

## Research article

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# New species of *Monocoryna* Gorham, 1885 (Coccinellidae: Monocoryninae) from India

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**Abstract.** The peculiar ladybird genus *Monocoryna* Gorham, 1885 is distributed in Eastern part of the Oriental Region, and it inhabits mainly the Malay Archipelago, with only nine species known. Recent molecular studies revealed that *Monocoryna* forms a separate branch on the phylogenetic tree of Coccinellidae, the subfamily Monocoryninae. In this study, a new species *M. indica* sp. nov. is described from Andippatti Hills in India. The discovery extends the range of the genus to the Western part of the Oriental Region. Additionally, male genitalia of *M. yamashinai* Sasaji from Thailand are described and illustrated for the first time. A distribution map and an updated key to all species of *Monocoryna* are also provided.

**Key words.** Coleoptera, Coccinelloidea, taxonomy, Tamil Nadu, ladybird beetles, new species.

## INTRODUCTION

The genus *Monocoryna* Gorham, 1885 was described by Gorham (1885) to accommodate a single species, *M. decempunctata* Gorham, 1885 from Sumatra, Indonesia. Due to its peculiar structure of antennae, extraordinary large and rounded terminal antennomere, and lobbed four-tarsomere tarsi it was classified by Gorham (1885) as Endomychidae Leach, 1815. That placement was also followed by subsequent authors (Arrow 1920; Strohecker 1953). After detailed examination of the morphology of specimens of *Monocoryna* Miyatake (1988) realized that it belongs to the ladybird beetles (Coccinellidae Latreille, 1807). He also proposed a new tribe Monocorynini for this peculiar genus.

Gorham (1885) suggested a close relationship of *Monocoryna* with the ladybird genus *Tetrabrachys* Kapur, 1948 (= *Litophilus* Frölich, 1799). Later Fürsch (1996) pointed out that *Monocoryna* also resembles in some morphological features the South African genus *Mimilitophilus* Arrow, 1920, which was placed either in Litophilini (Crowson, 1952) or Coccidulini (Iablokoff-Khnzorian, 1974). Studies of Seago et al. (2011) and Robertson et al. (2015) based on molecular data showed, however, that *Monocoryna* does not form a monophyletic clade with *Tetrabrachys* but is grouped with *Mimilitophilus*. A recent molecular analysis (Che et al. 2021) based on 96 molecular markers showed that *Monocoryna* forms a separate branch within Coccinellidae between subfamilies Microweseinae and Coccinellinae, thus authors proposed a new subfamily Monocoryninae for this genus.

*Monocoryna* is endemic to the Oriental Region and has been known from its eastern part so far. Ślipiński and Jadwiszczak (2000) listed nine currently recognized species of *Monocoryna*, of which four are known from Borneo (Malaysia), two from Mindanao (Philippines), one from mainland Malaysia, one from Chiang Mai (Thailand), and one occurring in Sumatra and Java (Indonesia). Specimens of *Monocoryna* are rarely found in collections, and each species is known from a single or just a few specimens. No information about its behavior or food preferences is known except scarce information about general habitat that can be concluded from the label data as a mainly forest species occurring at high altitudes (1250–3500 m a.s.l.) (Miyatake 1988; Ślipiński & Jadwiszczak 2000).

During research in the collection of the Museum and Institute of Zoology in Warsaw, a single specimen of *Monocoryna* from India was found which appeared to be a new species. The new species here described extends the range of the genus to the Western part of the Oriental Realm.

## MATERIAL AND METHODS

The holotype is deposited in the Museum and Institute of Zoology, Polish Academy of Sciences in Warsaw (MIZ). Material from the Muséum d'Histoire Naturelle, Geneva (MHNG) and the Staatliches Museum für Naturkunde, Stuttgart (SMNS) were also studied.

Genitalia were dissected, cleared in a 10% solution of KOH, rinsed with distilled water, transferred to glycerol, and examined on slides. All colour images were taken using a stereo microscope Leica MZ 16 with a digital camera IC 3D; final images were produced using Helicon Focus 5.0X64 and AdobePhotoshop CS6 software. Morphological terminology follows Ślipiński (2007).

## RESULTS

### Taxonomy

Family **Coccinellidae** Latreille, 1807  
 Subfamily **Monocoryninae** Miyatake, 1988  
 Tribe **Monocorynini** Miyatake, 1988  
 Genus **Monocoryna** Gorham, 1885

*Monocoryna* Gorham, 1885: 527.

**Type species:** *Monocoryna decempunctata* Gorham, 1885 (by monotypy).

*Walteria* Sicard, 1913: 511.

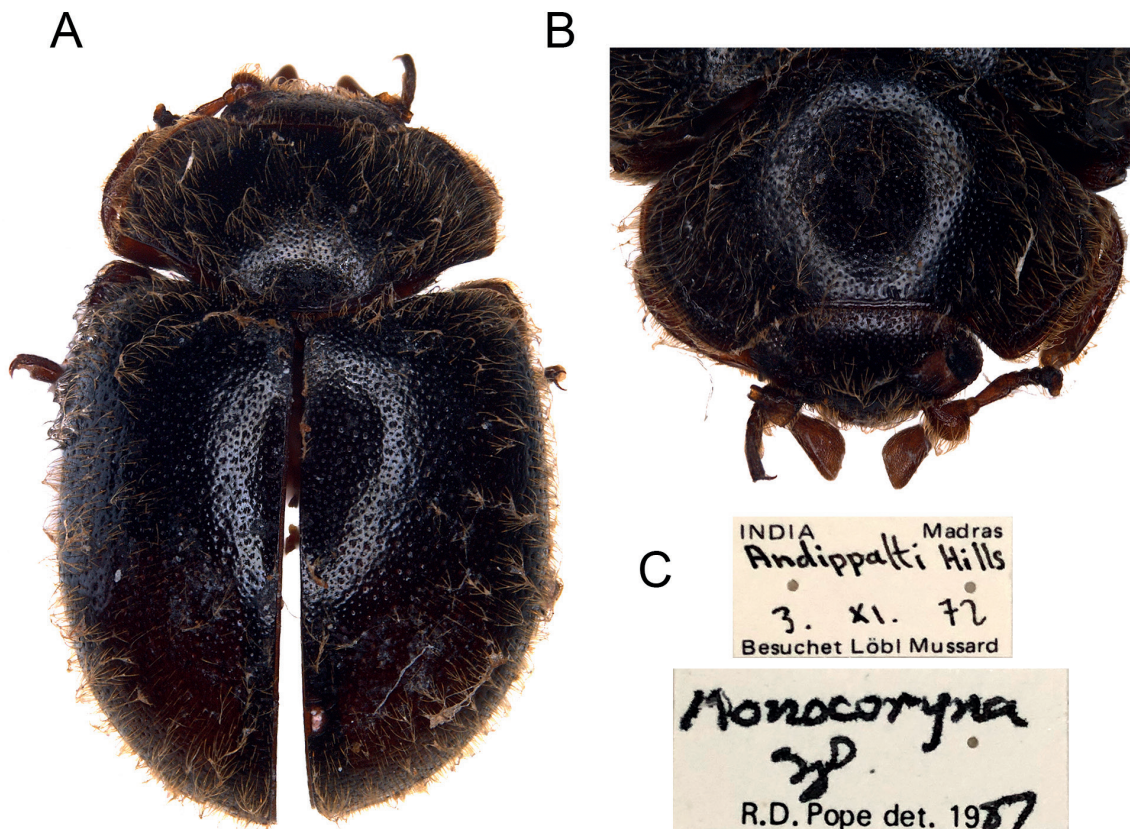
**Type species:** *Walteria antennalis* Sicard, 1913 (by monotypy). Synonymized by Miyatake 1988: 28.

*Sicara* Strand, 1942: 392. New name for *Walteria* Sicard, 1913, not Schultze, 1885. Synonymized by Fürsch 1996: 195.

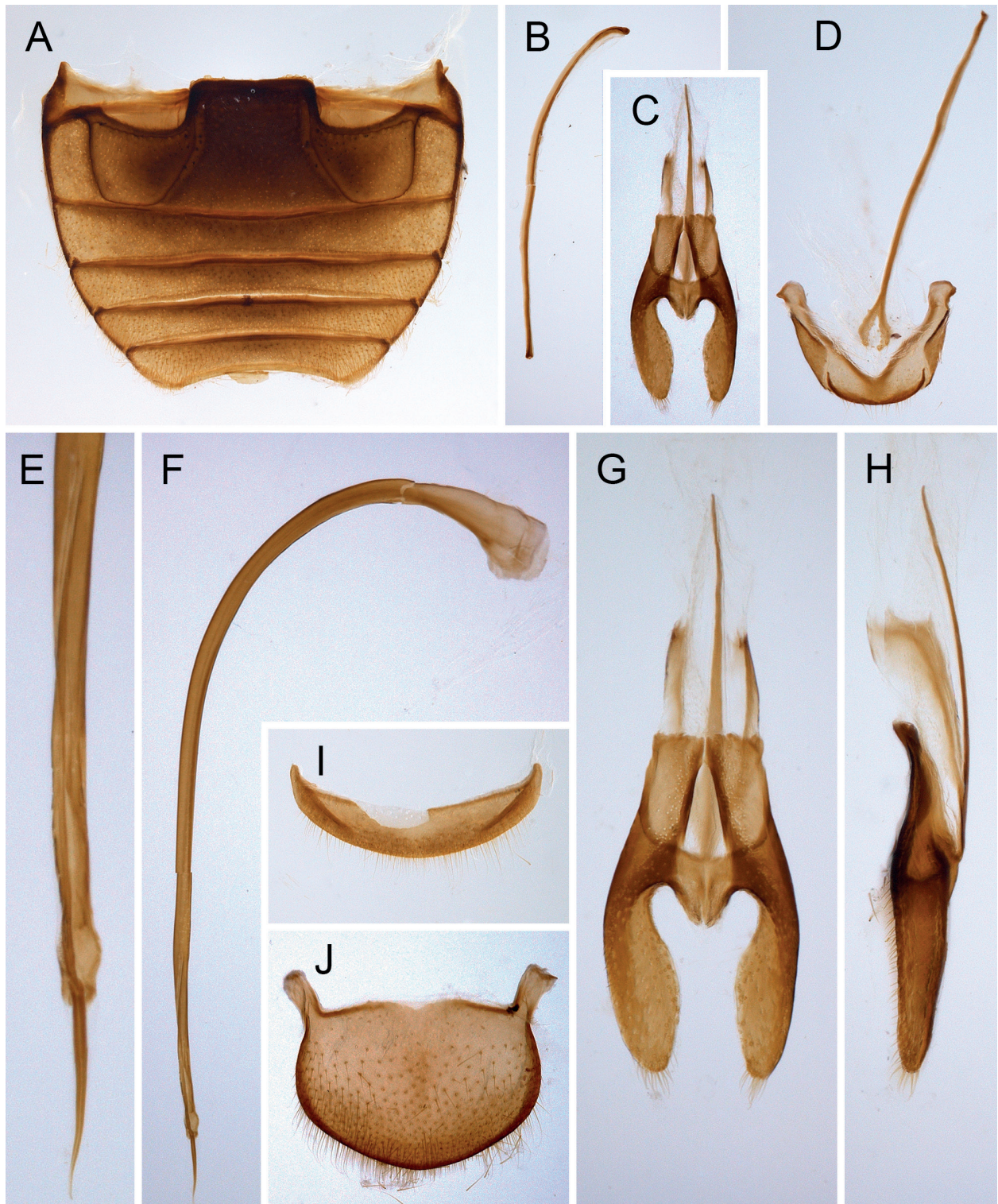
***Monocoryna indica* sp. nov.**

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 (Figs 1–2, 5)

**Diagnosis.** *M. indica* sp. nov. is most similar to *M. yamashinai* Sasaji, 1989 described from Thailand (Chiang Mai). Both species are dark brown to black, however, in *M. yamashinai* each elytron is bordered with a reddish-orange band with central disc dark brown, whereas *M. indica* sp. nov. has entirely dark brown elytra. It can be also separated by the shape of male genitalia, in *M. indica* parameres are slender, broadest in the middle, with apices narrowly rounded, penis guide moderately well developed and sub-triangular, and penis with single needle-like spine apically, while in *M. yamashinai* parameres are broadened apically with broadly rounded apices, penis guide reduced to a narrow projection, and penis with two apical spines. From the other species, *M. indica* sp. nov. can be separated by uniformly dark brown colouration, while other have bright yellowish to red-orange maculae on elytra, sometimes fused forming



**Fig. 1.** *Monocoryna indica* sp. nov. A. Habitus. B. Pronotum. C. Holotype labels.



**Fig. 2.** *Monocoryna indica* sp. nov. A. Abdomen. B. Tegminal strut. C. Tegmen. D. Male abdominal segments IX and X. E. Tip of penis. F. Penis, lateral. G. Tegmen, inner. H. Tegmen, lateral. I. Ventricle 6. J. Tergite VIII. B–D in the same scale; F–H in the same scale.

bands. It also has apically broadened penis apex with distinct needle like sclerite while other known species have simple, pointed apex.

**Etymology.** The newly described species is named after the country of its origin, India.

**Type material**

**Holotype.** ♂, "INDIA, Madras, Andippatti Hills, 3.XI.72, Besuchet Löbl Mussard/ *Monocoryna* sp. R.D. Pope det. 1987" (MIZ); Fig. 1C.

**Description. Male.** Length = 5.9 mm, width = 3.9 mm. *Body and colour.* Broadly oval (Fig. 1A), moderately convex dorsally, covered with moderately long, orange-brown vestiture. Pronotum dark brown with paler lateral sides (Fig. 1B), hypomeron reddish-brown, elytra entirely dark brown, epipleura dark brown with inner margin reddish-brown, meso and metaventrite brownish-black, mouthparts and tarsi brown, antennomeres 1–5 brown, 6–8 black. Head and pronotum densely covered with punctures of uniform size, elytra covered with intermixed smaller and larger punctures arranged irregularly. Wingless.

*Head.* Dorsally with long supraorbital sulci; with deep, long ventral antennal grooves. Eyes coarsely faceted, small, distance between eyes more than half width of the head. Terminal maxillary palpomere slightly broadened apically, longer than its width. Antenna with scape distinctly swollen with anterior surface roundly expanded

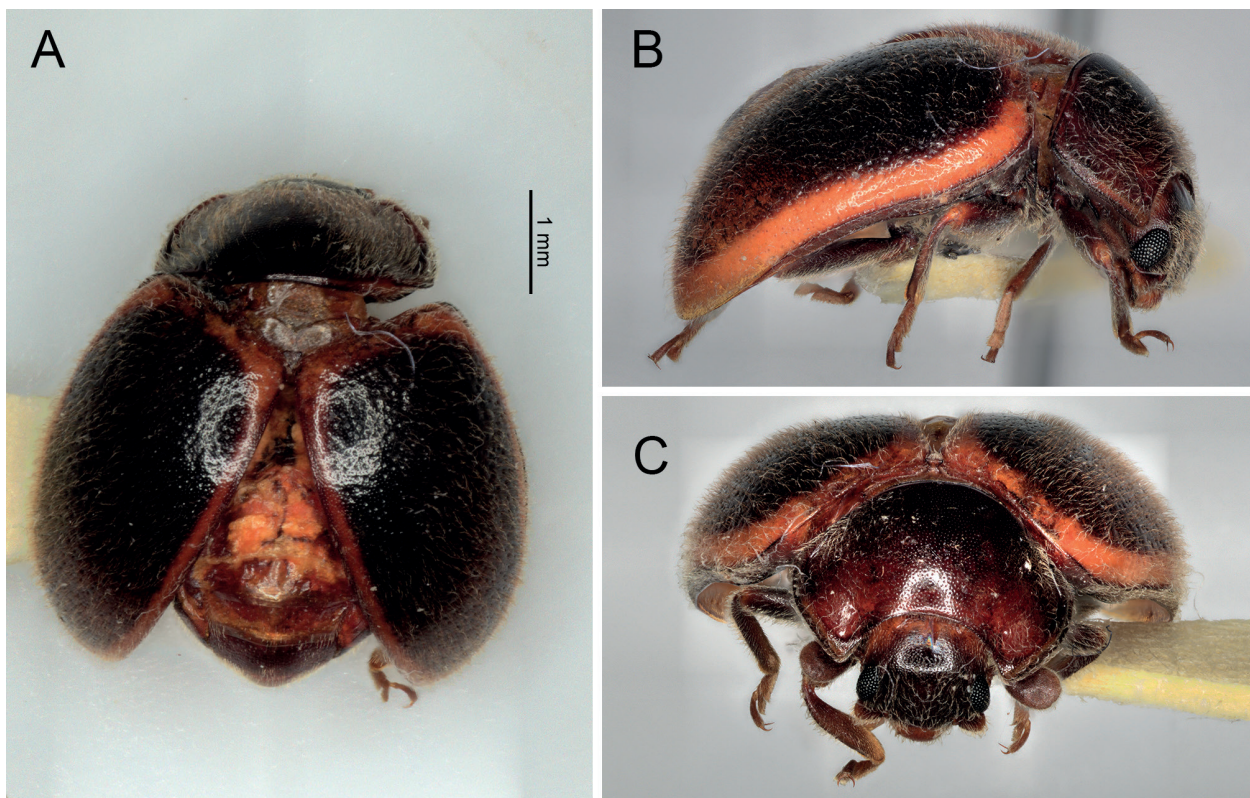
forwards; pedicel small, transverse; antennomere 3 elongate, longer than antennomeres 4–6 combined; antennomeres 4–7 transverse.

*Pronotum.* With complete anterior, lateral margins bordered, lateral borders anteriorly not touching anterior pronotal margin, posteriorly extending to lateral parts of hind margin of pronotum. Base of pronotum with two small, subtriangular sulci. Hypomeron with broad concave area in anterior part. Anterior prosternal margin produced forwards forming a chinpiece, partially covering mouthparts. Prosternal process broad with sinusoidal, subparallel, separate and complete carinae.

Scutellar shield small, subtriangular, bordered. Elytral margin narrow, not visible from above. Epipleuron incomplete apically. Mesoventral intercoxal process broader than mesocoxal diameter. Metaventral postcoxal lines joined medially forming a straight line on mesoventral process, descending laterally. Metanepimeron with carina near anterior margin.

*Legs.* Slender with trochanters sub-quadrate, tibiae without apical spurs, tarsi with four tarsomeres, tarsal claw simple without basal angulation.

*Abdomen.* With six ventrites (Fig. 2A); ventrite 1 long, more than  $1.5 \times$  as long as ventrite 2 at the level of postcoxal lines, postcoxal lines complete, recurved, deep, angulate, reaching posterior margin of the ventrite and sub-parallel to its margin; ventrite 5 broadly truncate api-



**Fig. 3.** *Monocoryna yamashinai* Sasaji, 1989. **A.** Habitus, dorsal. **B.** Habitus, lateral. **C.** Habitus, frontal.



**Fig. 4.** *Monocoryna yamashinai* Sasaji, 1989. **A.** Tip of penis. **B.** Penis, lateral. **C–D.** Tegmen, inner. **E.** Tegmen, lateral.

cally; ventrite 6 narrow, broadly rounded (Fig. 2I); tergite VIII large, arcuate (Fig. 2J). Apodeme of sternite IX long (Fig. 2B, D), rod like, distinctly broadened basally with median part translucent. Tergite X transverse.

**Genitalia.** Tegmen symmetrical (Fig. 2C, G–H), phallobase with long additional projection on outer surface; penis guide in inner view small, sub-triangular, moderately broad, with distinct median carina on outer surface; parameres in inner view large, long oval, broadest in the middle, densely setose on lateral and apical margins, in lateral view narrow, with margins straight; tegminal strut simple rod-like, very long. Penis long (Fig. 2E–F), slender, without capsule, apex slightly broadened with distinct needle-like projection.

**Female.** Unknown.

**Distribution.** India, Tamil Nadu, Andippatti Hills.

***Monocoryna yamashinai*** Sasaji, 1989

*Monocoryna yamashinai* Sasaji, 1989: 117.

Figs 3–5

**Material examined.** 1 ♂, Thailand, Chiang Mai Prov., Doi Sanyao 1000 m, Schwendinger 7.9.91/ *Monocoryna yamashinai* det. A. S. Ślipiński/ COL 3831 (MHNG) – 1 ♀, N. Thailand, NE Chiang Mai 6 km NE Doi Saket, 27.11.1998, R. Grimm/ Museum Stuttg (SMNS).

**Description.** **Genitalia.** Tegmen symmetrical (Fig. 4C–E), phallobase with additional short projection on outer surface; penis guide in inner view very small, sub-triangular, narrow; parameres in inner view large, long oval, distinctly broadened apically, sparsely setose on apical margin, in lateral view more broad, with margins more rounded; tegminal strut simple rod-like, very long. Penis long (Fig. 4A–B), slender, without capsule, apex distinctly narrowed in apical part with two terminal projections, one short and sinuate, the second longer and needle-like.

**Remarks.** Originally *M. yamashinai* was described by Sasaji in 1989 based on a single female specimen from

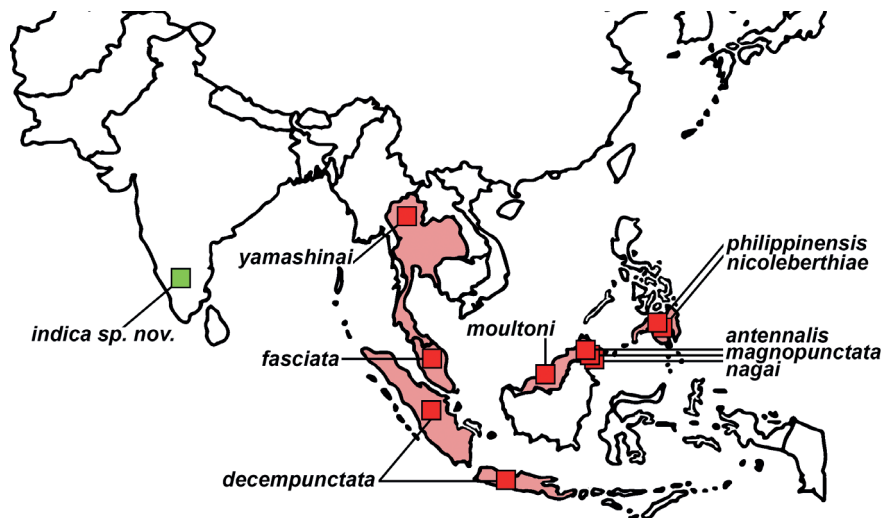


Fig. 5. Distribution map of species of *Monocoryna* Gorham, 1885.

Thailand (Chiang Mai). Since that time no new records were published. *Monocoryna yamashinai* can be easily separated from the most similar *M. indica* but also from the other congeners by its colour pattern of elytra, with disc dark brown and lateral margin with broad reddish-orange band (Fig. 3A–C). Examination of the additional material allowed description of the male genitalia of this species.

**Distribution.** Thailand, Chiang Mai.

#### Key to species of *Monocoryna* Gorham, 1885

1. Elytral disc without spots or transverse bands, uniformly dark brown to blackish ..... 2
  - Elytral disc with distinct paler spots, sometimes arranged in transverse bands ..... 3
2. Elytra uniformly dark brown to black, lateral margin of elytra without paler margin. India ..... *M. indica* sp. nov.
  - Elytra with lateral margin with paler yellow-orange border. Thailand ..... *M. yamashinai* Sasaji, 1989
3. Hind wings well developed; humeral callus distinct 4
  - Hind wings atrophied; humeral callus indistinct .... 7
4. Elytra brown to blackish brown with 10–12 isolated paler spots ..... 5
  - Elytra blackish brown with 3 reddish brown bands. Malay Peninsula ..... *M. fasciata* Arrow, 1920
5. Elytra with more than 10 spots. Malaysia (Borneo: Sarawak) ..... *M. nagaii* Miyatake, 1988
  - Elytra with 10 spots ..... 6
6. Elytral spots small and roundish; body shortly oval; smaller (4–5 mm in length). Malaysia (Borneo: Sarawak) ..... *M. moultoni* (Sicard, 1913)
  - Elytral spots larger and elongate; body oblong-oval, larger (7–8 mm in length). Malaysia (Borneo: Sabah) ..... *M. magnopunctata* Miyatake, 1988
7. Elytra piceous brown with 13 paler spots, of which postscutellar spot is situated on the elytral suture, two subapical spots are connected with each other at their tips, forming a V-shaped marking; scutellar shield moderate in size. Malaysia (Borneo: Sarawak) ..... *M. antennalis* (Sicard, 1913)
  - Elytra blackish brown to black with 10 paler spots, none of them situated on the elytral suture; scutellar shield very small ..... 8
8. Body length less than 6.5 mm. Indonesia (Java, Sumatra) ..... *M. decempunctata* Gorham, 1885
  - Body length more than 7.5 mm. Philippines ..... 9
9. Antennal club black, lateral pronotal sulcus joined to anterior margin of pronotum, body larger, around 9 mm in length ..... *M. nicolebertiae* Jadwiszczak & Ślipiński, 2000
  - Antennal club orange, lateral pronotal sulcus not reaching anterior margin of pronotum, body shorter, around 8 mm in length ..... *M. philippinensis* Jadwiszczak & Ślipiński, 2000

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