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On the Oviposition of Metœcus (Rhipiphorus) paradoxus

T. Algernon Chapman

The three species of *Tomicus* mentioned above have been again separated from that genus by M. Bedel, and placed in a new genus, *Pityogenes*, distinguished from *Tomicus* by the absence of a prosternal process. *Pityogenes chalcographus*, Linn., and *bidentatus*, Herbst, are well known species ; *P. quadridens*, Hart., is less known, and its place is sometimes supplied by examples of *P. bidentatus*. It is a distinctly smaller insect, the punctuation of the thorax is finer and more scattered. The male has four distinct teeth at the apex of the elytra, two at the summit of the apical declivity, which are large and hooked, and two rather more than half-way down it, but not as far down as the apex, the border between these two teeth is not crenulate, and is quite devoid of setigerous tubercles, which are always present in *P. bidentatus*. The female has four small tubercles in the situation of the male teeth.

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ON THE OVIPOSITION OF *METŒCUS* (*RHIPIPHORUS*) *PARADOXUS*.

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It is now some twenty years since I made a slight addition to our knowledge of the life-history of this interesting species. I was then obliged to leave undetermined the whole question of the oviposition, of the hatching of the young larva, and its means of reaching the wasps' nest. In this long interval I have, as opportunity occurred, made various efforts to clear up some of these points ; but it was not till this year that I made any further advance : so far as I have heard no one else has done anything in the matter. As my observations this year only throw a partial light on the still obscure questions, I had some idea of waiting till they were more complete before saying anything about them ; but I reflected that possibly another twenty years might elapse before making another step, and the appearance of the part of Mr. Fowler's *Coleoptera* dealing with the species making it seasonable, I submit this note.

Failures are often as instructive as successes, and have, in this case, led up to the trifling success I have at length reached, so that I am sorry to have kept no record of what I did in the matter at various times in recent years. I did, however, obtain examples of the beetle in greater or less numbers, and treated them in various ways, placing with them earth, sand, various plants, flowers, &c., but always with the result that in a few weeks at furthest they died, without either

ovipositing or showing any desire to hibernate. I, however, came to, or was confirmed in, the conclusion that the eggs were laid in autumn, and that the beetles did not hibernate, partly from the death of the beetles, partly from the females always being full of eggs fully matured. I have never succeeded in finding a free larva in the wasp's nest, whence I conclude that they are introduced one by one, and very quickly bury themselves in a wasp grub ; whereas, did the beetle hibernate, the female would lay many eggs in a nest, and the young larvæ would certainly be often met with. The female contains so many ova (though not so many as *Meloë*) that it is obvious that the great mortality of the species occurs between oviposition and the safe arrival of the larva into the interior of the wasp grub, especially as after that date the mortality is nil. If the egg were laid in the nest this would not be so.

Thinking out these matters, I this year enclosed a number of freshly disclosed beetles in a sunny place, with portions of dead and rotten wood, as well as some flowers. I was lucky enough on two occasions to see the beetles *in cop.*, proving certainly that pairing occurs in autumn, and afterwards I observed several females, fertile or otherwise, searching the crevices of the wood with their extensive ovipositors, and at times quietly resting with the ovipositor nearly out of sight, buried in the cracks of the wood. This clearly proves that the eggs are laid in autumn.

That a cavity in dead or rotten wood is the natural place of oviposition is not proved, but is rendered in the highest degree probable, when it is remembered that no other arrangement that I previously tried had any success in inducing oviposition. It becomes further, therefore, probable that the mite-like young larvæ are met with by the wasps in collecting the wood shavings for nest building, probably usually one at a time, and a nest contains a succession of *paradoxus*, because the same post or stick over which the beetle larvæ are wandering, is constantly frequented by the wasps of that nest, whilst those of other nests, free from *Rhipiphorus*, do not happen to have visited such a post. Though my observations will well bear refutation or confirmation, there remains really only one matter still unknown, that is, when do the eggs hatch ? From the delicate nature of the eggs I incline to believe that the young larva is developed in the autumn, but hibernates unhatched within the egg-shell. Those eggs that I found laid in the wood cavities were either infertile or injured by my examination, as they went mouldy instead of developing. Whether any I did not disturb may have been more lucky will not appear till next spring, but I much doubt it.