

Montina confusa (Stal, 1859) (Hemiptera, Reduviidae). III. Ethology of Nymphs and Adults¹

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ABSTRACT

The ethology of nymphs and adults of *Montina confusa* (Stal, 1859) (Hemiptera, Reduviidae), predator of larvae of *Eupseudosoma* spp. (Lepidoptera, Arctiidae), an important defoliator of *Eucalyptus* spp. trees in Brazil, was studied. The predators were reared on larvae of *Galleria mellonella* L., 1750 (Lepidoptera, Pyralidae) in the laboratory. The newly hatched nymphs are gregarious, but soon disperse and live as solitary predators. Mating and predation behavior is described for the adults. Cannibalism was observed to occur among nymphs and adults.

INTRODUCTION

The reduviid *Montina confusa* (Stal, 1859) is a predator of larvae of *Eupseudosoma* spp. (Lepidoptera, Arctiidae), a serious defoliator of *Eucalyptus* spp. in commercial plantings in Brazil. This paper deals with the behaviour of *M. confusa* nymphs and adults reared in laboratory on larvae of *Galleria mellonella* L., 1750 (Lepidoptera, Pyralidae).

MATERIALS AND METHODS

The reduviid was collected from *Eucalyptus* commercial plantings in Mogi Guaçu, State of São Paulo, Brazil. The adults were kept, individually or in couples, in plastic vials (9.2 cm diameter, 6 cm high) capped with nylon gauze. The nymphs were kept, individually, in glass tubes (2 cm diameter, 8 cm high) stoppered with cotton balls. The nymphs were fed honey solution during the first five days after hatching; then they were placed one in each glass tube and fed with newly hatched larvae of *G. mellonella*. As the molts succeeded, the nymphs were fed daily with larger *G. mellonella* larvae. The adults were also fed daily with *G. mellonella* larvae. The study was carried out under laboratory conditions (temperature $25 \pm 1^\circ\text{C}$; $70 \pm 10\%$ RH; 14-hour photophase).

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COMPENDIO

La presente investigación trata de la etología de ninfas y adultos de *Montina confusa* (Stal, 1859) (Hemiptera, Reduviidae), predator de orugas de *Eupseudosoma* spp. (Lepidoptera, Arctiidae) que es un importante deshojador de *Eucalyptus* spp. en Brasil. Los insectos fueron criados con orugas de *Galleria mellonella* L., 1750 (Lepidoptera, Pyralidae). Las ninfas recién eclosionadas se mantienen agregadas alrededor de la masa de huevos y dos días después se dispersan y viven como predadores solitarios. Los comportamientos de apareamiento y predación son descritos para los adultos. El canibalismo fue observado ocurriendo en las ninfas y los adultos.

RESULTS AND DISCUSSION

Nymphs

Upon hatching, the nymphs remained together at the egg mass. Two days later they dispersed and lived as solitary predators. Swadener and Yonke (4), working with the reduviid *Apiomerus crassipes*, observed that the first instar nymphs stayed around the egg mass from 12 to 24 hours.

Newly hatched nymphs, when individually kept in glass tubes, did not survive, even with an abundant food supply. This suggested that the gregarious habit immediately after hatching was an essential condition for the nymphs' survival.

When all nymphs from the same egg mass were maintained together, they exhibited cannibalism, which was more pronounced during food shortage periods. The cannibalism was more frequent among third, fourth, and fifth instar nymphs. On the other hand, if a fifth instar nymph molted into adult before the others did, it was killed by the remaining ones.

A single nymph usually attacked prey of its own size; when put together, first and second instar nymphs caught larger prey which served as food for two or three nymphs, sucking at different points. If the prey larva was much larger than the nymph, it generally killed the predator. Also, prey larvae of the same size as the nymph would kill it when present in large numbers. Therefore, prey density varied according to the developmental stage of the predator in a closed space.

The molting process lasted from two to three hours and the nymph stopped feeding 24 hours before the beginning of ecdysis; the whole exuvia was easily visible.

The predatory behaviour of the nymph was the same as described for the adults.

Adults

Mating

The initial reaction of the male to an approaching female was similar to that exhibited in the presence of prey: it directed its antennae towards the female, then moved forward and extended its rostrum. Sensorial information, probably chemical and received through the tip of the rostrum, ensures the sexual response and inhibits the predatory one. This has been suggested by Parker (1) for the reduviids *Rhynocorus bicolor* and *R. tropicus*.

Since the response of adult reduviids to individuals of the same species was apparently identical to its response to the prey until the moment of grasping, it is possible that the chemical stimulus was perceived by the tip of the rostrum when exploring the surface of the female's body. Then, the male started a "mounting" behaviour that lasted from four hours to four days. Its prothoracic legs were placed in the head-thorax junction of the female, and occasionally the male touched the female head with the tip of the rostrum. During this period, the female remained still or slowly walked on the walls of the cage, preying and feeding normally. When disturbed, the male dismounted, but soon returned to its former position on the female.

During mating, the male took a dorsal-lateral position, usually on the left side of the female. Its right meso- and metathoracic legs were placed on the dorsum of the female, while the prothoracic legs remained at the base of the female head. The left meso- and metathoracic legs were placed on the lateral side of the female or kept in an upright position. Then the male extruded its genitals on the female terminalia, moving the aedeagus from side to side until finding the female genitalia and inserting it. After mating, the male returned to the "mounting" position.

The pre-copulatory position of *M. confusa* males is a characteristic one in the mating behaviour of many reduviids. Parker (1, 2, 3) has observed this behaviour in *Vestula lineaticeps*, *Phonoctonus fasciatus*, *P. subimpictus*, *Rhynocorus bicolor* and *R. tropicus* (Reduviidae, Zelinae).

Predation

The reduviid *M. confusa* walked slowly inside the

rearing cage, with the antennae resting on the head. When it detected prey larva, it stopped, raised the anterior tibiae and extended the antennae forward. If the prey moved too fast, it would raise its prothoracic legs and bend its head in a defensive position. If the prey remained still or moved slowly, the predator would walk towards it until it held the prey with the anterior legs, and began to suck the body juices. After the insertion of the styles into the body, the prey was paralyzed; small larvae were rapidly immobilized (15 to 45 seconds), while larger larvae only stopped moving after five minutes. Woodward (5) has stated that the basic functions of the salivary secretions among predatory reduviids were to paralyze and kill prey, thus dissolving its body fluids. He has also observed that the fore and median tibiae presented an adhesive secretion which facilitated seizure of the prey.

The prey was handled with the forelegs and often with one or both median legs, and the predator usually walked holding the prey with the stylets. The feeding period stopped when all body fluids of the prey were drained.

Cannibalism

Cannibalism would generally occur during a food shortage, if many adults of *M. confusa* were kept together in the same cage. Each time an insect died inside the cage, it was set upon by the others. A similar behaviour was observed for males kept together and for females kept together. On the other hand, healthy individuals, when attacked, displayed a defensive attitude.

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