NOTES ON INSECTS FOUND IN OR NEAR NESTS OF FORMICA SUBNITENS CREIGHTON (HYMENOPTERA : FORMICIDAE) IN BRITISH COLUMBIA (1)

by

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Food habits of the ant Formica subnitens Creighton were investigated at Westbank, British Columbia, in the summers of 1954 and 1955. A number of other insects were commonly found within the nests or closely associated with the ants. This paper presents the data collected and observations made on some of these insects. The information presented was collected over a two-year period and was taken from approximately 20 nests of F. subnitens.

Except Crambldia casta (Pack.), Cremastocheilus armatus Wlk., Medon sp., and the Aphididae, all the insects found in and near ant nests were attracted by conditions created by the ants rather than by the ants themselves. The structure of the ant nest modified the temperature of the surrounding soil and probably aerated the soil to some extent. This resulted in greater plant growth, which, together with the modified microclimate, created suitable conditions for phytophagous insects. The abundance of phytophagous insects in turn attracted a large number of predaceous insects.

Crambldia casta (Pack).

The pearly footman moth, Crambldia casta (Pack.), was the most numerous insect found within the nests of F. subnitens. The larvae are dark grey with many plumose setae arising from the verrucae. They are 15 to 20 mm. in length when mature. They feed entirely on lichens on the soil surface. The adults are pure white, have a wing span of 35 mm., and fly at night.

The first-and second-instar larvae were first noted about June 1. Until they pupated in late July the larvae were frequently seen on the ant

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trails and nests but were ignored by the ants. During the heat of midday the larvae were commonly found sheltering under stones together with *F. subnitens*. Ants were not observed to attack the larvae. Many of the larvae entered the nests of *F. subnitens* and pupated during the latter part of July. At this time the presence of the ants did not cause them to remain motionless and they were observed to wander in and out of the nests together with the ants. By August all the larvae had pupated in the detritus surrounding the brood chambers of the nests. In laboratory tests the thin, weblike cocoons of the pupae afforded sufficient protection against attack by the ants. Naked pupae of *C. casta* were readily accepted as food by the ants.

The adult moths emerged from the pupae during the morning hours in mid-August. Adults were not observed emerging from the nest and it is not known whether they emerge directly through the detritus or through the brood chamber and the regular openings in the nest. Ants were observed to attack the moths. However, the scales of the moth were repellent to the ants and during the two summers of observation only three were observed captured and brought into the nest.

The exact relationship between *F. subnitens* and *C. casta* is not clear, but their apparent indifference to one another, particularly during the latter larval instars of *C. casta*, indicates that *C. casta* is a synoikete (Donisthorpe and Morley, 1945). The ants gain nothing from the relation ship and the moth apparently gains nothing directly other than a suitable place to pupate. Indirectly the pupae may gain some measure of protection from parasites and predators.

To obtain information on the latter, three nests of approximately equal size but with colonies of different sizes were dug up and the contents examined. The first nest contained a vigorous colony of average size, the second contained a small but vigorous colony, and the third had been abandoned by ants. This gave a nest with all the detritus inhabited by ants, one with the periphery of the detritus uninhabited by ants, and one with all the detritus uninhabited. All insects other than ants were recorded and all *C. casta* larvae and pupae were reared to maturity. The number of *C. casta* collected and the emergence of adult moths and parasites are shown in Table I.

The number of larvae and pupae of *C. casta* found in each nest was approximately proportional to the number of ants. This would suggest that it is the ants that attracted the larvae. It is also possible, however, that well-aerated detritus that is free from molds, as in a large healthy colony, is more suitable for pupation of the larvae than the decaying detritus found in unattended nests or in nests with low ant populations.

As there was little difference between the three nests in the percentage parasitism by Hymenoptera, it is unlikely that the ants had any influence in preventing parasitism of *C. casta* by these insects. The greater incidence of parasitism by Diptera in the abandoned nest may be of some significance; however, as proved from separate rearings of field-collected *C. casta*