

## A new species of *Synchonnus* (Coleoptera: Lycidae) from New Guinea, with an identification key to the Papuan species

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**Abstract.** The Papuan fauna of *Synchonnus* Waterhouse, 1879 contains only four species distributed in Mysool, Japen, and New Guinea and is less diversified than those of the continental Australia where 16 species have been recorded. *Synchonnus* occurs in lowlands and in lower mountain forests. A new species, *Synchonnus etheringtoni* sp. nov., is described from New Guinea, and *S. testaceithorax* Pic, 1923 is redescribed. All Papuan species are keyed.

**Key words.** Coleoptera, Lycidae, *Synchonnus*, taxonomy, new species, morphology, key, New Guinea

### Introduction

Papuan net-winged beetles are represented mostly by the subtribe Metriorrhynchina (Lycidae: Metriorrhynchini), and only a few other net-winged beetle tribes and subfamilies have been recorded in New Guinea and the adjacent islands (BOCAK & BOCAKOVA 2008; SKLENAROVA et al. 2013). Although the first Papuan species were described already at the beginning of the 19<sup>th</sup> century by GUÉRIN-MÉNEVILLE (1830–1838) and further about two hundred species before the second world war (KLEINE 1926), the diversity of the Papuan net-winged beetle fauna has not been systematically studied except for a few genus restricted reviews (e.g., BOCAKOVA 1992, BOCEK & BOCAK 2016). Most taxonomic information is represented by isolated descriptions without any reference to the species described earlier.

*Synchonnus* Waterhouse, 1879 was originally defined using only external characters, such as pronotal carinae, which are often misleading, especially when the arrangement of pronotal carinae and the number of elytral costae are used as principal traits for generic delimitation (SKLENAROVA et al. 2014). *Strophicus* Waterhouse 1879 was synonymized to *Enylus* Waterhouse, 1879 (BOCAK 2002). All known species of *Synchonnus* can be now identified only using

simultaneously the shape of pronotal ridges and the morphology of male genitalia (KUSY et al. 2017). *Synchronnus* is now treated as a genus merging all species previously placed in *Synchronnus*, *Achras* Waterhouse, 1879, *Enylus*, and *Strophicus* (KLEINE 1933, KUSY et al. 2017). Recently, molecular studies placed *Synchronnus* in relationships with *Leptotrichalus* Kleine, 1926 and *Wakarumbia* Bocak, 1999 and showed that the delimitations of the genera *Achras* and *Enylus* were unjustified and these are junior synonyms of *Synchronnus* (SKLENAROVA et al. 2013, KUSY et al. 2017).

Recently, two species of *Synchronnus* from New Guinea were obtained and hence, the description of one new species and redescription of another, poorly known species from New Guinea, are provided. Although the wide distribution of species from the adjacent islands has not yet been reported, these species are added to the identification key to all species from the Papuan Region.

### Material and methods

The specimens were preserved in alcohol in the field and dry-mounted after the removal of metathoracic muscles for future genetic studies. Morphological descriptions are based on adults, the larvae of *Synchronnus* remain unknown. Photographs were taken by a digital camera attached to a binocular microscope and assembled from several layers in Helicon Focus 6. Whole bodies were relaxed in 50% alcohol, the tip of the abdomen was detached, and muscles and fat tissues were cleared in hot 10% KOH. Then, genitalia were dissected. All measurements were taken using an ocular grid. The examined material is deposited in the Ladislav Bocák collection deposited at the Department of Zoology, Palacky University in Olomouc, Czech Republic (LMBC). The types of the previously described species were studied in the Museum national d'Histoire naturelle in Paris and the Natural History Museum in London. Abbreviations: BL – body length, WH – width at humeri, PL – pronotum length, PW – pronotum width, Edist – eye distance, Ediam – eye diameter, PhL – phallus length.

### Taxonomy

#### *Synchronnus* Waterhouse, 1879

*Synchronnus* Waterhouse, 1879: 59 (original description). Type species: *Porrostoma clientulum* Waterhouse, 1877 (by monotypy).

*Achras* Waterhouse, 1879: 61 (original description). Type species: *Achras limbatum* Waterhouse, 1879 (by monotypy). KUSY et al. (2017): 55 (synonymy).

*Enylus* Waterhouse, 1879: 72 (original description). Type species: *Enylus segregatus* Waterhouse, 1879 (by monotypy). KUSY et al. (2017): 5 (synonymy).

*Strophicus* Waterhouse, 1879: 73 (original description). Type species: *Strophicus nigellus* Waterhouse, 1879: 73 (by monotypy). BOCAK (2002): 335 (synonymy); KUSY et al. (2017): 5 (synonymy).

**Redescription.** Body weakly sclerotized, dorso-ventrally flattened, 5–12 mm long (Figs 1–2). Head small, without rostrum, partially hidden by pronotum, antennae serrate in both sexes, never flabellate, antennomere I pear-shaped, antennomere II very short, transverse, antennomeres III–XI longer than wide, flat, sometimes acutely pointed (Figs 5–6); mandibles

simple, slightly curved, without any teeth, maxillary palpi 4-segmented, slightly compressed, apical palpomere flat, securiform, labial palpi 3-segmented, similar in shape. Pronotum flat, transverse, with slightly elevated lateral margins, frontal margin widely rounded, projected anteriorly, lateral margins variable in shape, basal margin bisinuate to almost straight, anterior angles well marked but obtuse, sometimes inconspicuous, widely rounded, posterior angles rectangular to acutely projected; disc with three to five areoles, antero-lateral carinae always absent, postero-lateral carinae sometimes well developed, median areola always present, very slender to moderately wide, either directly attached to anterior and posterior margins or connected with anterior margin by short keel (Figs 3–4). Elytra weakly sclerotized, flat, apices independently rounded; elytra regularly apparently wider than abdomen, each elytron with four primary and five secondary longitudinal costae; primary costae always strong in humeral third of elytra, primary costae 2 and 4 sometimes very strong in whole length, costae 1 and 3 always weaker, especially in apical part; secondary costae often irregular, especially in apical part of elytra (Figs 9–10). Male genitalia with phallus and phallobase only, parameres absent, membrane in ventral part of phallobase never sclerotized, phallus variable in shape, very slender to short and robust, most species with two thorns in internal sac, their position variable, either located in basal part and then connected with apical membranes by pigmented duct or present in apical part of phallus, only seldom thorns absent.

**Differential diagnosis.** When a limited number of species was known, variability in the number of pronotal areolae led to the description of four separate genera (WATERHOUSE 1879). Based on molecular phylogeny, the status of these genera was revised (KUSY et al. 2017). Now, *Synchonnus* contains species which have diverse male genitalia and pronotal carinae. All *Synchonnus* have vestigial (Fig. 3) to absent (Fig. 4) antero-lateral pronotal costae. Additionally, they have symmetrical phallus with thorns in the internal sac, but the shape of the phallus and the position of the thorns are variable. Phallus can be long and slender, but also robust and short (KUSY et al. 2017). Always two separate thorns are present, they are close to each other and can be located either at the base of the phallus, in the middle part or close to the apex. *Synchonnus* belongs to a clade with *Leptotrichalus* Kleine, 1926 from Sulawesi and the Oriental Region, and *Wakarumbia* Bocak, 1999 from Sulawesi (SKLENAROVA et al. 2013, 2014). *Leptotrichalus* differs in the slender pronotum, absent thorns in the internal sac and shortened elytral costa 1. *Wakarumbia* has always five well marked areoles of a characteristic shape, unlike *Synchonnus* with well developed postero-lateral pronotal costae. Further it has a complex fused thorn in the basal part of the internal sac, very extensive ventral membranous part in the phallus, and many species have the asymmetrical phallic apex (BOCAK 2000). The distantly related trichaline genera have a similar pronotum, but they always have shortened elytral costa 1 and a very different phallus with only partly sclerotized apical part (BOCAK 2002).

**Distribution and abundance.** Continental Australia (16 spp.), New Guinea (2 spp.), Japan (1 sp.), and Mysool (1 sp.). In contrast with high relative abundance in the coastal and mountain rainforests of Queensland (KUSY et al. 2017), *Synchonnus* is rare in the Papuan region, only a few species have been reported and most of them are known only from single specimens.

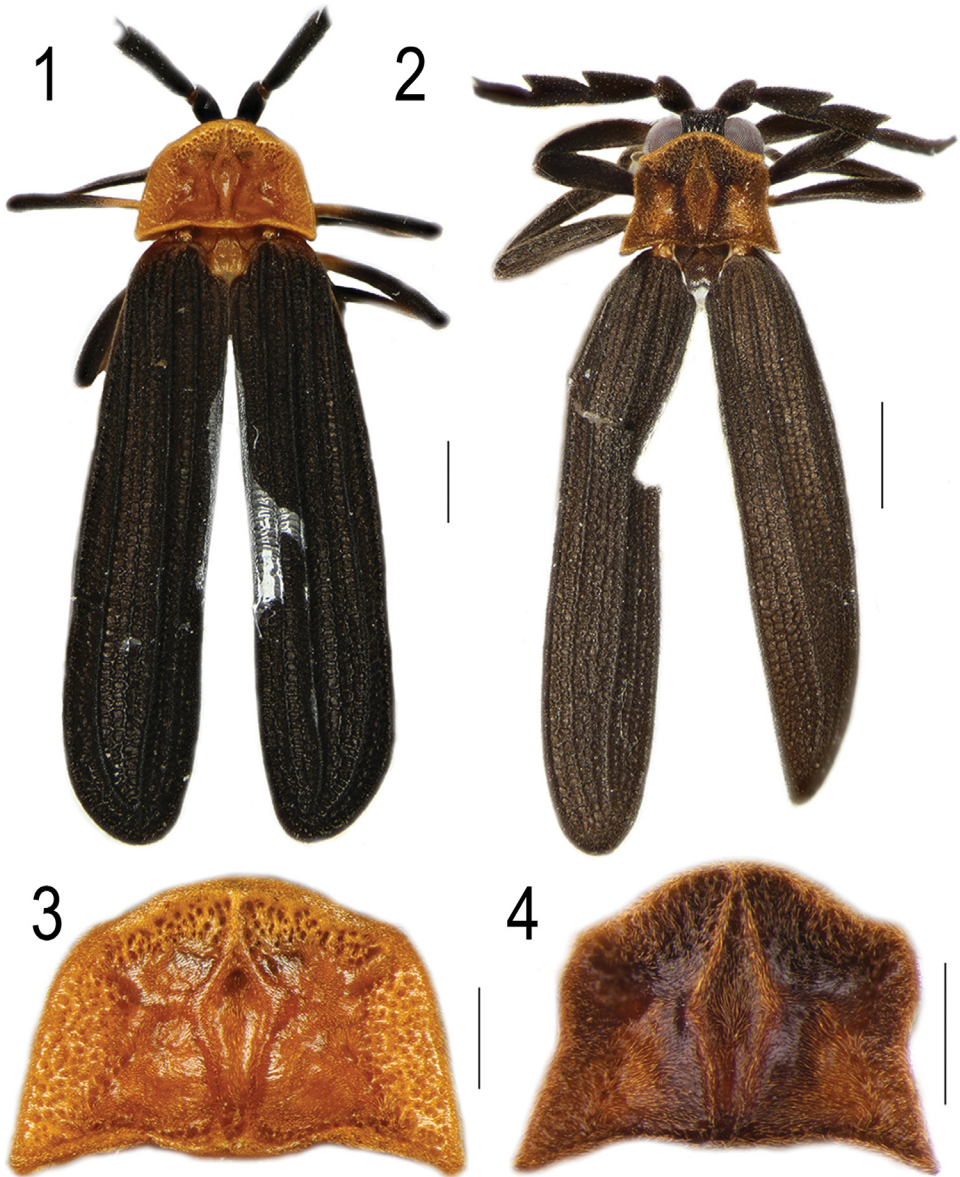
***Synchronnus testaceithorax* Pic, 1923**

(Figs 1, 3, 5, 9)

*Synchronnus testaceithorax* Pic, 1923: 35 (original description).**Type locality.** 'Nouvelle Guinée'.**Material examined.** INDONESIA: PAPUA PROVINCE: *Jayapura Regency*: Lereh env., 03°07'S, 139°57'E, 275 m, 1 ♀ (LMBC).**Redescription. Female.** BL 8.9 mm, WH 2.38 mm, PL 1.38 mm, PW 2.20 mm. Body robust, black, only pronotum, scutellum and basal part of femora orange (Fig. 1). Head small, antennae strongly compressed, serrate (Fig. 5), reaching to two-thirds of elytral length. Pronotum trapezoidal, 1.59 times wider than long at the midline, widest basally, anterior margin widely rounded, lateral margins straight to slightly convex, posterior angles robust, prominent, median areola relatively wide, connected to anterior margin by short longitudinal carina; anterior angles obtuse, (Fig. 3). Elytra 3.17 times longer than wide at humeri, costae 2 and 4 stouter than others, costa 3 shortened and weakly developed in almost whole length, secondary costae present in whole elytra, elytral cells mostly quadrate (Fig. 9).**Male.** Unknown.**Differential diagnosis.** *Synchronnus testaceithorax* is characterized by uniformly orange pronotum without any patches, completely black elytra, and reddish to dark brown head. *Synchronnus testaceithorax* is the only species of the genus with a very different strength of elytral longitudinal costae. Costae 1 and 3 are extremely strong in comparison with all other species placed in the genus.**Ecological information.** *Synchronnus testaceithorax* was collected on shaded vegetation in the lowland forest in the central part of the Mamberamo valley. The orange-black aposematic pattern was the most represented in the collected material.**Distribution.** New Guinea, the lower Mamberamo Basin.**Remarks.** The type of *S. testaceithorax* has not been found in the collection of M. Pic deposited in the Paris museum and only the original description (Pic 1923) is available for recognition of this species. As no difference was identified, and the fauna of the New Guinean lowlands contains widely distributed species, we identify the available specimen as *S. testaceithorax* and provide the redescription and illustrations of this species based on the abovementioned specimen.***Synchronnus etheringtoni* sp. nov.**

(Figs 2, 4, 6, 7, 8, 10)

**Type locality.** Indonesia, Papua Province, Central Mamberamo Regency, 5 km S of Kobakma, 03°43'S, 139°04'E, 1220 m a.s.l.**Type material.** HOLOTYPE: ♂, 'Indonesia, Papua Prov. / 5 km S of Kobakma / 1220 m, 03°43'S 139°04'E' (LMBC).**Description. Male.** BL 7.0 mm, WH 1.66 mm, PL 1.03 mm, PW 1.52 mm, Ediam 0.46 mm, Edist 0.37 mm, PhL 1.42 mm. Body slender, dark brown to black, pronotum dark brown, its frontal part and area along median areola darker (Fig. 2). Head small, eyes very large, hemispherically prominent, maximum eye diameter 1.24 times minimal frontal interocular distance. Antennae serrate, compressed (Fig. 6), reaching over midlength of elytra. Pronotum



Figs 1–4. *Sychonnis* species. 1–2 – general appearance (1 – *S. testaceithorax* Pic, 1923; 2 – *S. etheringtoni* sp. nov.). 3–4 – detail of pronotum (3 – *S. testaceithorax*; 4 – *S. etheringtoni* sp. nov.) Scales = 1 mm (Figs 1–2), 0.5 mm (Figs 3–4).





Figs 5–10. *Synchronnus* species. 5–6 – basal antennomeres (5 – *S. testaceithorax*; 6 – *S. etheringtoni* sp. nov.). 7–8 – male genitalia of *S. etheringtoni* sp. nov. (7 – ventral view; 8 – lateral view). 9–10 – right elytron, the middle part in detail (9 – *S. testaceithorax*; 10 – *S. etheringtoni* sp. nov.). Scales = 0.5 mm (Figs 5–10).

trapezoidal, 1.47 times wider than long at midline, widest at base, anterior margin projected frontally, lateral margins elevated, slightly concave, anterior angles obtuse, posterior angles sharply prominent; median areola wide, attached directly to anterior margin, surface of pronotum densely pubescent (Fig. 4). Elytra 3.95 times longer than wide at humeri, costae 2 and 4 stouter than others, costae 1 and 3 shortened, secondary costae weakly developed, elytral cells variable in shape (Fig. 10), elytral costae with short pubescence. Phallus long, slender, only slightly widened apically and enlarged at base, with inconspicuously constricted middle part, pair of thorns located basally (Figs 7–8).

**Female.** Unknown.

**Differential diagnosis.** The other three species of *Synchonnus* in the Papuan region have uniformly light coloured pronotum, and *S. etheringtoni* sp. nov. is the only one with a dark patch in the anterior part and along the median areola. Additionally, the species differs in sharply prominent posterior pronotal angles and dense pubescence (Fig. 4). *Synchonnus testaceithorax* Pic, 1923 differs from *S. etheringtoni* sp. nov. in red to dark brown colouration of its head and much more apparent vestiges of lateral pronotal carinae delimiting lateral areoles (Fig. 3). *Synchonnus segregatus* Waterhouse, 1879 occurs only in Mysool and has slender, parallel-sided pronotum, and *S. humeralis* from Japan has light coloured humeri.

**Ecological information.** *Synchonnus etheringtoni* sp. nov. was identified in an extensive material collected in the lower mountain forest.

**Etymology.** The specific epithet is a patronym in honour of Paul Etherington, a linguist working on Papuan and Australian languages.

**Distribution.** Indonesia, Papua: central Mamberamo valley.

### Identification key to Papuan species of *Synchonnus*

- 1 Humeri with small red patches. .... *S. humeralis* Pic, 1923
- Whole elytra uniformly dark coloured. .... 2
- 2 Disc of pronotum partly infusate in anterior part (Fig. 4). .... *S. etheringtoni* sp. nov.
- Pronotum orange or light yellow coloured. .... 3
- 3 Body robust, 3.8 times longer than wide at humeri, pronotum uniformly orange coloured, with straight to slightly convex lateral margins, pronotum orange, legs mostly dark coloured, only bases of femora orange. .... *S. testaceithorax* Pic, 1923
- Body slender, 4.4 times longer than wide at humeri, pronotum light yellow, with concave lateral margins, legs completely light yellow. ....
- ..... *S. segregatus* (Waterhouse, 1879)

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