On the behaviour of Chaetodactylus mites (Acar., Tyr.) in the nests of Osmia rufa L. and Chelostoma florisomne (L.) (Apidae, Megachilidae)

by

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The good results which KROMBEIN and others had obtained in rearing Hymenoptera in trap-nests, induced me to make a trial with these nests in the neighbourhood of Ulvenhout (province of Noord-Brabant). They consisted of wooden blocks of about 3 × 2 × 15 cm, with a drilled hole, of about 5 mm diameter and a depth of about 10 cm. The trap-nests had been set out at places which were somewhat protected from the rain, such as to poles of barns and against the wall of a house under the overhanging roof. Besides these wooden blocks also pieces of tonkin- and bamboo-sticks have been used, as FABRE and later entomologists had already done long before.

In the early season of 1956 many of the trap-nests were occupied by *Osmia rufa* L. and *Chelostoma florisomne* (L.). After splitting up the pieces of wood and tonkin it was very easy to study the biology of the bees and their parasites. To these parasites also belonged mites of the genus *Chaetodactylus* and the daily control of the nests revealed some interesting facts which seem to be new.

The nests of *Osmia rufa* and *Chelostoma florisomne* which I found in thatch in previous years often contained cells which were teeming with mites. As to *Osmia rufa* this will always have been *Chaetodactylus osmiae* (Dufour 1839) which is very common in the nests of this species. In the trap-nests of *Chelostoma florisomne* I found mites of the same genus *Chaetodactylus*, but belonging to a different species, according to the determination of the deutonymphae by Mr. G. L. VAN EYNDHOVEN, acarologist of the Zoological Museum at Amsterdam.

As I did not know the biology of *Chaetodactylus* I had always believed that they were food-parasites only and that after the accidental death of the young bee-larvae they had got an opportunity to multiply. I could now ascertain without any doubt, however, that these mites are not such innocent food-parasites as they seemed to be, but that they first kill the young larva of the bee before turning to the pollen which has been stored in the cell.

It was not possible to observe how the mites enter the nest, but it is rather certain that they have been carried there by the mother bee, clinging to its hairs in the deutonymphal stage, for which purpose these nymphae dispose of large, hooklike claws and a sucker plate. At first the mites seem to prefer to hide themselves in the dry pollen, in the lower part and near the sides of the cell, where the pollen has not been moistened by honey, and they will await there the hatching of the egg of the bee.

In the trap-nests I came across *Chaetodactylus osmiae* for the first time in a nest of *Osmia rufa*, where two larvae died a few days after hatching. In each of the cells a fullgrown mite was sitting on the bee-larva and it was very likely then that the mites had caused the death of the latter. In another nest of *Osmia rufa* I found a mite clinging to one of the segments just behind the head of a five days old larva. The bee-larva was swinging its head to and fro but could not get rid of its assassin. A few days later the bee-larva was dead.

The nests of *Chelostoma florisomne* were heavily infected by a different species of *Chaetodactylus*, as already mentioned above, but this species could not yet be identified. In at least ten cases I could ascertain the death of the bee-larvae as a result of the attacks of the mites. In a partly infected nest a few mites were placed in a cell which seemed to be non-infected yet. The following day already the bee-larva was dead.

It was in the nests of *Chelostoma florisomne* that I could get complete certainty as to the cause of the death of the bee-larvae. A very young larva with a mite clinging to its body was placed under the microscope and it was then possible to observe how the mite was sucking from a large and fresh wound whilst the body liquids of the larva were pouring out.

As a rule the bee-larva was killed in a very early stage, i.e. during the first days after hatching. When dying the larva of *Chelostoma florisomne* is getting dark-green and its body is no longer bent towards the food, but it takes a half-erected attitude. A few larvae of *Chelostoma florisomne* have been attacked in a later stage, but it is more likely, that in these cases the nests were infected some time after they had been opened than that the mites have been waiting all the time somewhere in the mass of pollen. In one of these cases the larva of *florisomne* when it was three weeks old did some irregular spinning, although there was still a stock of pollen of a height of about 10 mm. Two days after the beginning of the spinning the larva had a green colour, indicating that it was nearly dead, and some mites were found in the pollen.

In a second abnormal case the larva of *florisomne* had just defecated when it was found covered with wounds which must have been caused by a mite which was also in the cell. As in the preceding cell a larva of *florisomne* was killed a fortnight ago, it is very likely that the mite originated from this cell.

The mites soon start laying their eggs, many of which are deposited on the freshly killed larvae.

For the identification of the mites I am much indebted to Mr. G. L. VAN EYNDHOVEN, who also kindly consulted some litterature for me. According to his information VITZTHUM (Acarina, in BRONNS Klassen und Ordnungen, Leipzig 1943, Band V, Abt. IV, 5. Buch, Lfg. 4 (1941)) only gives some details about *Chaetodactylus ludwigi* Trouessart 1904, which feeds on the pollen collected by a *Megachile* species and is considered to be paraphagous. There exist, however, other members of the large family of the Tyroglyphidae, to which family also the genus *Chaetodactylus* belongs, which kill their host (*syllestium*) but apparently this only seems to occur casually.

Résumé

Dans les nids des Hyménoptères *Osmia rufa* L. et *Chelostoma florisomne* (L.) deux acariens différents ont été trouvés. Ce sont *Chaetodactylus osmiae* (Dufour) chez *Osmia rufa* et une autre espèce de *Chaetodactylus*, qui n'a pas encore été identifiée, chez *Chelostoma florisomne.*

Les deux acariens attendent l'éclosion de l'oeuf de l'abeille pour tuer la jeune larve. Ensuite ils se mettent sur le stock de pollen, où ils se multiplient et se transforment en deutonymphae, qui seront transportés au printemps prochain par les jeunes abeilles survivantes.

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