

A Revision of the Genus *Synona* (Coleoptera: Coccinellidae: Coccinellini)

Author(s) :J. Poorani, Adam Ślipiński and Roger G. Booth

Source: *Annales Zoologici*, 58(3):579-594. 2008.

Published By: Museum and Institute of Zoology, Polish Academy of Sciences

DOI: 10.3161/000345408X364427

URL: <http://www.bioone.org/doi/full/10.3161/000345408X364427>

BioOne (www.bioone.org) is a nonprofit, online aggregation of core research in the biological, ecological, and environmental sciences. BioOne provides a sustainable online platform for over 170 journals and books published by nonprofit societies, associations, museums, institutions, and presses.

Your use of this PDF, the BioOne Web site, and all posted and associated content indicates your acceptance of BioOne's Terms of Use, available at www.bioone.org/page/terms_of_use.

Usage of BioOne content is strictly limited to personal, educational, and non-commercial use. Commercial inquiries or rights and permissions requests should be directed to the individual publisher as copyright holder.

A REVISION OF THE GENUS *SYNONA* POPE, 1989 (COLEOPTERA: COCCINELLIDAE: COCCINELLINI)

J. POORANI¹, ADAM ŚLIPIŃSKI² and ROGER G. BOOTH³

¹Project Directorate of Biological Control, P.B. No. 2491, H.A. Farm Post,
Bellary Road, Bangalore 560 024, Karnataka, India; e-mail: pooranij@gmail.com

²CSIRO Entomology, GPO Box 1700, Canberra ACT 2601 Australia;
e-mail: Adam.Slipinski@csiro.au

³Department of Entomology, The Natural History Museum, Cromwell Road,
London SW7 5BD, UK; e-mail: r.booth@nhm.ac.uk

Abstract.— The genus *Synona* Pope (1989) (Coleoptera: Coccinellidae: Coccinellini) is revised, with particular reference to the Oriental and Australasian species complex widely identified as *S. melanaria* (Mulsant, 1850), the type species. It is concluded that the name *S. melanaria* ought to be applied to the species currently known as *S. seminigra* (Weise, 1902) and a lectotype is designated for *S. melanaria*. *Synona seminigra* (Weise, 1902) is synonymised with *S. melanaria* (**new synonym**). *Coccinella cassidoides* Montrouzier, 1857 (not *C. cassidoides* Donovan, 1798), and *Harmonia anthracina* Iablokoff-Khnzorian, 1982 are reduced to junior synonyms of *S. melanaria* (Mulsant, 1850) (**new synonyms**). *Synona melanopepla* (Mulsant, 1850), distributed in the Indian subcontinent and hitherto considered as a synonym of *S. melanaria*, is recognized as a valid species (**status revived**). *Synona rougeti* (Mulsant, 1866), *Lemnia melanopectera* Iablokoff-Khnzorian, 1978, and *Lemnia (Synia) martini* Iablokoff-Khnzorian, 1984 are synonymised with *S. melanopepla* (**new synonyms**). Three new species are described: *S. obscura* **sp. nov.** (India), *S. consanguinea* **sp. nov.** (China, Taiwan, Thailand, Vietnam), *S. philippinensis* **sp. nov.** (Philippines). A key to the species is provided, along with biological information wherever available. *Coelophora vidua* Mulsant, 1850 is synonymised with *Coelophora inaequalis* (Fabricius, 1775) (**new synonym**).



Key words.— Entomology, taxonomy, revision, Coccinellidae, Coccinellini, *Synona*, revision, new species, new synonyms, Oriental Region, Australian Region.

INTRODUCTION

The genus *Synona* Pope (1989) (Coccinellinae: Coccinellini) is distributed in the Oriental and Australasian regions. Pope (1989) proposed *Synona* as a replacement name for *Synia* Mulsant (1850) because the latter was preoccupied in Lepidoptera. It has close affinities with *Coelophora* Mulsant (1850), *Phrynocaria* Timberlake (1943) and other related genera. Iablokoff-Khnzorian (1982) and Fürsch (2007a, b) have regarded *Synona* as a subgenus of *Lemnia* Mulsant

(1850), which is considered to be synonymous with *Coelophora* by many authors. Pope's (1989) opinion that it is a distinct genus on account of the semi-circularly emarginate anterior clypeal border and genitalic differences is followed here. Pope (1989) provided a detailed description of the genus and the sole known Australian-New Guinean species, *S. seminigra* (Weise, 1902). Recently, Ślipiński (2007) has given a detailed description of the genus and the larva of *S. seminigra*.

All known species of *Synona* have a very characteristic external appearance, with a more or less

circular body outline, strongly convex and hemispherical dorsum, mostly yellow-orange head and pronotum with or without various degrees of black and fully black elytra. Significantly, nearly all species from the Australasian region are sexually dimorphic, with females having a darker head and pronotum than males which have a yellowish head. Most of the females from India, China, Taiwan, Vietnam and Thailand have a yellow head as in males and can be sexed externally only by examining the last two abdominal ventrites. Some females examined from the north-eastern region of India and Burma (Myanmar) are completely melanic and could not be definitively associated with any males.

External distinguishing characters for separating the species of *Synona* are very few, such as microsculpture on pronotum and elytra and marginal bead, which are of limited utility. The male genitalia need to be studied for reliably identifying the species. The intercoxal process of the first abdominal ventrite has a median sclerosis at the base in all the species – it varies from short and acutely pointed to very long and acutely pointed and at times somewhat blunt and poorly developed. It appears to be a useful character in identifying some species, but is not always constant.

At present, a great deal of uncertainty prevails over the identity of the type species, *S. melanaria* (Mulsant, 1850), though the name has been widely used. Originally described from “the East Indies”, it is reported to be widely distributed from India east to Taiwan and south to the Philippines (Iablokoff-Khnzorian, 1982; Pope, 1989). *Synona melanaria* was described as having a dark head, almost certainly a female, so interpreting this name has proved to be a big problem. Clearly a complex of species with similar appearance and distributed in different parts of the Oriental Region has been erroneously referred to as *S. melanaria* in the literature. For instance, *S. melanopepla* (Mulsant, 1850) and *S. rougeti* (Mulsant, 1866), both described from the Indian region as distinct species, have been subsequently regarded as mere colour variants of *S. melanaria* (Crotch, 1874). Our studies on *Synona* from the Oriental and Australasian regions indicate the need for redefining the existing species limits and are detailed in this paper.

The following abbreviations are used to indicate the museums/collections from which specimens, including types, were obtained for the study.

AM – Australian Museum, Sydney;

ANIC – Australian National Insect Collection, CSIRO, Canberra;

BMNH – The Natural History Museum, London;

BPBM – Bernice P. Bishop Museum, Honolulu;

DEI – Deutsches Entomologisches Institut, Eberswalde ;

IRSNB – Institut Royal des Sciences Naturelles de Belgique, Brussels;

KGC – Kumar Ghorpade’s Collection;

MNHN – Muséum National d’Histoire Naturelle, Paris;

MCZ – Museum of Comparative Zoology, Harvard University, Cambridge, Mass.;

NAQSM – Northern Australia Quarantine Strategy, AQIS, Mareeba;

NHMS – Naturhistorisches Museum, Stuttgart;

NHMW – Naturhistorisches Museum Wien, Vienna;

NPC – National Pusa Collection, Indian Agricultural Research Institute, New Delhi;

NTM – Northern Territory Museum, Darwin;

PDBC – Project Directorate of Biological Control, Bangalore;

QDPIB – Queensland Department of Primary Industries, Brisbane;

QDPIM – Queensland Department of Primary Industries, Mareeba;

SAM – South Australian Museum, Adelaide;

TMB – Természettudományi Múzeum, Budapest;

UCCC – University of Cambridge, Crotch Collection, Cambridge;

USNM – National Museum of Natural History, Washington DC;

ZMC – Zoological Museum, Copenhagen;

ZMHUB – Zoologisches Museum, Humboldt Universität, Berlin.

TAXONOMY

Synona Pope, 1989

Synia Mulsant, 1850: 375 (not Duponchel, 1845). Type species: *Synia melanaria* Mulsant, 1850, by subsequent designation of Crotch, 1874: 177. – Mulsant, 1866: 248; Crotch, 1874: 177; Korschefsky, 1932: 276; Timberlake, 1943: 56; Bielawski, 1964: 23; Iablokoff-Khnzorian, 1979: 74.

Lemnia (*Synia*): Iablokoff-Khnzorian, 1982: 232. – Fürsch, 2007a: 1–2; 2007b: 16.

Synona Pope, 1989: 660 (replacement name). – Fürsch, 2007b: 30. – Ślipiński, 2007: 179.

Diagnosis. Coccinellini of medium to large size (length 5.0–7.8 mm), form circular to broad oval, only slightly longer than broad, dorsum hemispherical and strongly convex (Figs 1–8). All known species with mostly yellow-orange head and pronotum with or without various degrees of black (sometimes sexually dimorphic), elytra completely black; occasionally more or less completely melanic; in general, females a little more strongly microsculptured than males and appear a little less shiny. Head (Fig. 9) with anterior clypeal margin distinctly and arcuately emarginate. Terminal maxillary palpomere (Fig. 10) securiform. Antenna (Fig. 11) short, about 1.5 times as long as head width, scape flattened and arcuate exteriorly, club three-segmented and compact, apical margin of terminal



Figures 1–8. Dorsal habitus of *Synope*: (1) *S. melanopepla* with pronotal marking; (2) *S. melanopepla* without pronotal marking; (3) *S. obscura*; (4) *S. melanaria*, typical form; (5, 6) *S. consanguinea*; (7) *S. melanaria*, atypical form; (8) *S. philippinensis*.

antennomere obliquely transverse. Elytra laterally narrowly explanate, with prominent marginal bead. Pronotal hypomera (Fig. 12) with conspicuous foveae on anterior inner corners; prosternal carinae (Fig. 12) present basally, reaching up to middle or beyond, into anterior half. Anterior margin of mesoventrite deeply emarginate medially (Fig. 13), posterior margin triangularly produced medially, fitting into medially emarginate anterior margin of metaventrite. Intercostal process of first abdominal ventrite (Fig. 14) with a distinct median scleritis, short or long and acutely pointed, rarely not prominent; abdominal postcoxal lines joined in middle, incomplete laterally, posteriorly very close to hind margin of ventrite, oblique dividing line close to or apparently fused with postcoxal line (Fig. 14). Posterior margin of ventrite 6 weakly arcuate and subtruncate in female and male, respectively. Elytral epipleuron (Fig. 16) broad, moderately to strongly reflexed, deeply foveolate on level with middle and hind legs; inner carina apically incomplete, reaching up to 5th abdominal ventrite. Mid- and hind tibiae with a pair of apical spurs; tarsal claws (Fig. 15) appendiculate, with a large basal tooth.

Geographic distribution. Oriental and Australasian regions (India, Sri Lanka, Bhutan, Burma, Thailand, Vietnam, Taiwan, China, Philippines, Indonesia, New Guinea, Solomon Islands, Australia).

Immature stages. Ślipiński (2007) has described in detail and keyed the fourth instar larva of *S. seminigra*. Afroze & Shujaiddin (1998) gave a general description of the immature stages of *S. melanaria* (?) from northern India.

Biology. The species of *Synona* have unusual and rather restricted feeding habits. Both *S. melanaria* auctt. and *S. seminigra* are known to feed on plataspid bugs (Hemiptera: Plataspididae) (Subramaniam 1924, Subramanyam 1925, Schilder and Schilder 1928, Puttarudriah and Channabasavanna 1953, Malhotra and Krishnaswami 1962, Pope 1989). The populations of *Coptosoma ostensum* Distant, a pest of *Butea monosperma* (Lam.) Taub. and several cultivated pulses such as lablab beans and pigeon pea, are kept in check under control by *Synona* spp. in south India (Subramanyam 1925, Malhotra and Krishnaswami 1962, Dejean *et al.* 2002, Rachappa *et al.* 2002). Both adults and larvae feed voraciously on the nymphs of *C. ostensum* and help to keep it under check (Malhotra and Krishnaswami, 1962; Rachappa *et al.*, 2002; Afroze and Shujaiddin, 1998). Data labels of specimens examined from India indicate that *Synona* species are also associated with other *Coptosoma* spp., *Megacopta cribraria* (F.) (= *Coptosoma cribraria* F.), and to some extent, other homopterous hosts such as aphids, psyllids, and scales. Monteith (2006) reported *S. melanaria* (as *S. seminigra*) preying upon nymphs of *Cumare pallida* Blote (Hemiptera: Tessarotomidae).

Key to the species of *Synona*

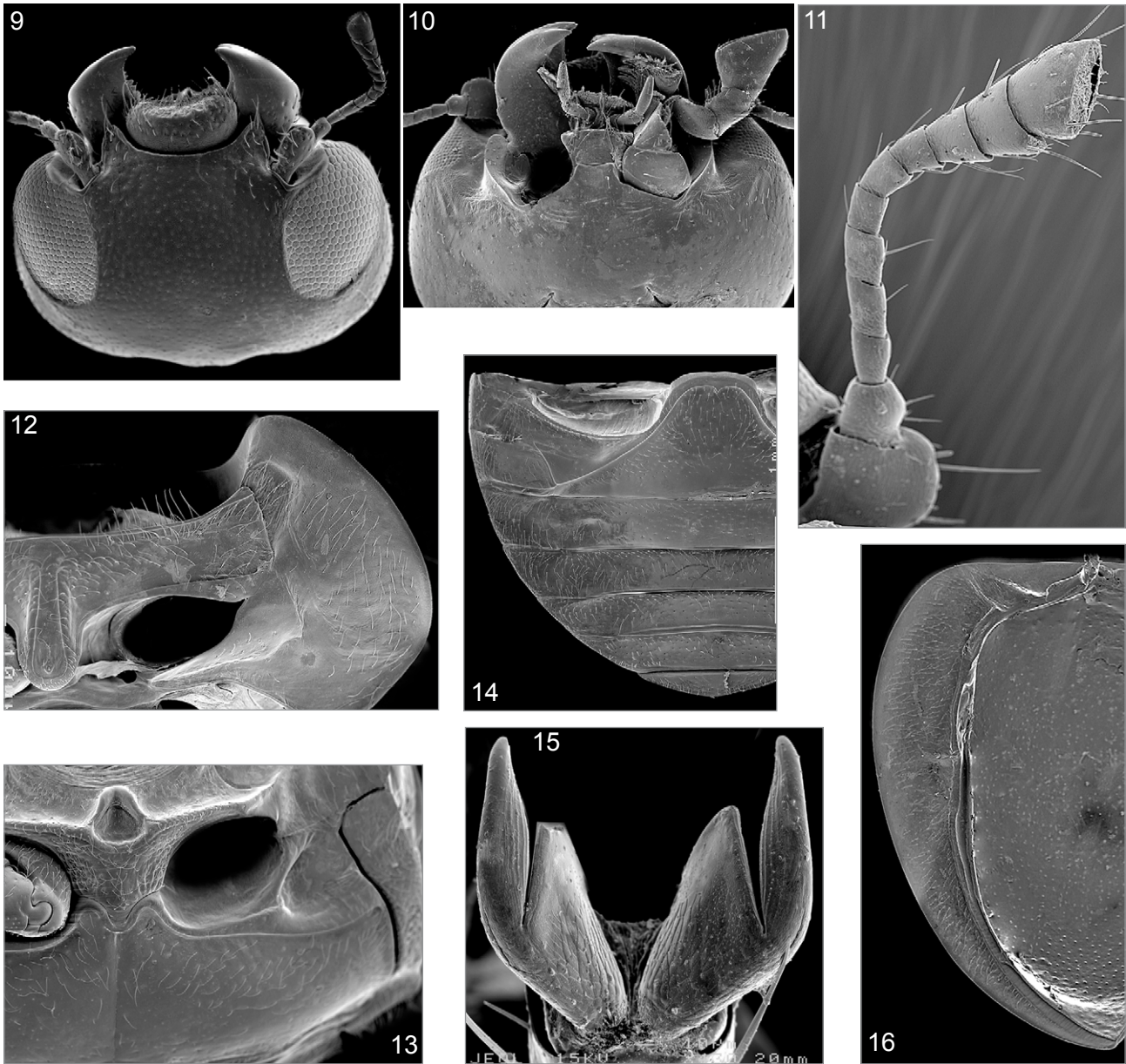
1. Head and pronotum partially black, elytra black . . . 2
 - Head and pronotum completely yellow-orange, elytra black 5
2. Head and pronotal colour sexually dimorphic, females darker than males 3
 - Head (frons only, not vertex behind eyes) and pronotum similar in both sexes, pronotum medially black 4
3. Male genitalia (Figs 34–38) as illustrated, membranous apical portion of penis (Fig. 38) always very long and sinuous, longer than siphonal capsule. Prosternal carinae short, usually not reaching beyond middle, apically strongly convergent and fused, appearing to be inverted Y-shaped. Head yellow in male, black in female, pronotum medially black, anterolateral angles yellow, elytra black. Interspaces between elytral punctures with deep microsculpture. Distributed in the Philippines *philippinensis* sp. nov.
 - Male genitalia as in Figs 26–33. Prosternal carinae and male genitalia variable *melanaria* (Mulsant) [part]
4. Elytral interspaces with deep and dense microsculpture; anterolateral areas of elytra with several coarse, deeply pitted punctures. Male genitalia (Figs 17–22) with penis guide very long, tubular and apically truncate in ventral view (Figs 18, 21), apically strongly arched and longer than parameres in lateral view (Figs 17, 20). Spermatheca (Figs 52, 53) with cornu having an apical flange. Distributed in northern and eastern India, Vietnam *melanopepla* (Mulsant) [part]
 - Elytral punctation more widely spaced on disk, somewhat dual on lateral sides but without distinct coarse punctures in anterolateral areas; interspaces with moderately deep microsculpture. Male genitalia (Figs 39–42) with penis guide uniformly wide for nearly 3/4 of its length, apically slightly narrowed to a broadly truncate apex in ventral view (Fig. 40). Female genitalia (Fig. 58) as illustrated. Distributed in Solomon Islands, the Philippines, Kei islands, Australia: Northern Territory *melanaria* (Mulsant) [part]
5. Body outline steeply domed and high in end-on view. Interspaces between elytral punctures with weak to shallow microsculpture and faint criss-crossing lines. Male genitalia (Figs 23–25) and spermatheca (Fig. 51) as illustrated. Commonly distributed in peninsular India *obscura* sp. nov.
 - Body outline less steeply domed in end-on view. Interspaces between elytral punctures with deeper, more distinct microsculpture. Male genitalia and spermatheca different 6

Male genitalia (Figs 17–22) with penis guide very long, tubular and apically truncate in ventral view (Figs 18, 21), apically strongly arched and longer than parameres in lateral view (Figs 17, 20). Spermatheca (Figs 52, 53) with cornu having an apical flange. Distributed in southern India
 *melanopepla* (Mulsant) [part]
 Male genitalia (Figs 43–46, 50) as illustrated, penis guide (Fig. 43, 44, 48) broadened in posterior half, apically produced into a short rounded projection. Distributed in China, Taiwan, Thailand and Vietnam *consanguinea* sp. nov.

Species of *Synopa* Pope

Synopa melanopepla (Mulsant) stat. rev.
 (Figs 1, 2, 17–22, 52, 53)

Synia melanopepla Mulsant, 1850: 376; 1866: 248. Type locality: “les Indes orientales”. – Crotch, 1874: 178 (as synonym of *S. melanaria*).
Synia melanaria ab. *melanopepla*: Korschefsky, 1932: 276.
Leis rougeti Mulsant, 1866: 175. Type locality: “les Indes”. – Crotch, 1874: 178 (as synonym of *S. melanaria*); Gordon, 1987: 22 (lectotype designation), **syn. nov.**
Synia melanaria ab. *rougeti*: Korschefsky, 1932: 276; Miwa and Yoshida, 1935; Bielawski, 1957: 88.



Figures 9–16. *S. melanaria*: (9) head, dorsal view; (10) head, ventral view; (11) antenna; (12) prothorax, ventral view; (13) meso- and meta-ventrites; (14) abdomen, postcoxal line; (15) tarsal claw; (16) elytral epipleuron.

Synia rougeti: Weise, 1923: 184; Miwa, 1931: 87.

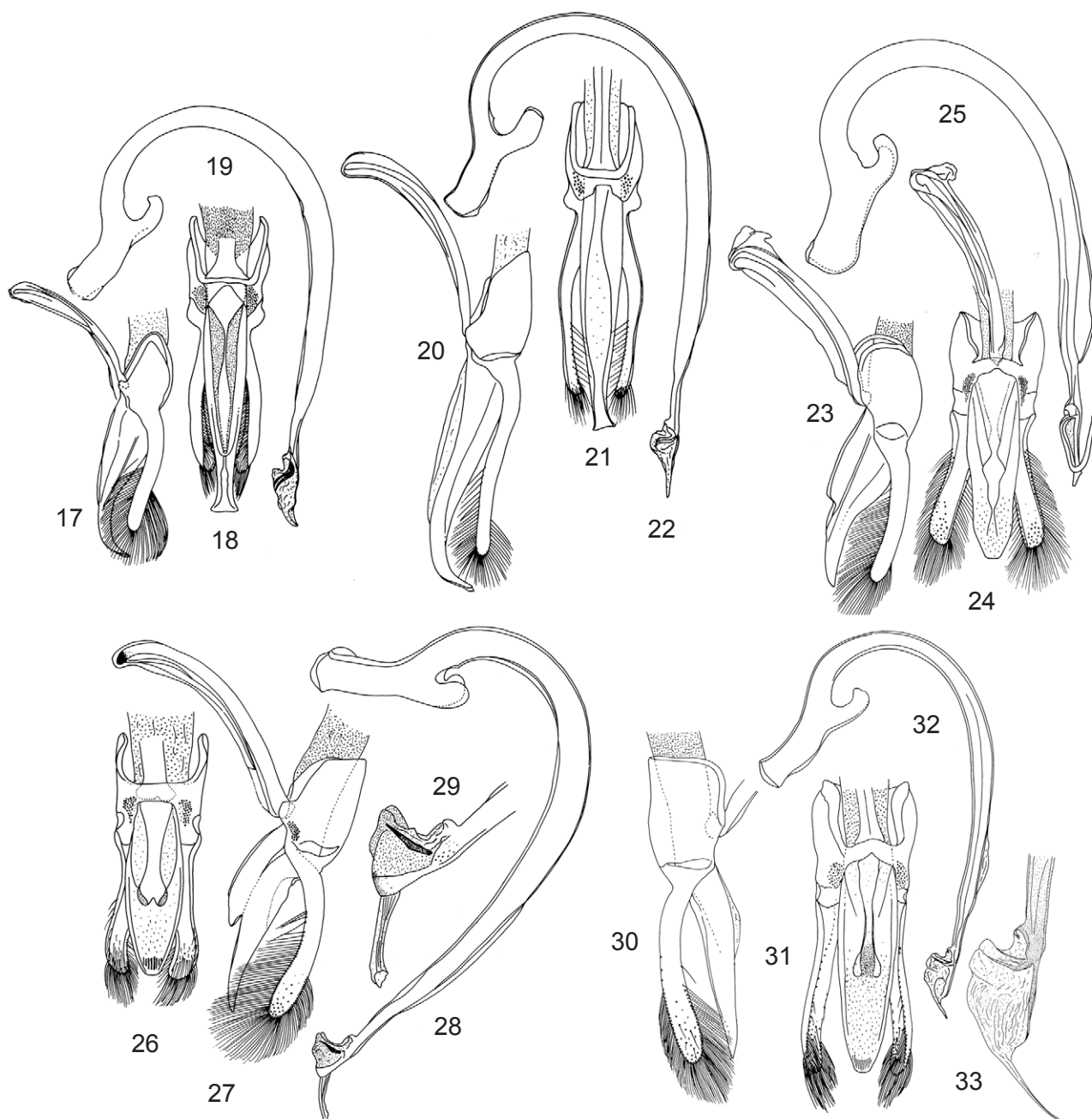
Lemnia melanoptera Iablokoff-Khnzorian, 1978: 180. Type locality: "Tonkin" (=Vietnam), *syn. nov.*

Lemnia (Synia) martini Iablokoff-Khnzorian, 1984: 205. Type locality: "Madras, Vellore", *syn. nov.*

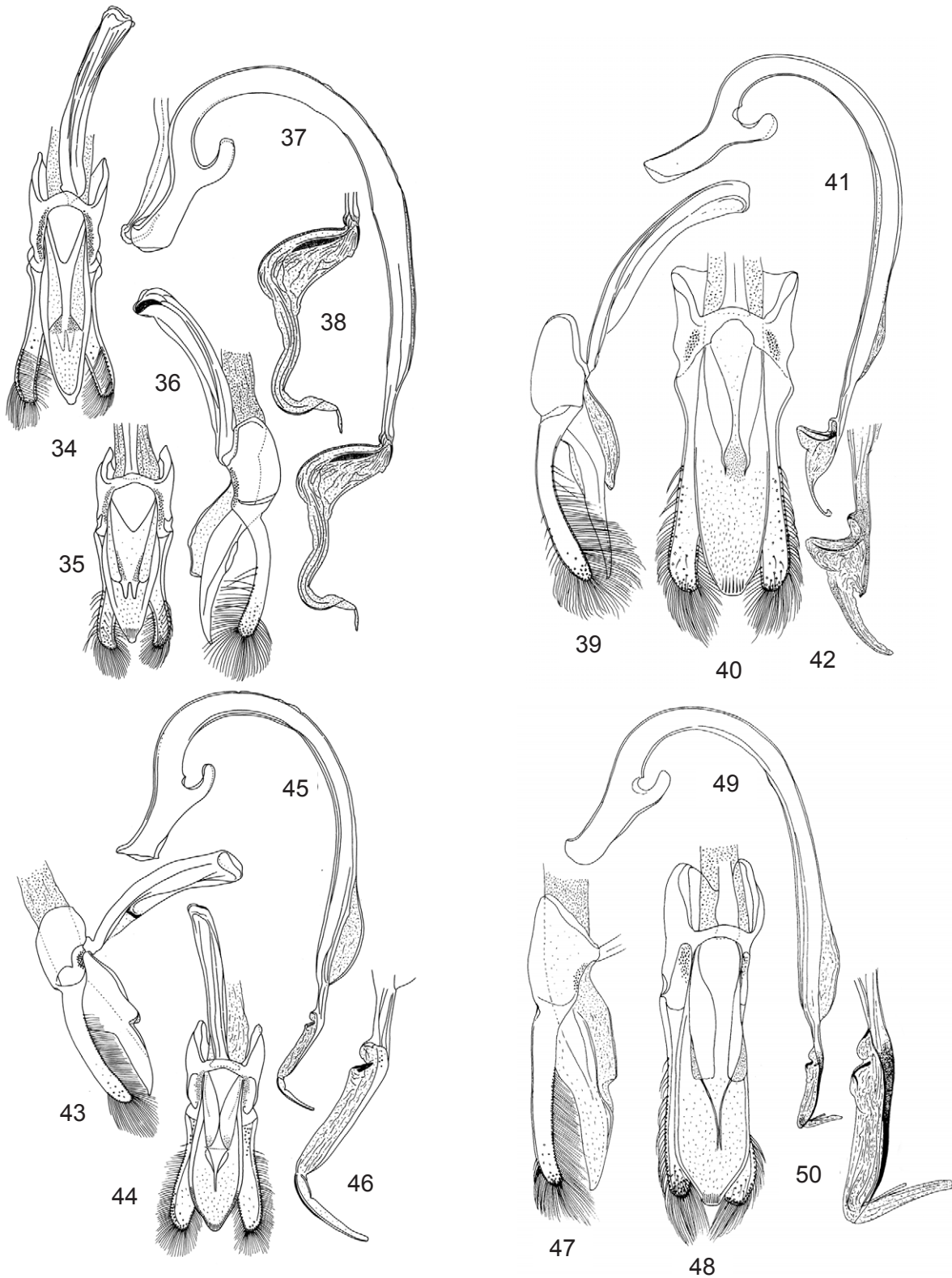
Diagnosis. The nominate form of this species can be readily distinguished by the median black marking on pronotum. The form with yellow pronotum is very

similar to *S. obscura* and can only be reliably separated by examining the male genitalia.

Description. Length: 6.9–7.6 mm; width: 5.9–6.4 mm. Body outline circular, very strongly hemispherical (Figs 1, 2). Head yellow, or with a pair of black markings on either side of posterior margin of eyes (in examples from northern and eastern India); pronotum uniform yellow-orange (in examples from peninsular



Figures 17–33. Male genitalia of *Synona*: (17–19) *S. melanopepla* with pronotal marking; (20–22) *S. melanopepla*, without pronotal marking; (23–25) *S. obscura*; (26–29) *S. melanaria* (Indonesia); (30–33) *S. melanaria* (Australia); (17, 20, 23, 27, 30) tegmen, lateral view; (18, 21, 24, 26, 31) tegmen, ventral view; (19, 22, 25, 28, 32) penis; (29, 33) apical part of penis.



Figures 34–50. Male genitalia of *Synopa*: (34–38) *S. philippinensis*; (39–42) *S. melanaria* (Solomon Islands); (43–46) *S. consanguinea* (China); (47–50) *S. consanguinea* (Thailand); (36, 39, 43, 47) tegmen, lateral view; (34, 35, 40, 44, 48) tegmen, ventral view; (37, 41, 45, 49) penis; (38, 42, 46, 50) apical part of penis.

India – Fig. 2), or with a median black marking (in examples from northern and eastern parts of India and Vietnam – Fig. 1), scutellum yellow, occasionally yellowish testaceous with a darker border or dark brown, elytra black. Ventral side more or less completely yellow-orange except elytral epipleura black, last antennomere darker, brownish. Head with interocular distance not more than twice eye width. Terminal antennomere wedge-shaped, apical margin very steeply and obliquely truncate. Pronotal punctures large and dense, interspaces between punctures conspicuously microreticulate. Elytral punctures finer, more widely spaced than those on pronotum, deeply impressed, interspaces between punctures with microsculpture clearly visible at low magnification, apparently stronger in females than males, punctures distinctly coarser towards lateral margins, anterolateral margins with denser, deeply pitted, coarse punctures, somewhat dual on areas adjacent to marginal bead; marginal bead rather narrow. Prosternal intercoxal process with carinae reaching up to or beyond middle of prosternum, variable from subparallel to distinctly convergent anteriorly. Median sclerosis on first abdominal ventrite usually very short and acutely pointed, very rarely longer. Male genitalia (Figs 17–22) as illustrated, penis guide apically strongly arched towards parameres in lateral view (Figs 17, 20), apex truncate in ventral view (Figs 18, 21). Spermatheca (Figs 52, 53) with cornu having a hook-like apical flange or projection, infundibulum present, only slightly sclerotized.

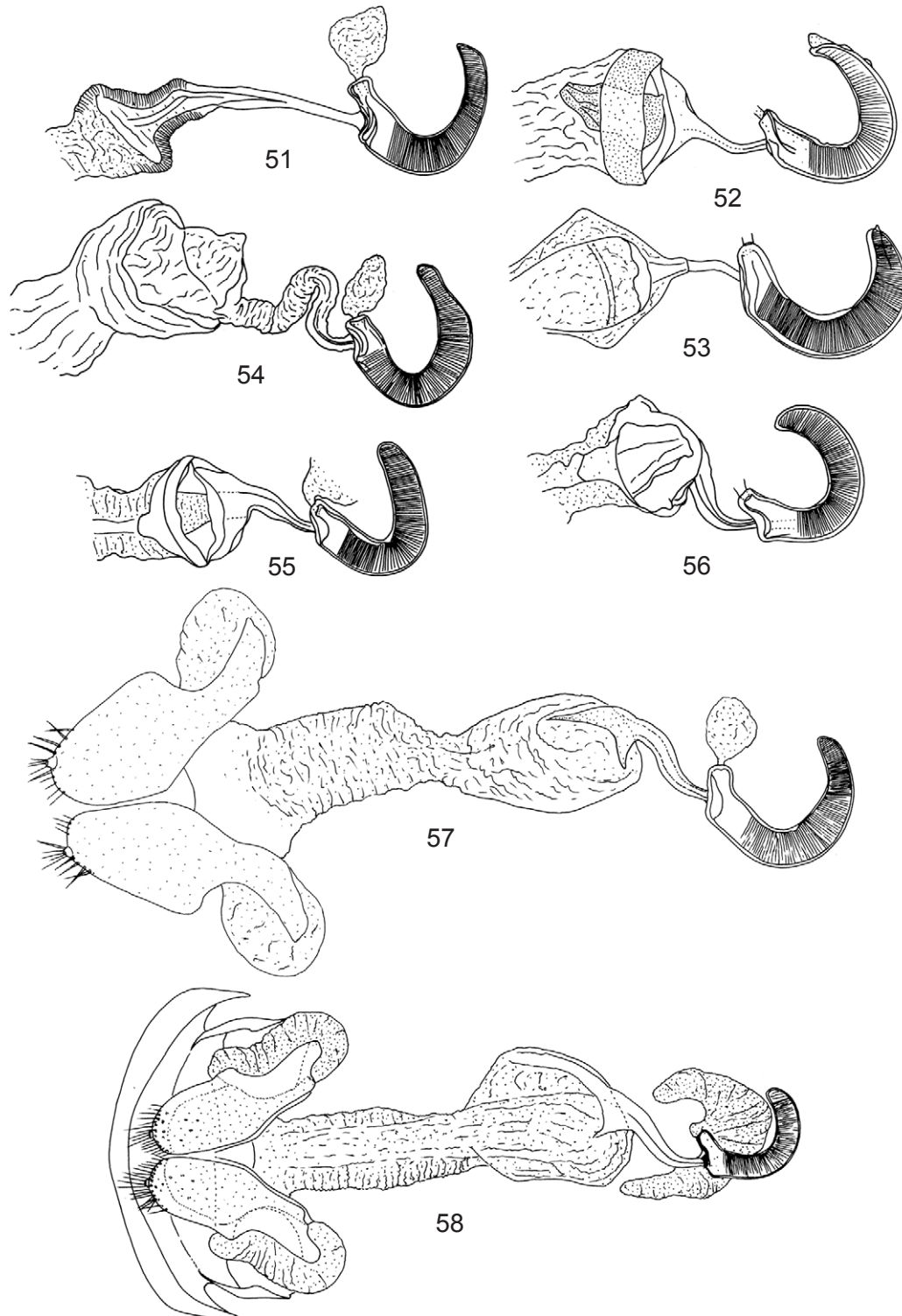
Types. *Lemnia melanopectera*: “Tonkin, Montes Mauson April–Mai 2–3000’ H. Fruhstorfer/Lemnia melanopectera Holotypus 1978 Khnz. (red handwritten label)” (ZMHUB, holotype male). *Leis rougeti*: “TYPE [printed on blue paper]/Rougeti Ind.or. Deyr [Crotch handwriting]/TYPE. [printed] Rougeti Deyr. [Crotch handwriting]/LECTOTYPE Leis rougeti Muls 1866 Gordon 1987” (UCCC, lectotype male, dissected by RGB).

Other specimens examined: *Synia melanopectera*: “melanopectera Ind. or: Deyr [Crotch handwriting]” (UCCC, male; not type specimen). **INDIA:** Tamil Nadu: Kodaikanal, 5.iv.[19]91, C. Durairaj, Sl. no. 3, pred. on psyllids on *Ficus* sp., IIE 22207, 2 males, 1 female, 1 unsexed (BMNH); Karnataka: Magadi, 9.ix.1988, on *Coptosoma cribraria*, C.A.Viraktamath, 1 male (PDBC); Bangalore, 916 m, vii.1971, K.Ghorpade, On *Butea monosperma*, 3 ex. (KGC); Bangalore, 22.iv.1979, K.D. Ghorpade, On cashew leaf, 4 ex. (KGC); Orissa: Satpara, Korschefsky Collection 1952, 1 male (USNM); Tangail, 10.i.1946, M. Bose, 1 male, 1 ex on champak (PDBC); Pusa, Bihar, 7.vii.1925, predacious on pentatomid on palas, 1 female (NPC); India, Bowring 63.47*, without other data, 1 female (dark centre to pronotum) (BMNH); Assam, Shillong, vi.1945, Beating bushes, J. Unyal / G.H.Dieke Coll’n, 1965, 3 ex. (USNM);

Garo Hills, Assam, 1200–1500’, 15.vi–vii.17, S.Kemp/ Korschefsky Collection 1952, 1 ex. (USNM).

Notes. A single male specimen of *S. melanopectera* and the male lectotype of *S. rougeti* from the Crotch collection examined by RGB were found to be identical except for the absence of the black pronotal marking in the latter. The lectotype of *S. rougeti* is clearly identical to *S. martini*, though the illustrations provided by Iablokoff-Khinzorian (1984) are very poor. We synonymise *S. rougeti* and *S. martini* with *S. melanopectera* as they differ from each other only marginally. *S. melanopectera* has a median black marking on pronotum and the scutellum is completely yellow in some examples. It appears to be restricted to the northern and north-eastern parts of India. The *martini/rougeti* forms have a more or less uniform yellow pronotum and almost all the specimens examined were collected from peninsular India. The antenna and the marginal beading of the elytra appear to be the same in both. However, the base of the head in female *S. melanopectera* is black, or at least with two dark marks on either side. The pale *S. rougeti* specimens have a very slightly dusky central pronotal area corresponding to the dark area of *S. melanopectera*. Further, there are some slight differences in male genitalia – in *S. rougeti/S. martini* (Figs 20–22), the parameres are slightly longer and narrower and the apex more flanged, but the penis apex appears to be similar. In the typical *S. melanopectera*, the cornu of spermatheca (Fig. 52) has a slightly more pronounced apical flange (projection), but that may be an artefact depending on preparation methods. However, the type of *S. rougeti* lay within the range of variation exhibited by other forms. The median sclerosis on abdominal ventrite 1 is very short and acutely pointed and appears to be more or less constant, with only one female specimen examined having a very long and pointed sclerosis. There are few other good characters to separate them apart from pronotal colour and the geographical separation. Lal and Kanakavalli (1960) illustrated the genitalia of this species from northern India as those of *S. melanaria*.

Lemnia melanopectera Iablokoff-Khinzorian (1978), described from Vietnam, is another new junior synonym of *S. melanopectera* as the holotype male has identical genitalia. The holotype of *L. melanopectera* is externally similar to *S. melanopectera* with a black pronotal marking, but has weaker microsculpture on pronotum and elytra compared to the examples from India. The median sclerosis on abdominal ventrite 1 is very long, extending beyond the hind coxal cavities and acutely pointed. de Gunst (1957) recorded *S. melanopectera* as an aberration of *S. melanaria* from Indonesia, but similar looking females examined from the Philippines and Solomon Islands belong to a different species described elsewhere in this paper.



Figures 51–58. Female genitalia of *Synopa*: (51) *S. obscura*; (52–53) *S. melanopepla*; (54) *S. philippinensis*; (55–56) *S. consanguinea*; (57) *S. melanaria* (lectotype female); (58) *S. melanaria* (Solomon Islands).

Biology. Feeds on unnamed psyllids on *Ficus* sp., *C. ostensum*, *Megacopta cribraria* (F.), and pentatomids (label data).

Distribution. India: Assam; Bihar; Karnataka; Meghalaya; Orissa; Tamil Nadu; Uttar Pradesh. Vietnam.

Synona obscura sp. nov.
(Figs 3, 23–25, 51)

Synia rougeti auctt.

Synia melanaria ab. *rougeti* auctt.

Etymology. The species name is in reference to the fact that it has remained so far unrecognised as a distinct species, though commonly collected.

Diagnosis. *S. melanopepla* and *S. obscura* are partially sympatric in South India, though the former is apparently rarer and collected in much fewer numbers. *S. obscura* can be easily distinguished from *S. melanopepla* by the following characters: (i) body outline, particularly elytra, broader, nearly as broad as long (larger and slightly more elongate in outline in *S. melanopepla*); (ii) eyes smaller, with interocular distance a little more than twice the eye width; (iii) elytra with distinctly broader marginal bead, disk less deeply impressed, interspaces between punctures with shallow, faint microsculpture not clearly visible at low magnifications; (iv) last antennomere transverse with apical margin much less strongly and steeply oblique than that in *S. melanopepla*; (v) elytral epipleura distinctly broader, more strongly and steeply descending externally, and (vi) the male and female genitalia, which are diagnostic.

Description. Length: 5.1–6.8 mm; width: 4.7–6.3 mm. Body outline broad, subcircular, not much longer than broad, widest around middle of elytra. Head and pronotum uniformly bright yellow-orange, elytra black (Fig. 3). Ventral side more or less completely yellow-orange, except elytral epipleura black. Head with inner ocular margins anteriorly divergent, interocular distance slightly more than twice as wide as an eye. Antenna with apical margin of last segment obliquely truncate. Pronotum densely punctate, interspaces between punctures with reticulate microsculpture. Elytral punctures finer than those on pronotum, interspaces with shallow, somewhat faint microsculpture and faint criss-crossing lines; in older specimens microsculpture indistinct or obliterated; punctures on anterolateral margins distinctly coarser and deeply pitted, more deeply impressed and dual adjacent to marginal bead, marginal bead distinctly broader and flatter than in *S. melanopepla*. Prosternal carinae reaching up to 3/4 of prosternum, subparallel. Elytral epipleura broad, externally very steeply descending.

Male genitalia (Figs 23–25) with penis guide subequal to parameres and apically pointed in lateral view (Fig. 23), cylindrical and gradually narrowed towards posterior, apex truncate in ventral view (Fig. 24); penis (Fig. 25) as illustrated. Spermatheca as in Fig. 51, infundibulum moderately to very slightly sclerotized.

Types. Holotype female: INDIA: Bangalore, 5.xi.2000, feeding on indeterminate aphids on pigeon pea, L. Lakshmi (PDBC). Paratypes: Bangalore, 8.vi.56, feeding on aphids on cabbage, V.P.Rao/*S. melanaria* ab. *rougeti* Muls., A.P.Kapur det. (NPC, 1 female); Bangalore, Hessaraghatta, 4.x.97, on lablab, Sunil Joshi (1, BMNH). Madras: Coimbatore, 420 m, 21.vii.1953, P.S. Nathan (BPBM, 1 male); Nilgiri Hills: H.L. Andrewes, Andrewes Bequest, BM 1922-221/*Synia melanopepla* Muls. [Andrewes handwriting] (BMNH, 1 male, dissected); Madras: Singera, 3400 ft, v.1948, Nathan for Gressitt (BPBM, 1 male); Kerala: Parli, S. Malabar, 6–20 June 15, C.N. coll./*Synia melanaria* Muls. ab. *rougeti* Muls., Det. G.E. Bryant (BMNH, 1 ex.); Karnataka: Magadi, 9.ix.1988, C.A. Viraktamath, Prey: *Coptosoma cribraria*, (PDBC, 1 male).

Other specimens examined. Bangalore, 5.xi.2000, feeding on indeterminate aphids on pigeon pea, L. Lakshmi, 1 ex. (PDBC); India Malabar/Fry Coll. 1905-100/Rougeti M [Crotch handwriting], (BMNH, 1 ex.); Bangalore, IHR, 22.v.1979, Clement Peter, on dolichos aphids (PDBC); Bangalore, iii.1962, CIBC-IS, found resting on cotton, 1 ex. (PDBC); Bangalore, ix.2004, ex pupa on subabul, Sunil Joshi, 1 male (PDBC); Tamil Nadu: Coimbatore, 15.ix.28, T.V.S., pred. on *Coptosoma ostensum* on *Butea*, 1 ♂; with same data except date 12.ix.28, 1 ♀; Coimbatore, v.1931, Kylasam, pred. on *Coptosoma cribraria* nymphs on lablab, 1 ♂; 8.x.23, T.V.S. coll., feeding on *Coptosoma* on *Butea* leaves, 1 ♀; Coimbatore, 9.12.30, BRP coll. (damaged) (PDBC); Karnataka: Magadi, 9.ix.1988, C.A. Viraktamath, Prey: *Coptosoma cribraria*, 2 ex. (PDBC); Bangalore, 916 m, 22.iv.1979, K.D. Ghorpade, on cashew leaf (aestivating?), 1 ex. (KGC); Bangalore, ii. 1979, K.D. Ghorpade, Ex. Gliricidia with *Aphis craccivora*, 1 ex. (KGC); Bangalore, ix.1970, K. Ghorpade, On guava tree with *Coccus viridis*, 1 ex. (KGC); Bangalore, viii.1969, Ex. *Butea monosperma* with *Coptosoma ostensum*, K. Ghorpade, 1 ex. (KGC); Bangalore: UAS campus, Hebbal, viii.1968, K.D. Ghorpade, On Palas infested with *Coptosoma* sp., 2 ex. (KGC).

Notes. This is the most commonly distributed species of the genus in India, particularly in the peninsular region, but it has been hitherto widely misidentified as *S. melanaria* ab. *rougeti*. Only a single male from northern India was examined in the study. It is described and named as a new species, as our studies on the type material of the true *S. rougeti* have indicated that it is distinct. Bielawski (1957) illustrated the female genital plate of *S. melanaria* f. *rougeti* from

Sri Lanka, which may belong to this species. Two females from Sri Lanka examined by RGB in BMNH with red pronota, but narrow elytral marginal bead, do not seem to belong to either *S. obscura* or *S. melanopepla*.

Biology. This species is commonly associated with *Coptosoma ostensum* Distant and *Megacopta cribraria* (Fabricius) infesting *B. monosperma* ('Palas'), lablab, pigeon pea, *Sesbania grandiflora* (L.) Pers., etc. Specimens have also been collected on sandal, snakegourd, cabbage, cashew, and *Trewia* sp., some in association with aphids and scales (label data). Malhotra and Krishnaswami (1962) and Rachappa *et al.* (2002) studied its biology in detail (both as *S. melanaria*). Most of the earlier records of *S. melanaria* from South India probably involve this species. The larvae are occasionally parasitized in the field by *Nothoserphus mirabilis* Brues (Hymenoptera: Proctotrupidae) and *Homalotylus flaminus* (Dalman) (Hymenoptera: Encyrtidae).

Distribution. India: Karnataka, Kerala, Tamil Nadu.

Synovia melanaria (Mulsant)
(Figs 4, 7, 26–33, 39–42, 57, 58)

Synovia melanaria Mulsant, 1850: 375. Type locality: "les Indes orientales". – Crotch, 1874: 178; Korschefsky, 1932: 276; Mader, 1934: 317.

Lemnia (Synovia) melanaria: Iablokoff-Khnzorian, 1982: 232.

Lemnia melanaria: Pang *et al.*, 2004: 46.

Coelophora seminigra Weise, 1902: 501. Type locality: New Guinea. – Korschefsky, 1932: 296, **syn. nov.**

Synovia seminigra: Bielawski, 1964: 24.

Lemnia (Synovia) seminigra: Iablokoff-Khnzorian, 1982: 232.

Synovia seminigra: Pope, 1989: 661.

Coccinella cassidoides Montrouzier, 1857: 77. Type locality: Woodlark Island, New Guinea. – Crotch, 1874: 48, 177; Korschefsky, 1932: 276, **syn. nov.**

Harmonia anthracina Iablokoff-Khnzorian, 1982: 474. Type locality: New Guinea, **syn. nov.**

Diagnosis. Male genitalia are the only reliable characters that can be used to distinguish this widely distributed and variable species from its congeners. See also *S. philippinensis*.

Description. Length: 5.2–6.5 mm; width: 3.6–6.0 mm.

Male. Body outline subcircular, dorsum strongly hemispherical and convex. In typical form (Fig. 4) head yellow, pronotum black except anterolateral areas yellow, elytra black. Atypical examples from Solomon Islands (Fig. 7) have head reddish-testaceous; pronotum reddish-testaceous with a large subtrapezoidal median black marking on posterior margin, slightly short of touching anterior margin; scutellum and elytra black. Ventral side more or less completely yellowish, except mesosternal episternum and epimeron brighter, luteous yellow; prosternum and pronotal hypomera

(except for anterolateral corners) dark pitchy brown. Head densely and uniformly punctate, punctures very shallowly impressed, separated by 0.5–2 diameters, interspaces between punctures very strongly microreticulate. Pronotum with slightly finer punctation than head on disk, shallowly impressed, widely separated by 2–6 diameters, much coarser and deeply impressed on lateral sides, particularly so on anterolateral corners; interspaces strongly microreticulate. Elytra with punctures on disk slightly finer, much more deeply impressed than those on pronotum, separated by 4–6 diameters, slightly more deeply impressed on sides; lateral sides particularly around marginal bead and anterolateral areas with deep, irregularly coarse punctures, marginal bead with a series of elongate, fine pits arranged in irregular rows; interspaces between elytral punctures with distinct, deep microsculpture, appearing to form a pattern of criss-crossing lines. Prosternal intercoxal process with carinae variable, reaching middle or much beyond, convergent towards anterior. Mesoventrite with anterior margin medially deeply emarginate. Epipleura deeply foveolate on level with middle and hind legs. Abdominal ventrite 1 with a very long median sclerosis; postcoxal line incomplete with an oblique lateral line. Ventrite 5 very shallowly and broadly emarginated, 6 subtruncate to very weakly arcuate. Male genitalia (Figs 26–29, 33; 39–42) as illustrated.

Female. Head black except inner margins of eyes narrowly yellowish, clypeal margin testaceous; pronotum black, anterolateral margins very narrowly yellowish; in atypical examples from Solomon Islands, female is externally similar to male. Female genitalia (Figs 57–58) as illustrated.

Types. *Synovia melanaria*: "Ost. Ind., Schaum/ Coll. Haag/ Syntypus/Synovia Mls/melanaria sp. Mls/Coll. DEI Müncheberg/Synovia melanaria Muls., female" (DEI, lectotype female, here designated to stabilize the taxonomic status of this species).

Coccinella cassidoides: "Coll. R.I. Sc. N.B. C. cassidoides [m] Synovia melanaria, Colln? I. Woodlark/Coll. R.I. Sc. N.B. Ile Woodlark Entrecasteaux 1847–1852 R.P. Montrouzier/Epilachna cassidoides Montr./Type [pink label]/Synovia seminigra (Wse) ♀, J. Chazeau det. 1976", abdomen and female genitalia dissected and mounted on card (IRSNB, lectotype female, here designated to stabilize the taxonomic status of this species).

Coelophora seminigra: "N. Guinea Fenichel/Austrolabe Bay, Stephansort/Holotypus 1902 Coelophora seminigra Weise (red bordered label)/ Term. Füz. XXV, 1902, p. 501/Lemnia seminigra Wse. Khnzorian det.", abdomen and male genitalia dissected and mounted on card (TMB, lectotype female, designated by Bielawski 1964: 25, as Typus) [see Pope, 1989: 661].

Harmonia anthracina: "New Guinea, Wau, 1300 m, 7.III.1968/J. & M. Sedlacek collectors, Bishop/

K-I. 144/Holotypus *Harmonia anthracina* Khnz. (red label)/*Harmonia anthracina* Khn. Khnzorian det. (BPBM, holotype male).

Other specimens examined. AUSTRALIA: Pascoe Coll. 93-60 (BMNH); Queensland: Cooloola, 5.x.1979, G. Kuschel (DSIR); Simson, Fry Coll. (BMNH); Lockhart River, Cape York, 8.iv.1992, J.F. Grimshaw/JFG 1027 (NAQSM); Iron Range NP, 13.v.1974, M. Walford-Huggins (BMNH); Iron Range, 13.v.1971, J.G. Brooks, at light (BMNH); Southedge, via Mareeba, 7-8.iv.1976, R. Storey at light, 1 male (QDPIB); Hammer Creek, Riverina forest, iv.1993, R.&J. Spencer (ANIC); 13 km W of Ravenshoe, Mt. Garnet Road, 2.v.1967, D. Colles (ANIC); 8 km SW Kuranda, 30.iii.1984, A. Calder, T. Weir (ANIC); Bowen, Townsville, 14.iii.1965, Exp. De F. Balogh/L. seminigra Weise Det. Khnzorian, 1 female (TMB); Bowen, Hagens & T.J. Hawkeswood on *Ficus* leaves, 2 males (QDPIB); Murray Isl., Torres Strait, H.L. Clark, 1 female (ANIC); Thursday Is., Torres Strait, 21.iv.1996, J.F. Grimshaw/JFG 2848A, ex. *Centrosema pubescens*, 1 male (NAQSM). Auburn River NP via Mundubbera, 17-19.iv.1987, on *Petalostigma pubescens*, predator of *Cumare* nymphs Tesseractomidae, GB. Monteith (QDPIB). Northern Territory: Darwin East Pt. Res. 26.xi.1980, M.B. Malipatil (BMNH, NTM). SOLOMON ISLANDS: NW Malaita, Dala, 8.vi.1964, R. Staatman Collector (BPBM). Paratypes: Buka Agric. Sta., 6-10.xii.1959, T.C. Maa Collector (1, BPBM); Guadalcanal, 29 km SE Honiara, Nalimbu R., 5.vi.1960, C.W. O'Brien (1, BPBM); Guadalcanal, Langa River (Mootb.), 26.v.1944, M.F. Milliron (1, BPBM). Guadalcanal, 12-20 or 1-20, J.A. Kusche Coll., Collection of M.W. Giffard (BPBM); Guadalcanal, Kukum, 16.ii.1964, M. McQuillan (BMNH); Guadalcanal, Tenaru, 30.viii.1956, E.S. Brown (BMNH); N end Bougainville, 14.iv.1956, J.L. Gressitt (1, BPBM). PAPUA NEW GUINEA: LAE, 19.3.1972/ H. Ohlmus collector, 1 male (ANIC); Kokoda, 1200 ft, ix.1933, L.E. Cheesman (BMNH); Kerema Govt. Stn, Gulf Distr., 6.v.1959, on *Catanus catan*, J. Szent-Ivany, A. Catley (BMNH); Magada PTN, Madang Dist., 18.x.1958, on Casava, J. Szent-Ivany (BMNH); Tapini, 1000-1100 m, 18.v.1961/ J.L.&M. Gressitt collectors, 1 male (BPBM); Feramin, 1450m/ Abid Beg Mirza collector, 1 male (BPBM); Wau, 1200m, 3.8.1973/ on Moraceae: *Ficus septica* Burm.f./ Renf collector, Wau Ecol. I./ K-1144, 1 male (BPBM); Wau, Morobe Distr., 1200-1300 m, 7.v.63/ J.M. Sedlacek collector, 1 male (BPBM); Wau, 1100-1200 m, v.1968/ N.L.H. Krauss collector, 2 females (BPBM); Koitaki, 1500 ft, Oct.-Nov.1928/ Pemberton coll., 1 female; Western Distr., Oriomo R., 3 m, 6.VIII.1964/ H. Clissold collector, 1 female (BPBM); Huon Peninsula, Finschhafen, 20-150m, 15.IV.1963/ J. Sedlacek, 1 female (BPBM); Popondetta Dist., Jumbora, 19.IX.-15.X.1963/ P. Shanahan collector, 1 female (BPBM); Popondetta, 25 m,

vi.66/ Shanahan-Lippert light trap, 1 female (BPBM); Popondetta, 60m, 3-4.IX.1963/ J. Sedlacek, 1 female (BPBM); Yule Island/ L. seminigra Weise, Det. Khnzorian, 1 female (TMB); N.Guinea Papua/ L. seminigra Wse. Det. Khnzorian, 1 female (TMB); "India Or" [mislabelled?]/ Lemnia seminigra Wse. Khnzorian det., 1 male (TMB); Idenburg Riv., xi.1920, W.Heurn (DEI). Mt Lamington, 1300-1500 feet, C.T. McNamara (SAM). INDONESIA: Irian Jaya, Nabire Kali Bobo, 100 m, ix.1990, Balke & Hendrich (NHMW). Buitenzorg, Java 4.10.09/ Bryant & Palmer Coll./ Synia melanaria Muls., ?Weise det., 3 ex (USNM); Java: Buitenzorg, 1906-1907, T. Barbour, 1 male, 1 female (BMNH); Buitenzorg, 1931, G.L. Windred, 1 female, 4 males (USNM); same locality, x.09, Bryant & Palmer coll. (MCZ). Burma: Tenasserim, Papun, Adamson's Coll., 1 female (BMNH).

Notes. The identity of *S. melanaria*, the type species, has to be settled based on available evidence as the syntypes we have managed to locate and examine have all turned out to be females, as suggested by the original description, and proved inconclusive in establishing the species identity beyond doubt. A female, identified as *S. melanaria* in the Crotch collection, examined by RGB, has a black head and fits the original description, and is labelled "melanaria Deyr." and hence cannot be a syntype, but it has a relatively long sperm duct between bursa and spermatheca. Its prosternal carinae suggest that it is an example of *S. philippinensis* sp. n., from the Philippines, described elsewhere in this paper. A male from the Crotch collection, again not a syntype, was found to fit the original description of *melanaria*, except for the yellowish head, with the genitalia very close to those figured by Pope (1989) for *S. seminigra*. The specimen is labelled "Madr." [presumably Madras] in ink on the top side and printed below on the underside is "Bouc.". Iablokoff-Khnzorian (1982) mentions that he examined a male of *S. seminigra* from India (labelled as Ind. Orient.) in the Budapest Museum (also examined by us), which appears to be a case of mislabelling.

The only species fitting the original description of *S. melanaria* are *S. seminigra* and *S. philippinensis* sp. n., described in this paper. The original locality data for *S. melanaria*, "les Indes orientales", points to the East Indies, i.e., the western part of Indonesia. The female syntype from DEI is more or less identical to a female from Java. It has almost completely black dorsum except for a narrow area adjacent to the inner margins of eyes and the anterior margin of pronotum. There are conspecific males for this species, which are similar to *S. seminigra* and *S. anthracina*, which would mean we have to synonymise all these with *S. melanaria*. Another female from New Guinea, identified by Sicard in DEI material, is identical to this syntype.

Therefore, it is concluded that the name *S. melanaria* ought to be applied to the species currently known as *S. seminigra*. We designate the syntype female from DEI as lectotype to clarify the identity and type locality of *S. melanaria* (**lectotype designation**). The name *melanaria* was probably applied wrongly in the past to species with a red pronotum following the fact that Crotch (1874) synonymised all the names under *S. melanaria*.

Coccinella cassidoides Montrouzier (1857), originally described from Woodlark Island (Papua New Guinea) and later synonymised by Crotch (1874) with *S. melanaria*, is here confirmed to be a senior synonym of *S. melanaria* as the female type of *S. cassidoides* (ISNB, examined) is identical with *S. melanaria*. However, *Coccinella cassidoides* Montrouzier is preoccupied by *C. cassidoides* Donovan (1798: 74) and is therefore not available because it is a junior primary homonym. Donovan's species name is spelt as *C. cassidoides* (in the index, p.607) and *C. cassidoides* (p. 258) by Korschefsky (1932), but the original spelling in the text is *C. cassidoides*.

Harmonia anthracina Iablokoff-Khinzorian (1982) is also synonymised with *S. melanaria* as the male genitalia of the holotype (examined) were found to be identical to those of *S. melanaria*.

Geographical variation. The populations from Solomon Islands and Northern Territory are similar to typical specimens of *S. melanopepla* in having a median pronotal marking and showing no sexual dimorphism in head and pronotal colour. Besides, the elytral punctation is more widely spaced on disk and somewhat dual on lateral sides, lacking the much coarser, deeply pitted punctures in anterolateral areas found in most specimens of *S. melanaria* and most other *Synona* spp. and the microsculpture on interspaces is less strong. The male genitalia (Figs 39–42) also show same minor variation.

The examples of *S. melanaria* from Indonesia and New Guinea and Australia exhibit some variations. The external appearance and coloration is similar in all, but the mesoventrite is almost always darker in the examples from Australia and New Guinea compared to the Indonesian examples. The microsculpture on elytral interspaces is always very strong in Indonesian examples, moderately strong to weak in New Guinea and Australian examples, and weak to very faint in some Australian examples. The penis guide of male genitalia is more or less similar, but distinctly broader in the middle and the penis capsule is also different in Indonesian examples (Figs 26–29) compared to those from New Guinea and Australia (Figs 30–33). Besides, the median sclerosis on first abdominal ventrite is very long and pointed in most of the examples from Indonesia, but much shorter and acutely pointed in most of the specimens from

New Guinea and even less so in Australian examples.

Distribution. Australia: Queensland, Northern Territory, Torres Strait; Solomon Islands; Papua New Guinea; Indonesia: Irian Jaya, Java; Burma.

Synona philippinensis sp. nov.
(Figs 8, 34–38, 54)

Etymology. The species is named after the type locality.

Diagnosis. This species is distinguished from the other species of *Synona* by the male genitalia, particularly the penis guide and the very long penis apex, and the prosternal carinae, which are short, anteriorly very strongly convergent and fused. It is very similar to *S. melanaria* from which it can be distinguished by the shorter, apically fused prosternal carinae and the male genitalia. It is also very similar to the fully black form of *Coelophora inaequalis* (F.) from which it can be distinguished by the generic characters (see notes below).

Description. Length: 5.3–6.4 mm; width: 4.7–5.6 mm. Body outline round (Fig. 8), dorsum hemispherical and strongly convex. Head with base and vertex black, and frons yellow in male, frons mostly black in female; anterolateral corners of pronotum yellow, rest of dorsum black. Ventral side with anterolateral corners of pronotal hypomera, antennae, mouthparts, legs and abdomen yellow, meso- and metaventrites slightly darker yellowish brown, cardo of maxillae and prosternum dark pitchy brown to black. Head with eyes anteriorly slightly divergent, densely punctate with interspaces between punctures microreticulate. Pronotum densely punctate, punctures separated by 1–2.5 diameters, interspaces between punctures strongly microreticulate. Elytral punctures finer and more widely spaced than those on pronotum, separated by 3–5 diameters, interspaces with deeply impressed microsculpture. Prosternal carinae variable, reaching a little more than half of prosternal length, much shorter in some examples, always anteriorly strongly convergent, sometimes fused or nearly so, appearing to be inverted Y-shaped with very long arms; anterior margin of mesoventrite medially with a deep, semicircular emargination. Male genitalia (Figs 34–38) as illustrated, penis apically (Fig. 38) very long. Spermatheca (Fig. 54) as illustrated, with a relatively long sperm duct between bursa and spermatheca.

Types. Holotype male; Manila PI 1409 / G. Compere Collection/Coelophora vidua Muls. (USNM). Paratypes: Banang Union, without other data, 1 male (USNM); Mt. Arayat, Pampanga, Luzon, 1923, RCMcGregor (USNM); Ilocos Sur, Luzon, McGregor (USNM); Los Banos, P.I. Baker/Coelophora vidua Muls. var; Mt.

Makilling, Luzon, Baker, 16569 (USNM); Davan, Mindanao, Baker (USNM); Banang Union, without other data (USNM); Manila PI 1409/G.Compere Collection/Coelophora vidua Muls. (USNM); Tuguegarao June 28/ Philippinen/ ex. Mūs. Bremen/ Korschefsky Collection 1952 (USNM); Luzon P.I., Manila/ Coelophora vidua var. Weise; Arayat / Philippinen/ ex. M?s. Bremen/ Korschefsky Collection 1952 (USNM); Iligan, Mindanao, Baker/ 16568 (USNM); Mt.Makilling, Luzon, C.F. Baker (BMNH, MCZ, USNM); Los Banos, P.I. Baker/16569 (USNM); Los Banos, Pemberton Coll (BPBM); Phillip Islands/ Semper/ Fry Coll. 1905-100, 1 male (dissected); Phillip Islands/ Semper/ Bohol./ 47224 [Fry collection number]/ Fry Coll. 1905-100 (BMNH); Phil Isl 42.22/ melanaria [Crotch handwriting]/ Named by Crotch, 1 male (abdomen missing) (BMNH); Phil Isl 42.22, 1 female; Philippine Is. E.M. Ledyard. B.M. 1925-491/ 1085, 1 female; Luzon Zambales leg. G. Böttcher /XII. 17 [on reverse]/ Taeuber Coll. B.M. 1949-474., 1 female (BMNH); Balabac, Pasia, 4.iv.1957, Y. Kondo coll. (1, BPBM).

Distribution. The Philippines.

Notes. The identity of *Coelophora vidua* Mulsant, 1850 has been confused by previous workers, including Iablokoff-Khnzorian (1982). He included more than one taxon in his treatment of this species (as *Lemnia vidua*), including a specimen from Kei island, illustrated on p. 251 (middle row, left of page), which is in fact *Callineda principalis* Weise (possibly belongs now in *Anisolemnia*). Mulsant (1850: 393) described *Coelophora vidua* from “Java (collect. Buquet).” There is a single female syntype of *Coelophora vidua* from Buquet’s collection in the Natural History Museum, London (BMNH) bearing the following labels “Type [red-bordered circular BMNH label]/ Java [handwritten on circular yellow label]/ 57.71 [handwritten BMNH accession number on circular blue label]/ Vidua Muls. Java. [Buquet collection label, yellow rectangle]/ Named by Mulsant [printed white rectangle]”. This specimen represents the black colour form of the common and widespread *Coelophora inaequalis* (Fabricius), into the synonymy of which the name *Coelophora vidua* Mulsant must now be placed (**syn. nov.**).

Synona consanguinea sp. nov.

(Figs 5, 43–50, 55–56)

Etymology. The species name is in reference to its close resemblance to the other species of *Synona* (derived from Latin: *con-* “with, together” + *sanguineus*, from *sanguis*, *sanguin-* “blood”).

Diagnosis. This species can be easily separated from other species of *Synona* by the male genitalia, which are diagnostic. It is very similar to *S. obscura* from which it can be separated by the slightly narrow-

er marginal bead, stronger microsculpture between interspaces of elytral punctures, and the male genitalia.

Description: Length: 4.90–5.10 mm; width: 4.9–5.0 mm.

Male. Body outline (Figs 5, 6) circular, about as broad as long, dorsum strongly hemispherical and convex. Head and pronotum bright orange-yellow, scutellum and elytra black. Ventral side uniform yellowish testaceous, except elytral epipleura black. Head with eyes broadly separated, interocular distance ca. 2.25 times as wide as an eye; frons densely punctate, punctures 1–2 diameters apart, closer on either side of eyes, slightly larger towards clypeal margin, interspaces strongly microreticulate. Pronotum uniformly punctate, punctures separated by 2–4 diameters, interspaces more weakly microreticulate than those on head in some examples. Elytra with punctures finer and more widely spaced than those on pronotum, uniform and separated by 4–7 diameters on disc, deeply impressed, interspaces with microsculpture and weak criss-crossing lines, markedly coarser and more deeply impressed adjacent to marginal bead, particularly so near anterolateral areas. Prosternal carinae subparallel, reaching up to nearly 3/4 length of prosternum. Posterior margin of ventrite 5 very shallowly emarginated, that of ventrite 6 subtruncate. Male genitalia (Figs 43–50) as illustrated.

Female externally similar to male. Posterior margin of abdominal ventrite 5 truncate, ventrite 6 arcuate. Spermatheca (Figs 55–56) as illustrated.

Types. Holotype, male: “China, Guangdong Prov. Huashi Shan 24°51’59”N 113°54’34”E, 8.11.2001, ca. 480 m, Jach & Komarek (CWBS 485)” (NHMW). Paratypes: **CHINA:** Guangdong, Xin Yi, 31.v.2002, Col. Fang Yuan Yuan (PDBC); same data except date 1.vi.2002 (PDBC); Guangdong, Fengkai, 1. vii.1987, col. Chen Shasteng (NPC); China, 1959.v.30/ Harmonia melanaria (Mulsant) (data labels in Chinese), 1 female (USNM); **TAIWAN:** Formosa, Horisha, 23.x.1928 Col. M. Chujo/ Korschefsky Collection 1952 (USNM); Kuaru, 14.vi.1937 Col. M. Chujo/ Korschefsky Collection 1952, 1 male (USNM); Taiwan, Nantou county, Mong Gwu, 14 km E. of Puli, 24°1.367’N 121°5.063’E/850 m/ swept from vegetation, 20.IV.2002, leg. D.A. Anstine, Gy. Fabian & O. Merkl/Lemnia melanaria (Mulsant, 1850) det. O. Merkl, 2003, 1 ex. (TMB). **Thailand:** “r. l. n. Chiang Rai, leg. Madl, 1988” (NHMW); **Vietnam** N. 25.5–10.6, 22°20’N 103°50’E SAPA (Lao Cai) 1991 E. Jendek, leg. (MHNW); Vietnam N 1990 Sa-Pa 11–19.VI. 1500 m Hoang Lien Son Prov. Strnad Jan lgt., male (NHMW); Tonkin, Hoabinh, Aug. 1918, R.V. de Salvaza, male (bearing the label *Synia melanaria* Muls., R.D. Pope det. 1981) (BMNH); Tonkin, Hanoi Mar. 1917 R.V. de Salvaza/ 1918-1, 1 male; Laos, Xieng Kimang [writing scarcely legible], 4.v.1919, R. Vitalis de Salvaza, 1 ex. (BMNH); Xieng Khouang, Ban Sai,

iii.1919, R.V. de Salvaza, 1 ex; Tonkin, Chapa, May 1916, R.V. de Salvaza/ 1918-1, 1 ex (BMNH). Myanmar: N Shan state Lashid, 26–28.v.1997, J. Pejsek (NHMS).

Notes. The male genitalia illustrations provided by Bielawski (1964) and Iablokoff-Khnzorian (1982) for *S. melanaria* fit those of examples of this species from China and Taiwan. Bielawski's illustration of the penis guide does not have a distinct apical projection as in this case, but penis is more or less similar. This species is similar to *S. obscura* in general appearance, but has stronger microsculpture between punctures on elytra.

Distribution. China; Taiwan, Myanmar (Burma), Thailand; Vietnam.

ACKNOWLEDGEMENTS

The authors are grateful to C.A.M. Reid (AM), S. Myers (BPBM), L. Zerche (DEI), D. Drugmand (IRSNB), N. Berti, I. Bruneau de Miré, A. Taghavian (MNH), P. Perkins (MCZ), J. F. Grimshaw (NAQS), W. Schawaller (NHMS), H. Schönmann (NHMW), V. V. Ramamurthy (NPC), J. Dally (NTM), J. Donaldson (QDPIB), R. Storey (QDPIM), J. Forrest and E. G. Matthews (SAM), O. Merkl (TMB), W.A. Foster and R. Stebbings (UCCC); A. Solodovnikov (ZMC), N. Vandenberg (USNM), B. Jäger, M. Uhlig (ZMHUB), M. Barclay (BMNH) and K. Ghorpade (KGC) for answering our queries and loaning specimens for this study. N. Vandenberg reviewed manuscript and suggested many improvements. Research on Australian and Papuan species has been supported by a grant from Australian Biological Resources Study to A. Ślipiński.

REFERENCES

- Afroze, S. and Shujaiddin. 1998. Bioecology of *Synia melanaria* (Coccinellidae: Coleoptera) predating on *Coptosoma ostensum* Distant. *Journal of Entomological Research*, 22: 329–336.
- Bielawski, R. 1957. Coccinellidae (Coleoptera) von Ceylon. *Verhandlungen der Naturforschenden Gesellschaft in Basel*, 68: 72–96.
- Bielawski, R. 1964. Die Arten der Gattung *Synia* Mulsant (Coleoptera: Coccinellidae). *Bulletin de l'Académie Polonaise des Sciences, Cl.II, Serie des Sciences Biologiques*, 12: 23–27.
- Crotch, G. R. 1874. A Revision of the Coleopterous Family Coccinellidae. Janson, London, 311 pp.
- de Gunst, J. H. 1957. Indonesian Lady-birds. *Penggemar Alam*, 36: 3–39.
- Dejean, A., Orivel, J. and M. Gibernau. 2002. Specialized predation on plataspid heteropterans in a coccinellid beetle: adaptive behavior and responses of prey attended or not by ants. *Behavioural Ecology*, 13(2): 154–159.
- Donovan, E. 1798. The natural history of British insects. T.7. London, Rivington, 96 + 6 pp.
- Duponchel, P. A. J. 1845. Catalogue méthodique des Lépidoptères d'Europe distribués en familles, tribus et genres avec l'exposé des caractères sur lesquels ces décisions sont fondées, et l'indication des lieux et des époques on l'on trouve chaque espèce; pour servir de complément et de rectification à l'Histoire naturelle des Lépidoptères de France. Paris, Mequignon-Marbis, xxi + 523 pp.
- Fabricius, J. C. 1775. *Systema Entomologiae*. Lipsiae, 832 pp.
- Fürsch, H. 2007a. Taxonomy of coccinellids (published in 1996 in *Coccinella*, 6). Updated online version. Available from: http://www.phil.uni-passau.de/fileadmin/group_upload/33/Fuersch/taxonomy.pdf (cited 9/10/2007).
- Fürsch, H. 2007b. Valid genera and subgenera of Coccinellidae (published in 1990 in *Coccinella* 2(1): 7–18). Updated online version. Available from: http://www.phil.uni-passau.de/fileadmin/group_upload/33/Fuersch/valid.pdf (cited 9/10/2007).
- Gordon, R. D. 1987. A catalogue of the Crotch collection of Coccinellidae (Coleoptera). *Occasional Papers on Systematic Entomology*, 3: 1–46.
- Iablokoff-Khnzorian, S. M. 1978. Dva novykh vida zhestokrylykh-kokcinnellid iz Vostochnoj Azii (Coleoptera, Coccinellidae). *Doklady Akademii Nauk Armyanskoy SSR*, 67 (3): 180–183. (In Russian).
- Iablokoff-Khnzorian, S. M. 1979. Genera der Paläarktischen Coccinellini (Coleoptera: Coccinellidae). *Entomologische Blätter für Biologie und Systematik der Käfer*, 75(1–2): 37–75.
- Iablokoff-Khnzorian, S. M. 1982. Les Coccinelles Coléoptères-Coccinellidae. *Tribu Coccinellini des régions Palearctique et Orientale*. Boubée, Paris, 568 pp.
- Iablokoff-Khnzorian, S. M. 1984. Notes sur la tribu des Coccinellini (Coleoptera, Coccinellidae). *Nouvelle Revue d'Entomologie (N.S.)*, 1(2): 203–220.
- Korschefskey, R. 1932. *Coleopterorum Catalogus. Pars 120. Coccinellidae II*. Berlin, 435 pp.
- Lal, R. and S. Kanakavalli. 1960. The genitalia of some Indian Coccinellidae. *Annals of Zoology*, 3(6): 69–110.
- Mader, L. 1926–1934. Evidenz der paläarktischen Coccinelliden und ihrer aberrationen in Wort und Bild, I-Teil. *Epilachnini, Coccinellini, Halyziini und Synonychini*. *Zeitschrift des Vereins der Naturbeobachter und Sammler, Wien*, 1934 (9): 289–336.
- Malhotra, C. P. and S. Krishnaswami. 1962. *Coptosoma ostensum* Dist. – a pentatomid pest of Palas (*Butea monosperma*) with notes on its coccinellid predator, *Synia melanaria* var. *rougeti* Mulsant and egg parasite, *Telenomus* species. *Indian Forester*, 88: 231–237.
- Miwa, Y. 1931. A Systematic catalogue of Formosan Coleoptera. Report of the Department of Agriculture, Government Research Institute, Formosa, Japan, No. 55, pp. 1–359.
- Miwa, Y. and T. Yoshida. 1935. Catalogue of Japanese Insects. Fasc. IX. Coleoptera. Coccinellidae. (In Japanese). *Entomological World, Tokyo*, 3 (22): 31–53.
- Monteith, G. B. 2006. Maternal care in Australian oncomerine shield bugs (Insecta, Heteroptera, Tessarotomidae). *Denisia*, 19: 1135–1152.
- Montrouzier, X. 1857. *Essai sur la faune de l'Île de Woodlark ou Moïou*. Lyon, Imprimerie de F. Dumoulin, 226 pp.
- Mulsant, E. 1850. *Species des Coléoptères trimères sécuri-*

- palpes. Annales des Sciences Physiques et Naturelles, d'Agriculture et d'Industrie, Lyon, (2)2: 1–1104.
- Mulsant, E. 1866. Monographie des Coccinellides. 1^{re} partie Coccinelliens. Paris, 294 pp.
- Pang, H., Shunxiang, R., Zeng, T. and X. Pang. 2004. Species diversity and utilization of Coccinellidae in China. 168 + xxiv pp. (In Chinese).
- Pope, R. D. 1989. A revision of the Australian Coccinellidae (Coleoptera). Part I. Subfamily Coccinellinae. Invertebrate Taxonomy, 2(1988): 633–735.
- Puttarudriah, M. and G. P. Channabasavanna. 1953. Beneficial coccinellids of Mysore-I. Indian Journal of Entomology, 15: 87–96.
- Rachappa, V., Hegde, R., Kulkarni, K. A. and R. K. Patil. 2002. Biology and feeding potential of *Synia melanaria* Mulsant on *Coptosoma ostensum* Distant. My Forest, 38(2): 145–150.
- Ślipiński, S. A. 2007. Australian ladybird beetles (Coleoptera: Coccinellidae). Their biology and classification. ABRIS, Canberra. 286 pp.
- Subramaniam, T. V. 1924. Some coccinellids of South India, pp. 108–118. In: T. B. Fletcher (Ed.). Report of the Proceedings of the Fifth Entomological Meeting held at Pusa from 5th to 10th February, 1923. Superintendent Government Printing, India, Calcutta.
- Subramanyam, T.V. 1925. *Coptosoma ostensum* Dist. and its enemy *Synia melanaria* Muls. Journal of the Bombay Natural History Society, 30: 924–925.
- Timberlake, P. H. 1943. The Coccinellidae or lady beetles of the Koebele collection-Part I. Hawaiian Planters' Record, 47: 1–67.
- Weise, J. 1902. Coccinelliden aus der Sammlung des Ungarischen National-Museums. Természetráji Füzetek, 25: 489–520.
- Weise, J. 1923. H. Sauter's Formosan-Ausbeute: Coccinelliden. Archiv für Naturgeschichte, 89(A)2: 182–189.

Received: May 17, 2008

Accepted: June 30, 2008