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ON PARASEMATISM IN THE MOTH  
*ATOLMIS (GNOPHRIA) RUBRICOLLIS* (L.) (Arct.)

by J. KLEINHOUT

SOMMAIRE

L'auteur propose une explication du parasématisme chez *Atolmis (Gnophria) rubricollis* (L.).

Many animals (fishes, butterflies and caterpillars) wear conspicuous patterns, which resemble eyes of birds. Sometimes they have simpler marks. It is noteworthy that the marks are seen at several divisions of animals, and, in the first case, with such marked perfection. One might suppose that a predator is being lead away from the body of the prey to hit the more peripheral parts. This concept is found already by BACOT (1905). This idea when used to explain other conspicuous patterns, does not seem applicable. Vital parts of the body can also attract attention, and this may play a part in the defence. This could be concluded from the following observations. Another explanation seems to be more plausible in some cases, namely that the sudden display (e.g. in the touched eyed hawk moth) discourages the hunting animals, by which they turn away from their prey. At the first glance it seems an anthropomorphism to point out a terrified reaction in the hunting birds. Predators have been intimidated by artificial eyes under experimental conditions. At least the eyespots were favourable for the survival of the prey (BLEST, 1957). In the Dutch (pine) forests such behaviour has been observed also (*Atolmis rubricollis* (L.) Arct.).

The hairy larvae are living on trees. Their food consists of *Parmelia*. The trees are not only old ones, but they live in relative young woods also. The excrements are black, oblong and rounded off. It has been proven by samples, that during the day the animals do not occur in the



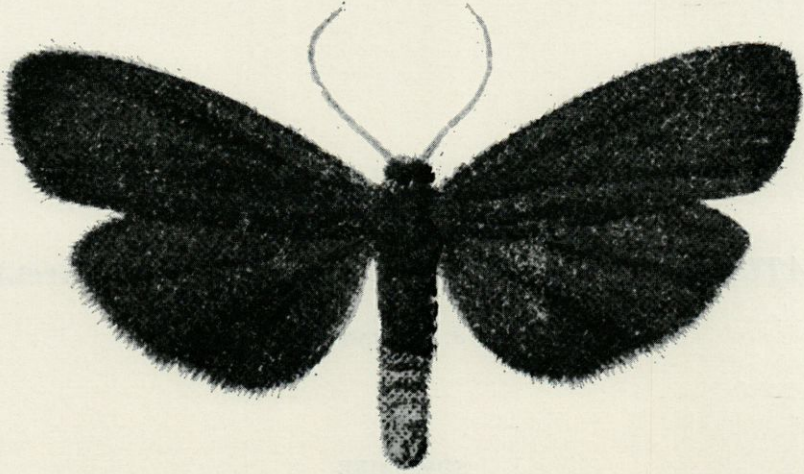


FIG. 1. — *Atolmis rubricollis*. After Ter Haar.

periphery of the trees. They descend during September. There is one generation a year. The pupa lies in the litter, in a thin web. The third flying period of *Cratichneumon nigrarius* is during September-October, thus earlier than the common species of the pinewood, *Bupalus piniarius*, appears in the litter. In the woods tested, it had been parasitated heavily by the ichneumon. The imagos of *Atolmis* hatch in the afternoon. They lay their eggs on needles of pinetrees, in large sets.

The origin of their behaviour seems to be influenced by the following sequence of factors.

— To begin with the milieu of the forests examined (Scotch pinewoods) are more or less poor, thus the floor surface is an « easy » hunting place.

— Then there are also unfavourable qualities in the animal. After emergence of the pupa Lepidoptera shows very little displacement and they are hanging at all sorts of elevations near the surface (grasses, pine cones, etc.).

— Further the moth is helpless, because the cuticula of the wings is weak for a long time (WIGGLESWORTH, 1947, points out the remarkable long time).

— Beside that they cannot hide themselves in this vulnerable period, because their wings must be freely extended in connection with the creasing of them. I have observed that *Atolmis*, coming out of small jars, have such wings. They hang out on places where they are exposed to the eyes of predators. Further a large part of the body still remains, when tits remove the wings for their young. This is the case especially in females, big with eggs.

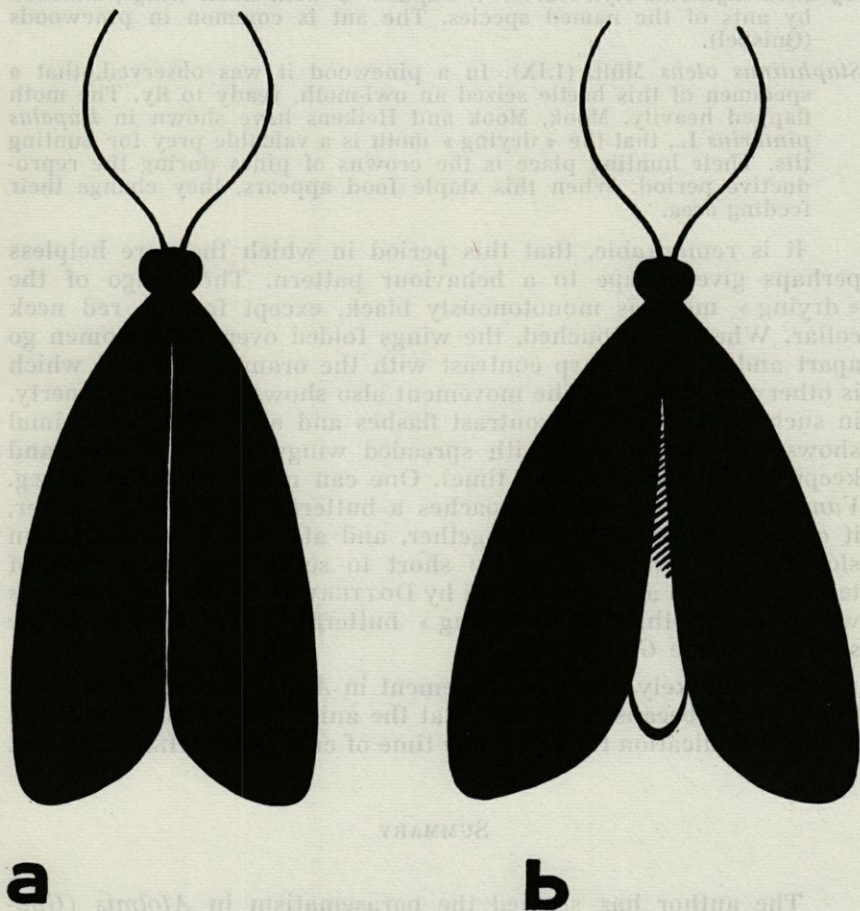


FIG. 2. — The situation in which *Atolmis* shows parasematism. a. «drying» imago. — b. Imago after touching, before falling on the ground.

I did no observations in other wood-types. According to STEPHAN the caterpillars feed on «Wand- und Baum-flechten» (1923), so it may be, that the animal lives in other habitats also.

I have seen various animals preying on the «drying» moth *Bupalus piniarius* L., for instance tits, soil surface hunting spiders, ants, etc. I did the following observations :

*Trochosa terricola* (10.VI). A spider of this species, preying on a *Bupalus* ♂ with small wings. However the animal seems to be more active at night.



*Myrmica ruginodis* Nyl. (12.VI). A *Bupalus* ♀ with small wings, attacked by ants of the named species. The ant is common in pinewoods (Quispel).

*Staphilinus olens* Müll. (1.IX). In a pinewood it was observed, that a specimen of this beetle seized an owl-moth, ready to fly. The moth flapped heavily. Mook, Mook and Heikens have shown in *Bupalus piniarius* L., that the « drying » moth is a valuable prey for hunting tits. Their hunting place is the crowns of pines during the reproductive period. When this staple food appears, they change their feeding area.

It is remarkable, that this period in which they are helpless perhaps gives shape to a behaviour pattern. The imago of the « drying » moth is monotonously black, except for the red neck collar. When it is touched, the wings folded over the abdomen go apart and form a sharp contrast with the orange hindpart, which is otherwise invisible. The movement also shows a kinetic property, in such a way that the contrast flashes and after this, the animal shows freezing (it falls with spreaded wings on the ground and keeps motionless for some time). One can make a parallel to e.g. *Vanessa io*. When one approaches a butterfly sitting on a flower, it quickly claps the wings together, and afterwards reopens them slowly. The movement is too short to serve as a regulation of temperature, in a way, as found by DOTTERWEICH (1928). In *Atolmis* we see a « nothing undertaking » butterfly (the meaning of the scientific name *Gnophria*).

It is unlikely, that the movement in *Atolmis* happens in moth ready to fly, because it seems, that the animal is active only in the dark. An indication for this is the time of emergence (HERING, 1926).

#### SUMMARY

The author has studied the parasematism in *Atolmis* (*Gnophria*) *rubricollis* (L.). It seems that the sudden movement of the black wings, when the animal is touched, forming a sharp contrast with the orange hindpart, which may play a part in defence.

#### RÉSUMÉ

L'auteur a étudié le parasématisme chez *Atolmis* (*Gnophria*) *rubricollis* (L.). Il semble que le brusque mouvement des ailes noires, formant un contraste marqué avec l'abdomen orangé, lorsque l'animal est touché, joue un rôle de défense.

ZUSAMMENFASSUNG

Parasematismus wurde vom Autor bei *Atolmis (Gnophria) rubricollis* (L.) untersucht. Die plötzliche Bewegung der schwarzen Flügel, in scharfem Kontrast zu dem orangefarbenen Leib scheint, bei Berührung des Tieres, eine Verteidigungsrolle zu spielen.

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