

Studies on Tiger Beetles. CII. The Cicindelidae collected by Roland A. Müller in the Philippine Islands, with description of three new species (Coleoptera: Cicindelidae) *

F. Cassola

Cassola, F. Studies on tiger beetles. CII. The Cicindelidae collected by Roland A. Müller in the Philippine Islands, with description of three new species (Coleoptera: Cicindelidae). Zool. Med. Leiden 73 (33), 6.iii.2000: 491-509, figs 1-9.— ISSN 0024-0672.
Fabio Cassola, Via F. Tomassucci 12/20, I-00144 Roma, Italy.

Key words: Cicindelidae; tiger beetles; Philippine Islands; new data; new species.

The tiger beetles are discussed which have been collected by Mr Roland A. Müller (St. Gallen, Switzerland) in the course of his several expeditions to the Philippine Islands, together with a few more specimens from other sources. Distributional new data are provided for several interesting or poorly known species, and moreover three new species are described: *Heptodonta mindoroensis* spec. nov. from Mindoro Island, *Lophyridia mindanaoensis* spec. nov. from Mindanao, and *Thoepetica (Thoepetica) rolandmuelleri* spec. nov. also from Mindanao.

Introduction

The tiger beetle fauna of the Philippine Islands is still uncompletely known, due to lack of recent specialized research in the very many islands (over 7100, with only 11 greater than 2500 km²) which constitute the whole Philippine archipelago. As a matter of fact, very little collecting has been done so far, mainly by a handful of entomologists visiting the Philippines long ago or even in the 19th century, such as C.G. Semper in 1859-1865 (who first made several tiger beetle species known to the German specialist H.R. Schaum), G. Böttcher in the years 1913-19, and few others.

What was known about the Philippine tiger beetle fauna has been in the past communicated or reviewed by Schaum (1860, 1861, 1862, 1863a, b), Baer (1886), Schultze (1916), Horn (1923, 1924, 1926), and more recently by Wiesner (1980, 1988a,b, 1989, 1992a,b) and Cassola & Ward (1996, in prep.). Naviaux (1995) has reviewed the species of the genus *Collyris* s.l. and described several new species, while a few more data from the island of Leyte have been published by Trautner & Schawaller (1996). The present overall knowledge on the tiger beetle fauna of the Philippines has been summarized recently by Cassola & Pearson (1999), who have indicated a total of 130 tiger beetle species known as occurring in the archipelago, 111 of which (85.4%) are endemic, what points out the Philippine tiger beetle fauna to be the fifth richest country of the world in absolute number of tiger beetle species (km²/species ratio: 2,294) and very high in percentage and absolute number of endemic species (fourth highest).

A recent international workshop, focused on the natural history of the Philippines, which was held in Berlin, Germany (Museum für Naturkunde, 7-8 December 1998), has fully confirmed the great interest that can be attached to the Philippine insect fauna, but deep concern was also expressed for the conservation of the archipelago's huge biodiversity, as the Philippines are one of the most densely populated

* Results of the Roland Müller Zoological Expeditions to the Philippines, No. 16.

countries in Southeast Asia (with nearly 65 million people in 1989 and a population growth rate of nearly 2 per cent annually) and as a consequence the natural environment has been greatly depleted. The islands were originally clothed wholly in forest, but despite a total land surface of nearly 300,000 km² the extent of natural forests was reduced to only 64,400 km² in 1988 (Collins et al., 1991). Because most faunal elements, including many tiger beetles, were certainly linked to forest environment, and only a few could adapt themselves to secondary forest or to non-forested habitat, a rich unknown biological heritage is probably gone for ever.

A Swiss colleague, Mr Roland A. Müller (St. Gallen, Switzerland), who is a student of Odonata and visited the Philippines several times in recent years (Hämäläinen & Müller, 1997), has kindly submitted for study and identification the rich tiger beetle material he collected in different islands. Such a material proved to be outstandingly interesting, as it has brought to light the discovery of two new species and has made it finally possible the full recognition of a third new one. Information about the islands visited and the location of the sites investigated during the expeditions is given by Hämäläinen & Müller (1997). Mr Roland A. Müller's material is now entirely deposited in the collections of the Nationaal Natuurhistorisch Museum of Leiden, Netherlands (RMNH), except for a few specimens presently in my own collection (FC). In the following list of species, whenever useful or necessary, I have included as well some more material from the Paris (MNHN), Berlin (ZMB) and my own collections, but unless otherwise indicated all the listed specimens have been collected by Mr Roland A. Müller himself.

Material

Tricondyla punctipennis Chevrolat, 1841

Material.— **Sibuyan** (Romblon Province): 2 ♂♂, 6 ♀♀ (RMNH), 1 ♀ (FC), Magdiwang, Tampayan, Camp New St. Gallen area, 19-31.vii.1986, 50-200 m. **Samar** (Western Samar): 1 ♀ (RMNH), 1 ♀ (FC), Hinabangan, Arizona, Mining Company, mercury light, 280 m, 29.iii-6.iv.1997. **Homonhon** (Eastern Samar): 1 ♀ (RMNH), Magellanes Point, 5-100 m, 13-31.v.1988. **Cebu** (Cebu): 1 ♀ (RMNH), Minglanilla, Camp Seven, 21-22.v.1991, 300 m. **Dinagat** (Surigao del Norte): 1 ♀ (RMNH), Loreto, Mt Redondo, Layonggan, 10-20.v.1989, A. Buenafe. **Mindanao** (Surigao del Sur): 1 ♀ (RMNH), Carmen 2 Equipment Shop, km 11, Lanang Line, 600-650 m, 21-24.iv.95, R.A. Müller, A. Buenafe & L. Gorostiza.

The genus *Tricondyla* Latreille, 1822, which includes a number of Oriental, flightless, tree-dwelling species, definitely needs to be revised, based on re-examination of all type and recently collected specimens. Such a task, unfortunately, is not a easy one, because most species have been poorly collected so far and old specimens usually lack precise collecting label data. Most specimens are found just occasionally, while quickly running on tree trunks in the forest or on ground when passing from one tree to the other. *T. punctipennis* is one of the various taxa which are usually considered to be merely subspecies of the well-known, common New Guinean species *T. aptera* Olivier, 1790 (Wiesner, 1992b), but it is possible that some out the various Philippine forms which have been described so far (*T. p. globicollis* Chaudoir, 1844, *ventricosa* Schaum, 1862, *ovicollis* Motschulsky, 1864, *lumawigi* Wiesner, 1989, and others) will result to represent separate full species. The few specimens listed above are provisori-

ly ascribed to *punctipennis*, because the elytral punctuation better fits the one figured by Horn (1938), and also because *T. punctipennis* is the oldest available name.

Tricondyla cyanipes Eschscholtz, 1829

Material.— **Sibuyan** (Romblon): 1 ♀ (RMNH), Magdiwang, Tampayan, Camp New St. Gallen area, 19-31.vii.1986, 50-200 m; 1 ♀ (FC), Magdiwang, Tampayan, 50m, New St. Gallen, near Pawala River, 20-30.v.1986, light trap.

T. cyanipes represents another Philippine complex which definitely deserves to be reviewed, as several of the forms which are normally attached to it as subspecies (*T. c. conicicollis* Chaudoir, 1844, *brunnipes* Motschulsky, 1861, *planiceps* Schaum, 1862, *fuscilabris* Mandl, 1964, *nigripennis* Mandl, 1977, *kambodshensis* Mandl, 1970) (Wiesner, 1992b) will probably prove to be valid species, as soon as more well-labelled specimens will become available.

Neocollyris (Neocollyris) albitarsis (Erichson, 1834)

Material.— **Luzon** (Zambales): 1 ♂ (ZMB), Zambales Mts., Pili, 5-7.xi.1998, 150 m, W. Mey & Speidel. **Homonhon** (Eastern Samar): 1 ♂ (FC), Magellanes Point, 5-100 m, 13-31.v.1988. **Mindanao** (South Cotabato): 1 ♀ (RMNH), Koronadal, Barrio 8, 200m, 13.iv.1985.

The widespread Oriental genus *Neocollyris* Horn, 1901, has been recently the object of a most welcomed, wonderful monograph by Naviaux (1995). It shows that the Philippine Islands represent a distinct faunistic province with no less than 27 species of *Neocollyris* and 4 species of the genus *Protocollyris* Mandl, 1975 (sensu Naviaux, 1995). *N. (N.) albitarsis* is a Philippine endemic, well-known from several islands from Luzon to Mindanao.

Neocollyris (Neocollyris) bonellii (Guérin, 1834) subspec. *paraguensis* (W. Horn, 1894)

Material.— **Sibuyan** (Romblon): 1 ♀ (RMNH), Magdiwang, Tampayan, Camp New St. Gallen area, 19-31.vii.1986, 50-200 m.

The common widespread *N. (N.) bonellii* (Guérin, 1834) is probably the *Neocollyris* species with the largest geographical distribution, which ranges from southern and eastern India to Burma, Thailand, Vietnam, southern China, and the Sunda islands (Naviaux, 1995). In the Philippines, it is represented by ssp. *paraguensis*, which the listed specimen seems to belong to. However, this subspecies was known so far from Palawan and Balabac only (Naviaux, 1995).

Neocollyris (Heterocollyris) pseudospeciosa (W. Horn, 1932)

Material.— **Sibuyan** (Romblon): 1 ♀ (RMNH), Magdiwang, Pawala River, Tampayan, Camp Ga-ong area, 19.iii-7.iv.1987, 70-400 m; 1 ♂ (RMNH), 1 ♀ (FC), Magdiwang, Tampayan, Camp New St. Gallen area, 19-31.vii.1986, 50-200 m.

The subgenus *Heterocollyris* Naviaux, 1995, is almost a Philippine endemic, including no less than 19 species in the archipelago, two more species in Sumatra and one in Borneo (Naviaux, 1995). *N. (H.) pseudospeciosa* was described just from Sibuyan Island and it is apparently endemic to it (Naviaux, 1995).

Neocollyris (Heterocollyris) similior (W. Horn, 1892)

Material.— **Mindanao** (South Cotabato): 1 ♀ (RMNH), 1 ♀ (FC), Koronadal, Barrio 8, 100-300 m, 12-14.vii.1986; 1 ♀ (RMNH), Koronadal, Barrio 8, 200m, 12-14.vii.1986, light trap.

N. (H.) similior is endemic to Mindanao (Naviaux, 1995), where its closely related *N. (H.) affinis* (Horn, 1892) is known to occur too.

Neocollyris (Heterocollyris) rhodopus (Bates, 1878)

Material.— **Palawan** (Palawan): 1 ♂ (RMNH), Olanguan River, 50-400 m, 30.v.1991.

This species is known to occur in northern Borneo and moreover in the Philippine islands of Palawan and Balabac only (Naviaux, 1995). These islands lie on the Sunda Shelf and are often considered to biogeographically be more a Bornean extension than a true Philippine component (Delacour & Mayr, 1946; Vane-Wright, 1990).

Prothyma (Genoprothyma) discretepunctata W. Horn, 1924

Material.— **Sibuyan** (Romblon): 1 ♀ (FC), Magdiwang, Tampayan, Camp New St. Gallen area, 19-31.vii.1986, 50-200 m; 1 ♀ (RMNH), Magdiwang, Pawala River, Tampayan, Camp New St. Gallen area, 20-30.vii.1986, 100-400 m.

The genus *Prothyma* Hope, 1838, was reviewed by Rivalier (1964), who also created the subgenera *Genoprothyma* and *Symplecthyma*, which all the Philippine species belong to. However, unlike the subgenus *Symplecthyma*, which is a strict Philippine endemic, the subgenus *Genoprothyma* includes as well several species from the Asian mainland (Assam to Laos). *P. (G.) discretepunctata* is a large beautiful species which apparently is endemic to Sibuyan Island only.

Prothyma (Symplecthyma) incerata Rivalier, 1964

Material.— **Mindanao** (Davao Oriental): 1 ♀ (RMNH), 1 ♀ (FC), Boston, Mt Agtuuganon, Camp 55, May 29.v-7.vi.1996, 1020 m, light trap, R.A. Müller, A. Buenafe & L. Gorostiza.

This species was known so far to science by only the three type specimens described by Rivalier (1964), deposited in the Paris Museum, which, however, are just labelled "Philippines (Semper)" without any further indications. The fortunate finding of two additional female specimens with precise locality data, indicates that it occurs in the island of Mindanao. These specimens, which at first seemed to me to represent a new undescribed species, sorted out to correspond quite well to Rivalier's description of *P. (S.) incerata*, even if they present some different characters in colour and elytral

markings, which seem to indicate this species to be more variable than supposed. Whereas the first female specimen has dark blackish upper parts, with bluish-violet reflections on head and pronotum and reduced well-definite elytral markings, the second one has golden-cupric metallic upper parts and larger, poorly defined elytral markings, the humeral spot even extending to nearly the whole front part of elytra. However, all other characters (colour of antennae, palpi, legs and underside) well fit the ones given by Rivalier (1964), and moreover the large metallic golden cupric or golden green labrum is diagnostic. Rivalier (1964), who could examine male genitalia too, has showed this species to belong to the subgenus *Symplecthyma*.

Prothyma (Symplecthyma) heteromallicollis W. Horn, 1909

Material.— **Leyte** (Leyte): 2 ♂♂ (ZMB), 1 ♂ (FC), Lake Danao, 650 m, 14-17.iv.1997, W. Mey & Speidel. **Mindanao** (South Cotabato): 1 ♀ (RMNH), Koronadal, Barrio 8, 200 m, 12-14.vii.1986, light trap.

The small *Symplecthyma* species close to the *P. heteromallicollis-nitida* group will probably prove to include several distinct taxa, but more material is needed for proper separation, and type specimens should be examined. Even the relations between *P. heteromallicollis* and *P. (S.) nitida* Rivalier, 1964, are far from being clear.

Heptodonta melanopyga Schaum, 1862

Material.— **Sibuyan** (Romblon): 1 ♂ (FC), 1 ♀ (RMNH), Magdiwang, Tampayan, Camp New St. Gallen area, 19-31.vii.1986, 50-200 m; 1 ♂ (RMNH), Magdiwang, Pawala River, Tampayan, Camp New St. Gallen area, 20-30.vii.1986, 100-400 m.

Species of *Heptodonta* are known to occur in road cuts and vertical or steeply sloping surfaces, where larval holes also occur. *H. melanopyga* is easily distinguished from the type species of the genus, *H. analis* (Fabricius, 1801), which also occurs in the Philippine Islands (Luzon: Wiesner, 1992b), because of the dark metallic (instead of yellow-rufous) last abdominal sternites. A subspecies of *H. analis*, *nigrosericea* W. Horn, 1930, which most probably will prove to be a valid species, has been described from Columbogan (Horn, 1930). The specimens indicated above from Sibuyan clearly are to be ascribed to *H. melanopyga*, which was known so far from Luzon, Mindanao and Batan only (Wiesner, 1992b), but which most certainly will prove to occur in several other islands too.

Heptodonta lumawigi Wiesner, 1980

Material.— **Mindanao** (South Cotabato): 1 ♂ (RMNH), 1 ♀ (FC), Parker Mts, Salacafe, T'Boli, 600-900 m, 2-12.iv.1985.

This species was described by Wiesner (1980) from Panay and it was known so far from that island only (Wiesner, 1992b). The present record seems to indicate it to be present in Mindanao too. *H. lumawigi* is easily distinguished from *H. melanopyga* by its darker body colour and the different labrum. However, in the frame of a full revision of the genus, the type specimens of *H. nigrosericea* should be studied.

Heptodonta mindoroensis spec. nov.
(fig. 1a)

Material.— **Mindoro** (Mindoro Oriental): Holotype, ♀ (RMNH). Calapan, Mt Halcon, Barrio Luyang, 360-600 m, 14-17.v.1991.

Diagnosis.— A rather large *Heptodonta* species, similar to *H. melanopyga* but having proportionally longer, more parallel-sided elytra. Colour mostly green with brownish or cupric reflections on head and pronotum, elytra metallic bluish-green at sides and on back slope, darkened in the whole longitudinal inner half of disc from the shoulder to the preapical callus. Labrum testaceous, wider than long, four-haired, distinctly tri-dentate in front middle edge. Male unknown.

Description.— Head dull green with some metallic hue, darkened on frons and neck, with very fine longitudinal striae on vertex and eyes, the striae being concentric on frons, transversely waved behind on neck; border of eyes smooth, narrowly violaceous-black. Surface glabrous, only two setigerous punctures near both eyes; antennal plates blue-green, smooth, cheeks roughly striated, bluish-green with some violet reflections. Eyes pale yellow. Labrum rufous-testaceous, wider than long, four-haired, distinctly seven-dentate in front edge, the three middle teeth sharp, produced outwards, narrowly darkened on tips. Mandibles strong, rufous testaceous at base, darkened on the outer border, shiny black on apical and inner teeth. Labial and maxillary palpi testaceous, the last joint of labial palpi metallic dark, the last two segments of maxillary palpi missing in the holotype specimen. Antennae broken after the fifth segment, articles 1-4 blackish-bronze, glabrous, a single setigerous puncture near tip of scape; article 5 narrowly metallic black at base, than brownish black with a very short, fine and even pubescence.

Thorax: pronotum slightly wider (2.7 mm) than long (2.5 mm), distinctly narrowed behind, the maximum width in front part of middle lobe, entirely glabrous, with very fine transverse striae; same colour as on head, slightly darkened in the middle. Episterna bluish-green, smooth, entirely glabrous, with no apparent coupling sulci on the shiny mesepisterna.

Elytra proportionally long (8.9 mm), narrow and elongate, parallel-sided, evenly convex on disc, metallic bluish-green on lateral sides from shoulder to the apical slope, darkened in the whole longitudinal inner half of disc from the shoulder to the preapical callus; elytral punctuation small but strong, evenly covering the whole elytral surface except the extreme front base which is nearly smooth, the punctures tending to coalesce in elytral front part to form transversal, more or less evidente, anastomosed series. Preapical impression strong, apical border slightly emarginate, not-serulated, with almost no sutural tooth. Epipleura metallic blue-black.

Underside glabrous, smooth, metallic bluish-green with some violaceous reflections; last abdominal segment shining black. Some white erect setae on the front part of pro- and mesocoxae and along the extreme side margins of metacoxae; trochanters rufous, femora also rufous in basal three quarters, "knees" and tibiae violaceous black, with a few spiniform white setae; tarsal segments also violaceous black, the spiniform setae and the apical claws rufescent.

Male unknown.

Length: 14.5 mm (without labrum).

Etymology.— This new *Heptodonta* species is named after the island (Mindoro) where the single female specimen comes from. Future research may show the species to be more widely distributed in the Philippine archipelago.

Remarks.— This is a rather large unexpected new species, which is clearly a close relative of *H. melanopyga*, however differing from it because of the slightly larger size and the elongated, more parallel-sided, shape of elytra (elytral length/pronotal length ratio: 3.6 in *H. mindoroensis*, 3.1-3.2 in *H. melanopyga*). Because of its size and the elongated parallel-sided elytra, *H. mindoroensis* is even somewhat reminiscent of the mainland Asia species *H. pulchella* (Hope, 1831) and *H. ferrarii shooki* Wiesner, 1986, which females both, however, have a much longer labrum. On the other hand, the dark colour of last abdominal sternites avoids any confusion with *H. analis*, while the testaceous labrum and the lighter greenish body colour separate the new species from *H. lumawigi*.

Therates c. coracinus Erichson, 1834

Material.— **Mindanao** (South Cotabato): 2 ♂♂ (RMNH), Koronadal, Barrio 8, 200 m, 12-14.vii.1986, light trap.

Following Wiesner's revision of the genus *Therates* Latreille, 1817 (Wiesner, 1988a), *Th. coracinus* represents a Philippine endemic, more precisely the Philippine counterpart of the more widespread *Th. labiatus* (Fabricius, 1801), which is known to occur from Sulawesi eastwards to Moluccas, New Guinea and the Solomon Islands (Cassola, 1987a,b; Cassola, 1991). From Mindoro and Mindanao, Wiesner (1988a) has described a subspec. *fulvescens*, having rufous-brown instead of shiny black upperparts, which most probably, because subspec. *coracinus* too is quoted by Wiesner (1988a) from the same islands, represent a valid species. As I have already indicated elsewhere (Cassola, 1985), the problem of many co-occurring, so-called "subspecies" of *Therates* - probably either separate full species or merely "ecotypes" - needs to be better investigated and understood, based on more specimens and extensive ecological observations in the field.

Therates fulvipennis Chaudoir subspec. *everetti* Bates, 1878

Material.— **Mindanao** (South Cotabato): 1 ♂ (RMNH), Parker Mts, Lake Maugham, 1700 m, 6.iv.1985, light trap.

Unlike *Th. coracinus*, this species (also a Philippine endemic) has a yellow-rufous, instead of black, metasternum (Wiesner, 1988a). Three "subspecies" (*T. f. fulvipennis* Chaudoir, 1848, *everetti*, and *bidentatus* Chaudoir, 1861) have all been recorded from Mindanao, what clearly deserves better study.

Therates fasciatus (Fabricius) subspec. *quadrifasciatus* W. Horn, 1895

Material.— **Mindanao** (South Cotabato): 1 ♂ (FC), Parker Mts, Salacate, 600-900 m, 2-12.iv.1985; 1 ♂, 1 ♀ (RMNH), Koronadal, Barrio 8, 200 m, 12-14.vii.1986, light trap.

Th. fasciatus, a species known to occur in the Philippines, Sulawesi and Moluccas (Wiesner, 1988a), represents another good example of the puzzling "subspecies" problem in the genus *Therates*, as four subspecies at least (*T. f. fasciatus* Fabricius, 1801, *quadrimaculatus*, *pseudolatreillei* W. Horn, 1928, and *flavohumeralis* Mandl, 1964) are all known to occur on Mindanao. More material is obviously needed to definitely ascertain their relative taxonomic status. The above mentioned specimens clearly belong to subspec. *quadrimaculatus*, which has been recorded so far from quite a number of Philippine islands (Luzon, Panay, Leyte, Panaon, Siargao, Mindanao, Basilan: Wiesner 1988a, 1992b).

Lophyridia lacrymosa (Dejean, 1825) [= *L. insularis* (Blanchard, 1853)]
(fig. 1b)

Material.— **Luzon** (Ifugao): 1 ♀ (FC), Lagawe, 600 m, 15.viii.1981, J. Margraf. (Aurora): 1 ♂, 1 ♀ (RMNH), Dinalungan, Mt Anaguao, Alebit River Cam, 700m, light trap, March, 9-13.iii.1997. (Zambales): 1 ♀ (ZMB), Zambales Mts, Pili, 5-7.xi.1998, 150 m, W. Mey & Speidel. 1 ♂, 1 ♀ (FC), Gapan, I.1968, G. Schirmer. 1 ♂ (FC), Gueron, Bales, viii.1982. 2 ♂♂. 2 ♀♀ (FC), Kabgao, x.1984. **Mindoro** (Mindoro Oriental): 4 ♂♂ (FC), Magtibay, nr Mt Halkon, 21.vii.1982, N. Nishikawa. **Palawan** (Palawan): 1 ♂, 2 ♀♀ (RMNH), 1 ♂ (FC), Albaguin I., off shore Port Barton, 0-50 m, 17.v.1985; 1 ♂, 3 ♀♀ (RMNH), 1 ♀ (FC), Olanguan River, 50-400 m, 30.v.1991; 2 ♂♂, 1 ♀ (RMNH), 1 ♀ (FC), Nara, Estrella Falls, 90-200 m, 4.vi.1991; 1 ♂ (FC), Tigoplan, Brooke's Pt., 29.iv.1947, CNHM-Philippine Zool. Exped. 1946-47, F.G. Werner; 1 ♂ (FC), Canacan, Aborlan, 17.v.1947, CNHM-Philippine Zool. Exped. 1946-47, H. Hoogstraal & F.G. Werner; 1 ♂ (FC), Mt. St. Paul, 5-6.iv.1995, Babuyan-Fluß, Cayasan, W. Mey; 7 ♂♂, 1 ♀ (FC), env. of Aborlan, Palawan Nat. Agr. Coll., 5.i.1984, G. Carpaneto. **Sibuyan** (Romblon): 2 ♂♂, 3 ♀♀ (RMNH), 2 ♂♂ (FC), Magdiwang, Tampayan, 50 m, New St. Gallen near Pawala River, 20-30.vii.1986, light trap; 1 ♂, 2 ♀♀ (RMNH), 1 ♂ (FC), Magdiwang, Tampayan, Camp New St. Gallen area, 19-31.vii.1986, 50-200 m; 1 ♂, 1 ♀ (RMNH), Magdiwang, Pawala River, Tampayan, Camp Ga-ong area, light, 19.iii-7.iv.1987, 70-400 m; 2 ♂♂, 4 ♀♀ (FC), x.1985. **Homonhon** (Eastern Samar): 1 ♂ (RMNH), Magallanes Point, 5-100 m, 13-31.v.1988. **Leyte**: 1 ♂ (FC), Visca, 1944; 1 ♂ (FC), San José, 22.i.1945, E. Ray. **Mindanao** (Zamboanga): 2 ♀♀ (MNHN), "Samboanga, Hombron 1841" [lectotype and paralectotype of *Cicindela insularis* Blanchard, 1853]; 1 ♂ (MNHN), "Samboanga, Jacquinet 1841" [paralectotype of *Cicindela insularis* Blanchard, 1853]. (Lanao del Norte): 1 ♂ (FC), Tipanoy, Iligan City, 20.viii.1977, A. Bandinelli. (Misamis Oriental): 2 ♂♂, 2 ♀♀ (FC), Tagoloan river, Tagoloan, 1.xi.1976, A. Bandinelli. (Davao): 1 ♀ (FC), Calian, 18.vii.1930, C.F. Clagg, Field Mus./F.Psota Coll.. (Davao Oriental): 1 ♂, 3 ♀♀ (RMNH), 1 ♂, 1 ♀ (FC), Boston, Mt Agtuuganon, Camp 55, 29.v-7.vi.1996, 1020 m, light trap, R.A. Müller, A. Buenafe & L. Gorostiza. (Surigao del Sur): 1 ♂ (RMNH), San Miguel, Suba River, 50-150 m, 13-14.iv.1995, light trap, R.A. Müller, A. Buenafe & L. Gorostiza.

The material recently collected by Roland A. Müller has led me to face finally a delicate taxonomic problem which I was aware of for a long time. *L. lacrymosa* is, in fact, a well-known Philippine endemic, commonly found, under this name, in most entomological collections. However, a deeper examination of male genitalia had showed it to be a dual species, i.e. under the name of *L. lacrymosa* usually two well-separate but superficially similar species are included, which have completely different male genitalia and obviously represent two distinct specific taxa. However, such a discovery was not by itself sufficient for describing the second species, because it was not clear which one, out of the two, had to be considered Dejean's *lacrymosa*. Moreover, a second taxon already exists in the entomological literature, *insularis* Blan-

chard, 1853, a name considered by Chaudoir (1865), Fleutiaux (1892), W. Horn (1905, 1915), and all subsequent literature, to be merely a junior synonym of *lacrymosa*. Thus, theoretically, the two species involved could well be *L. lacrymosa* and *insularis*, but even if such was the case it had still to be decided which one is Dejean's species. For a long time, therefore, I have set aside such a problem, which only could be solved upon examination of Dejean's and Blanchard's type specimens deposited in the Paris Museum (Horn et al., 1990).

Luckily enough, thanks to the instrumental help of Dr Thierry Deuve, the type specimens have been found in the collections of the Paris Museum (MNHN). In particular, Dejean's type of *L. lacrymosa* sorted out to be a female specimen, labelled "Brévost [sic!] Duval", and indeed Dejean himself (1825) had clearly stated that he had a female specimen only ("...dans la femelle, le seul sexe que je connaisse") and that "Elle m'a été envoyée par M. Prévost Duval, comme venant des îles Philippines". Thus, I designate this specimen as the lectotype of *L. lacrymosa*.

As to Blanchard's species, the type specimens of *L. insularis* sorted out to be two females bearing the following labels: "Museum Paris [printed]/ Samboanga [handwritten]/ Hombron 1841 [handwritten]" and "1526/41 [handwritten, round label]", as well as a male specimen labelled "Museum Paris/ Mindanao/ Samboanga/ Jacquinet 1841 [printed]" and "484/41 [handwritten, round label]". These are most certainly Blanchard's original specimens, because Blanchard himself (1853) has clearly stated that Hombron and Jacquinet (the latter being the Commander of *La Zelée*) had collected them ("La collection entomologique formée pendant l'expédition de l'*Astrolabe* et de la *Zelée*, par MM. Hombron et Jacquinet..."). I designate here one of the two female specimens as the lectotype of *insularis*, while the two other specimens are paralectotypes. Now, despite the surprising and unfortunate lack of the aedeagus and the last two abdominal segments in the male paralectotype, these specimens sorted out to be obviously identical with Dejean's species, thus the synonymy: *L. insularis* Blanchard, 1853 = *lacrymosa* Dejean, 1825, can here be fully confirmed.

L. lacrymosa is a rather small *Lophyridia* species, having greenish, sometimes bluish elytra (slightly blackened on disc), with the blue-green punctuation mostly well-apparent through especially in front part. Elytral markings normally include an anterior lateral dot, and in many specimens, on one elytron at least, there is an evident narrow lineole tending to connect to each other the two discal dots. The suture is clearly metallic cupreous (sometimes green), and in most female specimens a punctured, crescent-shaped, cupric-green elytral mirror is noticeable, transversally placed across the suture in the front third of the elytral length. The scutellum too is cupreous, slightly striated transversely behind. Female coupling sulci include a dorso-ventral groove in the middle of mesepisternum, with a poorly marked puncture in its upper part. The surface of mesepisterna is more or less pubescent in its lower half. The labrum is testaceous, narrowly blackened in the middle part of front edge, with the middle tooth markedly protruding forwards. The last two joints of the maxillary palpi are more or less metallic green, while the third one is testaceous. As to the male genitalia, the aedeagus of all males which have been examined and compared to the type specimens of both *L. lacrymosa* and *insularis*, and which resulted to share the same general characters described above, sorted out to be approximately 3.6-3.7 mm long, regularly arc-shaped, normally tapered, with a short blunt apex.

L. lacrymosa is apparently widespread in the Philippine Islands, from Luzon south to Mindanao. It was known so far to occur in the above mentioned islands only, and moreover in Balabac (Wiesner, 1992a), but the above recorded specimens indicate that it is more widespread than supposed. It is interesting to note that on Mindanao Island, in three sites at least (Boston, Mt Agtuuganon, Camp 55; Tagoloan river, Tagoloan; Tipanoy, Iligan City), *L. lacrymosa* seems to occur sympatrically, may be even syntopically, with the following species.

Lophyridia mindanaoensis spec. nov.
(fig. 1c-d)

Material.— Holotype ♂ (RMNH), allotype ♀ (RMNH), 2 paratypes ♂♂ (RMNH, FC), from **Mindanao** (Davao Oriental): Boston, Mt Agtuuganon, Camp 55, 29.v-7.vi.1996, 1020 m, light trap, R.A. Müller, A. Buenafe & L. Gorostiza. Twenty-three additional paratypes (13 ♂♂, 10 ♀♀) also from Mindanao (Zamboanga): 2 ♂♂ (FC), Zamboanga, W. Mindanao, 4.i.1983, S. Hashimoto. (Lanao del Norte): 1 ♂ (FC), Tipanoy, Iligan City, 20.viii.1977, A. Bandinelli; 1 ♀ (FC), Tipanoy, Iligan City, 21.v.1978, A. Bandinelli. (Misamis Oriental): 1 ♂ (FC), Tagoloan river, Tagoloan, 1.xi.1976, A. Bandinelli; 1 ♂ (FC), Tagoloan river, Tagoloan, 24.x.1976, A. Bandinelli; 1 ♂ (FC), Tagoloan river, Tagoloan, 9.i.1977, A. Bandinelli. (Bukidnon): 1 ♂ (FC), S. Vicente, 20 km S Cagayan de Oro, 24.vii.1977, A. Bandinelli. (South Cotabato): 1 ♂ (RMNH), Koronadal, Barrio 8, 200m, 13.iv.1985; 1 ♂, 1 ♀ (RMNH), 1 ♂ (FC), Parker Mts., Lake Maugham, 1700 m, 6.iv.1985, light trap; 1 ♀ (RMNH), Parker Mts, Salacate, T'boli, 600-900 m, 2-12.iv.1985; 3 ♀♀ (RMNH), 1 ♀ (FC), Parker Mts., Salacate, 600-900 m, 2-12.iv.1985. (Davao): 2 ♂♂ (FC), Sibulan, S.E. slope Mt Apo, ca. 2000 ft, 23.x.1946, at light, CNHM-Philippine Zool. Exped. 1946-47, F.G. Werner; 1 ♂, 2 ♀♀ (FC), Maco, Tagum, sea level, x.1946, CNHM-Philippine Zool. Exped. 1946-47, H. Hoogstraal. 1 ♀ (FC), Mindanao.

Diagnosis.— A *Lophyridia* species very similar to *L. lacrymosa*, however slightly larger in size on an average, with darker, nearly velvety black elytra; elytral punctuation not or poorly visible through. Anterior lateral spot very small, sometimes lacking, the two discal dots not connected each other by a narrow lineole. Scutellum not or poorly striated, mesepisternal female coupling sulcus with a marked puncture in its upper part. Labrum slightly shorter than that of *L. lacrymosa*, more extensively blackened in front, the blackened area more or less triangularly extended behind on disc.

Description.— Head glabrous, except on cheeks which are pilose; colour dull reddish-brown on frons, eyes and neck, golden green with some cupric reflections on clypeus, cheeks, and sides of vertex, bluish-green on sides of frons; a smooth metallic cupreous-green area above the insertion of antennae. Eyes yellowish, relatively large. Labrum six-haired, wider than long, distinctly carinated in the middle, almost truncated in front near the male, distinctly three-toothed near the female; colour testaceous, narrowly blackened in front edge, the blackening more or less triangularly extended behind on disc. Mandibles long, strong, testaceous at base, shining black on apical and inner teeth; apical tooth longer in male. Labial palpi testaceous with the last joint metallic green; the last two joints of the maxillary palpi also metallic green, the third one more or less tinged with metallic violet-green. Antennae slender, longer in male, with articles 1-4 metallic cupric-green, glabrous, a single seta near the tip of scape and few spiniform setae on joints 3 and 4; antennomeres 5-11 dull black, finely and evenly pubescent.

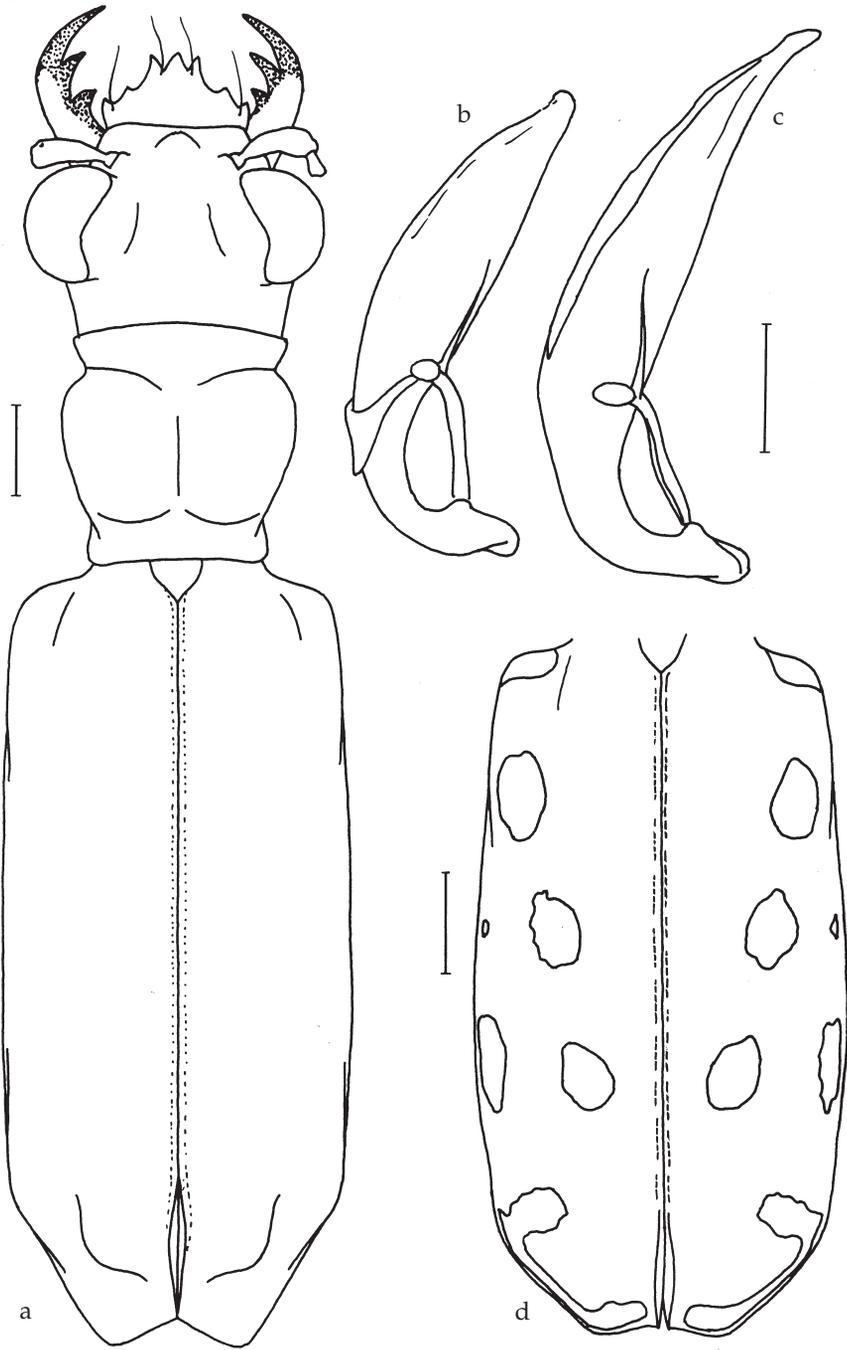


Fig. 1a. *Heptodonta mindoroensis* spec. nov., holotype, ♂: habitus; 1b, *Lophyridia lacrymosa* (Dejean, 1825), ♀, Mt Agtuuganon, Davao Oriental, Mindanao: aedeagus; 1c-d, *Lophyridia mindanaoensis* spec. nov., holotype, ♂: c, aedeagus; d, left elytron. Scale lines: 1 mm.

Thorax: pronotum subsquared, subparallel-sided, glabrous with some white setae on lateral margins; colour dull reddish-brown with some cupreous reflections; side margins and transversal grooves blue green. Episterna cupreous with some bluish or violet reflections, smooth and bare above, with long erect white setae or setigerous punctures in the rest of their surface; a distinct dorso-ventral groove in mesepisternum of female, with a slight shallow puncture above the middle (coupling sulcus). Scutellum metallic cupreous, not or poorly striated behind.

Elytra elongate, much wider than head with eyes, rather convex on disc, dull velvety black, metallic cupric-red at base between the scutellum and the humeral dot; a row of metallic green punctures in front third, parallel to but some distance from the suture, some more punctures in a row below the shoulders. Suture metallic cupreous-red; female elytral mirror small but evident, strongly punctured, metallic cupric-green in colour, transversally placed to form a crescent-shaped areole across the suture in the front third of the elytral length. Elytral markings identical with those of *L. lacrymosa*, but the anterior lateral dot is very small or even lacking and the discal dots never tend to be connected each other by a narrow lineole; hind margins evenly rounded, serrulated, with a small sutural tooth. Epipleura metallic green.

Underside metallic bluish-green with golden or cupreous reflections; glabrous, a fine white pubescence on sides of sternum, episterna, epimera, outer edge of coxae, sides of sternum, and the first three abdominal sternites. Trochanters piceous-black, femora and basal half of tibiae metallic cupreous, "knees", distal half of tibiae, and tarsal segments, metallic dark blue-green.

Male aedeagus much different from that of *L. lacrymosa*, much longer (4.5 mm), arc-shaped, tapering, ending in a long straight apical beak.

Length: 12-13 mm (without labrum).

Etymology.— This interesting new *Lophyridia* species is named after the island of Mindanao, because the presently available data seem to indicate to be an endemic of this island.

Remarks.— *L. mindanaoensis* spec. nov. is clearly a close relative of *L. lacrymosa*, with which it can be easily mistaken. However, shapes of male aedeagi are diagnostic. It is probable that many more specimens are to be found in entomological collections under the name of "*Cicindela lacrymosa* Dejean". As it has been noted above, in Mindanao this new species is interestingly known to occur, in some localities at least, sympatrically, may be even syntopically, with *L. lacrymosa*. Field research is needed to detect eventual differences in the ecology of both species.

Lophyridia (Spilodia) striolata (Illiger) subspec. *uniens* (W. Horn, 1896)

Material.— **Palawan** (Palawan): 1 ♀ (RMNH), Nara, Estrella Falls, 90-200 m, 4.vi.1991.

L. striolata is a polytypic species, widely spread in nearly the whole Oriental region. Very variable in size and elytral markings, it should definitely be thoroughly revised, based on a large collection of specimens from as many countries and islands as possible. It is also noteworthy that the species is apparently absent in Borneo (Cassola, 1991). From the Philippines the records of three subspecies at least, *L. s. dorsolinata* Chevrolat, 1845, *tenuiscripta* Fleutiaux, 1893, and *uniens* W. Horn, 1896, have been

puzzling (Wiesner, 1992b). For the time being at least, I ascribe here the above mentioned specimen to subspec. *uniens*, described by Horn (1896) just from Palawan and Balabac, but the Philippine populations definitely deserve a taxonomic revision.

Thopeutica (Thopeutica) milanae Wiesner, 1992

Material.— **Mindanao** (Davao Oriental): 1 ♂ (FC), 1 ♀ (RMNH), Boston, Mt Agtuuganon, Camp 55, 29.v-7.vi.1996, 1020 m, R.A. Müller, A. Buenafe & L. Gorostiza.

In a previous work (Cassola, 1991), while revising the tiger beetle fauna of the Indonesian island of Sulawesi, I have completely re-defined the genus *Thopeutica* Chaudoir (in Schaum, 1861). In fact, such a genus had been misinterpreted by Rivalier (1961), who had erroneously ascribed to it the species *W. eximia* (van der Linden, 1829), as well as other related taxa from Sulawesi, all characterized by a male aedeagus devoid of any flagellum. On the contrary, re-examination of the type-species, *T. diana* (Thomson, 1859), had showed it to be specifically distinct from *eximia* (contrary to what stated by Chaudoir, 1865, and popularly believed by all subsequent authors, including Kibby, 1985) and moreover, by reason of its shorter and wider aedeagus, having a complex spiralled flagellum, to belong to the sister genus that Rivalier (1961) had called *Diotophora* (type-species: *virginea* Schaum, 1861, from the Philippine Islands). Consequently, since *diana* remains undoubtedly the type-species of the genus *Thopeutica*, as originally designated by Chaudoir (in Schaum, 1861), *Diotophora* was shown to be a junior synonym of *Thopeutica*, and a new generic name (*Wallacedela* Cassola, 1991) was created for *eximia* and its related species from Sulawesi (Cassola, 1991).

Unlike the genus *Wallacedela*, which appears to be a Sulawesi endemic, the genus *Thopeutica*, as it was newly defined as above, includes so far, apart from many Sulawesi species, several additional species from the Philippines, whose careful revision is the task of a separate forthcoming paper (Cassola & Ward, in prep.).

Th. milanae, a close relative of *Th. microcephala* (W. Horn, 1924), has been described by Wiesner (1992a) based on five specimens from Leyte, but it is presently known, by means of two additional specimens, from Samar and Mindanao as well (Cassola & Ward, in prep.). The two more specimens collected by R.A. Müller, however, slightly differ from those already examined in body colour and other minor characters, and represent a most welcomed addition to the knowledge of this poorly known species.

Thopeutica (Thopeutica) angulihumerosa (W. Horn, 1929)

Material.— **Mindanao** (Davao Oriental): 2 ♀♀ (RMNH), 1 ♀ (FC), Boston, Mt Agtuuganon, Camp 55, 29.v-7.vi.1996, 1020 m, light trap, R.A. Müller, A. Buenafe & L. Gorostiza.

This species too was known so far by only seven specimens in all, as occurring in the islands of Samar and Mindanao (Davao Province, Todaya) (Cassola & Ward, in prep.). The three specimens indicated above (unfortunately all females) add a new precise locality for this poorly known species. Amongst all other Philippine *Thopeutica*, *Th. angulihumerosa* and the following species are unmistakable by reason of the unusual character represented by a conspicuous protruding humeral callus of elytra in females.

Thoeputica (Thoeputica) rolandmuelleri spec. nov.
(fig. 2)

Material.— Holotype, ♂ (RMNH), allotype, ♀ (RMNH) and 8 paratypes (2 ♂♂, 2 ♀♀ RMNH; 2 ♂♂, 2 ♀♀ FC). **Mindanao** (Davao Oriental): Boston, Mt. Agtuuganon, Camp 55, 29.v-7.vi.1996, 1020 m, light trap, R.A. Müller, A. Buenafe & L. Gorostiza.

Diagnosis.— A medium-sized *Thoeputica* species, similar to *Th. angulihumerosa*, however distinctly larger in size (10.5-11.5 mm), with a longer pronotum, a proportionally smaller female elytral mirror, a stronger sutural spine in both sexes, a straighter blunt apex of male aedeagus, and a deeper female mesepisternal coupling sulcus (placed just near and under the mesepimeral rim). As those of *Th. angulihumerosa*, females are unmistakable because of the protruding humeral callus of elytra.

Description.— Head dark bronze with a slight violaceous lustre, golden green on clypeus and cheeks, antennal plates shining cupreous green; glabrous, just the two usual fine sensorial setae or setigerous punctures near both eyes. Very fine longitudinal striae on eyes and sides of frons, concentric on frons and vertex, waved fine transverse wrinkles behind on neck; genae longitudinally striated, antennal plates smooth. Labrum metallic greenish-bronze with some cupric to violaceous reflections on sides, short and transverse, distinctly carinated in the middle, the anterior margin obtusely truncate to subtriangular, slightly more produced outwards in female; 5-6 submarginal hairs near forward edge on both sides (10-12 in all), and sometimes 1-2 more medial setae behind on disc. Mandibles narrow and very elongate, testaceous at base, metallic greenish bronze in the middle outer part, shining piceous black on apical and inner teeth. Maxillary and labial palpi testaceous, the last joint metallic dark green; penultimate segment of maxillary palpi darkened, sometimes even the third one more or less tinged with a violaceous metallic hue. Antennae slender, long, surpassing the half of the elytral length in male, shorter in female; scape cupreous-green, a single seta on its tip, article 2 metallic green, glabrous, joints 3-4 dark violaceous, nearly bare; antennomeres 5-11 blackish-brown, finely and evenly pubescent.

Thorax: pronotum elongate, distinctly longer than wide, narrowed in front, subrectangular in male, trapezoid-shaped in female, with fine short irregular wrinkles transversely placed on the bare disc; some white pubescence at sides, with light curly hairs especially dense behind. Colour dark bronze as on head, with some cupric reflections at sides, metallic bluish- or golden-green on transversal grooves and hind tubercles. Sternum, episterna and epimera bronze to cupric green, more or less densely covered with white recumbent pubescence; female mesepisternum bare, wide, flat, shiny violaceous-black, with a deep fovea (coupling sulcus) just near and under mesepimeral rim.

Elytra elongate, clearly wider than head with eyes, subparallel-sided; shoulders slightly rounded in male, with a conspicuous, protruding, oblique humeral callus in female, similar to that of *Th. angulihumerosa* but slightly less abruptly produced outwards. Colour dull brownish-black, with some greenish reflections on base and lateral sides; scutellum metallic cupreous to green. Female mirror spot relatively smaller than in *Th. angulihumerosa*, oval-shaped, shining violaceous-black, obliquely placed in front half of elytra some distance from the surrounding elytral dots. Elytral macula-

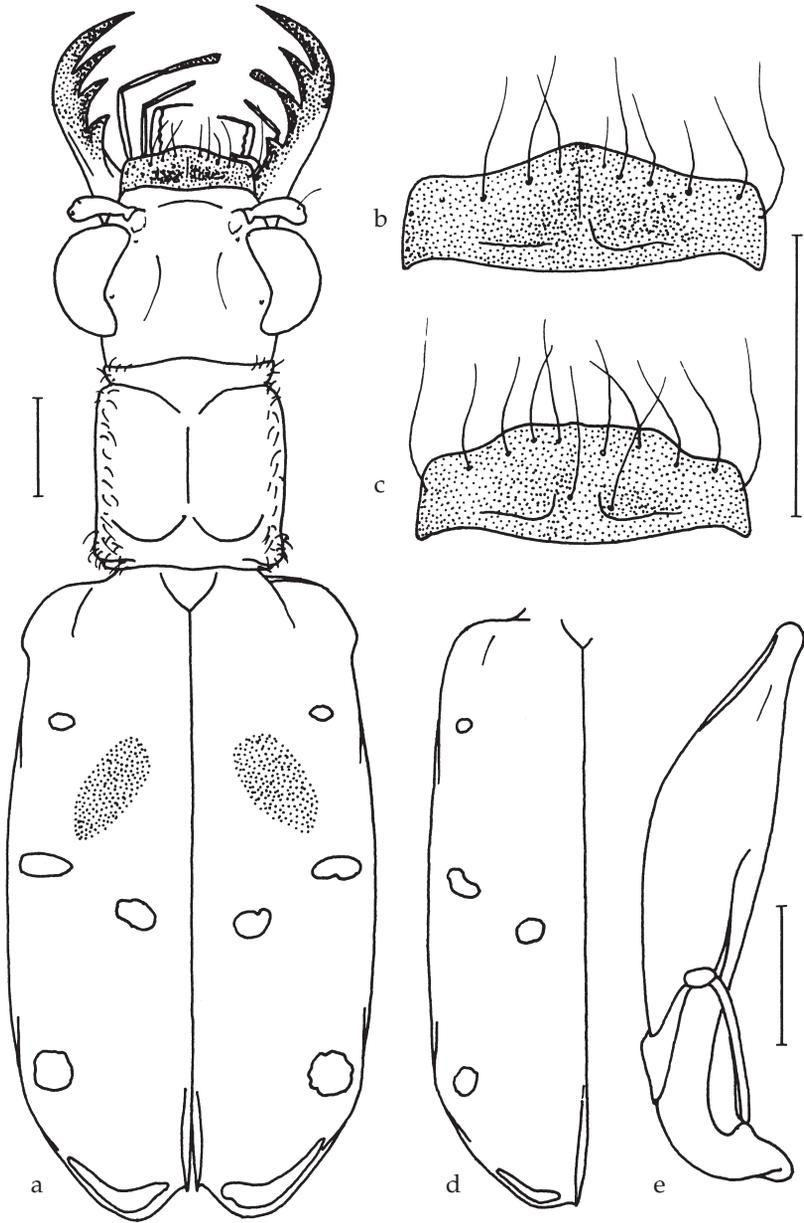


Fig. 2a-b. *Thopeutica (Thopeutica) rolandmuelleri* spec. nov., allotype, ♀: a, habitus; b, labrum; 2c-e, id., holotype, ♂: c, labrum; d, left elytron; e, aedeagus. Scale-lines: 1 mm.

tion typically six-spotted as in the other species of genus *Thopeutica*, however dots are relatively small, roundish, well-separated from each other, the apical one only being transverse, elongate, comma-shaped. Sutural spine small but distinct, slightly stronger in female. Epipleura dark metallic green-bronze.

Abdominal sternites dark greenish-bronze with cupric to golden reflections at sides, fully clothed with fine recumbent pubescence. Trochanters rufous-testaceous, legs slender, elongate, nearly bare, the femora slightly club-shaped, pubescent, golden green coloured on basal half; "knees" tinged with metallic cupric-green, tibiae and tarsal segments bluish-black with violaceous reflections.

Male aedeagus fusiform, tapering, with a short blunt straight apex; inner sac typical of the genus, with a long ultra-evoluted flagellum which describes several convolutions.

Length: 10.5-11.5 mm (without labrum).

Etymology.— This interesting new *Thopeutica* species is named in honour of its collector, Mr Roland A. Müller (St. Gallen, Switzerland), who greatly contributed to the knowledge of the Philippine insect fauna.

Remarks.— *Th. rolandmuelleri* spec. nov. is clearly a close relative of *Th. angulihumerosa*, also known from Mindanao (and moreover from Samar). Interestingly enough, the two species appear to be sympatrically, may be even syntopically, living at Camp 55 of Mt Agtuuganon, together with the following species too, but ecological observations should be done to ascertain ecological separation.

Thopeutica (Thopeutica) virginalis (W. Horn, 1901)

Material.— **Negros** (Negros Occidental): 1 ♂ (RMNH), Silay, Patag, Malisbog River, River Dam, 850 m, 23.v.1996, light trap. **Mindanao** (Davao Oriental): 1 ♀ (RMNH), Boston, Mt Agtuuganon, Camp 55, 29.v-7.vi.1996, 1020 m, R.A. Müller, A. Buenafe & L. Gorostiza.

This is a widespread variable species which apparently inhabits most of the main islands of the Philippine archipelago from Luzon southwards to Mindanao. It is well-characterized by elongate, parallel-sided, dull greyish-black to olive-green elytra, a glossy black mirror spot in females, a long and distinct sutural spine of elytra in both sexes, and a long, slender, apically hooked male aedeagus (Cassola & Ward, in prep.).

Cylindera (Ifasina) viduata (Fabricius, 1801)

Material.— **Mindanao** (Surigao del Sur): 1 ♂ (RMNH), San Miguel, Suba River, 150-150 m, 13-14.iv.1995, light trap, R.A. Müller, A. Buenafe & A. Gorostiza. (Davao Oriental): 1 ♂, 2 ♀ (RMNH), 1 ♀ (FC), Boston, Mt Agtuuganon, Camp 55, 29.v-7.vi.1996, 1020 m, R.A. Müller, A. Buenafe & L. Gorostiza.

This common widespread species inhabits the most part of the Oriental region from India to China, the Philippines, the Sunda Islands, eastwards to Papua New Guinea (Cassola, 1987a, 1991). Acciavatti & Pearson (1989), based on examination of type specimens, have shown *C. viduata*, for a long time considered to be synonymous with *C. (I.) holosericea* (Fabricius, 1801), to be the valid name for this species, instead of the long-used name *C. triguttata* Herbst, 1806.

Cylindera (Ifasina) fabiocassola Wiesner, 1989

Material.— **Luzon** (Nueva Vizcaya): 1 ♂ (FC), Santa Fe, Dalton Pass, 900 m, 8-12.vi.1991.

This interesting, small, poorly-collected species, obviously a close relative of *C. (I.) viduata*, was only known so far by the four paratype specimens described by Wiesner (1989), all of which were also coming from northern Luzon (Mt. Province). It is clear that these small, inconspicuous tiger beetles of the genus *Cylindera* are still uncompletely known, as for instance one more new species has been recently described by Naviaux & Sawada (1996), based on a single male specimen from Balabac Island.

Cylindera (Ifasina) discreta (Schaum) subspec. *elaphroides* (Dokhtouroff, 1882)

Material.— **Mindanao** (Davao Oriental): 1 ♂, 1 ♀ (RMNH), Boston, Mt Agtuuganon, Camp 55, 29.v-7.vi.1996, 1020 m, light trap, R.A. Müller, A. Buenafe & L. Gorostiza. (Surigao del Sur): 1 ♂ (FC), 1 ♀ (RMNH), San Miguel, Suba River, 150-250 m, 13-14.iv.1995, light trap, R.A. Müller, A. Buenafe & L. Gorostiza. **Samar** (Western Samar): 1 ♀ (RMNH), Hinabangan, Arizona, Mining Company, mercury light, 280 m, 29.iii-6.iv.1996. **Leyte** (Southern Leyte): 1 ♀ (ZMB), Libas, Bagong River, 20.iv.1997, W. Mey & Speidel.

As I have underlined in a previous paper (Cassola, 1991), *C. (I.) discreta* (Schaum, 1863) represents a polytypic complex, to whom several forms have been usually connected, at the subspecific level, which altogether inhabit a very large geographical range, from Cambodja, Malacca and Sumatra eastwards to Borneo, the Philippines, New Guinea, the Solomons, northern Australia and the New Hebrides. Some of these at least, however, definitely deserve full specific status, such as *C. d. froggatti* Macleay, 1887, from New Guinea, northern Australia and the Solomons (Cassola, 1987a, b), *spinosa* W. Horn, 1905, from Bismarck Archipelago and Bougainville (Cassola, 1987a, b), *salomonica* Cassola, 1987, from Guadalcanal, Solomon Islands (Cassola, 1987b), *sikhimensis* Mandl, 1982, from N.E. India and Burma, and *reductula* W. Horn, 1915, from Sumatra (Acciavatti & Pearson, 1989). Another closely related species is *C. (I.) juergenwiesneri* Naviaux, 1991, from Thailand (Naviaux, 1991).

As to *C. (I.) discreta* itself, it has been described from "Celebes" (Schaum, 1863b), therefore this name has to be kept linked with the Sulawesi populations only (which typically lack the marginal apical lunule) (Cassola, 1991), while the populations from the other islands would have to be designated as separate subspecies at least. Those from the Philippines can tentatively be ascribed to ssp. *elaphroides* Dokhtouroff, a "var." described from "Manille" (Dokhtouroff, 1882).

Acknowledgements

Best thanks are due to Mr Roland A. Müller (St. Gallen, Switzerland), who has submitted all the tiger beetle specimens collected by him in the course of his several expeditions to the Philippine Islands, as well as to Dr Thierry Deuve (Muséum National d'Histoire Naturelle, Paris, France), who kindly allowed me to borrow and study the type specimens. I also thank Dr Wolfram Mey (Museum für Naturkunde, Berlin, Germany), who organized the above mentioned Philippine Workshop and also collected and submitted a few additional tiger beetle specimens.

References

- Acciavatti, R.E., & D.L. Pearson, 1989. The tiger beetle genus *Cicindela* (Coleoptera, Insecta) from the Indian subcontinent.— *Annls Carnegie Mus.* 58: 77-353.
- Cassola F., 1987a. Studi sui Cicindelidi. 51. I Cicindelidae (Coleoptera) della Nuova Guinea.— *Ann. Mus. civ. St. nat. Genova* 86: 281-454.
- Cassola F., 1987b. Studi sui Cicindelidi. LII. I Cicindelidae (Coleoptera) delle Solomon Islands.— *Ann. Mus. civ. St. nat. Genova* 86: 509-551.
- Cassola, F., 1991. Studi sui Cicindelidi. LXIII. I Cicindelidae (Coleoptera) dell'Isola di Sulawesi, Indonesia.— *Ann. Mus. civ. St. nat. "G. Doria"* 88: 481-664.
- Cassola F. & D.L. Pearson, 1999. Numbers of tiger beetle species (Coleoptera: Cicindelidae) known from countries of the world and their significance in selecting conservation priorities.— *Biological Conservation*, Barking (in press).
- Cassola F. & R.D. Ward, 1996. Biodiversity and biogeography of the tiger beetles (Coleoptera: Cicindelidae) of the Philippine Islands.— *Proceedings of the XX International Congress of Entomology* (Firenze, Italy, August 25-31, 1996), Abstract 02-026: 76.
- Cassola F. & R.D. Ward (in prep.). The tiger beetle species of the genus *Thopeutica* Chaudoir, 1861, of the Philippine Islands (Coleoptera, Cicindelidae).
- Chaudoir M., Baron de, 1865. Catalogue de la collection de Cicindèles de M. le Baron de Chaudoir.— *Brussels, Tip. Nys*: 1-64.
- Collins N.M., J.A. Sayer & T.C. Whitmore (eds.), 1991. *The Conservation Atlas of Tropical Forests: Asia and the Pacific*: 1-256.— IUCN, London and Basingstoke.
- Delacour J. & E. Mayr, 1946. *Birds of the Philippines*: 1-309.— New York.
- Dokhtouroff W., 1882. Sur quelques Cicindélides nouveaux ou peu connus (Suite et fin).— *Rev. Ent.* 1: 274-276.
- Fleutiaux, E., 1892. *Catalogue systématique des Cicindelidae décrits depuis Linné*: 1-186.— Liège.
- Hämäläinen M. & R.A. Müller, 1997. Synopsis of the Philippine Odonata, with lists of species recorded from forty islands.— *Odonatologica* 26: 249-315.
- Horn W., 1905. Systematischer Index der Cicindeliden.— *D. entom. Zeitschr., Supplement*, 49: 1-56.
- Horn W., 1915. Coleoptera Adephaga, Fam. Carabidae, Subfam. Cicindelinae: 209-486, pls. 16-23. In: P. Wytsman (ed.), *Genera Insectorum*, Fasc. 82C.— Bruxelles.
- Horn W., 1923. Philippine species of the genus *Prothyma* and other Cicindelinae.— *Philipp. J. Sci.* 22: 357-363.
- Horn W., 1924. Three new Cicindelidae from the Philippines.— *Philipp. J. Sci.* 24: 87-89.
- Horn W., 1926. Carabidae: Cicindelinae: 1-345. In: S. Schenkling (ed.), *Coleopterorum Catalogus*, Pars 86.— W. Junk, Berlin.
- Horn W., 1930. Beiträge zur Kenntnis neuer und alter Cicindelinen des Indo-papuanischen Faunengebietes.— *Wiener ent. Z.* 47: 1-9.
- Horn W., 1938. 2000 Zeichnungen von Cicindelinae.— *Ent. Beihefte Berlin-Dahlem* 5: 1-71, pls. 1-90.
- Kibby G., 1985. A review of *Thopeutica*, a subgenus of *Cicindela* (Coleoptera: Cicindelidae), with a key to species and descriptions of two new taxa.— *J. nat. Hist. Lond.* 19: 21-36.
- Naviaux R., 1991. Les Cicindèles de Thaïlande, étude faunistique (Coleoptera Cicindelidae).— *Bull. mens. Soc. linn. Lyon* 60: 209-288.
- Naviaux R., 1995. Les *Collyris* (Coleoptera Cicindelidae). Revision des genres et description de nouveaux taxons.— *Soc. linn. Lyon*: 1-332.
- Naviaux, R., Sawada, H., 1996. *Cylindera (Ifasina) balabacensis*, nouvelle espèce des Philippines (Coleoptera, Cicindelidae).— *Rev. scient. Bourbonnais*: 63-64.
- Rivalier É., 1961. Démembrement du genre *Cicindela* L. (suite). IV. Faune Indomalaise.— *Rev. franç. Ent.* 28: 121-149.
- Schaum H., 1860. Beiträge zur Kenntniss einiger Laufkäfer-Gattungen. I. Die *Cicindelen* der Insel Luçon.— *Berl. ent. Zeitschr.* 4: 180-182.
- Schaum H., 1861. Eine Decade neuer Cicindeliden aus dem tropischen Asien.— *Berl. ent. Zeitschr.* 5: 68-80.

- Schaum H., 1862. Die Cicindeliden der philippinischen Inseln.— Berl. ent. Zeitschr. 6: 172-184.
- Schaum H., 1863a. Beiträge zur Kenntnis einiger Carabicingen-Gattungen.— Berl. ent. Zeitschr. 7: 67-92.
- Schaum H., 1863b. Contributions to the Knowledge of the *Cicindelidae* of tropical Asia, containing Descriptions of new Species, a List of those hitherto described, and Synonymical Notes.— J. Ent. 2: 57-74.
- Schultze W., 1916. A catalogue of Philippine Coleoptera.— Philipp. J. Sci. 11: 1-8.
- Trautner J. & W. Schawaller, 1996. Larval morphology, biology and faunistics of Cicindelidae (Coleoptera) from Leyte, Philippines.— Trop. Zool. 9: 47-59.
- Vane-Wright, R.I. 1990. The Philippines - Key to the biogeography of Wallacea?, p. 19-34. In: W.J. Knight & J.D. Holloway (eds.), Insects and the Rain Forests of South East Asia (Wallacea): iii + 343.— Roy. ent. Soc. Lond., London.
- Wiesner J., 1980. Beiträge zur Kenntnis der philippinischen Cicindelidae (Coleoptera).— Mitt. münch. ent. Ges. 70: 119-127.
- Wiesner J., 1988a. Die Gattung *Therates* Latr. und ihre Arten. 15. Beitrag zur Kenntnis der Cicindelidae (Coleoptera).— Mitt. münch. ent. Ges. 78: 5-107.
- Wiesner J., 1988b. Eine neue *Cylindera* von den Philippinen (Coleoptera: Cicindelidae). 16. Beitrag zur Kenntnis der Cicindelidae.— Ent. Zeitschr. m. Insektenb. 98: 153-155.
- Wiesner J., 1989. Beiträge zur Kenntnis der philippinischen Cicindelidae (II) (Coleoptera). 22. Beitrag zur Kenntnis der Cicindelidae.— Ent. Zeitschr. m. Insektenb. 99: 237-238.
- Wiesner J., 1992a. Eine neue *Thopoutica* von den Philippinen (Coleoptera: Cicindelidae). 26. Beitrag zur Kenntnis der Cicindelidae.— Ent. Zeitschr. m. Insektenb. 102: 128-130.
- Wiesner J., 1992b. Verzeichnis der Sandlaufkäfer der Welt. Checklist of the Tiger Beetles of the World: 1-364.— Keltern.

Received: 9.viii.1999

Accepted: 9.ix.1999

Edited: C. van Achterberg

