



## Rediscovery of *Lustrina* Kurian (Hymenoptera, Chrysididae), with redescription of *L. assamensis* Kurian

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### Abstract

The genus *Lustrina* Kurian, 1955 is discussed and *Lustrina assamensis* Kurian, 1955 is redescribed based on the examination of type specimen as well as a specimen recently collected.

**Key words:** Cleptinae, *Cleptes*, *Cleptidea*, Oriental Region, Vietnam

### Introduction

The subfamily Cleptinae is considered as one of the most plesiotypic group within Chrysididae (Kimsey & Bohart 1991; Pauli *et al.* 2018) and currently includes 115 valid species (Wei *et al.* 2013; Rosa *et al.* 2015). *Cleptes* Latreille, 1802 is the most speciose genus, including 90 species predominantly Holarctic, with a dozen species distributed in the Oriental region and a single South American one. *Cleptidea* Mocsáry, 1904 is distributed only in the New World and includes 19 species: 17 in the Neotropics and two in Northern Mexico (Kimsey 1981, 1986; Móczár 1996a, b). Besides these two well-known genera, a third, monotypic and mysterious genus *Lustrina* Kurian, 1955 has remained to be studied.

Kurian (1955) described *Lustrina* in the family Bethyridae, subfamily Mesitiinae. The generic diagnosis was based on a single female collected in India (Assam), named *Lustrina assamensis* Kurian, 1955. Only Nagy (1968) was able to examine the type specimen, and transferred this genus into the family Chrysididae, subfamily Cleptinae. He considered *Lustrina* a well-defined valid genus, separated from *Cleptes* Latreille and *Cleptidea* Mocsáry by the absence of mesopleural median pit. He also provided the line drawing of *L. assamensis*, seen in dorsal view, stating that legs and wings matched Kurian's (1955) drawings (even if tarsal claws' structure is not shown in these illustrations). Furthermore, Nagy (1968) reported that the head was lost. Kimsey & Bohart (1991), Krombein (1996) and Móczár (1996b) could not examine the type of *L. assamensis*. Kimsey & Bohart (1991), without any taxonomic discussion, synonymised *Lustrina* with *Cleptes*. Móczár (1996b) revalidated the genus without any available specimen, merely based on Kurian's (1955) description and Nagy's (1968) personal intuition.

Móczár's (1996b) revalidation was based on the bifid tarsal claws, as described by Kurian (1955). In Cleptinae, the shape of tarsal claws is considered a generic diagnostic feature (Kimsey & Bohart 1991): in *Cleptidea* the tarsal claw is bifid, bearing a single, large, and subapical subsidiary tooth (Fig. 1B), whereas in *Cleptes* the tarsal claw bears a small perpendicular submedial tooth (Fig. 1C), in some species unrecognizable. Móczár (1996b) separated *Lustrina* and *Cleptidea* from *Cleptes* based on the shape of tarsal claws, and then separated *Lustrina* from *Cleptidea* by the shape of head and pronotum, taking also in consideration their zoogeographical distribution.

The recent finding of a specimen of *Lustrina* in Vietnam and a new examination of Kurian's type (Fig. 4) has shed new light in the taxonomic placement of this mysterious genus.

## Materials and methods

The specimen was examined and described under a stereomicroscope, Olympus SZX10. All images of *Lustrina*, except general habitus, were taken with a digital camera Olympus E-5 attached to SZX10. Habitus was taken with a digital camera, Canon Eos Kiss X8i and a macro lens, Canon MP-E65 mm. Images were processed using Zerene Stacker 1.04 (Zerene Systems, LLC). Morphological terminology of this study mainly follows that of Kimsey & Bohart (1991) and Móczár (1996b). We also adopted the terms antennal foramen, transverse pronotal sulcus, anterior pronotal flange, dorsal pronotal area, metapectal-propodeal complex, posterior propodeal projection, and posterior ocelli used by Azevedo *et al.* (2018) for bethylids.

The abbreviations used in the descriptions are as follows: ASD = antennal socket diameter; EL = eye maximum length, the vertical line length of compound eye, full-face view; F1, F2, F3, etc. = flagellomere 1, flagellomere 2, flagellomere 3 and so on; IOL = inter-ocular line, the shortest distance between inner margins of compound eyes, full-face view; MOD = midocellar diameter; MS = malar space, the shortest distance between the base of mandibles and margin of the compound eyes; OCL = ocellar-occipital line, the shortest distance between posterior ocellus and occipital carina; OOL = oculo-ocellar line, the shortest distance between posterior ocellus and compound eye; PD = puncture diameter; Ped = pedicel; POL = posterior ocellar line, the shortest distance between posterior ocelli.

## Subfamily Cleptinae Latreille, 1802

**Diagnosis.** Cleptinae can be distinguished from other Chrysididae subfamilies by metasoma convex ventrally, with four visible terga in females and five in males; pronotum campanulate, narrowed anteriorly, subdivided by the transverse pronotal sulcus in the anterior pronotal flange and the bell-shaped dorsal pronotal area; metapectal-propodeal complex (propodeum in Kimsey & Bohart (1991) and Móczár 1996b) with elongate dorsal surface and vertical propodeal declivity, posterolaterally angulated to dentate; claws dentate; forewing with weakly defined discoidal cell and an incomplete, or lacking, radial sector vein; ovipositor long and robust.

## Key to genera

1. Tarsal claws with one minute, perpendicular sub-medial or sub-basal tooth (Fig. 1C), sometimes indistinct to fading; forewings hyaline, rarely slightly banded (e.g. *Cleptes semiauratus* (Linnaeus, 1761) ♀) ..... *Cleptes* Latreille, 1802
- Tarsal claws bifid, with broadened, subapical tooth (Figs 1A–1B), as broad as the upper tooth; forewings banded, rarely with only one single light brown irregular band (e.g. *Cleptidea scutellaris* (Cameron, 1897)). ..... 2
2. Eyes following head profile (Fig. 3A); pronotum without median longitudinal sulcus; mesoscutellum fully and densely punctate (Fig. 2); metanotum flat in profile; posterior propodeal projection (= propodeal tooth) unmodified, triangular, and apically rounded (Fig. 2); metasomal terga fully black, with blue to violet metallic reflections and with transverse golden or greenish-golden metallic bands, without whitish marks; head 1.2 × wider than high in frontal view; EL:IOL=1.0:1.2 ..... *Lustrina* Kurian, 1955
- Eyes bulging (see Kimsey 1981: Fig. 7; Kimsey & Bohart 1991: Fig. 14a; Móczár 1996a: Fig. 1); pronotum with median longitudinal sulcus; mesoscutellum largely impunctate; metanotum from weakly convex to strongly projecting in profile; posterior propodeal projection sharp and acute, ventrad; metasoma colour various, from fully black to fully metallic, with whitish marks in some species groups, not transversally banded; head 1.3–1.5 × wider than high in frontal view; EL:IOL=1.0:1.0 ..... *Cleptidea* Mocsáry, 1904

## Genus *Lustrina* Kurian, 1955

*Lustrina* Kurian, 1955: 86. Type species: *Lustrina assamensis* Kurian, 1955. Monobasic and original designation.

*Lustrina* Kurian: Nagy 1968: 168.

Synonym of *Cleptes* Latreille, 1802: 316, according to Kimsey & Bohart 1991: 53.

*Lustrina* Kurian: Móczár 1996b: 133.

*Lustrinia* Kurian: incorrect subsequent spelling by Wei *et al.* 2013: 56.

**Diagnosis.** *Lustrina* is characterized by the combination of the following characters: tarsal claws bifid, with broad, subparallel tooth; mesonotum with dense, deep and contiguous punctures; forewings with two dark brown bands,

one basal and one subapical; wing microtrichia long and thick; legs entirely reddish-testaceous, including coxae; metasomal colouration metallic and transversally banded; body and legs covered by elongated, thick and greyish setae. The combination of the following morphological characters is also considered distinctive, even if some characters are shared with few *Cleptes* species groups: POL less than 1.0 MOD; pronotum with transverse basal pit row, with large, subquadrate pits, extending to basolateral margins; mesopleuron with ill-defined scrobal sulcus extended horizontally, formed by enlarged and irregular foveae; smaller irregular foveae continue almost forming a loop as in the *Cleptes asianus* group; metanotal anteromedian pit present; metasomal punctation dense and deep on the second and third tergum.

**Distribution.** The only known species, *Lustrina assamensis*, is distributed in the Oriental region from India (Assam) to Vietnam.

### *Lustrina assamensis* Kurian, 1955

(Figs 1A, 2, 3A–3C, 4A–4D)

*Lustrina assamensis* Kurian, 1955: 87. Holotype ♀, INDIA: Assam (Forest Research Institute, Dehradun, India).

*Lustrina assamensis* Kurian: Nagy 1968: 168.

*Cleptes assamensis* (Kurian): Kimsey & Bohart 1991: 53, 59.

*Lustrina assamensis* Kurian: Móczár 1996b: 134.

**Redescription, Female.** Body 8.8 mm long.

**Head.** Head  $1.2 \times$  wider than high, densely punctate with interstices between punctures 0.3–0.5 PD wide and polished; posterolateral margin of posterior ocelli deeply hollow; ASD:MOD:OOL:POL:OCL:MS = 1.0:1.0:1.6:0.8:2.6:1.0. Mandible blackish brown, medially pale brown. Scape, pedicel and proximal half of F1 reddish testaceous; distal half of F1 dark brown, rest of antennae black. Relative lengths of Ped:F1:F2:F3 = 27:13:9:10. Pubescence on head whitish, 1.0–1.5 MOD, long. Holotype lacks head.

**Mesosoma.** Mesosoma  $1.8 \times$  longer than wide. Pronotum roughly punctate by dense and deep contiguous punctures; PD twice wider than those on head, with interspaces between punctures 0.2–0.3 PD wide; transverse basal pit row present. Mesonotum roughly punctate; punctures deep and dense but shallower than those on pronotum; interspaces between punctures 0.3–0.5 PD wide. Mesopleuron roughly punctate by deep contiguous punctures as pronotum; punctures above scrobal sulcus smaller; scrobal sulcus ill-defined, extended horizontally, and formed by enlarged and irregular foveae. Metanotum with deep anteromedian pit. Metapectal-propodeal complex dorsally with rugose, irregular carinae. Posterior propodeal projection rounded. Legs not metallic, reddish testaceous with distal apex of tarsi darkened. Forewing pale brown with basal and subapical bands. Wing venation typical for *Cleptes*. Microtrichia long and thick. Hind wing with distal 2/5 and posterior margin of anal lobe weakly tinged with brown. Pubescence on mesosoma whitish, 1.0 MOD long.



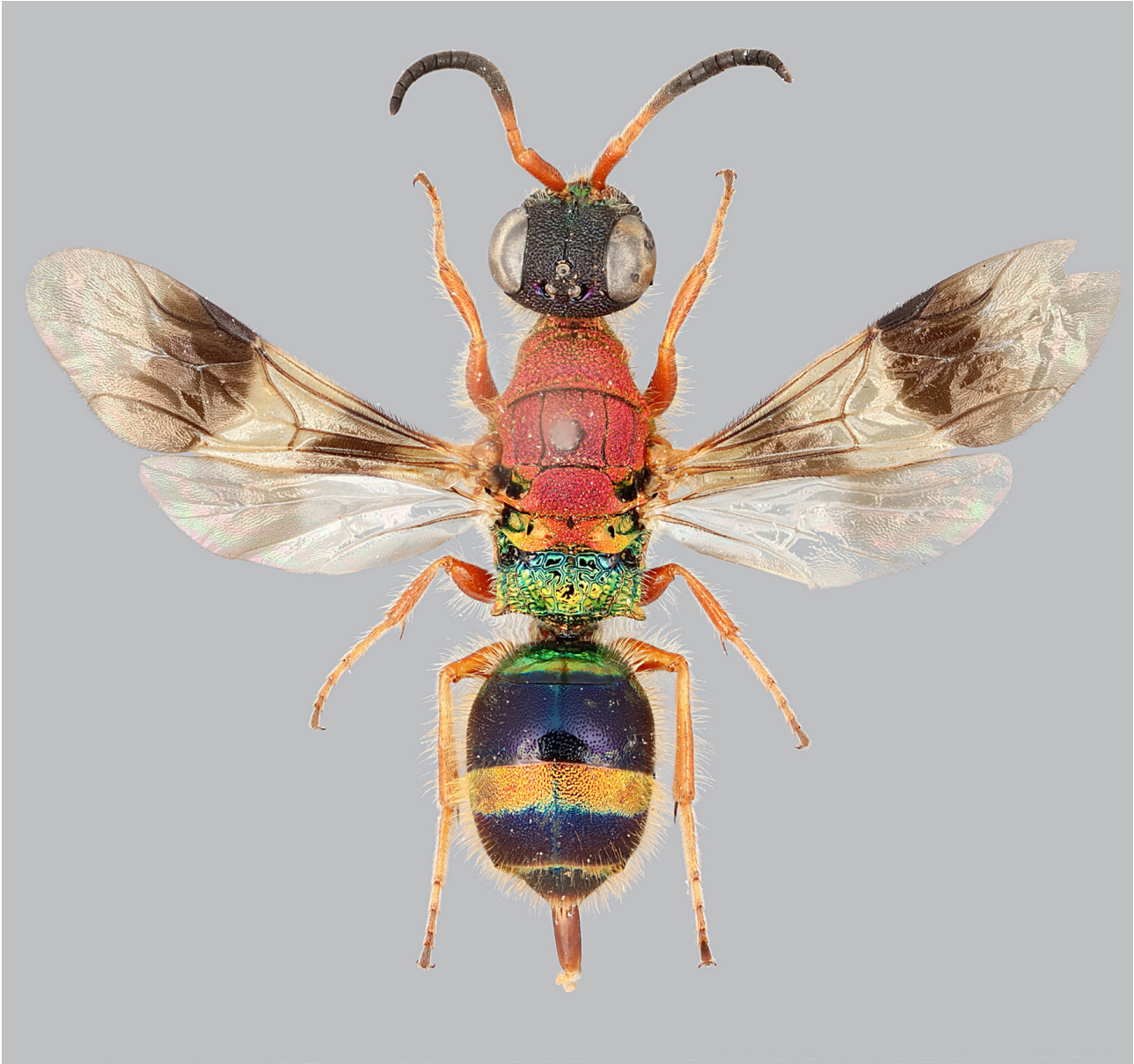
**FIGURE 1.** Protarsal claws. A) *Lustrina assamensis* Kurian. B) *Cleptidea pedicellaris* Kimsey. C) *Cleptes orientalis* Dahlbom.

**Metasoma.** Metasoma  $1.4 \times$  longer than wide. First metasomal tergum (T-I *sensu* Kimsey & Bohart 1991) polished, only bearing small scattered punctures. Second tergum punctate by small punctures, with interspaces polished, 1–2 PD wide. Third tergum densely punctate by small punctures, with interspaces 0.3–0.5 PD wide. Pubescence on metasoma dense, whitish, 1.5 MOD long.



**Colouration.** Head black with scattered faint purplish lustre; clypeus, lower face around antennal foramen (= antennal socket) and median line metallic green, outer margin and narrow surface between posterior ocelli metallic purple; posterior margin of head narrowly metallic orange. Mesosoma metallic red, with faint golden lustre; metanotum laterally golden; metapectal-propodeal complex metallic green, basally metallic light blue. Most part of metasoma dark metallic purple, but basal 4/5 of first tergum metallic green; golden wide bands present on basal 2/5 of the third tergum and basal half of the fourth tergum; posterior margin of the golden band with metallic blue, rest of the fourth tergum black. Pubescence on head and mesosoma grey, metasoma pale brown to yellowish.

**Material examined.** INDIA: ♀, H. Inglis coll. Murphulani T.E., Assam. 1.12.[19]20 / *Lustrina* ♀ Assami [!] gen. nov., sp. nov. det. C. Kurian / Holotype 48 / Holotype: ♀ *Lustrina assamensis* Kurian ex. C. Nagy–1969 [examination based on pictures kindly provided by Forest Research Institute, Dehradun, India] (Fig. 4A–4C). VIETNAM: ♀, Phi Lien, 3.iii.2014, Y. Fujisawa leg. (Faculty of Agriculture, Kyushu University).



**FIGURE 2.** *Lustrina assamensis* Kurian, habitus, dorsal view.

## Discussion

*Lustrina assamensis* superficially resembles members of the *Cleptidea fasciata* species group by following characters: large size; blackish head; part of antenna and legs fully non-metallic yellow; red thoracic colouration; fore-

wing with only faint stained traces of discoidal cell and two dark brown bands, one basal and one subapical; wing microtrichia long and thick. Despite the *Cleptidea* habitus, the main morphological characters of *Lustrina* do not support its placement in the genus *Cleptidea*. In particular, the head is only slightly wider than its height; the eyes are relatively small, following the head contour; the mid ocellus is equal to antennal foramen; the pronotum is without longitudinal medial groove; the metanotum is flat in profile; the posterior propodeal projections are short and unmodified; the body is without whitish markings. On the other hand, *Lustrina assamensis* cannot be confused with any *Cleptes* species. Perhaps a certain affinity could be found with *Cleptes asianus* species group, also distributed in the Oriental region (including *Cleptes asianus* Kimsey, 1987, *Cleptes humerosus* Móczár, 2000, *Cleptes thaiensis* Tsuneki, 1961, and *Cleptes taiwanus* Tsuneki, 1982) by pronotum with transverse basal pit row, without longitudinal, medial groove; metallic metasoma, and vestigial extended scrobal sulcus on mesopleuron.

Based on morphological characters, we agree with Móczár's (1996b) interpretation that *Lustrina* can be considered a separated genus, easily recognizable among other genera of the subfamily Cleptinae.

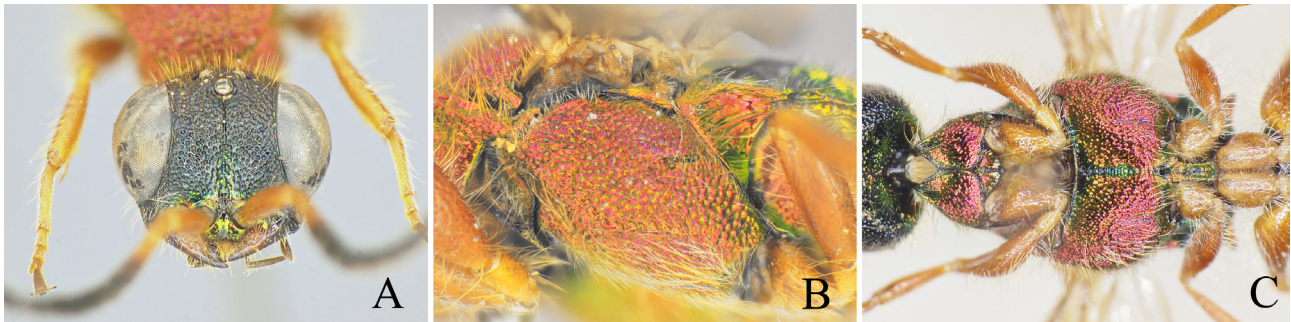


FIGURE 3. *Lustrina assamensis* Kurian. A) head, in frontal view; B) mesopleuron, lateral view; C) mesosoma, ventral view.

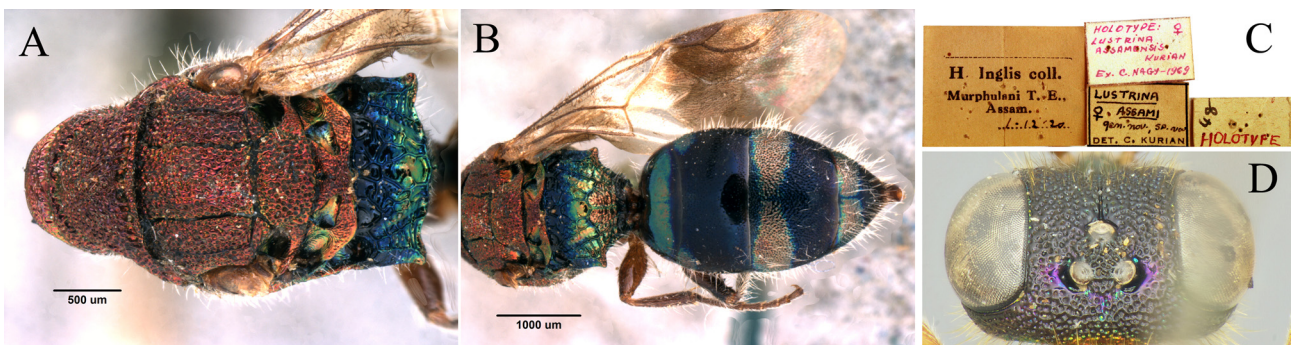


FIGURE 4. *Lustrina assamensis* Kurian, holotype, ♀. A) mesosoma, dorsal view; B) propodeum and metasoma, dorsal view. C) labels. *L. assamensis*, Vietnam, ♀, D) head, dorsal view.

*Cleptes* can be separated from *Lustrina* by following characters: tarsal claws with very minute sub-medial to sub-basal tooth; mesonotum with small, sparse and shallow punctures, usually with large polished interstices especially on mesoscutellum; wings hyaline, only exceptionally slightly darkened (*Cleptes semiauratus* (Linnaeus), ♀, and *Cleptes striatipleuris* Rosa, Forshage, Paukkunen & Soon, 2015, ♀); wing microtrichia short and thin; legs at least partially metallic; metasoma differently coloured, never banded with metallic colours. *Lustrina* shares with *Cleptes* the following morphological characters: head almost as wide as long or longer; eyes relatively small, following the head contour; anterior ocellus equal to or smaller than antennal foramen; metanotum flat or slightly convex in profile; posterior propodeal projections short; body without whitish markings. The propodeal posterior pit row is shared only with a few *Cleptes* species groups.

*Cleptidea* can be separated from *Lustrina* by following characters: head distinctly wider than high; eyes large, bulging; mid ocellus usually wider than antennal foramen; pronotum with deep, longitudinal, medial groove and deep basal pit row; metanotum variable, from weakly convex to strongly projecting and acute; posterior propodeal projections sharp, large and acute; tarsal claws with a broadened, subparallel subsidiary tooth; fore wing with one or two dark bands sometimes vanishing in *Cleptidea scutellaris* (Cameron) and *Cleptidea viridiceps* (Kieffer, 1911); in about one third of *Cleptidea* species the body has white markings; body colouration variable from entirely non-metallic brown and black (*Cleptidea xanthomelas* (Mocsáry, 1889)) to fully metallic with white markings (*Cleptidea magnifica* (Ducke, 1905)); in the majority of the species at least the scutellum is non-metallic reddish-brown.



We are aware that future systematic molecular analyses are necessary to validate the correct placement of this genus. Kimsey & Bohart (1991), based on morphological data, hypothesized that the subfamily Cleptinae is the sister group of all remaining Chrysididae. In the latest molecular study, Pauli *et al.* (2018) inferred the genus *Amisega* Cameron, 1888 (subfamily Amiseginae) as sister group of the remaining cuckoo wasps; their results also indicated the possible paraphyly of Amiseginae, and sister group relationship between *Adelphe* Mocsáry, 1890, included in Amiseginae, and *Cleptes* was strongly supported. Anyway, we should wait for results of further molecular studies including *Cleptidea* and *Lustrina* to prove the monophyly of the subfamily Cleptinae and relationships among its genera.

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