The book scorpion, a welcome guest in bee colonies

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Translated by David Heaf from *Der Bücherskorpion, ein willkommener Gast der Bienenvölker.*[1] Österreichischer Imker Bd. 1, 1951, S. 209–211.

Among the many more or less welcome, mostly even unwanted guests in bee hives, the book scorpion or *Chelifer canroides*, leads a very humble and – unjustly, as we shall see – little-noticed existence. This is because the barely 3mm large, eight-legged, Arachnid pincer-bearer, can easily hide its oval, flattish body in the smallest cracks and crevices of wooden structures, which this light-shy creature likes to do at every opportunity. So beekeepers rarely see them, although certainly almost every bee house[2] shelters several of these creatures. For the book scorpion is distributed almost globally, where in warmer regions it is a typical bark-dweller. For its habitation it exhibits a preference for warm, dry localities, especially in the rougher areas of human dwellings, stables, barns and even hives, where it is protected from the rigours of the weather. As a companion of humans it has been able to spread in this way northwards to Britain, southern Scandinavia and northern Russia, i.e. into climates which would certainly not allow it to live in the open. Here it is often a useful roommate because it is a predator not only on dust mites on our bookshelves – hence its name – but also a hunter of annoying bed bugs. It was even found on lice-ridden childrens' heads where it no doubt preyed on the biting crawlers.

And for the same reasons the book scorpion should be welcome to beekeepers. In beehives too it makes itself useful by destroying mites, dust lice, and even bee lice that it seems to pick off the bees, as well as other more or less annoying intruders, but above all by hunting the larvae of the dreaded wax moth. As it moves fast forwards and backwards, and to the sides with equal ease, its long pincer-armed pedipalps stretched forwards like a crab, or spread laterally angled, it moves very confidently in the bee hive and detects its prey in the darkest corners. It orientates not with its weak eyes, that are hardly adapted to image recognition, but with the help of the dozens of long, straight sensory hairs, which, in the adult, are on the 'fingers' of the pincers and as a result of their deflections respond to the slightest air movements, so they can be described with a certain justification as hearing hairs. If in this way it detects a prey species, e.g. a wax moth larva, it first grabs it with the powerful grip of its palp pincers. Then the fangs sitting at the ends of the two pincer fingers, through which pass venom ducts, penetrate the skin of the victim and allow a little of the poisons of the venom gland, located in the cavity of the fingers, to flow in. This quickly paralyses the victim so that the book scorpion can overcome relatively large prey species, and the up to 1 cm long wax moth larva, provided that the skin is sufficiently soft to allow the poison fangs to penetrate. Then it transfers the paralysed prey to its mouth with the palp pincers, stabs it with its little jaw pincers and allows digestive juice to flow into the prey's wound. For, like all arachnids it cannot simply swallow its prey, but instead must first liquefy its fleshy parts on the spot with the decomposing action of its spat out gastric juice so that it can then drink it up. During the meal the initially plump wax moth larva becomes noticeably flaccid and finally only its empty skin remains.

This benefit is not offset by any damage that the book scorpion would cause in the hive, for it can do absolutely no harm to the bees, by whom it is tolerated, or to the brood hidden in the comb, not to mention that it avoids the moist, sticky honey. Often, especially at swarm time, one can find a book scorpion clinging tightly with its pincers to a leg or other body part of a bee so that the bee takes it with her in flight, yet suffers no damage by this, and is not hindered in its activity by its unusual passenger. It cannot even harm the much more delicate housefly, to which book scorpions can equally frequently be found clinging at certain times, especially from May to September, for the fangs on the pincer fingers can neither in this case nor in the previous one penetrate the relatively hard chitin skin. And when a book scorpion sometimes sticks to a passing bee so as to be carried by it, absolutely no harm is intended. And in this case it is not possible to mistake the bee for a creature to be preyed upon, because the book scorpion is without doubt able to assess its size with its incredibly sensitively reacting tactile hairs. It is much more an instinct to travel, that is awoken in the book scorpion by the agitation of the bees that are about to swarm, and causes it to catch a convenient means of transport. Significantly, it is almost always pregnant females who are thus found as air passengers because they are of course responsible for spreading the species. However, as their active dispersal behaviour is very limited, they just use any convenient means of transport. In this way it is ensured

that the young [*sic*] queen with her colony carries one or two book scorpions to their new home. These then lay a limited number of eggs – mostly about 20 – which until the hatching of the young she carries in a disc-shaped pouch fixed to her abdomen and during a certain period of embryonic development she supplies with a liquid feed which is sucked up by the embryos. The young, initially whitish, book scorpions remain a few more days with their mother in a brood web that she has prepared before their hatching and later become independent. With the help of the spinnerets of their jaw pincers, they make their own little moulting nests for each moult, of which they have to go through three. These oval, shield-shaped, humped, tight cocoons camouflaged with dust, fragments of wood etc. can be found in the most protected places stuck to wooden parts inside the hive, and easily reveal the presence of book scorpions even if you do not get to see the creatures yourself.

Although it is true that the book scorpion is a frequent though only occasional guest of our honey bees and mainly found at other locations, in tropical and southern Africa as well as in Asia there are pseudoscorpions that live exclusively on bees and indeed live not only with honey bees but also in the nests of various wild bees. These are the hitherto known five species of *Ellingsenius* which are characterised by squat and most strange warty sculpted palps. These too are tolerated guests of bees that live on its parasites, i.e. from the point of view of the colony they should clearly be regarded as beneficial, even if, as rather robust animals, they occasionally attack injured bee larvae. They have the same lifestyle as our book scorpions and like these, let themselves be carried by swarming bees to a newly founded nest. How numerous they must be in the bee hive is shown by the fact that for example no less than 25 to 30 individuals of *Ellingsenius sculpuratus*, the commonest southern African species, can be found in a single bee swarm. With this needs to be considered that certainly only a fraction of the individuals living in the infested colony go off on a journey with the swarming bees. Thus, the *Ellingsenius* species without doubt play a still more important and significant part as vermin-absorbers and health police in bee hives than our shy book scorpions.

Finally we should mention that certain pseudoscorpions live as permanent guests with other Hymenoptera: *Dasychernes inquilinus* with tropical South American wild bees; *Hesperochernes laurae* in North America with wasps and *Myrmochernes africanus* in South Africa with ants, to name only the most important ones. Thus we see that the small, inconspicuous pseudoscorpion offers many interesting things in its life habits and deserve the benevolent attention of the beekeeper.

Notes

1. The text used is at https://chelifer.de/der-buecherskorpion-ein-willkommener-gast-der-bienenvoelker-max-beier-1951/ . It was assumed that it was faithfully copied from the original.

2. In Germany, apiaries are commonly situated in bee houses.