LOCUSTACARUS BUCHNERI (ACARINA: PODAPOLIPODIDAE) INFECTION OF BUMBLEBEE COLONIES (BOMBUS TERRESTRIS L.)

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Summary
The mite Locustacarus buchneri, multiplies in the air sacs of adult bumblebees. The female feeds on hemolymph, swells up and lays about fifty eggs. These eggs hatch into six-legged larviform females and males. After mating, part of the females leave the host in search of a new host. Into an infected bumblebee colony, we put some adult bumblebees from a hive that was mite-free. After 8 days, we caught these bumblebees again and checked them on mites. We found mites in 1 of 11 queens, 1 of 9 workers and 10 of 14 drones. On the larvae of an infected colony we found numerous Locustacarus females near the entrances of the tracheae. We also observed that female mites enter the larvae through these openings. In sections of the abdomen of frozen bumblebee pupae we found several Locustacarus females, not yet multiplying. Although the mites can infect adult bumblebees, the infection route via the bumblebee larvae seems to be preferred. Apparently the mites survive the pupal stages of the bumblebee inside the pupa.

INTRODUCTION

Locustacarus buchneri was described by Stammer in 1951 as Bombacarus buchneri. It was found for the first time in trachea of bumblebees in France (Toumanoff, 1930). The authors found L. buchneri mites in the Netherlands in the autumn of 1997 in bumblebees of B. terrestris and B. pascuorum. The mite has been found in the trachea of 18 bumble bee species in Europe, North America and New Zealand (Hasselrot 1960, Husband & Sinha 1970, Macfarlane et al. 1995, Schmid-Hempel, P., Schmid-Hempel, R., 1990). Two infected nests of B. agrorum (=B. pascuorum) (Cumber, 1949), showed 50%, and 92% positive cases amongst workers, and 100 % infection of new queens. Several bees from a nest of Bombus bimaculatus (Husband, 1969) were checked and 61% of the worker bees, 55% of the males and 45% of the newly emerged queens had L. buchneri in the abdominal air sacs. Furthermore one of two pupal queens had mites in an abdominal air sac. This was the first record of an internal mite in a pupa and it was suggested that the young female mites may enter the cells containing larvae as they are fed by workers. The life-cycle, first described by Cumber (1949) is as follows: this mite multiplies in the air sacs of adult bumblebees. The female feeds on hemolymph, swells up and lays about fifty eggs. These eggs hatch into six-legged females and males. After mating, some of the females leave the host (Husband 1969) in search of a new host.
OBSERVATIONS ON BEES, PUPAE AND LARVAE OF REARED BOMBUS TERRESTRIS FOR LOCUSTACARUS BUCHNERI

Five young colonies, sent to us by a commercial bumblebee firm, had an infection of L. buchneri. These colonies had a queen and an offspring of about ten bumblebees each. In these five young colonies all bumblebees had mites in their abdominal air sacs except for one newly emerged worker in which no mites could be found. Another newly emerged worker bee contained female mites which were attached to the tracheal wall after piercing it and were swelling. These mother mites had not yet started to lay eggs. In the other, older bumblebees, mother mites with clustered eggs on them besides larviform mites were found. Only the bumblebee queens had an older infection in the air sacs with crusts with old mites, hatched eggs and young mother mites laying eggs.

In an older colony from the bumblebee firm, with workers, males and young queens, two workers, three males and three queen bees were picked out. Seven bees proved to be infected with mites except for one newly emerged queen where no mites could be found.

Several bumblebee pupae were searched for mites but no mites could be found on the pupae. In sections of the abdomen of frozen bumblebee pupae we found also (Husband 1969) several Locustacarus females, not yet multiplying nor swollen.

On four old larvae, from which three had already spun, mites were found around the tracheal spiracles. Up to 13 mites could be found on one larvae and several mites could be seen "waiting" at one opening. There seemed to be no preference for a particular spiracle opening. In contrast to the older larvae which all proved to have mites on them, the younger bumblebee larvae had no mites. On the spun larvae could be observed, that several mites were trying to enter the spiracles. This is the first recorded instance of L. buchneri on bumblebee larvae and the entering into the larva.

In order to find out what the importance was of the infection of adult bees we put some marked adult bumblebees from a hive that was mite-free, into a heavily infected hive. After 8 days, we caught these bumblebees again and checked them on mites. We found mites in 1 of 11 queens, 1 of 9 workers and 10 of 14 drones. Although the mites can infect adult bumblebees, the infection route via bumblebee larvae seems to be more important.

When rearing bumblebees it is important to take notice of these findings.

REFERENCES


