

# Synonymy of the potter wasp genus *Philippodynerus* Gusenleitner (Hymenoptera, Vespidae, Eumeninae) with *Apodynerus* Giordani Soika, with taxonomic notes on *Apodynerus* species

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## Abstract

*Philippodynerus omicroniformis* Gusenleitner, 1996, the type species of the monotypic potter wasp genus *Philippodynerus* Gusenleitner, 1996, is a synonym of *Apodynerus gregarioides* (Giordani Soika, 1986), and consequently *Philippodynerus* Gusenleitner, 1996 is synonymized under *Apodynerus* Giordani Soika, 1993. Taxonomic notes on *Apodynerus* species are given, including two new synonymies for *Apodynerus troglodytes troglodytes* (de Saussure, 1856): *A. t. karimonensis* (van der Vecht, 1937), **syn. n.** and *A. t. baliensis* (Giordani Soika, 1987), **syn. n.** A synoptic key to species and a revised species checklist are provided.

## Keywords

Potter wasps, Vespidae, Eumeninae, *Apodynerus*, *Philippodynerus*, new synonymy

## Introduction

The potter wasp genus *Apodynerus* was proposed for *Odynerus troglodytes* de Saussure, 1856 (Giordani Soika 1993a). Giordani Soika (1994) redescribed *Apodynerus* treating it as a new genus, and included in it six species that had been until then placed in *Pachymenes* de Saussure, 1852 and also one newly described species. The genus *Philippodynerus* was proposed by Gusenleitner (1996) together with a description of the only included species, *Philippodynerus omicroniformis*.

We examined the holotypes of *Philippodynerus omicroniformis* Gusenleitner, 1996 and *Apodynerus gregarioides* (Giordani Soika, 1986) [= *Pachymenes gregarioides* Giordani Soika, 1986], and came to the conclusion that they are synonymous. Consequently *Philippodynerus* Gusenleitner, 1996 is synonymized under *Apodynerus* Giordani Soika, 1993. The present paper also provides taxonomic notes on some other species of *Apodynerus* including new synonymies, a synoptic key to all the species of *Apodynerus*, and a revised species checklist.

## Materials and methods

The materials examined are deposited in the Natural History Collection at Ibaraki University, Mito, Japan (IUNH), Systematic Entomology Institute, Hokkaido University Museum, Sapporo, Japan (SEIHU), Museum Zoologicum Bogoriense, Cibinong, Indonesia (MZB), and Forestry and Forest Products Research Institute, Tsukuba, Japan (FFPRI).

The acronyms for other type repositories are as follows: BMNH – The Natural History Museum, London; ETHZ – Entomologisches Institut, Technische Hochschule, Zürich; LACM – Natural History Museum of Los Angeles County, Los Angeles, California; MRSN – Museo Regionale di Scienze Naturali, Torino; MVEN – Museo Civico di Storia Naturale, Venice; OLM – Oberösterreichischen Landesmuseum, Linz; OUM – Hope Entomological Collection, Oxford University Museum, Oxford, UK; RMNH – Nationaal Natuurhistorisch Museum (formerly Rijksmuseum van Natuurlijke Historie), Leiden.

Morphological characters and color patterns were examined on pinned-and-dried specimens under a stereoscopic dissecting microscope. Drawings were made using the drawing tube attached to the microscope. Terminology mainly follows Carpenter and Cumming (1985) and Yamane (1990).

## Synonymy of *Philippodynerus* under *Apodynerus*

The holotypes of *Philippodynerus omicroniformis* Gusenleitner and *Apodynerus gregarioides* (Giordani Soika) are both males and collected in the same locality, Palo on Leyte

Island, the Philippines. We examined these holotypes and they are only slightly different from each other, allowing us to conclude that they are the same species, and thus we synonymize *Philippodynerus omicroniformis* under *Apodynerus gregarioides*. The holotype of *P. omicroniformis* differs from that of *Apodynerus gregarioides* (character states for the latter are given in square brackets) as follows: clypeus proportionally slightly wider, 1.17 [1.13] × as wide as high in frontal view; metasomal tergum I slightly stouter (Fig. 7), 1.4 [1.45 (Fig. 6)] × as long as its apical width; mesoscutum posteriorly with paired small ferruginous spots [absent]; metasomal sternum II with no basal markings (Fig. 5) [with paired lateral yellow spots basally (Fig. 4)].

We did not find any characters that would allow us to differentiate *A. gregarioides* [= *Philippodynerus omicroniformis*, the type species of *Philippodynerus*] from the other species of *Apodynerus* at the generic level. Consequently *Philippodynerus* Gusenleitner, 1996 is synonymized under *Apodynerus* Giordani Soika, 1993.

## Taxonomy

### *Apodynerus* Giordani Soika, 1993

<http://species-id.net/wiki/Apodynerus>

*Apodynerus* Giordani Soika, 1993a: 155, genus; reference to *Apodynerus* Gusenleitner, 1988. Type species: *Odynerus troglodytes* de Saussure, 1856, by original designation and monotypy.

*Apodynerus* Gusenleitner, 1988: 180, used as generic name in the combination “*Apodynerus* (VDV.i.sch.) *t. troglodytes* (SAUSSURE 1856)”. Unavailable under Article 13.1.1 of the Code (ICZN 1999).

*Apodynerus* Giordani Soika, 1993b: 22. *Nomen nudum*.

*Apodynerus* Giordani Soika, 1993c: 27. *Nomen nudum*.

*Philippodynerus* Gusenleitner, 1996: 39, genus. Type species: *Philippodynerus omicroniformis* Gusenleitner, 1996, by original designation and monotypy. **Syn. n.**

**Note.** The characters given in the key for *A. amandus* Gusenleitner, 2002, *A. diffinis* Giordani Soika, 1996, *A. rufipes* Giordani Soika, 1994 and *A. nitidichypeus* Gusenleitner, 2013, were taken from the original descriptions (Giordani Soika 1994, 1996, Gusenleitner 2002, 2013), and for *A. formosensis* (von Schulthesses, 1934), from Giordani Soika (1994). The characters in the key are applicable to both sexes unless the sex is mentioned.

### Key to species of *Apodynerus*

- 1 Anterior face of pronotum densely punctured, with median pit. Female clypeus truncated apically; in frontal view nearly entirely flattened, with distinctly carinate border; in lateral view flattened.....***A. nitidichypeus* Gusenleitner**

- Anterior face of pronotum glossy and slightly punctured laterally, without median pit and with series of median striae. Female clypeus in frontal view more or less convex, without carina; in lateral view more or less convex.....**2**
- 2 Female clypeus truncated apically. Punctures on frons moderately dense in lower half, sparser and superficial in upper half; posterior part of vertex and gena with large, sparse punctures. Propodeum with lateral face distinctly separated from dorsal face.....**A. rufipes Giordani Soika**
- Female clypeus at least slightly emarginate apically (Figs 2, 11–14, 41). Punctures on frons and vertex more or less dense, slightly smaller and sparser in posterior part of vertex. Border between lateral face and dorsal face of propodeum ill-defined .....**3**
- 3 Submarginal carina of propodeum long, narrow, curved upwards and sharply pointed. Mesepisternum smooth and glossy, with superficial punctures. Metanotum obtusely dentiform. Male terminal flagellomere slender, curved backwards, apically nearly reaching the base of flagellomere IX.....**A. flavospinosus (Giordani Soika)**
- Submarginal carina of propodeum short and wide. Mesepisternum usually with dense punctures. Metanotum dentiform or not. Shape of male terminal flagellomere variable .....**4**
- 4 Tergum II in lateral view only slightly convex dorsally (Fig. 24); basomedian furrow of metasomal sternum II distinct.....**5**
- Tergum II in lateral view convex dorsally (Figs 4, 25–27); basomedian furrow of metasomal sternum II absent or inconspicuous.....**6**
- 5 Clypeus with sparse and superficial punctures. Mesepisternum with dense punctures; interspaces between punctures cariniform. Body entirely covered with long and dense setae.....**A. icarioides (Bingham)**
- Clypeus with dense and deep punctures. Mesepisternum with dense punctures; interspaces non-cariniform. Body with short setae.....**A. formosensis (von Schulthess)**
- 6 Metanotum sharply dentiform. Metasomal segment I proportionally long,  $0.6 \times$  as long as mesosoma (Figs 4, 5); in dorsal view more or less smoothly widened posteriorly (Figs 6, 7). Male terminal flagellomere flattened dorsoventrally, long and curved backwards, apically reaching the base of flagellomere IX (Figs 8, 9).....**A. gregarioides (Giordani Soika)**
- Metanotum obtuse or non-dentiform. Metasomal segment I proportionally short, about or less than  $0.4 \times$  as long as mesosoma; in dorsal view abruptly widened at the base (Fig. 30). Male terminal flagellomere short in most specimens (Figs 28, 29) .....**7**
- 7 Female clypeus about as wide as high. Metanotum non-dentiform. Metasomal sternum II without basomedian furrow.....**A. amandus Gusenleitner**
- Female clypeus wider than high (Figs 11, 12, 41–47). Metanotum hardly to obtusely dentiform. Metasomal sternum II with inconspicuous basomedian furrow.....**8**

- 8 Metasomal tergum II with dense punctures in anterior half, interspace between punctures smaller than puncture, punctures becoming smaller but denser towards apex. Tergum I in lateral view abruptly swollen dorsally ..... *A. diffinis* Giordani Soika
- Metasomal tergum II more or less uniformly punctured. Tergum I in lateral view gradually swollen dorsally (Figs 25–27)..... **9**
- 9 Ventral margin of clypeus proportionally wider, about 0.3 × maximum width of clypeus (Figs 41–47). Metasomal tergum II in lateral view more or less evenly and slightly convex dorsally (Fig. 25) ..... *A. troglodytes* (de Saussure)
- Ventral margin of clypeus proportionally narrower, about 0.2 × the maximum width of clypeus (Figs 11, 12, 15, 16) ..... **10**
- 10 Female clypeus about 1.2 × as wide as high (Fig. 11). Gena wider ventrally (Fig. 21). Anterior face of pronotum with distinct striae. Mesosoma proportionally long and slender, 1.4 × as long as high ..... *A. yayeyamensis* (Matsumura)
- Female clypeus about 1.1 × as wide as high (Fig. 12). Gena wider dorsally (Fig. 22). Anterior face of pronotum without distinct striae. Mesosoma proportionally short and stout, 1.2 × as long as high ..... *A. quadricolor* Giordani Soika, **stat. n.**

***Apodynerus gregarioides* (Giordani Soika)**

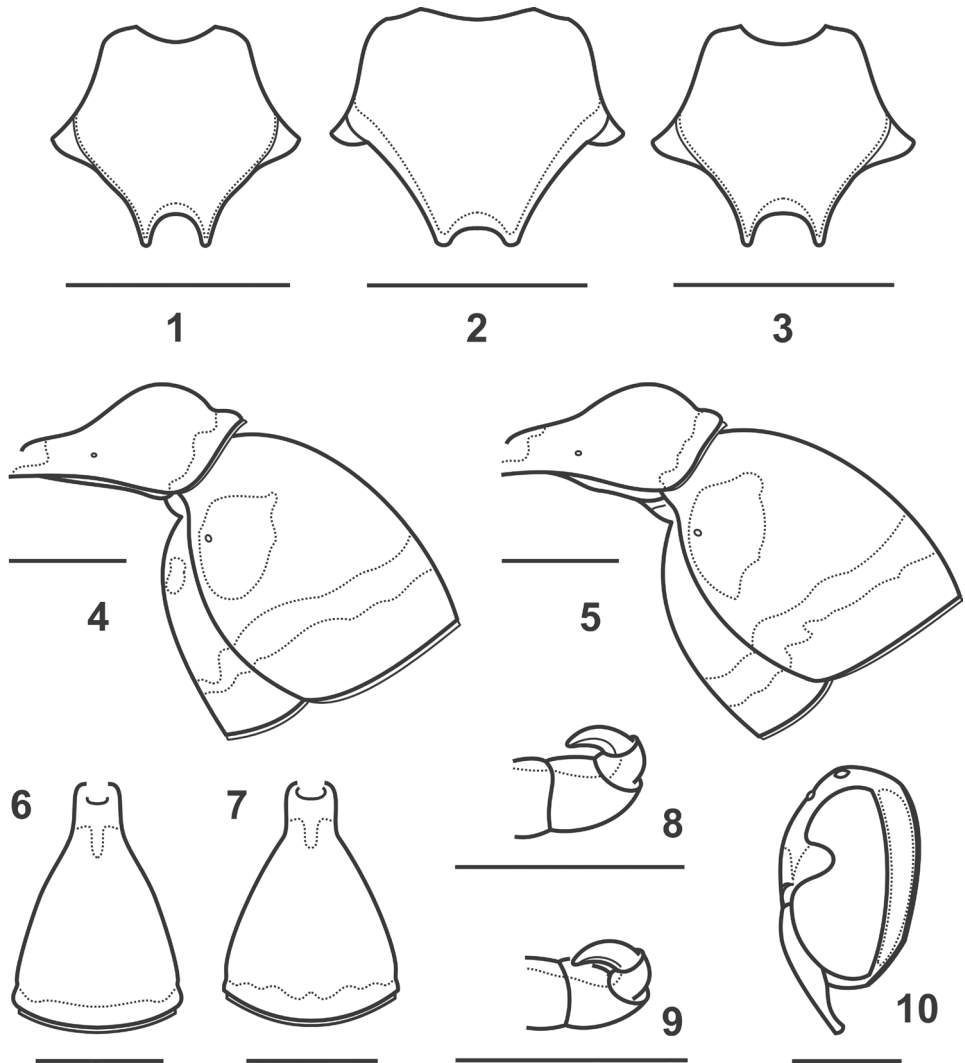
[http://species-id.net/wiki/Apodynerus\\_gregarioides](http://species-id.net/wiki/Apodynerus_gregarioides)

Figs 1, 2, 4, 6, 8, 10

*Pachymenes gregarioides* Giordani Soika, 1986: 79, ♂♀, “Leyte: Palo”, holotype ♂ (IUNH).

*Philippodynerus omicroniformis* Gusenleitner, 1996: 39, 40, ♂, “Philippines, Palo, Leyte, Naga-Naga”, holotype (SEIHU). **Syn. n.**

**Diagnosis.** MALE: Head in frontal view about as wide as high; clypeus as wide as high (Figs 1, 3), in lateral view with anterior margin slightly convex dorsally and nearly straight ventrally (Fig. 10); labrum broadly rounded apically; apicalmost tooth of mandible long and sharp; gena narrow (Fig. 10); antennal flagellomeres IX and X flattened ventrally, flagellomere X smaller than preceding flagellomeres; mesosoma slender, 1.4 × as long as high and 1.3 × as long as wide; pronotum with distinct and well-developed striae on vertical anterior face; propodeum with shallow and narrow (less than half as wide as width of propodeum) concavity on posterior face; propodeal valvula subrectangular, not fused to submarginal carina; propodeal orifice oval; second submarginal cell of fore wing petiolate basally; metasomal segment I proportionally longer than that of any other species, 0.6 × as long as mesosoma; sternum VII with longitudinal carina at least in anterior half, latero-basally with brush-like setae. FEMALE: Head in frontal view about as wide as high; clypeus proportionally wider than that of male, 1.2 × as wide as high (Fig. 2); mesosoma 1.5 × as long as wide.



**Figures 1–10.** *Apodynerus gregarioides*. 1, 4, 6, 8, 10 holotype ♂ 2 paratype – allotype ♀. *Philippodynerus omicroniformis* 3, 5, 7, 9 holotype ♂ 1–3 clypeus 4, 5 Metasomal segments I–II, lateral view 6, 7 Metasomal tergum I, dorsal view 8, 9 Apical part of antenna 10 Head, lateral view. Scale 1 mm.

**Material examined.** PHILIPPINES: LEYTE I.: 1 ♂ (IUNH; holotype of *Pachymenes gregarioides*), labeled “Palo, Leyte, Philippines, 1978.3.20, J. Kojima” and “Holotypus *Apodynerus gregarioides* Giordani Soika”; 1 ♂ (SEIHU; holotype of *Philippodynerus omicroniformis*), labeled “Naga-Naga, Palo, Leyte, Philippines, 1978.3.25, J. Kojima” and “*Philippodynerus omicroniformis* nov. Spec. ♂, J. Gusenleitner, det. 1996, Holotypus”; LUZON I.: 1 ♀, C.L.S.U. [Central Luzon State University], Munoz, Nueva Ecija, 18 Apr.1980, J. Kojima (IUNH; paratype of *Pachymenes gregarioides*).

**Remarks.** This species is only known from the areas given in the original description (Luzon and Leyte, the Philippines). Giordani Soika (1994) recorded this species from Lokojengo on Sumba Island, Lesser Sunda Islands. The occurrence of this species on Sumba, however, needs confirmation, considering the unusual disjunct distribution and possibility of misidentification with the other species known from the Lesser Sunda Islands, such as *A. rufipes* Giordani Soika and *A. quadricolor* Giordani Soika.

***Apodynerus flavospinosus* (Giordani Soika)**

[http://species-id.net/wiki/Apodynerus\\_flavospinosus](http://species-id.net/wiki/Apodynerus_flavospinosus)

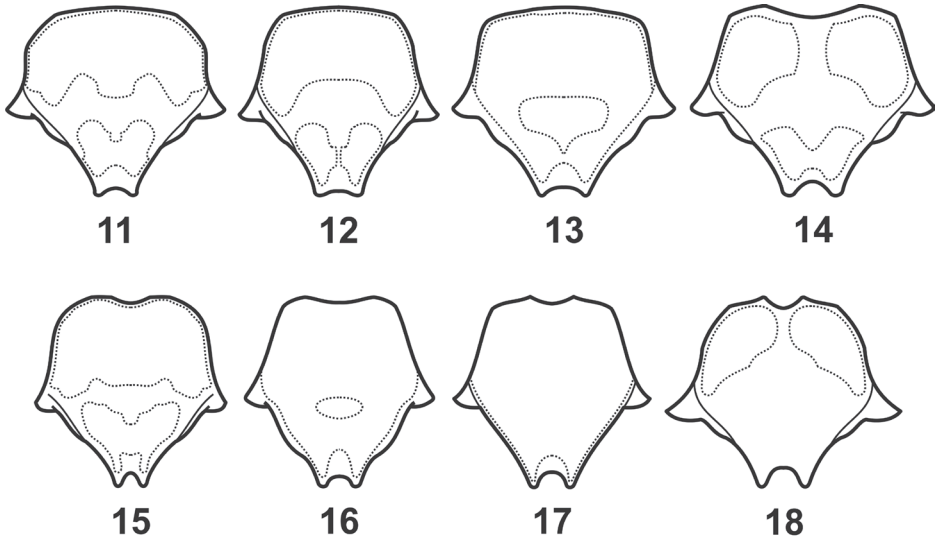
Figs 13, 17, 20, 23

*Pachymenes flavospinosus* Giordani Soika, 1986: 80, ♀♂, “Naga Naga, Leyte, Palo”, holotype ♀ (IUNH).

**Diagnosis.** The species can be easily distinguished from other *Apodynerus* by the peculiar shape of the submarginal carina, which is long, narrow, sharply pointed and curved upwards. The following combination of characters also helps distinguish this species from its congeners: female clypeus in frontal view wider than high, 1.2 × as wide as high (Fig. 13); male clypeus in frontal view proportionally narrower than in female, as wide as high (Fig. 17); metanotum obtusely dentiform; metasomal tergum I in lateral view moderately convex dorsally, then slightly concave preapically (Fig. 23).

**Material examined.** PHILIPPINES: LEYTE I.: 1 ♀ (IUNH; holotype of *Pachymenes flavospinosus*), labeled “Naga-Naga, Palo, Leyte, Philippines, 1978.3.26, J. Kojima” and “Holotypus *Apodynerus flavospinosus*”; 1 ♀, 1 ♂ (IUNH; paratypes of *Pachymenes flavospinosus*), Naga-naga, Palo, 25 Mar.1978, J. Kojima; 11 ♀, 11 ♂ (IUNH; paratypes of *Pachymenes flavospinosus*), Palo, [1 ♀, 1 Mar.1978; 1 ♀, 1 ♂, 9 Mar.1978; 1 ♀, 1 ♂, 20 Mar.1978; 2 ♀, 2 ♂, 24 Mar.1978; 1 ♀, 1 ♂, 25 Mar.1978; 1 ♂, 26 Mar.1978; 1 ♀, 27 Mar.1978; 1 ♂, 30 Mar.1978; 3 ♀, 1 ♂, 31 Mar.1978; 1 ♂, 3 Apr.1978; 1 ♀, 2 ♂, 20 Jun.1980], J. Kojima; 1 ♀ (IUNH; paratype of *Pachymenes flavospinosus*), Burauen, 5. Mar.1978, J. Kojima; PALAWAN I.: 2 ♂ (IUNH; paratypes of *Pachymenes flavospinosus*), St. Pedro, Puerto Princesa, 29. Apr.1980, J. Kojima; 4 ♀, 7 ♂ (IUNH; paratypes of *Pachymenes flavospinosus*), Puerto Princesa, [1 ♀, 2 ♂, 23 Apr.1980; 1 ♂, 26 Apr.1980; 3 ♀, 3 ♂, 27 Apr.1980; 1 ♂, 29 Apr.1980], J. Kojima; LUZON I.: 8 ♀, 17 ♂ (IUNH; paratypes of *Pachymenes flavospinosus*), Univ. Phil. Los Banos, Laguna, [1 ♀, 18 Mar.1980; 1 ♀, 1 ♂, 26 Mar.1980; 4 ♂, 4 May.1980; 1 ♂, 6 May.1980; 1 ♀, 9 May.1980; 1 ♀, 1 ♂, 10 May.1980; 2 ♀, 1 ♂, 11 May.1980; 3 ♂, 12 May.1980; 1 ♂, 13 May.1980; 1 ♂, 20 May.1980; 1 ♂, 21 May.1980; 2 ♀ 3 ♂, 27 Jun.1980], J. Kojima; MINDANAO I.: 1 ♂ (IUNH; paratype of *Pachymenes flavospinosus*), C.M.U. Musuan, Bukidnon, 28. May.1980, J. Kojima; 1 ♂ (SEIHU), Zamboanga, 13 Jun.1933, K. Kuwasima.

**Remarks.** This species is only known from the Philippines.



**Figures 11–18.** *Apodynerus* species. 11–14 ♀ 15–18 ♂. 11, 15 *A. yayeyamensis* 12, 16 *A. quadricolor* 13, 17 *A. flavospinosus*, holotype and paratype – allotype, respectively 14, 18 *A. icarioides* 11–18 Clypeus, frontal view.

### *Apodynerus icarioides* (Bingham)

[http://species-id.net/wiki/Apodynerus\\_icarioides](http://species-id.net/wiki/Apodynerus_icarioides)

Figs 14, 18, 19, 24, 29

*Odynerus icarioides* Bingham, 1897: 363 (in key to aculeates of British India), 372, ♀, “Tenasserim”, type (BMNH).

**Diagnosis.** This species can be distinguished from other species of *Apodynerus* by the combination of the following characters: head in frontal view subcircular, slightly wider than high, 1.1 × as wide as high; female clypeus in frontal view wider than high, 1.3 × as wide as high, with dorsal and ventral margins distinctly emarginate medially (Fig. 14); male clypeus in frontal view proportionally narrower than that of female, 1.15 × as wide as high (Fig. 18); gena wide (Fig. 19); metanotum obtusely dentiform; metasomal tergum I stout, in lateral view swollen dorsally from base to mid-length, then moderately concave preapically (Fig. 24); metasomal tergum II in lateral view slightly convex dorsally (Fig. 24).

**Material examined.** INDONESIA: Kalimantan: 2 ♀, Bukit Soeharto, East Kalimantan, 3, 23 Feb.1998, H. Makihara (FFPRI); 1 ♀, Mentawir River, about 50 m, Balikpapan, East Kalimantan, Oct.1950, A.M.R. Wegner (MZB); 1 ♂, Kayan Mentarang Nature Reserve, Pujungan, East Kalimantan, Apr.1993, D.C. Darling & R. Ubaidillah (MZB).

**Remarks.** This species shows a disjunct distribution pattern, occurring in India and Myanmar, and on Borneo. Van der Vecht (1937) examined the type and provided a diagnosis for this species.



***Apodynerus yayeyamensis* (Matsumura)**[http://species-id.net/wiki/Apodynerus\\_yayeyamensis](http://species-id.net/wiki/Apodynerus_yayeyamensis)

Figs 11, 15, 21, 26

*Odynerus yayeyamensis* Matsumura, 1926, in Matsumura and Uchida 1926: 36, ♂, “Okinawa (Okinawa-honto)” [possibly erroneously listed locality], lectotype from Yaeyama Islands (SEIHU).

*Odynerus bokotoensis* Sonan 1929: 534, ♀♂, [Taiwan:] “Hôkotô ... Takao”. Holotype ♀ originally in “Entomological Laboratory, Taihoku Imperial University”, but current depository unknown.

**Description of female and lectotype male.** FEMALE. Head in frontal view about as wide as high. Clypeus in frontal view wider than high,  $1.2 \times$  as wide as high (Fig. 11). Vertical anterior face of pronotum with series of conspicuously produced striae. Metanotum compressed, obtusely dentiform; posterior margin oblique in lateral view. Metasomal tergum II in lateral view distinctly swollen anterodorsally and barely convex in posterior two-thirds (Fig. 26).

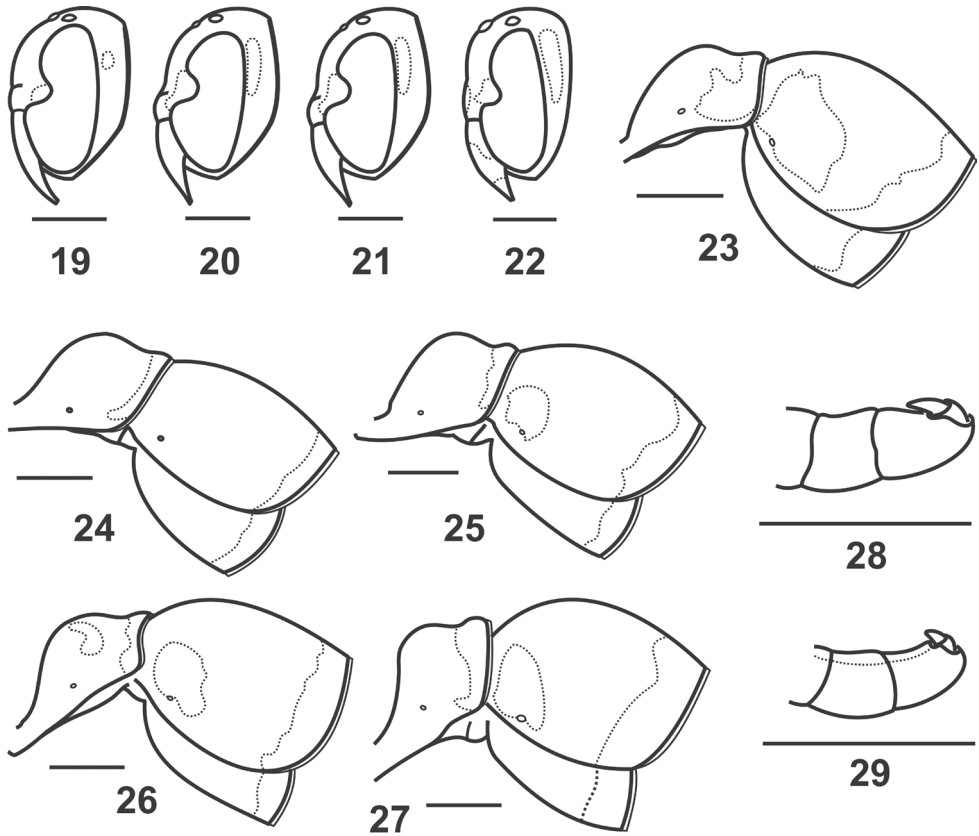
Head and mesosoma black, with following yellow markings: interantennal spot, ocular sinus, scape ventrally, mandible basally, band on gena, large dorsal spot and ventral scrobal spot on clypeus; anterior half of dorsal face of pronotum interrupted medially; spot on upper part of mesepisternum, tegula except median ferruginous spot, parategula, scutellum nearly entirely, large spots on dorsal face of propodeum; antenna dark brown. Legs black, but apical part of fore and mid femora and outer face of tibiae yellow. Metasoma black, with following yellow markings: tergum I: paired sublateral bands running obliquely towards posterolateral corner of tergum and apical band; segment II: basal lateral spots on tergum, and apical band.

Lectotype male. Clypeus in frontal view about as wide as high; ventral margin proportionally narrow (Fig. 15), about  $0.2 \times$  the maximum width of clypeus. Scape  $3.3 \times$  as long as its maximum width; flagellomere X small; flagellomere XI minute, curved backward, with apex reaching about half length of flagellomere IX. Mandible with five teeth; apicalmost tooth long and sharp.

Mesosoma in lateral view about  $1.4 \times$  as long as high; in dorsal view about  $1.3 \times$  as long as wide. Metanotum dorsally with closely pair of obtuse teeth. Propodeum with somewhat deep median concavity on posterior face, in lateral view strongly convex.

Lateral face of propodeum with dense, strong punctures, in most specimens forming ridges between punctures. Metasomal segment I with dense, conspicuous deep punctures; segments II–VII with dense, deep punctures.

Black, with following yellow markings: interantennal spot, spot filling ocular sinus extending ventrally to antennal socket, band on gena, clypeus except apical ferruginous band and black transverse band at level of lateral lobes, scape except black dorsal face, mandible except ferruginous tip and narrow black band along outer margin; anterodorsal part of pronotum, scrobal spot on mesepisternum, tegula except ferruginous mid spot and outer margin, parategula, scutellum nearly entirely, spot on metanotal



**Figures 19–29.** *Apodynerus* species. 19–27 ♀ 28–29 ♂ 19, 24, 29 *A. icarioides* 20, 23 *A. flavospinosus*, holotype 25 *A. troglodytes* 21, 26 *A. yayeyamensis* 22, 27, 28 *A. quadricolor* 19–22 Head, lateral view 23–27 Metasomal segments I–II, lateral view 28, 29 Apical part of antenna. Scale 1 mm.

teeth, paired large dorsal spots on propodeum; markings on metasoma as in female, but terga IV–V with posteromedian yellow spot.

Color variation in males from Taiwan. Sublateral yellow bands on tergum I in some specimens reduced to small spots or lacking, terga IV–V and occasionally also VI with posteromedian yellow spot, and sternum III sometimes with apical yellow band.

**Material examined.** JAPAN: 1 ♂ (SEIHU; lectotype of *Apodynerus yayeyamensis*), labeled “SK, Japan Matsumura, Yaeyama, VIII 07”, “*Odynerus* n. sp. *yayeyamensis*, det. Matsumura”, “Type Matsumura”, and “*Pachymenes fragilis* (Smith) det. K. Yasumatsu, 1938”; 1 ♀, Motobu, Sesoko I, 9 Sep.1982, J. Kojima (IUNH). TAIWAN: 2 ♂, Tojuko, Prov. Taichu [=Taichung], 1–8 Aug.1931, N. Owaki (SEIHU).

**Remarks.** Matsumura and Uchida (1926) mentioned the two males collected on “Okinawa-honto” [=Okinawa Island] by S. Kiyamu and S. Sakaguchi in the description of *Odynerus yayeyamensis* [= *Apodynerus yayeyamensis*]. Although, as Yamane (1990) pointed out, the locality “Yaeyama” written on the label was not mentioned in

the original description, the two male specimens referred to by Yamane (1990: 137) as “The type specimen” and that “believed to be the one in the type-series” are certainly the syntypes. Yamane (1990: 137) inadvertently designated the lectotype by specifically referring to one of the two syntypes as “The type specimen” (Article 74.6.1 in the Code, ICZN 1999). The lectotype we located in the SEIHU bears the following labels: (1) on upper side “SK” [=?S. Kiyamu] in handwriting and “Japan Matsumura” in print; on underside, “Yaeyama” [Chinese characters] and “VIII 07” [=August 1907; Yamane (1990) read “vii[?] 0’7”], both in handwriting, (2) “*Odynerus* n.sp. *yayeyamensis*” in handwriting, and “det. Matsumura” in print, (3) red label “Type Matsumura” in print, (4) *Pachymenes fragilis* (Smith) det. K. Yasumatsu, 1938” in handwriting. We have added a label “LECTOTYPE [in red]/*Odynerus yayeyamensis*/Matsumura, 1926/by designation of/Yamane (1990)” [a slash denotes the start of a new line]. We searched in vain in the SEIHU for the other specimen, the paralectotype, that according to Yamane (1990) is labeled (1) “56” in handwriting and (2) “Okinawa S. Sakaguchi” in print.

***Apodynerus quadricolor* Giordani Soika, stat. n.**

Figs 12, 16, 22, 27, 28

*Apodynerus yayeyamensis tricolor* Giordani Soika 1994: 209 (key), [incorrect spelling].

*Apodynerus yayeyamensis quadricolor* Giordani Soika 1994: 215, ♂♀, “C. Sumba: Lokojengo”, holotype ♂ (RMNH).

**Diagnosis.** *Apodynerus quadricolor* is distinguished from *A. yayeyamensis* in the following characters [states for the latter are given in the brackets]: clypeus in frontal view proportionally narrower, about 1.1 × as wide [1.2 × as wide] as high in female (Fig. 12) and slightly narrower [wider] than high in male (Fig. 16); gena narrow (Fig. 22) [wider (Fig. 21)]; vertical anterior face of pronotum with series of striae faintly produced [distinct and conspicuously produced]; mesosoma more or less stout [slenderer], in lateral view about 1.2 [1.4] × as long as high, in dorsal view about 1.2 [1.4] × as long as wide; metanotum with posterodorsal margin rather sharply dentiform [obtusely dentiform]; metasomal tergum I in lateral view with dorsal margin arising after short distance from [at] basal slit; metasomal tergum II with dorsal margin basally strongly convex (Fig. 27) [less convex (Fig. 26)].

**Description.** *Color.* MALE. Black, with following bright-colored markings: yellowish-orange: band on gena, interantennal spot, ocular sinus, anterior half of dorsal face of pronotum, large scrobal spot on mesepisternum, tegula except semitransparent ferruginous median spot, parategula, scutellum nearly entirely, paired small lateral spots on metanotum, dorsal face of propodeum, paired large anterolateral spots on metasomal tergum II; yellow: clypeus except dark-brown median spot and ferruginous semitransparent ventral part, mandible basally, posteromedian spot on metasomal terga V and VI; apical bands on metasomal tergum I and segment II pale yellow. Antenna pale ferruginous,

darker dorsally. Pronotal lobe dark ferruginous. Coxae black; trochanters, femora, tibiae, and tarsi ferruginous. Fore wings ferruginous, slightly darker along anterior margin.

Female. Markings as those on male, but clypeus black with yellow dorsal spot and ventral scrobal spot, only metasomal tergum V apically with median yellow oval spot.

**Material examined.** INDONESIA: Sumba I.: 1 ♂, 9°40'S, 119°51'E, Sumba Timur, 30 Jan.2003, J. Kojima (IUNH); 2 ♂, 10°02.247'S, 120°03.332'E, alt. about 350 m, Laiwangi, 17 Jun.2010, A. Perrard (MZB); 1 ♀, 9°45'S, 120°35'E, Sumba Timur, 29 Jan.2003, J. Kojima & R. Ubaidillah (MZB).

**Remarks.** Giordani Soika (1994) described *A. yayeyamensis quadricolor* based on two males and one female collected in Central Sumba. Our specimens from Sumba more or less agree with his original description of *quadricolor*, while as mentioned above they are different from the specimens of *A. yayeyamensis* (including the lectotype) enough to allow us to conclude that *quadricolor* is a distinct species.

### *Apodynerus troglodytes troglodytes* (de Saussure)

[http://species-id.net/wiki/Apodynerus\\_troglodytes\\_troglodytes](http://species-id.net/wiki/Apodynerus_troglodytes_troglodytes)

Figs 25, 30–47

*Odynerus troglodytes* de Saussure, 1856: 249, ♂, “le Sénégal” [type locality doubtful: Yamane (1990) mentioned “Vecht (pers. comm., 1981) ... doubts Saussure’s statement about the type locality.”], type (MRSN).

*Odynerus fragilis* Smith, 1857: 61, ♂, “Borneo”, type (BMNH).

*Odynerus petulans* Smith, 1861: 89, ♀, “Makassar”, type (OUM).

*Odynerus lybas* Cameron, 1902: 114, ♀, “Sarawak”, type (BMNH).

*Odynerus drescheri* Cameron, 1905: 77, ♀, “Tjandi near Semarang”, type (BMNH).

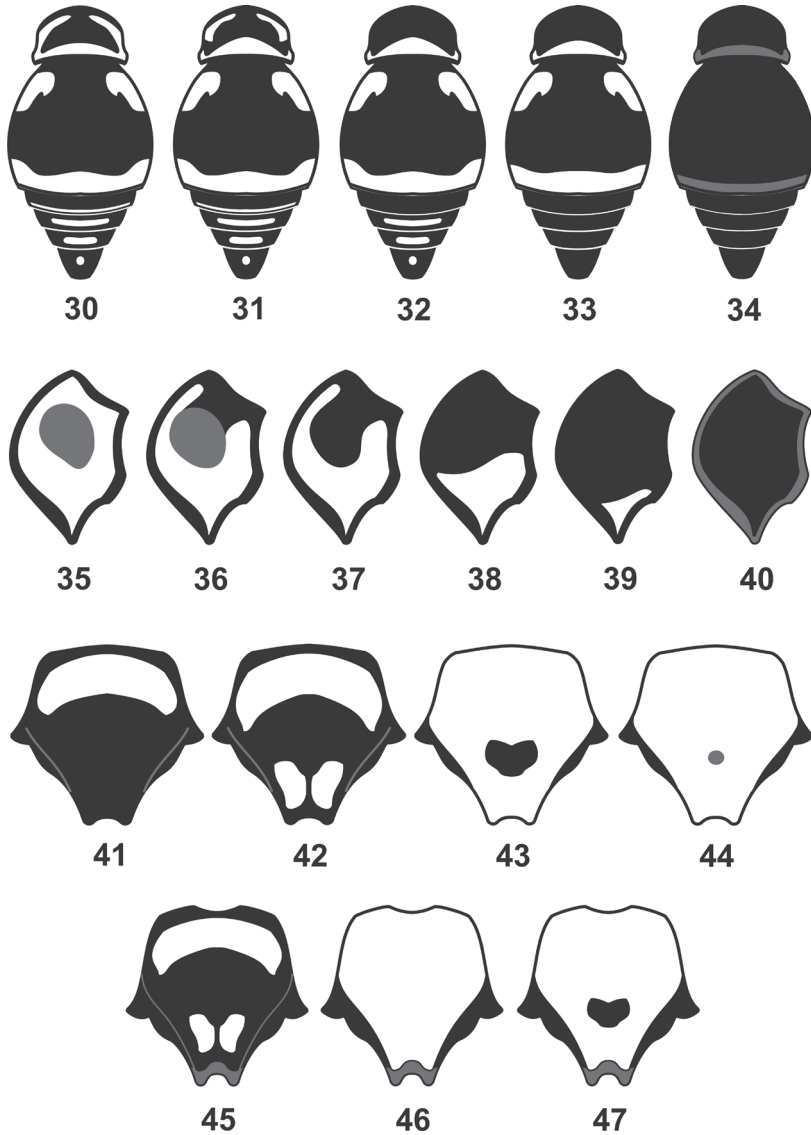
*Odynerus brooksii* Cameron, 1908: 561, ♂, “Kuching, Sarawak, Borneo”, type depositary unknown.

*Pachymenes fragilis* var. *karimonensis* van der Vecht, 1937: 278, ♀♂, “Karmon Djawa Islands”, holotype ♀ (MZB). **Syn. n.**

*Pachymenes troglodytes baliensis* Giordani Soika, 1987: 145, ♀♂, “Bali: Samur”, holotype ♀ (MVEN). **Syn. n.**

**Diagnosis.** *Apodynerus troglodytes* is similar to *A. yayeyamensis*, but can be distinguished from the latter by the following characters: Ventral margin of clypeus proportionally wide (Figs 41–47), about 0.3 × the maximum width of clypeus; female clypeus slightly wider than high, 1.1 × as wide as high (Fig. 41); male clypeus proportionally narrower than that of female, about as wide as high (Fig. 45); metasomal tergum I in lateral view with dorsal margin arising in slightly convex line from the basal slit, then broadly curved down to slight preapical convexity (Fig. 25); tergum II in lateral view more or less evenly and weakly convex dorsally.

**Material examined.** HONG KONG: 1 ♀, Pak Sha O, 70 m, 24 Apr.–14 May.2009, C. Barthelemy (IUNH). VIETNAM: 1 ♂, TT Mai, Chau, Hoa Binh, 3 Jun.2012, P.H.



**Figures 30–47.** Marking patterns of *Apodynerus troglodytes*. For the variations in Indian specimens, after Kumar et al. (2013). **30** Java, Kangean Is., Bali **31** Kangean Is., Java, Bali, Kepulauan Seribu, Krakatau, Lesser Sunda, Moluccas **32** India, Hongkong, Vietnam, Malay peninsular, Sumatra, Java, Bali, Krakatau, Kangean Is., Borneo, Lesser Sunda **33** Sumatra, Krakatau, Java, Borneo, Lesser Sunda, Sulawesi, Moluccas **34** Karimunjawa Is. **35** Kangean Is., Krakatau, Bali **36** India, Sumatra, Krakatau, Java, Bali, Kangean Is., Borneo, Sulawesi **37** India, Hongkong, Sulawesi, Java, Bali **38** India, Vietnam, Malay peninsular, Sumatra, Krakatau, Java, Borneo, Lesser Sunda, Sulawesi **39** Sumatra, Krakatau, Lesser Sunda, Borneo, Moluccas **40** Karimunjawa Is., Sulawesi **41** Karimunjawa Is. **42** India, Hongkong, Sumatra, Java, Krakatau, Borneo, Lesser Sunda, Sulawesi **43** Sumatra, Kepulauan Seribu, Krakatau, Java, Kangean Is., Bali, Sulawesi, Lesser Sunda, Moluccas **44** Kangean, Bali **45** India, Sumatra, Karimunjawa Is., Borneo, Sulawesi **46** Krakatau, Kangean Is., Java, Bali, Lesser Sunda **47** Vietnam, Malay peninsular, Sumatra, Krakatau, Java, Kangean Is., Borneo, Sulawesi, Lesser Sunda, Moluccas **30–34** metasoma **35–40** tegula **41–44** female clypeus **45–47** male clypeus.

Phong (IUNH). MALAYSIA: Peninsular Malaysia: 1 ♂, Bukit Fraiser, 20 Jan.1991, T. Matsumura (IUNH); 1 ♂, Kuala Tahan, 31 Aug.1970, R. Jander (SEIHU). INDONESIA: Sumatra I.: 1 ♀, 4 ♂, Sekincau, S. Sumatra [= Lampung], 23 Jul.1982, Sk. Yamane (MZB); 1 ♂, Labuan Batu, Kec. Jabung, Lampung Tengah, 5 Nov.1975, S. Achmad (MZB); 1 ♂, West Sumatra, Kec. Limau Manis, Andalas University, 0°54.683'S, 100°28.35'E, 23. Sep.2010, H. Nugroho & J. Kojima (MZB); Sunda Strait I.: 2 ♀, P. Sebuku, S. Sumatra, 15 Jun.1955, AMR Wegner (MZB); 1 ♀, 1 ♂, P. Legundi, S. Sumatra, ♀ 19, Jun, ♂ 21 Jun.1955, AMR Wegner (MZB); 4 ♂, P. Rakata Kecil, Krakatau, 27 Jul.1982, Sk. Yamane (MZB); 1 ♂, P. Anak Krakatau, 10 Jul.1982, Sk. Yamane (MZB); Kepulauan Seribu: 6 ♀, 19 ♂, [1 ♀, Pulau Opak Besar, 05°40.23'S, 106°34.92'E, 9 Mar.2005; 1 ♀, 1 ♂, Pulau Kotok Besar, 05°41.976'S, 106°32.254'E, 10 Mar.2005; 1 ♂, Pulau Samak Daun, 05°43.778'S, 106°34.313'E, 11 Mar.2005; 1 ♀, 1 ♂, Pulau Pamagaran, 05°38.093'S, 106°34.74'E, 24 Mar.2005; 1 ♀, Pulau Dua Timur, 05°25.1'S, 106°29.4'E, 9 Apr.2005; 2 ♂, Pulau Bira Kecil, 05°37.6'S, 106°34.53'E, 12 Apr.2005; 1 ♀, 1 ♂, Pulau Bundar, 05°31.260'S, 106°31.563'E, 28 Apr.2005; 1 ♀, 1 ♂, Pulau Paniki, 05°41.726'S, 106°42.675'E, 30 Apr.2005; 4 ♂, Pulau Bokor, 05°56.744'S, 106°37.917'E, 5 May.2005; 2 ♂, Pulau Lancang Besar, 05°55.867'S, 106°35.230'E, 7 May.2005; 3 ♂, Pulau Rambut, 05°58.680'S, 106°41.569'E, 9 May.2005; 3 ♂, Pulau Untung Jawa, 05°58.611'S, 106°42.181'E, 11 May.2005], A. Spengler (MZB); Java I.: 1 ♀, 2 ♂, Carita, West Java, [1 ♀, 1 ♂, 21 Jul; 1 ♂, 13 Jul.1982], Sk. Yamane (MZB); 1 ♂, Geduwang, Baturetno, Wonogiri, Central Java, 24 Jul.2008, H. Nugroho & Giyanto (MZB); 1 ♂, 7°41.73'S, 110°28.99'E, alt. about 280 m, Manisrenggo, Klaten, Central Java, 30 Jun.2009, H. Nugroho (MZB); Kangean Is.: 4 ♀, 5 ♂, Bujutan, [3 ♀, 23 Aug; 1 ♀, 21 Aug; 5 ♂, 23 Aug.1954], A. Hoogerwerf (MZB); Karimunjawa Is.: 1 ♀ (MZB; holotype of *Pachymenes fragilis* var. *karimonensis*), 1 ♂ (MZB; paratype – allotype of *Pachymenes fragilis* var. *karimonensis*), "Karimon Djawa", 22–20 Nov.1930, M.A. Lieftinck; Kalimantan I.: 1 ♀, 1 ♂, Central Kalimantan, Hutan Gambut Kalampangan, Palangkaraya, Pematang Kanal, 02°17.956'S, 114°01.625'E, alt. about 15 m, 31. May.2003, S Kahono (MZB); 2 ♀, 1 ♂, E. Borneo, Samarinda, Muara Kaman, alt. about 50 m, Nov.1950, AMR Wegner (MZB); 3 ♀, 4 ♂, E. Borneo, Balikpapan [2 ♀, Wain River, alt. about 50 m, Nov.1950; 1 ♀, 4 ♂, Mentawir River, alt. about 50 m, Oct.1950], AMR Wegner (MZB); Bali I.: 1 ♀, 8°08'S, 115°04'E, Singaraja, 9 Sep.2005, J. Kojima & R. Ubaidillah (IUNH); 1 ♂, Tanah Lot, 10 Sep.2005, J. Kojima & R. Ubaidillah (IUNH); Lombok I.: 1 ♂, Mataram, 4 Nov.2000, J. Kojima (IUNH); 2 ♀, 4 ♂, 8°31.903'S, 116°14.288'E, alt. about 270 m, Aiq Nyet, Lingsar, Lombok Barat, 28 Mar.2010, H. Nugroho (MZB); 1 ♀, 8°34.010'S, 116°14.009'E, alt. about 255 m, TWA Suranadi, Narmada, 27 Mar.2010, H. Nugroho (MZB); 1 ♀, 8°33.065'S, 116°25.245" E, alt. about 590 m, Tetebatu, Sikur, Lombok Timur, 3 Apr.2010, H. Nugroho (MZB); Sumbawa I.: 1 ♂, Batudulang, Batulanteh, Sumbawa Besar, 10 Nov.2000, J. Kojima (IUNH); 1 ♀, 1 ♂, 8°37.555'S, 117°10.71'E, alt. about 920 m, Tepal, Batu Lanteh, [♀, 14 Apr.; ♂, 16 Apr.2010], H. Nugroho & Y.R. Suhardjono (MZB); Sulawesi I.: 2 ♀, [Remboken, Tondano; Rurukan, Tomohon], Minahasa Peninsula, 27 Nov.1999, J. Kojima (IUNH); 1 ♀, 2 ♂, Tompasu, Remboken, Minahasa peninsula, 29 Nov.1999, J. Kojima (IUNH).

**Remarks.** This species, widely distributed in southern Asia from India in the west to Moluccas and Lesser Sunda Islands (Lombok and Sumbawa, new records) in the east, is represented by four color forms formally recognized as subspecies, of which two are so far known respectively only from Bali (*baliensis*) and Karimunjawa Islands (*karimonensis*). As mentioned below, after examination of specimens from various localities mainly in the Indonesian Archipelago, we have reached the conclusion that *A. t. baliensis* and *A. t. karimonensis* are synonyms of *A. troglodytes*. We tentatively treat *shanensis* Giordani Soika, 1994 as a subspecies of *A. troglodytes* (see the checklist) until we have a chance to examine specimens of *A. troglodytes* from Myanmar including the type of *A. t. shanensis*.

Giordani Soika (1987) described *Pachymenes troglodytes baliensis* based on the female holotype and two males (paratypes) from Bali, and according to him this subspecies is characterized by more extensive yellow markings than typical *troglodytes* as follows: tegula and parategula entirely, paired sublateral bands and apical band on metasomal tergum I (Figs 30, 31), paired basal spots and apical bands both on tergum and sternum II, traces of apical band on tergum III, narrow apical band on sternum III, and narrow posteriomedian bands on terga IV–V. Our examination of the large number of specimens listed above, mainly from Java and Kangean Islands, shows that extensive variation in markings even occurs within local populations, thus *baliensis* would not be treated as a subspecies even if the subspecies had a position in the phylogenetic system. Van der Vecht (1937) treated the Karimunjawa Islands population of *P. troglodytes* as a distinct color variety and named it *Pachymenes fragilis* var. *karimonensis*. This local population is characterized by markings much reduced (Figs 34, 40, 41, 45). The Karimunjawa Islands population does not have any morphological characters justifying treating it as a valid species, and thus *A. t. karimonensis* (van der Vecht, 1937) is synonymized under *A. troglodytes* (de Saussure, 1856).

### Revised species checklist of the genus *Apodynerus*

Kumar et al. (2013) provided a checklist of the world species of *Apodynerus*, which included 15 species-group taxa (nine species and six subspecies). Below a revised species checklist is provided with detailed nomenclatural information.

*Apodynerus sparsipunctatus* Gusenleitner, 2008 described from New Caledonia was synonymized under *Parodynerus quodi* (Vachal, 1907) by Gusenleitner and Madl (2011) and is not included here.

#### *Apodynerus amandus* Gusenleitner, 2002

*Apodynerus amandus* Gusenleitner, 2002: 1091, 1093, ♂, ♀, “Thailand, Chiang Mai: Maerim”, holotype ♂ (LACM).

**Distribution.** Thailand: North Thailand.

***Apodynerus diffinis* Giordani Soika, 1996**

*Apodynerus diffinis* Giordani Soika, 1996: 36, ♂, “Sulawesi: Patunuang”, holotype (MVEN).

**Distribution.** Indonesia: Sulawesi.

***Apodynerus flavospinosus* (Giordani Soika, 1986)**

*Pachymenes flavospinosus* Giordani Soika, 1986: 80, ♀, ♂, “Naga Naga, Leyte, Palo”, holotype ♀ (IUNH).

*Apodynerus flavospinosus*; Giordani Soika 1994: 207 (key), 216.

**Distribution.** Philippines: Luzon, Leyte, Mindanao, Palawan.

***Apodynerus formosensis formosensis* (von Schulthess, 1934)**

*Odynerus formosensis* von Schulthess, 1934: 101, ♂, ♀, “Formosa” [=Taiwan], syntypes (ETHZ).

*Apodynerus formosensis formosensis*; Giordani Soika 1994: 208 (key), 217.

**Distribution.** Taiwan.

***Apodynerus formosensis continentalis* Giordani Soika, 1994**

*Apodynerus formosensis continentalis* Giordani Soika, 1994: 208 (key), 217, ♀, ♂, “Cina: Kukien, Kuantun”, holotype ♀ (MVEN).

**Distribution.** China; Laos; Vietnam.

***Apodynerus formosensis indicus* Giordani Soika, 1994**

*Apodynerus formosensis indicus* Giordani Soika, 1994: 208 (key), 218, ♀, “Nepal: Taplejung Distr., Snagu, 6500 ft”, holotype (BMNH).

**Distribution.** Nepal.



***Apodynerus gregarioides* (Giordani Soika, 1986)**

*Pachymenes gregarioides* Giordani Soika, 1986: 79, ♂, ♀, “Leyte: Palo”, holotype ♂ (IUNH).

*Apodynerus gregarioides*; Giordani Soika 1994: 208 (key), 219.

*Philippodynerus omicroniformis* Gusenleitner, 1996: 39, 40, ♂, “Philippines, Palo, Leyte, Naga-Naga”, holotype (SEIHU). **Syn. n.**

**Distribution.** Philippines: Luzon, Leyte; ?Indonesia: Sumba.

***Apodynerus icarioides* (Bingham, 1897)**

*Odynerus icarioides* Bingham, 1897: 363 (key), 372, ♀, “Tenasserim”, type (BMNH).

*Pachymenes icarioides*; van der Vecht 1937: 278.

*Apodynerus icarioides*; Giordani Soika 1994: 208 (key), 219.

**Distribution.** India: Assam, Sikkim; Myanmar; Malaysia: Sarawak, Sabah; Indonesia: Kalimantan.

***Apodynerus nitidiclypeus* Gusenleitner, 2013**

*Apodynerus nitidiclypeus* Gusenleitner, 2013: 121, 125, figs 11–15, ♀, ♂, “Vietnam, Dak Lak Prov., Easo, 12°55'N 108°38'E, holotype ♀ (OLM).

**Distribution.** Vietnam.

***Apodynerus quadricolor* Giordani Soika, 1994**

*Apodynerus yayeyamensis tricolor* Giordani Soika 1994: 209 (key), [incorrect spelling].

*Apodynerus yayeyamensis quadricolor* Giordani Soika 1994: 215, ♂, ♀, “C. Sumba, Lokojengo”, holotype ♂ (RMNH).

**Distribution.** Indonesia: Sumba.

***Apodynerus rufipes* Giordani Soika, 1994**

*Apodynerus rufipes* Giordani Soika, 1994: 207 (key), 214, ♀, “Flores: Ruteng”, holotype (RMNH).

**Distribution.** Indonesia: Flores.

***Apodynerus troglodytes troglodytes* (de Saussure, 1856)**

*Odynerus troglodytes* de Saussure, 1856: 249, ♂, “le Sénégal” [type locality doubtful], type (MRSN).

*Odynerus fragilis* Smith, 1857: 61, ♂, “Borneo”, type (BMNH). Synonymized by Yamane (1990).

*Odynerus petulans* Smith, 1861: 89, ♀, “Makassar”, type (OUM). Synonymized by van der Vecht (1937).

*Odynerus lybas* Cameron, 1902: 114, ♀, “Sarawak”, type (BMNH). Synonymized by van der Vecht (1937).

*Odynerus drescheri* Cameron, 1905: 77, ♀, “Tjandi near Semarang”, type (BMNH). Synonymized by van der Vecht (1937).

*Odynerus brooksii* Cameron, 1908: 561, ♂, “Kuching, Sarawak, Borneo”, type depository unknown. Synonymized by van der Vecht (1937).

*Pachymenes fragilis*; van der Vecht, 1937: 277.

*Pachymenes fragilis* var. *karimonensis* van der Vecht, 1937: 278, ♀♂, “Karmon Djawa Islands”, holotype ♀ (MZB). **Syn. n.**

*Antepipona fragilis*; Lee 1982: 218, 220.

*Pachymenes troglodytes baliensis* Giordani Soika, 1987: 145, ♀♂, “Bali: Samur”, holotype ♀ (MVN). **Syn. n.**

*Apodynerus troglodytes troglodytes*; Gusenleitner 1988: 180.

*Apodynerus* “(VAN DER VECHT i. l.)” *troglodytes*; Gusenleitner 1991: 258.

*Pachymenes troglodytes*; Giordani Soika 1991: 164.

*Apodynerus troglodytes*; Giordani Soika 1993a: 156, fig.

*Apodynerus troglodytes baliensis*; Giordani Soika 1994: 209 (key), 212.

*Apodynerus troglodytes karimonensis*; Giordani Soika 1994: 209 (key), 213.

**Distribution.** India; Andaman and Nicobar Islands; China; Hong Kong; Myanmar; Thailand; Laos; Malaysia: Peninsular Malaysia, Sarawak, Sabah; Singapore; Indonesia: Sumatra, Krakatau Islands, Kepulauan Seribu (new record), Java, Kangean Islands, Bali, Karimunjawa Islands, Sulawesi, Moluccas, Lombok (new record), Sumbawa (new record).

***Apodynerus troglodytes shanensis* Giordani Soika, 1994**

*Apodynerus troglodytes shanensis* Giordani Soika 1994: 209 (key), 213, ♂, ♀, “Burma: Shan State, estremità S del lago Inle, Taugdo, 900 m”, holotype ♂ (RMNH).

**Distribution.** Myanmar.

***Apodynerus yayeyamensis* (Matsumura, 1926)**

*Odynerus yayeyamensis* Matsumura 1926, in Matsumura and Uchida, 1926: 36, ♂, “Okinawa (Okinawa-honto)” [possibly erroneously listed locality], lectotype from Yaeyama Islands (SEIHU).

*Odynerus hokotoensis* Sonan 1929: 534, ♀♂, [Taiwan:] “Hôkotô ... Takao”. Holotype ♀ originally in “Entomological Laboratory, Taihoku Imperial University”, but current depository unknown. Synonymized by Yamane (1990).

*Pachymenes yayeyamensis*; Giordani Soika, 1986: 65, figs 5–9.

*Apodynerus yayeyamensis yayeyamensis*; Giordani Soika 1994: 209 (key), 215.

**Distribution.** Taiwan; Japan: Ryukyu Islands

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