

One Case of the Mimicry in Oriental Coleoptera Ischaliinae (Anthicidae), Lagriinae (Tenebrionidae), and Galerucinae (Chrysomelidae)

DMITRY TELNOV

Abstract. An interesting case of mimicry in Oriental Ischaliinae (Anthicidae), Lagriinae (Tenebrionidae), and Galerucinae (Chrysomelidae) is recorded and discussed.

Zusammenfassung. Ein interessantes Fall der Mimikrie in orientalischen Vertreter der Ischaliinae (Anthicidae), Lagriinae (Tenebrionidae) und Galerucinae (Chrysomelidae) ist festgestellt und diskutiert.

Key words. *Ischalia*, *Casnonidea*, *Theopea*, Anthicidae, Ischaliinae, Tenebrionidae, Lagriinae, Chrysomelidae, Galerucinae, mimicry, Oriental region.

Introduction

In Anthicidae, numerous cases of mimicry have been recorded, mostly with ants, but very little information on mimicry complexes involving Anthicidae is available. Anthicids are very occur together with ants, in a variety of habitats. They mimic the ants' body form, colouration and movement. Examples include numerous species of *Anthelephila* HOPE, *Acanthinus* LAFERTÉ-SÉNECTÈRE, *Cyclodinus* MULSANT & REY and *Anthicus* PAYKULL (HEMP, 1994; KISTNER, 1982; MENOZZI, 1930; WASMANN, 1894; WERNER, CHANDLER, 1995; TELNOV, personal observations). No case of mimicry between Anthicidae and other members of the order Coleoptera has previously been documented.

One interesting case of presumed Müllerian mimicry is here recorded on Borneo and peninsular Malaysia in representatives of three families of tenebrionoid and chrysomeloid Coleoptera. The following genera and species are apparently involved in the mimicry complex:

Anthicidae Ischaliinae – *Ischalia indigacea* PASCOE, 1860 (fig. 1).

This species is widely distributed on Borneo: Sarawak, Sabah, W Kalimantan, as also known from whole peninsular Malaysia, Sumatra, and Philippines (Palawan).

There is also one another species known, *Ischalia zetteli* SATO, 2002, with very similar body form and colouration. This recently described species is closely related to *I. indigacea* and is only known from the type locality on Borneo (Sarawak). This species may also be a member of the same mimetic complex, but at moment there is no confirmation.

Tenebrionidae Lagriinae - *Casnonidea apicicornis* FAIRMAIRE, 1887 (fig. 2).

This species is known from Borneo: Sarawak, as also from Sumatra and peninsular Malaysia.

There are no another species known in the Lagriinae with similar colour pattern and body form.

Chrysomelidae Galerucinae - *Theopea pulchella* BALY, 1864 (fig. 3).

This species is actually known from Borneo and Sumatra.

There are also two another species with very similar body form and colouration, *T. sauteri* CHUJO, 1935 (known from China, Laos, Taiwan, and Vietnam) and *T. coerulea* GRESSITT, KIMOTO, 1963 (known from S China and Vietnam). These species may also be members of the same mimetic complex, but at moment there is no confirmation.

In 1993 *Ischalia indigacea* and *Theopea pulchella* were observed and collected in association with one another in primary lowland rainforest, Gunung Palung National Park (Indonesian Borneo: W Kalimantan, 1°13'S, 110°7'E). They were collected during the day by beating the low branches of trees and sweeping undergrowth. They were frequently found together, sometimes even in the same sweep net (O.MERKL, personal communication). The species *Casnonidea apicicornis* was not collected in association with the two mentioned above. But the general distribution and preferred microhabitats of this species are consistent with those of *I. indigacea* and *T. pulchella*, so an association seems possible.

Results and Discussion

Body form and size of members of the discussed mimetic complex

Body elongate, elytra slightly widened toward the apical fourth. Head round to slightly elliptical. Eyes large, rounded. Antennae long, with elongated antennomeres, about half the length of the body (in *I. indigacea*) to reaching the apical third of elytra (in *C. apicicornis* and *T. pulchella*). Elytra very densely and confusedly punctured (in *I. indigacea*) or with rows of dense punctures (regular in *C. apicicornis* and irregular in *T. pulchella*). Pubescence very fine and sparse. Antennomeres with dense, adpressed pubescence (finer and shorter in *C. apicicornis*). Terminal antennomere in *C. apicicornis* is elongated, about as long as the three terminal antennomeres combined in *I. indigacea* and *T. pulchella*.

Species are of the following approximate sizes (max. length x max. width in apical third of elytra): *Ischalia indigacea*: 7.5 x 2.4 mm, *Casnonidea apicicornis*: 7.8 x 2.3 mm, *Theopea pulchella*: 6.6 x 2.2 mm.

Body colour pattern

The main colour of these insects is dark blue, shiny to slightly shiny, legs black / very dark brown (sometimes with indistinct metallic reflection), antennae black with three (in *I. indigacea*, *T. pulchella*) terminal antennomeres or only the terminal antennomere (*C. apicicornis*) strongly paler, almost white to slightly yellowish. Pubescence of antennae is black on black antennomeres and whitish on light ones.

Species ecology / physiology

Ischaliinae: many anthicids have a pair of defensive mesothoracic glands. Large round pores of gland structures in *Ischalia* open near the upper margin of the sternum. Also there are distinct deep grooves near the upper margin of the mesepisternites (fig. 4). There are also visible paired pores on the dorsum of the pronotum, better developed in Nearctic and Palaearctic representatives of the genus *Ischalia*. The glands are large, oval, situated internally in the area of sternal pores and connected with all the pores by internal tissues. The secretion of these glands is poisonous to very poisonous, frequently containing cantharidin. The exudation of this poisonous secretion protects these beetles from predatory invertebrates and, possibly, from small birds.

Lagriinae: Lagriines, like most tenebrionids, have paired defensive glands between abdominal sternites VII and VIII. Although the volume of secretion produced by Lagriinae is not great when compared to that of *Blaps* (Tenebrioninae) and numerous tropical tenebrionids, which have extremely pungent and copious secretions (O.MERKL, personal communication).

Galerucinae: data on the ecology of *Theopea* are very limited. Possibly they are poisonous, as are many other members of Galerucinae. When handled the secrete hemolymph from the knees (L.N.MEDVEDEV, personal observation), which is characteristic of several poisonous beetles.

Conclusion

It is difficult to decide between two well-known types of mimicry – Müllerian and Batesian, because no detailed information on the ecology and physiology of the insects under discussion is known. In the author's opinion, all the species discussed are possible members of a Müllerian mimicry complex (when a group of toxic or harmful species share the same basic colour pattern and body form). This only can be proved by further investigations.

Acknowledgements

For information on species, their biology and ecology, and also for the help with comparative material I am deeply indebted to Dr. OTTO MERKL (Hungarian Museum of Natural History, Budapest), Dr. LEV N.MEDVEDEV (Severtsov Institute of Problems of Ecology and Evolution Russian Academy of Sciences, Moscow), and LADISLAV BOČAK (Osaka Prefecture University, Osaka). I thank my friend ANDREAS HERRMANN (Stade) for assistance in preparing photographs for this manuscript. My thanks also to my friend MAXWELL V.L.BARCLAY (The Natural History Museum, London) for help with English.

Bibliography

HEMP, C. 1994. Anthiciden und Cantharidin. Ein Beitrag zur chemischen Ökologie, Bionomie und Phylogenie der Ameisenkäfer (Coleoptera: Anthicidae). Dissertation zur Erlangung des Doktorgrades der Fakultät Biologie, Chemie und Geowissenschaften der Universität Bayreuth. Bayreuth: 1-131.

KISTNER, D.H. 1982. The Social Insects' Bestiary. *In*: HERMANN, H.R. (ed.), Social Insects. Vol. 3. Academic press, New York: 1-244.

MENOZZI, C. 1930. Una nuova specie, probabile mirmecofila, di *Anthicus* (Coleopt. - Anthicidae) della R. Dominicana. – *Bolletino del Laboratorio die Zoologia generale e agraria della R.Schula superiore d'agricoltura* **25**: 92-94.

WASMANN, E. 1894. Kritisches Verzeichnis der myrmekophilen und termitophilen Arthropoden. Mit Angabe der Lebensweise und mit Beschreibung neuer Arten. F.L.Dames press, Berlin: XV+1-231.

WERNER, F.G., CHANDLER, D.S., 1995. Anthicidae (Insecta: Coleoptera). Fauna of New Zealand, 34. Manaaki Whenua Press, Lincoln, Canterbury: 1-61.

Author's address:

Dipl.-Biol. DMITRY TELNOV, Rigas raj., Stopinu pag., Dzidrinās, Darza iela 10, LV-2130, Latvia;

E-mail: telnovs@finieris.lv ; URL:

<http://www.zin.ru/Animalia/Coleoptera/eng/telnov.htm>

FIGURES

Fig. 1. *Ischalia indigacea* PASCOE (dorsal view; specimen from Cabang Panti, Gunung Palung Natonal Park, Kalimantan Barat, Indonesian Borneo).

Fig. 2. *Casnonidea apicicornis* FRM. (dorsal view; specimen from Gg. Benom, Lata Jarom, Raum env., Pahang, peninsular Malaysia).

Fig. 3. *Theopea pulchella* BALY (dorsal view; specimen from Cabang Panti, Gunung Palung Natonal Park, Kalimantan Barat, Indonesian Borneo).

Fig. 4. *Ischalia indigacea* PASCOE (ventral mesothorax). Paired pores indicated as "P.1" and "P.2".