hanging head upwards. When a colony swarms the curtain may be only one bee thick over the brood, but queen cells which are left behind are well protected with a heavy curtain of bees.

Methods of moving nests were studied but with only limited success. It is possible to clip a piece of comb from an active nest and to capture some of the bees from an active nest and to transfer them to a new location. Queen rearing by such bees is possible.

Laying worker colonies were observed which outwardly had all the characteristics described for Apis mellifera laying worker colonies. Swarming was observed and in two cases there was a colony division with the old queen departing with a swarm containing about 70 per cent of the population. No afterswarms were observed. Apis dorsata absconds if disturbed too much; the queen is apparently able to take flight at any time.

Dancing bees were observed on nests; dancers dance on the surface of the curtain, but only in a well defined area on it. Field bees could be captured and would feed on honey in a box if forced to do so. Several such bees were observed and feeding stations were established. Several bees returned to the feeding station, one bee over 150 times, but none of these bees brought recruits with them to the feeding stations.

Apis dorsata has few predators because of its fierce sting. Wax moths (Galleria mellonella) infest active nests. One species of mite (Tropilaelops clareae) causes some mortality in the pupal stage. No bacterial or viral diseases which might affect the larvae were seen in any of the colonies examined.

In its general biology, Apis dorsata closely resembles Apis mellifera and Apis indica. In the evolution of Apis it appears that a clear separation of the brood and food occurred early; likewise, nest temperature control and the concomitant well defined brood rearing cycle appears to have evolved early in the development of the genus. Apis mellifera and Apis indica nests and nesting habits differ from the remaining two Apis species in two important ways, they have multiple comb nests and build their nests in protected cavities. Making use of a protected cavity within which to build a nest reduces the number of bees required for nest temperature control and therefore frees a greater percentage of the worker force for food gathering. The quantity of honey found in Apis dorsata nests was much less

than that which would be found in an Apis mellifera colony with a similar population. Honey is required for survival in colder climates; Apis dorsata is probably restricted to the Tropics because of its inefficient division of labor which limits the quantity of food it may store to survive periods of adversity.

A detailed paper on the biology of Apis dorsata in The Philippines and descriptions of the 30 nests observed or taken will be published in cooperation with Dr. F. M. Laigo, Assistant Professor of Entomology, College of Agriculture, University of The Philippines, College, Laguna, The Philippines.