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NOTES ON THE MYRMECOMIMICRY OF
*SYRINGOGASTER RUF*A CRESSON, 1912
(DIPTERA, ACALYPTRATAE, MEGAME-
RINIDAE) *

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In 1912, studying some Acalyptrate Diptera of the Neotropical Region, Cresson described *Syringogaster*, with two species: *rufa* and *brunnea*, both from Costa Rica. This genus, as has already been noted by Cresson, presents a remarkable resemblance to *Gobrya*, described by Walker from southeastern Asia, and especially to de Meijere's *Gobrya simulans*. However, Cresson eliminated the possibility of synonymy commenting: "According to the figure of *Gobrya simulans* de Meij. (Tidj. V. Ent. livr. 363, 1911) this genus seems similar but is very distinct. The generic characters of *Gobrya* given by de Meijere are not as definite as they should be, but if one may be guided by the figure given, the position of the fore coxae will at once eliminate the possibility of synonymy."

Two years later Cresson received from Kertész, of the Hungarian Museum, a male identified as *Syringogaster brunnea* sent for confirmation, as it presented some differences from the original diagnosis. Having described the species based only on female specimens, Cresson designated the male as allotype, commenting on the interesting geographical distribution of the species, described originally from Costa Rica and then appearing in Peru.

Curran (1934) examined some specimens of *Syringogaster* captured in Panama (Barro Colorado Island, Canal Zone) and, as far as we know, there have been no further references to the genus.

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In the collection of Diptera of the Departamento de Zoologia de São Paulo we found twelve specimens (5 ♂ and 7 ♀) of *Syringogaster* which were identified as *rufa*, captured in the months of April, July and August, 1955, by Dr. Karol Lenko, entomologist of the Departamento, at Barueri, State of São Paulo. We received later, from Dr. Carlos Alberto Campos Seabra, six specimens (2 ♂ and 4 ♀) of the same species and locality. Of the same species, *rufa*, we were able to study nine specimens more, sent by Dr. Hugo de Souza Lopes, of the Instituto Oswaldo Cruz, Rio de Janeiro, from the following localities: Osasco, State of São Paulo, IV.1939 (J. Lane); Japuhya, Angra, State of Rio de Janeiro, X.1936 (Travassos & S. Lopes) and Recreio dos Bandeirantes, Rio de Janeiro, State of Guanabara, XI.1936 (S. Lopes).

The flies from Barueri were captured, according to Dr. Lenko, as they walked on the surface of a large leaf of an unidentified plant, in a *Eucalyptus* plantation, with medium and low vegetation among the trees. The same plant was visited by several ants, later determined by Dr. Lenko as *Pseudomyrmex muticus* (Mayr, 1887).

Syringogaster rufa bears a remarkable resemblance to these ants in its relatively small size (6,25 mm), rounded head, clavate legs and abdomen, coloration and several other characters. At first glance it can be confused with the ants.

The wings of the flies bear three brownish spots, arranged in the following way: one over the apices of second basal and anal cells; another over the anterior crossvein and a third over the posterior crossvein, joining the Costa. When the fly walks, it holds the wings overlapping and appressed to the abdomen, in such a way that the spots coincide perfectly; thus the two proximal spots closely resemble the two segments of the ant's pedicel. The third spot, together with the apical portion of the abdomen, seen by transference through the apical part of the wings, looks exactly like the ant's gaster.

Adding to all this the fly's way of walking, the resemblance is extremely close.

A more detailed examination of this interesting fly reveals still more striking features, quite similar to the structures of an ant. Thus, the pleurae are elongate, some of them conical (e. g. the hypopleurae). The posterior femora are clavate and incrassate. Finally the abdomen has the first and second segments fused, basally narrowed, the distal segments widening towards the apex.

This strange structure in this fly caught the attention of Curran and de Meijere, when they studied the genera *Syringogaster* and *Gobrya*, respectively. Curran has compared the former to a *Sphegina* and de Meijere the latter to a *Baccha*. It is interesting to note that both these syrphids are also mimetic of Hymenoptera other than ants.

The ant *Pseudomyrmex muticus*, according to Kempf (1961), "lives in plants' cavities" and "establishes its nest in dried branches and hollowed stems. It is a forest and field-inhabiting ant." Gallardo (1915) observed some specimens in artificial nests and noted their ferocity, since they attacked other insects placed in the nest, killing them and sucking their internal juices. He noted, too, that they could walk forwards and backwards with equal ease, which permits them to move easily through very narrow channels.

In this manner the ants are probably well-protected against possible predators, both on account of the narrowness of the channels, where they can hide, and of their great ferocity, as they can bite and kill small enemies.

We believe, then, that the fly obtains some advantage from its resemblance to the ant. We would have here, therefore, an example of Batesian mimicry, as the following rules are observed:

1. Although the fly is similar to the ant in its conspicuous characters which deviate from the family's norm, its inconspicuous characters show its real nature.
2. The mimic should obtain some advantage from its resemblance to the model: the fly, quite inoffensive, certainly must have an advantage in mimicking *Pseudomyrmex*, a ferocious ant.
3. The mimic lives in the same biotope of the model.
4. The mimic is rarer than the model; undoubtedly *Syringogaster rufa* is a very rare fly, only a few specimens being known in collections, while *Pseudomyrmex muticus* is "the commonest species of the genus in Southern Brazil" (Kempf, 1961:390).

However, this explanation of the resemblance of the fly to the ant may contain a good deal of anthropomorphism, since ants, as it was observed by McAtee (1932:92-93), provide a sizable part of many birds' diet. In the same way they could be attacked by other entomophagous vertebrates. To be sure that this mimicry really exists, a more detailed study of the relationships between these flies and the ants, and the relationships of both to the surrounding environment and the possible predators should be made.

On the other hand, the occurrence of this mimicry could explain a series of facts. The specimens of *Syringogaster rufa* examined by us show some slight differences in coloration, not found in Cresson's description, such as the presence of two yellowish fasciae (though faint in most specimens) longitudinally and presuturally disposed in the mesonotum; the pleurae are darker, almost entirely black and the hind femora are yellowish on the base and blackish in the remaining.

These differences, however, are not at all sufficient to erect a new specific entity.

A probable explanation of these differences can be the following: *Pseudomyrmex muticus* is distributed throughout Argentina, Uruguay and Southern Brazil. Records of the species in the Amazon Valley and Trinidad Island by Wheeler (1912, 1922, 1923) are considered by Kempf (1961: 389) "a case of erroneous identification". So, since this species of ant does not exist in Central America, the differences between the populations of *rufa* could be due to the absence of a model to mimick. We would then tend to consider the flies from Central America and those in the South as geographical races and not as distinct species.

The same explanation would serve to clarify the differences found by Cresson (1914:26) between the Costa Rican female and Peruvian male of *Syringogaster brunnea*, in case of course, that they also mimick ants. These differences would indicate the presence of two geographical races and not of sexual dimorphism, since in geographically homogeneous samples of *Syringogaster rufa* males and females are similar.

Another fact that might be explained through the acceptance of this mimicry is the systematic position of *Syringogaster*. Cresson placed this genus among the Psilidae. Curran, in 1934, transferred it to the Megamerinidae, though saying: "I am not certain that this genus belongs to the Megamerinidae, as the species show striking differences from a species of *Megamerina* (so named) in the American Museum of Natural History".

We agree with the situation of *Syringogaster* among the Megamerinidae, since it presents the characters of this family which can be thus summarized: costal vein not fractured; first radial vein naked on the superior surface; first posterior cell almost parallel-sided, open on the wing margin; basal cells long; anal vein short; posterior femora armed with spines on the internal surface; abdomen long; oviduct telescopic, not sclerotized in the base (Séguy, 1951:691).

According to Hendel's 1922 key to the Acalyprate Diptera of the Palaearctic Region, *Syringogaster* would also be placed among the Megamerinidae. Besides, we had the occasion to study, through the kindness of Dr. Hugo de Souza Lopes, a male specimen of *Megamerina dolium* (Fabricius) and noticed that, notwithstanding the great differences between these two genera, they belong effectively to the same family. Curran's doubt in placing this genus among the Megamerinidae is explained by the fact that a mimetic insect deviates considerably from the physiognomic characters of its family (Carpenter & Ford, 1954:54).

Gobrya, as far as we can see by de Meijere's figure (1911, pl. 20, fig. 31), perhaps also belongs to the Megamerinidae, as its wing venation is quite similar to that of *Syringogaster*. In this case, if it could be proved that this genus is also mimetic with some ant of the Oriental Region, we would have an example of parallel evolution as a result of a parallel selection, due to which *Gobrya* and *Syringogaster* have come to present morphological homology (Rensch, 1959:198-203).

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