

Revision of the genus *Trispinaria* Quicke (Hymenoptera: Braconidae)

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The genus *Trispinaria* Quicke, 1986 (Hymenoptera: Braconidae: Braconinae) has been revised and six new species are described. The type-species is fully illustrated, and redescribed. A key to the species is added; the phylogeny, biogeography and distribution are discussed.

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Introduction

In 1986 the aberrant genus *Trispinaria* Quicke was described from SW. Sulawesi, including only the type-species (Quicke, 1986). For some time I planned to revise this genus because of the presence of two new species in the collections of the Nationaal Natuurhistorisch Museum, Leiden and because more specimens of different species were found in other collections. Finally during my visit to the Polska Akademia Nauk in October 1990 a second described species from Sumatra was discovered, which was incorrectly included in the genus *Pseudospinaria* Enderlein, 1920; the latter genus was included in the subfamily Exothecinae Foerster, 1862 by Enderlein (1920: 54) instead of in the subfamily Braconinae Nees, 1812 where it belongs.

The biology of *Trispinaria* is unknown, but the united and heavily sclerotized basal segments of the metasoma suggest the oviposition into a hard substrate. It has been collected in teak-forests; this agrees with my experience in Borneo (Sabah) and Sulawesi that this species is not found in the rain-forest. Its colour also corroborates the idea that it occurs in open, rather sunny and dry types of forest. In the Indo-Australian tropical rain-forest most of the large Braconidae possess a dark reddish-brown and black colour pattern (personal observation); to some degree this agrees with observations in Africa (Quicke, 1986b).

The taxonomical position of the genus is uncertain. It shares with the subtribes *Physaraiina* van Achterberg, 1984 and the *Aspidobraconina* van Achterberg, 1984 the immovably joined first and second metasomal tergites, the setose mesoscutum, the presence of the median carina of the metanotum, and of the malar suture, and the short second submarginal cell of fore wing (van Achterberg, 1984: fig. 153). In Quicke's analysis (Quicke, 1988) it was placed as a sister-group of *Physaraia* Shenefelt, 1978. However, *Trispinaria* has a long vein 1r-m of hind wing (figs. 5, 8), the third-fifth metasomal tergites possess spines (figs. 1, 16), the first subdiscal cell of fore wing is more slender (fig. 5), the second tergite has a pair of converging grooves (fig. 15), and the propleuron is concave ventrally (fig. 1). More likely it is closely related to the Oriental genus *Pseudospinaria* Enderlein, 1920 because of the shared

long and curved vein 1r-m of hind wing, the pair of converging grooves of the second tergite, the protruding median carina of metanotum, the presence of spines on third to sixth tergites and the united dorsal carinae of the first tergite. The additional subapical tooth of the tarsal claws of *Pseudospinaria* is obviously reduced in *Trispinaria*. *Pseudospinaria* differs from *Trispinaria* by having both basal segments of metasoma movably joined, the large second submarginal cell of fore wing, the bifurcate tarsal claws, and the reduced scutellar sulcus.

For the terminology used in this paper, see van Achterberg, 1988 (p. 5-11).

Biogeography

The species of the genus *Trispinaria* occur all over the Oriental region from Sri Lanka to Sulawesi, the Philippines, Taiwan, and south as far as the Kangean Islands near Bali. Both less derived species (fig. 45), i.e., *T. setosa* spec. nov. (which has the vein 1r-m of hind wing still free: fig. 29) and *T. betremi* (which has the subbasal cell of fore wing completely setose: fig. 33) occur on these islands. The remainder of the species are more derived. The most derived group occurs in the Philippines and Sulawesi (*T. unicolor* spec. nov., *T. priscicolorus* Quicke, *T. sulcata* spec. nov.). The group is characterized by the convex vertex (fig. 12), the grooves of the mesoscutum (fig. 13), and the more or less sculptured depressions of the frons (fig. 14). The less derived group has a large distribution from Sumatra to India and Taiwan (fig. 45).

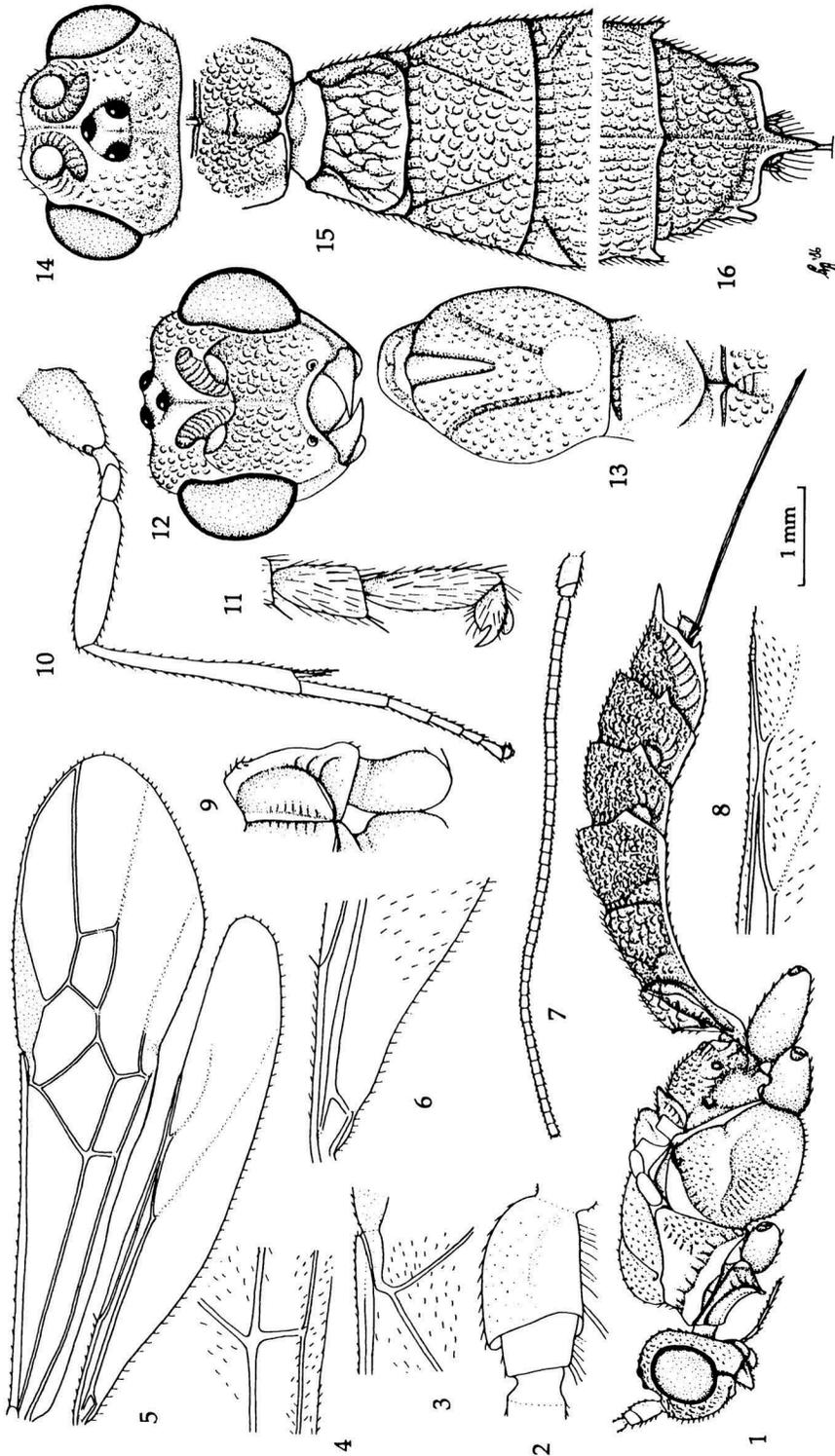
Systematic part

Trispinaria Quicke, 1986

Trispinaria Quicke, 1986a: 10 & 1987: 134.

Type-species: *Trispinaria priscicolorus* Quicke, 1986 (by original designation).

Diagnosis.— Antennal segments 66-79; face rugose or punctate; vertex and mesosoma dorsally distinctly punctate (figs. 1, 12-14, 28, 44); scapus robust, dorsally longer than ventrally or truncate apically (figs. 2, 27), and inner apex without double margin; eyes glabrous and slightly or not emarginate (figs. 12, 28), and without depression behind eyes (fig. 1); clypeus elevated dorsally, but without dorsal or ventral carinae (figs. 12, 28); malar suture present, rather weakly defined (fig. 12); labio-maxillary complex not protruding; occipital flange large and wide (fig. 1), fitting in the concavity of the propleuron; frons may possess pair of sculptured depressions (figs. 12, 14); mandible with carina on its outer side; labrum concave; antescutal depression absent; mesoscutum short setose; notauli complete (fig. 13); propleuron strongly concave, and with curved crest posteriorly (fig. 9); mesosternal groove crenulate; pleural sulcus smooth; metapleural flange distinct (fig. 1); scutellar sulcus rather narrow and with some crenulae (fig. 13); median carina of metanotum complete and protruding posteriorly (figs. 1, 13); propodeum with median depression, without median carina, and only with V-shaped carina posteriorly (fig. 15);



Figs. 1-16. *Trispinaria priscoloris* Quicke, 9, holotype. 1, habitus, lateral aspect; 2, scapus, outer lateral aspect; 3, detail of vein 1-SR of fore wing; 4, posterior part of subbasal cell of fore wing; 5, wings; 6, base of hind wing; 7, antenna; 8, detail of vein 1r-m of hind wing; 9, propleuron, latero-ventral aspect; 10, hind leg; 11, inner hind claw; 12, head, frontal aspect; 13, mesosoma, dorsal aspect; 14, head, dorsal aspect; 15, propodeum, first and second metasomal tergites, dorsal aspect; 16, sixth tergite, dorsal aspect. 1, 5, 7, 10: 1 x scale-line; 2, 11: 5 x; 3, 4, 6, 8, 9, 12-16: 2 x.

propodeal spiracle rather large, round and situated behind middle of propodeum, without tubercle above it but rather angular protruding latero-posteriorly (fig. 1); angle between veins 1-SR and C+SC+R of fore wing about 75 ° (figs. 3, 17, 22, 34, 42); vein 1-SR+M of fore wing straight (fig. 32) or bent posteriad (fig. 26); vein cu-a of fore wing slightly postfurcal (figs. 4, 40, 41); vein 1-M of fore wing straight; vein CU1b of fore wing much shorter than vein 3-CU1 (fig. 37); vein m-cu of fore wing medium-sized, far antefurcal and converging posteriorly to vein 1-M (figs. 5, 22, 37, 42); vein 1-R1 of fore wing much longer than pterostigma, ending near apex of fore wing and distad of apex of vein 3-M (figs. 5, 17, 37); vein 1-SR of fore wing short to obsolescent (figs. 3, 32); vein r of fore wing oblique and about as long as maximum width of pterostigma or longer (figs. 5, 22, 37); second submarginal cell of fore wing robust, upper and lower veins parallel-sided, and anteriorly more or less narrowed (figs. 5, 22, 37, 42); vein 2-SC+R of hind wing long and longitudinal (figs. 5, 8, 19); vein 1r-m of hind wing about as long as vein SC+R1 and more or less curved (figs. 8, 23, 29, 36); vein 1-M of hind wing normally widened basally (fig. 6); marginal cell of hind wing absent apically and vein SR curved basally (fig. 5); base of hind wing glabrous (fig. 6); hind wing with one subbasal bristle (fig. 6); tarsal claws with acute medial lobe and only with setae (fig. 11); fourth tarsal segment truncate apically and with bristly setae (fig. 11); fore tibia with one spur, and anteriorly normally setose; dorsal carinae of first tergite united in basal 0.4 of tergite (fig. 15), and dorso-lateral carina present (fig. 1); first tergite widely concave basally and immovably joined to second tergite (fig. 15); second metasomal suture deep, straight, wide and crenulate (fig. 15); second tergite with pair of narrow posteriorly converging grooves and no medio-basal area (fig. 15); second to sixth tergites with antero-lateral grooves and no subapical transverse grooves (fig. 1); fourth to sixth tergites with weak median carina (fig. 16); third to sixth tergites with lateral protuberances (figs. 15, 16); sixth tergite of ♀ with medio-apical spine (fig. 16), but absent in ♂ (fig. 21); first to sixth tergites with sharp lateral crease; length of ovipositor sheath 0.3-0.5 times fore wing, rather slender and normally setose; hypopygium of ♀ large and acute, but not protruding beyond apex of metasoma.

Distribution.— Oriental: eight species.

Note.— The phylogenetic relationships and distribution of the species are depicted in fig. 45.

Key to species of the genus *Trispinaria*

1. Middle lobe of mesoscutum with pair of long and deep longitudinal grooves (fig. 13); vertex strongly convex, distinctly protruding above level of eyes in frontal view (fig. 12) 2
- Middle lobe of mesoscutum without grooves, except pair of short shallow impressions, not or hardly reaching disc of mesoscutum; vertex normal, slightly protruding above level of eyes in frontal view (fig. 28) 4
2. Mesoscutum with three black patches; area behind stemmaticum dark brown or black; sixth metasomal tergite with pair of dark patches, or if completely yellowish-brown then length of ovipositor sheath about 0.4 times fore wing (figs. 1, 5); vein 3-SR of fore wing usually somewhat longer than vein 2-SR (fig. 5) 3

- Mesoscutum completely yellowish-brown; area behind stemmaticum yellowish-brown or infuscated; sixth tergite completely yellowish-brown; length of ovipositor sheath about 0.3 times fore wing; length of vein 3-SR of fore wing about equal to length of vein 2-SR (fig. 17), exceptionally somewhat longer *T. unicolor* spec. nov.
- Note. One specimen (AEI) has the pterostigma largely yellowish and the scapus completely brownish-yellow, and is probably a colour aberration of *unicolor*.
- 3. Third to sixth metasomal tergites with pair of dark patches per tergite; length of ovipositor sheath about 0.3 times fore wing; scapus dark brown dorsally; hind tarsus dark brown; mesopleuron only punctate anteriorly; vertex partly smooth, and with smaller punctures (fig. 24) *T. sulcata* spec. nov.
- Third to sixth tergites completely yellowish-brown; length of ovipositor sheath about 0.4 times fore wing (figs. 1, 5); scapus yellowish-brown dorsally; hind tarsus yellowish-brown; mesopleuron with rugulae anteriorly (fig. 1); vertex largely punctate and with large punctures (fig. 14) *T. priscicolorus* Quicke
- 4. Hind coxa and femur, and propodeum yellowish-brown; metasoma at most with small patches on fourth-sixth tergites blackish; medial third of propodeum punctate or rugulose; (Indonesia) 5
- Hind coxa and femur, propodeum largely, and large patches of six basal metasomal tergites black (but hind femur may be largely infuscated only, and propleuron of σ may be completely yellowish; transverse medial third of propodeum distinctly rugose; (Sri Lanka to Taiwan) 6
- 5. Vein 3-SR of fore wing distinctly shorter than vein 2-SR (fig. 26); second submarginal cell of fore wing comparatively short (fig. 26); base of pterostigma yellowish, contrasting with dark brown distal half of pterostigma; mesoscutum and metasoma completely yellowish-brown; surroundings of stemmaticum black; vein 1r-m of hind wing distinctly separated from vein 1-SC+R (fig. 29); wing membrane yellowish; subbasal cell of fore wing normally setose (fig. 30) *T. setosa* spec. nov.
- Vein 3-SR of fore wing about as long as vein 2-SR (fig. 32); second submarginal cell of fore wing longer (fig. 32); whole pterostigma blackish; mesoscutal lobes medially and pair of patches of sixth metasomal tergite (sometimes also on fourth and fifth tergites) blackish; surroundings of stemmaticum yellowish-brown; vein 1r-m of hind wing partly united with vein 1-SC+R (fig. 31); wing membrane subhyaline; anterior half of subbasal cell of fore wing largely glabrous (fig. 35) *T. betremi* spec. nov.
- 6. Mesoscutal lobes and stemmaticum completely brown; first and second metasomal tergites completely white; anterior half of subbasal cell of fore wing setose (fig. 33); length of ovipositor sheath about 0.45 times fore wing; second submarginal cell of fore wing comparatively long (fig. 34) *T. albibasis* spec. nov.
- Mesoscutal lobes black(ish) medially; stemmaticum at least infuscated; first and second tergites partly black; anterior half of subbasal cell of fore wing largely glabrous (figs. 40, 41); length of ovipositor sheath 0.29-0.48 times fore wing; second subbasal cell of fore wing comparatively short (figs. 37, 42) 7
- 7. Surroundings of stemmaticum of ♀ blackish; whole antenna black; face coarsely punctate, at most with some rugae dorsally; second submarginal cell of fore wing comparatively robust (fig. 37); vein cu-a of fore wing distinctly inclivous, more so

- than vein 3-CU1 (figs. 37, 40); length of ovipositor sheath 0.46-0.48 times fore wing; length of vein SR1 of fore wing 3.9-4.4 times vein 3-SR (fig. 37)
 *T. sannio* (Enderlein)
- Surroundings of stemmaticum of ♀ yellowish-brown; antenna near its apical 0.4 brown; face transversely rugose; second submarginal cell of fore wing less robust (fig. 42); vein cu-a of fore wing vertical or nearly so, less inclivous than vein 3-CU1 (figs. 41, 42); length of ovipositor sheath 0.29-0.37 times fore wing; length of vein SR1 of fore wing 4.5-6.2 times vein 3-SR (fig. 42) *T. maculata* spec. nov.

***Trispinaria albibasis* spec. nov.**
 (figs. 33, 34, 36)

Material.— Holotype, ♀ (TC), "Pasoh Forest Res., Negri S., Malaysia, 25.x.[19]79, sec. for., P. & M. Becker".

Holotype, ♀, length of body 6.6 mm, of fore wing 6.1 mm.

Head.— Antennal segments 69, length of third segment 1.2 times fourth segment, length of third, fourth, and penultimate segments 2.4, 2.0, and 1.4 times their width, respectively; length of maxillary palp 0.9 times height of head; length of eye in dorsal view 2.7 times temple; OOL:diameter of ocellus:POL = 10:5:4; depressions of frons obsolescent; frons finely punctate, and with median groove; vertex sparsely finely punctate, with interspaces much wider than diameter of punctures, and laterally hardly protruding above level of eyes; face coarsely transversely rugose; length of malar space 0.7 times basal width of mandible.

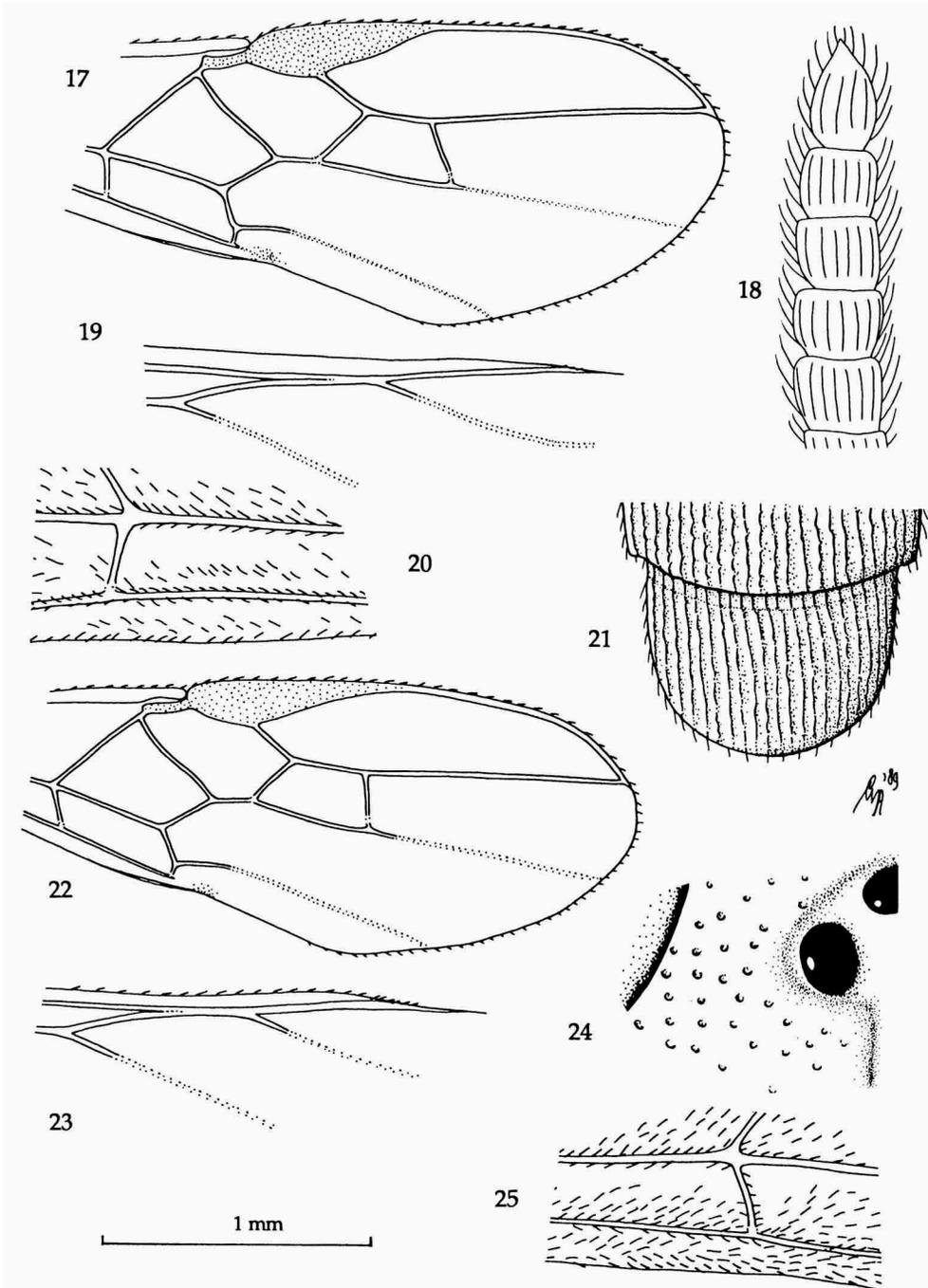
Mesosoma.— Length of mesosoma 1.5 times its height; pronotal sides coarsely crenulate medially, and remaining part largely smooth; mesopleuron anteriorly and posteriorly smooth, but subanteriorly and medio-ventrally comparatively sparsely and finely punctate, and medio-dorsally coarsely punctate; middle lobe of mesoscutum without grooves on disc, only with pair of short and superficial impressions on anterior vertical part; mesoscutal lobes largely smooth, but especially near notauli finely punctate; notauli moderately crenulate; transverse medial part of propodeum coarsely rugose. Further as *T. priscicolorus*.

Wings.— Fore wing: r:3-SR:SR1 = 10:15:55; 2-SR:3-SR:r-m = 12:15:11; r-m comparatively strongly inclivous (fig. 34); anterior half of subbasal cell setose (fig. 33); second submarginal cell comparatively long (fig. 34); cu-a vertical or nearly so (figs. 33, 34); 1-SR+M slightly curved. Hind wing: long part of 1r-m united with 1-SC+R (fig. 36).

Legs.— Length of femur, tibia, and basitarsus of hind leg 4.6, 10.2, and 8.6 times their width, respectively; length of hind tibial spurs 0.4 and 0.5 times hind basitarsus.

Metasoma.— Length of first tergite 0.6 times its apical width; sculpture and shape of metasoma as for *T. priscicolorus*, but antero-lateral grooves deeper; length of ovipositor sheath 0.45 times fore wing.

Colour.— Yellowish-brown; mesosoma (except propodeum) largely brown; basal half (except inner side of scapus) and apical tenth of antenna, propodeum largely, hind leg, large patches (divided by a narrow line) on third-sixth tergites and ovipositor sheath black(ish); middle coxa, trochanter, and tarsus, veins, and pterostigma dark brown; stemmaticum brown; remainder of metasoma white; apical third of



Figs. 17-21, *Trispinaria unicolor* spec. nov., ♀, holotype, but fig. 21 of ♂(?) from Quezon National Park, Luzon, Philippines; figs. 22-25, *T. sulcata* spec. nov., ♀, holotype. 17, 22, apical half of fore wing; 18, apex of antenna; 19, 23, detail of vein 1r-m of hind wing; 20, 25, apical quarter of subbasal cell of fore wing; 21, sixth metasomal tergite, dorsal aspect; 24, detail of area between stemmaticum and eye (= OOL). 17, 22: 0.5 × scale-line; 18: 2.8 ×; 19-21, 23, 25: 1 ×; 24: 1.9 ×.

wing membrane slightly infuscated.

***Trispinaria betremi* spec. nov.**
(figs. 31, 32, 35)

Material.— Holotype, ♀ (RMNH), "Tembajangan, Djati-bosch [= Teak-forest], ii.[19]36, leg. Walsh", "Kangean eilanden [= Kangean Islands, north of Bali]". Paratype: 1 ♀ (QC), "Tjimerang, W. Java, xi", "Sternitzky collection".

Holotype, ♀, length of body 7.9 mm, of fore wing 6.5 mm.

Head.— Remaining antennal segments 35, length of third segment 1.4 times fourth segment, length of third, and fourth segments 2.0, and 1.4 times their width, respectively; length of maxillary palp 0.8 times height of head; length of eye in dorsal view 2.6 times temple; OOL:diameter of ocellus:POL = 10:5:3; depressions of frons present, but largely smooth; vertex sparsely punctate anteriorly, and distinctly punctate posteriorly, with interspaces about equal to diameter of punctures, and rather flat, laterally hardly protruding above level of eyes; face coarsely transversely rugose; length of malar space 0.7 times basal width of mandible.

Mesosoma.— Length of mesosoma 1.5 times its height; pronotal sides coarsely crenulate medially, and remaining part largely smooth; mesopleuron antero-ventrally densely punctate, and remainder of mesopleuron smooth (but dorsally with rugose area and punctulate postero-ventrally); middle lobe of mesoscutum without grooves on disc, only with pair of short and superficial impressions on anterior vertical part; mesoscutal lobes largely smooth; notauli widely crenulate; transverse medial part of propodeum rugulose, and medially with some rugae. Further as *T. priscicolorus*.

Wings.— Fore wing: r:3-SR:SR1 = 14:15:73; 2-SR:3-SR:r-m = 16:15:14; subbasal cell largely glabrous, but setose near posterior border (fig. 35); cu-a oblique (figs. 32, 35); 1-SR+M nearly straight (fig. 32). Hind wing: long part of 1r-m united with 1-SC+R (fig. 31).

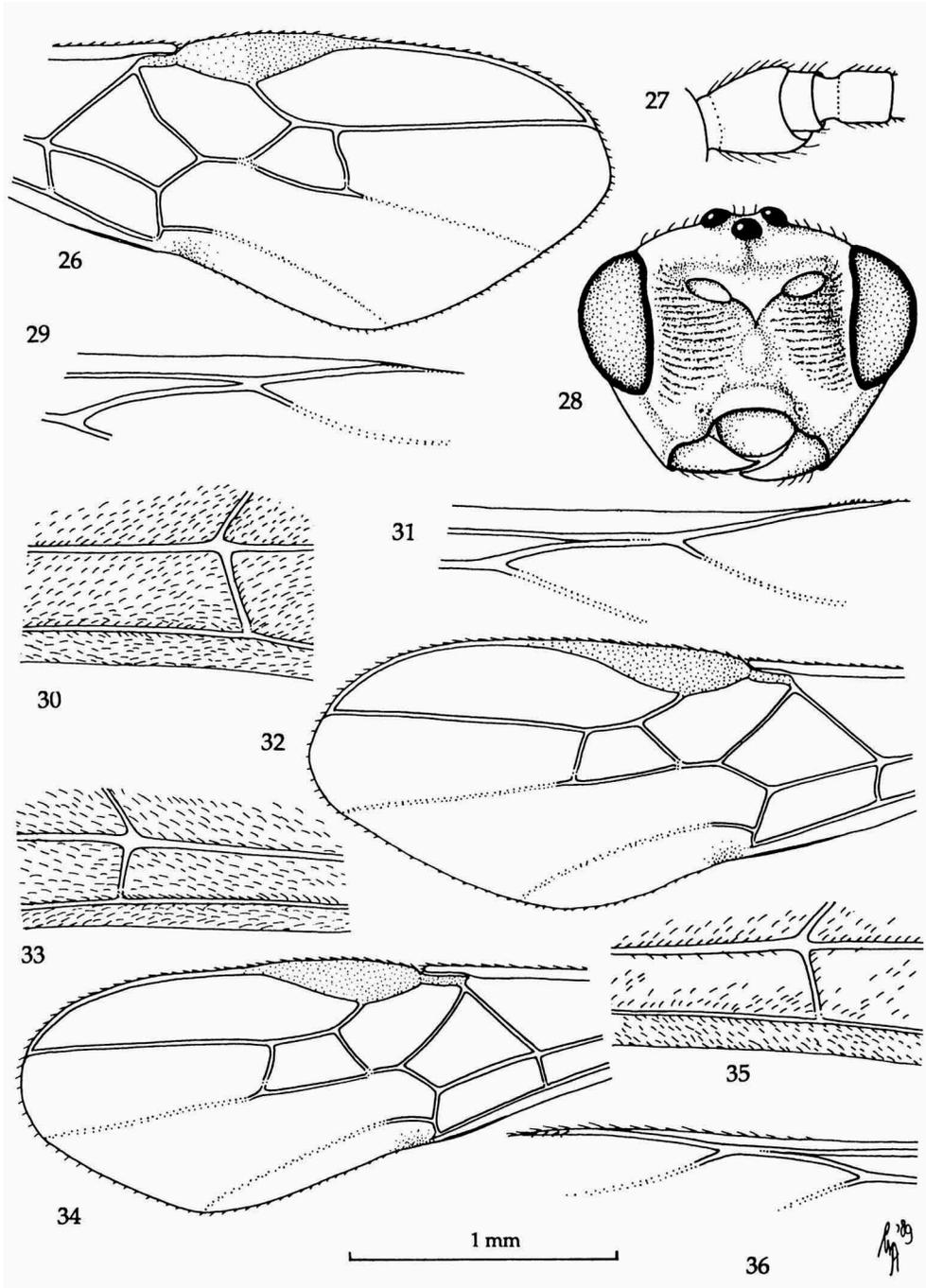
Legs.— Length of femur, tibia, and basitarsus of hind leg 4.1, 8.4, and 7.6 times their width, respectively; length of hind tibial spurs 0.4 and 0.5 times hind basitarsus.

Metasoma.— Length of first tergite 0.7 times its apical width; sculpture and shape of metasoma as of *T. priscicolorus*, but antero-lateral grooves deeper; length of ovipositor sheath 0.33 times fore wing.

Colour.— Yellowish-brown; antenna (as far as present, including scapus but with narrow brown stripe on its outer side), three patches of mesoscutum, pterostigma, vein C+SC+R of fore wing, pair of patches of fifth and sixth tergites, and ovipositor sheath blackish; pair of patches of fourth tergite, stemmaticum, hind tarsus (except basal 0.7 of basitarsus), and veins dark brown; wing membrane subhyaline.

Variation.— Length of fore wing 6.5-6.7 mm, of body 7.5-7.9 mm; length of ovipositor sheath 0.33-0.34 times fore wing. Paratype has the dark patches on fourth and fifth tergites missing.

Note.— This species is dedicated to Dr J.G. Betrem (1899-1980), because the holotype belonged to his collection. It is because of the efforts of him and Dr P.A. van der Laan (Wageningen) that the Braconidae in his collection were rescued after the Japanese occupation.



Figs. 26-30, *Trispinaria setosa* spec. nov., ♀, holotype; figs. 31, 32, 35, *T. betremi* spec. nov., ♀, holotype; figs. 33, 34, 36, *T. albibasis* spec. nov., ♀, holotype. 26, 32, 34, apical half of fore wing; 27, detail of scapus and pedicellus, outer aspect; 28, head, frontal aspect; 30, 33, 35, apical quarter of subbasal cell of fore wing; 31, 36, detail of vein 1r-m of hind wing. 26: 0.4 × scale-line; 27: 1.2 ×; 28-30: 0.8 ×; 31, 32, 35, 36: 1 ×; 32, 34: 0.5 ×.

***Trispinaria maculata* spec. nov.**
(figs. 41-44)

Material.— Holotype, ♀ (TC), "Sunmoon Lake, Taiwan, M. Trap, x.28-xi.3.1969". Paratypes: 5 ♀♀; 1 ♀ (TC), "S.India, Coimbatore, iv.[19]60, P.S. Nathan"; 2 ♀♀ (QC, RMNH), "Pasoh Forest Res., Negri S., Malaysia, i.16.[19]79 & ii.4.[19]80, for. gap & sec. forest, P. & M. Becker"; 1 ♀ (USNM), "Singapore, Coll. Baker"; 1 ♀ (USNM), "Sri Lanka, Kan., Kandy, 5-15.vii.1976, S. Karunaratne", "Udawattakele Sanctuary, 2100 feet".

Holotype, ♀, length of body 8.2 mm, of fore wing 7.0 mm.

Head.— Antennal segments 66, length of third segment 1.3 times fourth segment, length of third, fourth and penultimate segments 2.2, 1.7, and 1.4 times their width, respectively; length of maxillary palp 0.7 times height of head; length of eye in dorsal view 2.8 times temple (fig. 44); OOL:diameter of ocellus:POL = 15:7:6; depressions of frons obsolescent, frons laterally rugose, medially smooth and with groove (fig. 44); vertex rather flat, slightly protruding above level of eye dorsally, punctate with interspaces usually wider than punctures and area between eye and ocelli largely smooth (fig. 44); face transversely rugose; length of malar space 0.8 times basal width of mandible.

Mesosoma.— Length of mesosoma 1.6 times its height; pronotal sides coarsely crenulate medially, punctate postero-dorsally, and remainder largely smooth; mesopleuron densely punctate anteriorly and ventrally, and remainder largely smooth; middle lobe of mesoscutum without grooves on disc, only with a pair of short impressions on vertical part; mesoscutal lobes finely punctate, especially near notauli; notauli moderately crenulate; transverse medial part of propodeum coarsely rugose. Further as *T. priscicolorus*.

Wings.— Fore wing: r:3-SR:SR1 = 15:13:81; 2-SR:3-SR:r-m = 18:13:19; second submarginal cell less robust than that of *T. sannio*; anterior half of subbasal cell largely glabrous and remainder setose (fig. 42); cu-a vertical; 1-SR+M straight. Hind wing: long part of 1r-m largely united with 1-SC+R (fig. 43).

Legs.— Length of femur, tibia and hind basitarsus of hind leg 4.3, 10.8, and 8 times their width, respectively; length of hind tibial spurs 0.4 and 0.5 times hind basitarsus.

Metasoma.— Length of first tergite 0.6 times its apical width; sculpture and shape of metasoma as of *T. priscicolorus*, but antero-lateral grooves deep and crenulate; length of ovipositor sheath 0.29 times fore wing.

Colour.— Pale yellowish; basal half and apical fifth of antenna, large patches on mesoscutum, propodeum, first and second tergites with a large patch, third to sixth tergites with pair of large patches, separated by a narrow pale line, ovipositor sheath and hind leg (except spurs) black; remainder of antenna brown; scapus with indistinct and narrow dark brown area dorsally; veins, pterostigma, patches on metapleuron dorsally and posteriorly, and stemmaticum dark brown; apical third of wing membrane slightly infuscated, and remainder subhyaline.

Variation.— Length of body 6.3-8.2 mm, of fore wing 4.9-7.0 mm; vein SR1 of fore wing 4.5-6.2 times vein 3-SR; length of ovipositor sheath 0.29-0.37 times fore wing; vein 3-SR of fore wing distinctly shorter (holotype), about equal to, or somewhat longer than vein 2-SR; hind femur may be largely infuscated only; metapleuron may be completely yellowish-brown; body pale yellowish to yellowish-brown; surround-

ings of stemmaticum yellowish or infuscated; dark brown dorsal patch of metapleuron present or absent, sometimes as a faintly pigmented spot only; ventral part of hind coxa and hind trochantellus may be yellowish.

***Trispinaria priscicolorus* Quicke, 1986**
(figs. 1-16)

Trispinaria priscicolorus Quicke, 1986a: 12, figs. 1-11 & 1987: 134.

Material.— Holotype, ♀ (OUM), "Apr. 30, 1905, Celebes, Macassar, R. Shelford", "1905, 12/63", "Holotypus *Trispinaria priscicolorus* Quicke '83", "Type Hym.: 1333, *Trispinaria priscicolorus* Quicke, Hope Dept. Oxford".

Holotype, ♀, length of body 7.8 mm, of fore wing 6.6 mm.

Head.— Remaining antennal segments 42, length of third segment 1.3 times fourth segment, length of third, and fourth segments 2.0 and 1.6 times their width, respectively; length of maxillary palp 0.8 times height of head; length of eye in dorsal view 2.7 times temple (fig. 14); OOL:diameter of ocellus:POL = 9:4:5; pair of depressions of frons bean-shaped and rugulose (figs. 12, 14), and frons with median groove; vertex rather coarsely punctate (fig. 14), with interspaces narrower than diameter of punctures, area between eye and ocelli distinctly punctate, and strongly convex, laterally protruding above level of eyes (fig. 12); face largely coarsely rugose (fig. 12); length of malar space 0.9 times basal width of mandible.

Mesosoma.— Length of mesosoma 1.6 times its height; pronotal sides crenulate medially, punctate posteriorly, and remainder largely smooth (fig. 1); mesopleuron with rugulae anteriorly, posteriorly and dorsally punctate (fig. 1), and remainder largely smooth; middle lobe of mesoscutum with pair of weakly converging grooves, enclosing a glabrous and smooth triangular area medially (fig. 13); remainder of mesoscutum coarsely punctate and short setose; surface of propodeum coarsely reticulate-punctate, medially depressed and only with a few carinae (fig. 15).

Wings.— Fore wing: r:3-SR:SR1 = 6:9:34; 2-SR:3-SR:r-m = 7:9:7; second submarginal cell less robust than that of most other species (fig. 5); subbasal cell largely glabrous except posteriorly (fig. 4); cu-a straight and vertical (fig. 4); 1-SR+M straight. Hind wing: part of 1r-m close to 1-SC+R and nearly united (fig. 8).

Legs.— Length of femur, tibia and hind basitarsus of hind leg 4.3, 10.4, and 6.8 times their width, respectively; length of hind tibial spurs 0.50 and 0.55 times hind basitarsus.

Metasoma.— Length of first tergite 0.7 times its apical width, its surface behind united dorsal carinae coarsely and rather sparsely reticulate (fig. 15), and its medial convexity surrounded by a groove laterally; glymma wide and deep anteriorly (fig. 1); second-sixth tergites coarsely reticulate, more densely from third tergite onwards (fig. 1), and their antero-lateral grooves medium-sized (fig. 1); length of ovipositor sheath 0.42 times fore wing.

Colour.— Pale brownish-yellow; outer and ventral sides of scapus largely, stemmaticum and area behind it, and mesoscutal lobes medially, black; remainder of antenna, hind tarsus and metasoma yellowish-brown; pterostigma and most veins brown; pterostigma paler anteriorly than posteriorly; wing membrane subhyaline.

***Trispinaria sannio* (Enderlein, 1920)**
(figs. 37-40)

Pseudospinaria sannio Enderlein, 1920: 54; Shenefelt, 1975: 1212.

Trispinaria sannio; Quicke & van Achterberg, 1990: 262.

Material.— Holotype, ♀ (PAN), "Sumatra, Soekaranda, Dr. H. Dohrn S.", "Type", "Pseudospinaria sannio Enderl., ♀, Type, Dr. Enderlein det. 1919"; 1 ♀ (USNM), "Singapore, Coll. Baker".

Holotype, ♀, length of body 10.0 mm, of fore wing 8.8 mm.

Head.— Antennal segments 77 (but apical segment missing; of ♀ from Singapore 79), length of third segment 1.2 times fourth segment, length of third, and fourth segments 1.8, and 1.5 times their width, respectively (penultimate segment of ♀ from Singapore 1.4 times); length of maxillary palp equal to height of head; length of eye in dorsal view 2.6 times temple; OOL:diameter of ocellus:POL = 11:5:4; depressions of frons obsolescent, with deep median groove, laterally coarsely punctate, and medially largely smooth; vertex sparsely finely punctate, with interspaces much wider than punctures and area between stemmaticum and eyes largely smooth, and rather flat, laterally hardly protruding above level of eyes; face coarsely punctate and with some rugae dorsally (but rugae absent in ♀ from Singapore), interspaces about equal to diameter of punctures or narrower; length of malar space 0.5 times basal width of mandible.

Mesosoma.— Length of mesosoma 1.7 times its height; pronotal sides, mesopleuron, mesoscutum, notauli and propodeum as in *T. maculata*.

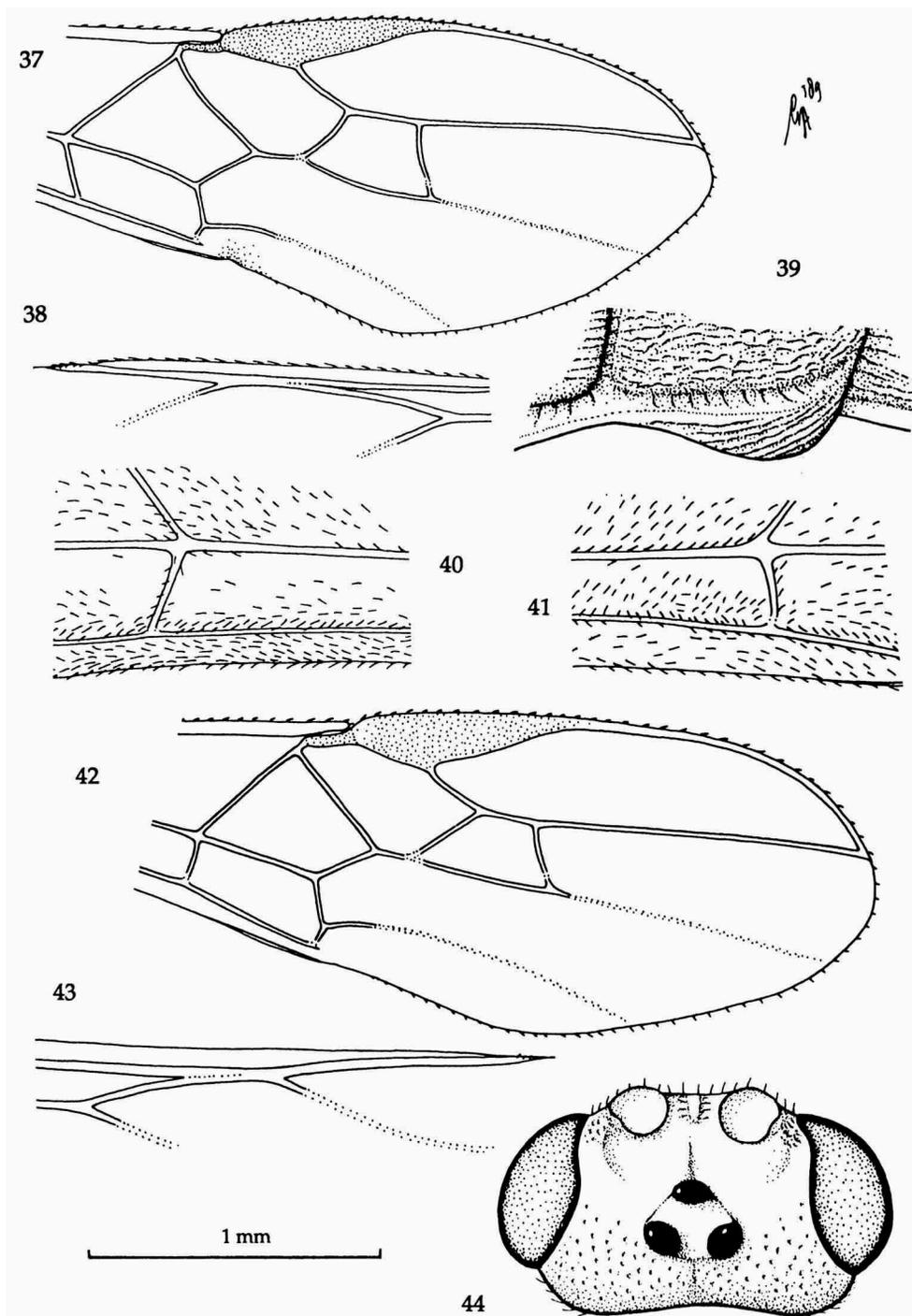
Wings.— Fore wing: r:3-SR:SR1 = 10:10:44; 2-SR:3-SR:r-m = 10:10:11; second submarginal cell comparatively robust (fig. 37); cu-a more inclivous than 3-CU1 (figs. 37, 40); anterior half of subbasal cell partly glabrous, with only few setae (fig. 40); 1-SR+M slightly curved (fig. 37). Hind wing: nearly half of 1r-m united with 1-SC+R (cf. fig. 38).

Legs.— Length of femur, tibia, and basitarsus of hind leg 5.0, 10.2, and 7.7 times their width, respectively; length of hind tibial spurs 0.45 and 0.55 times hind basitarsus.

Metasoma.— Length of first tergite 0.7 times its apical width; third tergite hardly enlarged laterally (but distinctly in ♀ from Singapore: fig. 39); median ridge of fourth-sixth tergites and medio-apical tooth of sixth tergite more strongly developed than in *T. maculata*, shape and sculpture further similar to that of *T. maculata*; length of ovipositor sheath 0.46 times fore wing.

Colour.— Yellowish-brown; antenna, frons medially, surroundings of stemmaticum, mesoscutum largely (except near notauli), large patch on mesopleuron, small patch on metapleuron, propodeum with pair of two large patches, large patch on first and second metasomal tergites, pair of large patches (divided by a narrow line) on third-sixth tergites black; vertex medially, hind leg (except coxa ventro-basally and apically, trochantellus, apex and base of femur narrowly, basal 0.6 of tibia largely, apex of tibia narrowly, and spurs), ovipositor sheath, pterostigma and veins dark brown or blackish; hind femur with brown streak on its outer side; wing membrane completely subhyaline.

Variation.— Length of body 8.5-10 mm, of fore wing 8.2-8.8 mm; length of maxillary palp 0.8-1.0 times length of head; length of eye in dorsal view 2.6-3.2 times tem-



Figs. 37-40, *Trispinaria sannio* (Enderlein), ♀, Singapore; figs. 41-44, *T. maculata* spec. nov., ♀, holotype. 37, 42, apical half of fore wing; 38, 43, detail of vein 1r-m of hind wing; 39, lateral flange of third metasomal tergite, lateral aspect; 40, 41, apical quarter of subbasal cell of fore wing; 44, head, dorsal aspect. 37: 0.4 × scale-line; 38, 40: 0.8 ×; 39, 41, 43, 44: 1 ×; 42: 0.5 ×.

ple; length of malar space 0.5-0.6 times basal width of mandible; length of vein SR1 of fore wing 3.9-4.4 times vein 3-SR; length of ovipositor sheath 0.46-0.48 times fore wing.

Note.— I have seen a second specimen from Singapore (USNM, probably a male but the metasoma is missing) probably belonging to this species. It has vein cu-a of fore wing even more inclivous, scapus largely yellowish, mesopleuron and propodeum completely yellowish, the hind femur only infuscated, the hind tibia largely yellowish-brown, the hind tarsus only slightly infuscated, and the surroundings of the stematicum yellowish-brown. The venation of the fore wing is typical and it shares with the ♀ from Singapore the sculpture of the face.

Trispinaria setosa spec. nov.

(figs. 26-30)

Material.— Holotype, ♀ (RMNH), "Tembajangan, Djati-bosch [= Teak- (= *Tectonia grandis* (Linnaeus)) forest], ii.[19]36, leg. Walsh", "Kangean eilanden [= Kangean Islands, north of Bali]".

Holotype, ♀, length of body 9.3 mm, of fore wing 8.2 mm.

Head.— Antennal segments 75, antenna 1.5 times as long as fore wing, length of third segment 1.5 times fourth segment, length of third, fourth and penultimate segments 1.6, 1.1, and 1.1 times their width, respectively; subapical segments of antenna cylindrical, not depressed; apex of antenna with short spine; scapus subtruncate apically, globose and more robust than of *T. priscicolorus*; length of maxillary palp 0.9 times height of head; length of eye in dorsal view 2.1 times temple; OOL:diameter of ocellus:POL = 11:5:5; bean-shaped depressions of frons absent, frons only slightly transversely impressed and behind antennal sockets largely smooth; vertex largely smooth, posteriorly superficially strigose and rather flat, and laterally hardly protruding above level of eyes; face transversely rugose; length of malar space 0.9 times basal width of mandible.

Mesosoma.— Length of mesosoma 1.5 times its height; pronotal sides coarsely crenulate medially, and remaining part largely smooth; mesopleuron antero-ventrally densely punctate only, punctulate antero-ventrally and largely smooth dorsally; disc of middle lobe of mesoscutum without grooves, only with pair of short and superficial impressions on anterior vertical part; mesoscutal lobes largely smooth; notauli largely smooth, only posteriorly superficially crenulate; transverse medial part of propodeum rugulose, and only with some rugae. Further as *T. priscicolorus*.

Wings.— Fore wing: r:3-SR:SR1 = 15:10:70; 2-SR:3-SR:r-m = 17:10:17; subbasal cell largely regularly setose (fig. 30); cu-a oblique (figs. 26, 30); 1-SR+M rather curved (fig. 26); second submarginal cell robust (fig. 26). Hind wing: 1r-m remains separated from 1-SC+R (fig. 29).

Legs.— Length of femur, tibia, and basitarsus of hind leg 4.0, 8.1, and 6 times their width, respectively; length of hind tibial spurs 0.45 and 0.5 times hind basitarsus.

Metasoma.— Length of first tergite 0.6 times its apical width; sculpture and shape of metasoma as of *T. priscicolorus*, but antero-lateral grooves deeper and wider, also distinct on second and third tergites; length of ovipositor sheath 0.40 times fore wing.

Colour.— Yellowish-brown; head, and mesopleuron dorsally pale yellowish; antenna (except brown apical 0.2-0.5), stemmaticum and its surroundings, and ovipositor sheath black; hind tarsus (except basal 0.6 of basitarsus) and apical half of pterostigma largely, dark brown; basal half of pterostigma, vein C+SC+R and most of other veins (but 1-R1, 3-SR and SR brown) yellowish-brown; wing membrane light yellowish.

***Trispinaria sulcata* spec. nov.**
(figs. 22-25)

Material.— Holotype, ♀ (USNM), "Iligan, Mindanao, Baker". Paratypes: 5 ♀♀ (USNM, TC, RMNH), 2 ♀♀, topotypic; 1 ♀, "Island of Basilan, Baker"; 1 ♀, "Isl. Bilitan, Phillipines, Baker"; 1 ♀, "Alcate, Vict., Mdro [= Mindoro, Phillipines], 10.iv.[19]54, Phil., H.M. & D. Townes".

Holotype, ♀, length of body 7.4 mm, of fore wing 7.6 mm.

Head.— Antennal segments 66, length of third segment 1.4 times fourth segment, length of third, fourth, and penultimate segments 1.9, 1.4, and 1.0 times their width, respectively; subapical antennal segments somewhat depressed; apex of antenna with minute spine; length of maxillary palp 0.8 times height of head; length of eye in dorsal view 3.5 times temple; OOL:diameter of ocellus:POL = 17:7:6; depressions of frons shallow, and largely smooth; vertex largely smooth, with small punctures, interspaces wider than diameter of punctures (fig. 24), and strongly convex, laterally protruding above level of eyes (cf. fig. 12); face coarsely transversely rugose; length of malar space 0.7 times basal width of mandible.

Mesosoma.— Length of mesosoma 1.6 times its height; pronotal sides coarsely crenulate medially, and remaining part largely smooth; anteriorly and ventrally mesopleuron punctulate only, dorso-posteriorly largely smooth (except for some rugae dorsally); middle lobe of mesoscutum with pair of deep and smooth grooves on disc (cf. fig. 13); mesoscutal lobes largely smooth, but near notauli finely punctate; notauli widely crenulate; transverse medial part of propodeum distinctly rugose. Further as *T. priscicolorus*.

Wings.— Fore wing: r:3-SR:SR1 = 10:15:55; 2-SR:3-SR:r-m = 13:15:12 (fig. 22); anterior half of subbasal cell largely glabrous, and its posterior half setose (fig. 25); cu-a oblique (figs. 22, 25); 1-SR+M nearly straight (fig. 22). Hind wing: long part of 1r-m united with 1-SC+R (fig. 23).

Legs.— Length of femur, tibia, and basitarsus of hind leg 4.3, 8.4, and 7.5 times their width, respectively; length of hind tibial spurs 0.4 and 0.5 times hind basitarsus.

Metasoma.— Length of first tergite 0.7 times its apical width; sculpture and shape of metasoma as *T. priscicolorus*, but antero-lateral grooves more differentiated; length of ovipositor sheath 0.29 times fore wing.

Colour.— Yellowish-brown; scapus (except stripe on outer side), pedicellus and antenna (except yellowish part near its apical third), hind tarsus, pterostigma and ovipositor sheath dark brown; most veins brown; wing membrane subhyaline; stemmaticum, area behind it, three patches of mesoscutum, and pairs of patches of fourth-sixth tergites black.

Variation.— Antennal segments of ♀ 64(1) or 66(1); length of fore wing 5.8-7.6 mm, of body 6.0-7.4 mm; vein 3-SR of fore wing usually somewhat longer than vein

2-SR, but sometimes about as long; frontal depressions may be deeper and rugulose; length of ovipositor sheath 0.29-0.34 times fore wing. The paratype from Basilan is darker, it has also a large patch on the second metasomal tergites and two large patches on the third tergite, and the whole surroundings of the stemmaticum black.

***Trispinaria unicolor* spec. nov.**
(figs. 17-20)

Material.— Holotype, ♀ (USNM), "Mt. Makiling, Luzon, Baker". Paratypes: 8 ♀♀ (USNM, TC, RMNH), 1 ♀, topotypic; 2 ♀♀, "Mt. Banahao, P.I. [= Philippines], Baker"; 1 ♀, "Malinao, Tayabas, Baker"; 4 ♀♀, "Los Banos, Lag., 12.ix.1953 (1 ♀; 1 ♀ 22.ix.1953, 1 ♀ 19.ix.1953, 1 ♀ 1.viii.1953), P.I., Townes family".

Holotype, ♀, length of body 8.5 mm, of fore wing 7.2 mm.

Head.— Antennal segments 74, length of third segment 1.3 times fourth segment, length of third, fourth, and penultimate segments 1.9, 1.5, and 1.0 times their maximum width, respectively; subapical antennal segments somewhat depressed; apical segment of antenna with short apical spine (fig. 18); length of maxillary palp 0.9 times height of head; length of eye in dorsal view 2.5 times temple; OOL:diameter of ocellus:POL = 14:6:4; pair of depressions of frons distinct (cf. fig. 12), rugose; vertex coarsely punctate, with interspaces about equal to diameter of punctures, and strongly convex, laterally protruding above level of eyes (cf. fig. 12); face coarsely transversely rugose (nearly costate); length of malar space 0.6 times basal width of mandible.

Mesosoma.— Length of mesosoma 1.5 times its height; pronotal sides coarsely crenulate medially, and remaining part largely smooth; anteriorly and ventrally mesopleuron finely punctate, and remainder of mesopleuron smooth; middle lobe of mesoscutum with pair of deep and smooth grooves on disc; mesoscutal lobes largely smooth, except some punctulation; notauli widely crenulate; transverse medial part of propodeum rugose. Further as *T. priscicolorus*.

Wings.— Fore wing: r:3-SR:SR1 = 13:15:73; 2-SR:3-SR:r-m = 15:15:15 (fig. 17); sub-basal cell largely glabrous, but setose near posterior border (fig. 20); cu-a slightly oblique (figs. 17, 20); 1-SR+M nearly straight (fig. 17). Hind wing: long part of 1r-m united with 1-SC+R (fig. 19).

Legs.— Length of femur, tibia, and basitarsus of hind leg 4.3, 9.6, and 6.4 times their width, respectively; length of hind tibial spurs 0.5 and 0.6 times hind basitarsus.

Metasoma.— Length of first tergite 0.6 times its apical width; sculpture and shape of metasoma as of *T. priscicolorus*, but antero-lateral grooves wider and more differentiated; length of ovipositor sheath 0.31 times fore wing.

Colour.— Yellowish-brown; scapus and pedicellus ventrally, and stemmaticum black; remainder of scapus and pedicellus, and part of antenna near its apical quarter yellowish-brown; remainder of antenna infuscated or dark brown; hind tarsus (except basally), ovipositor sheath and pterostigma dark brown; veins brown; wing membrane subhyaline.

Variation.— Antennal segments of ♀ 72(1) or 74(2); length of fore wing 6.6-7.5 mm, of body 7.1-8.5 mm; vein 3-SR of fore wing as long as vein 2-SR or somewhat longer; area behind and besides posterior ocelli yellowish-brown or infuscated; length of ovipositor sheath 0.27-0.31 times fore wing.

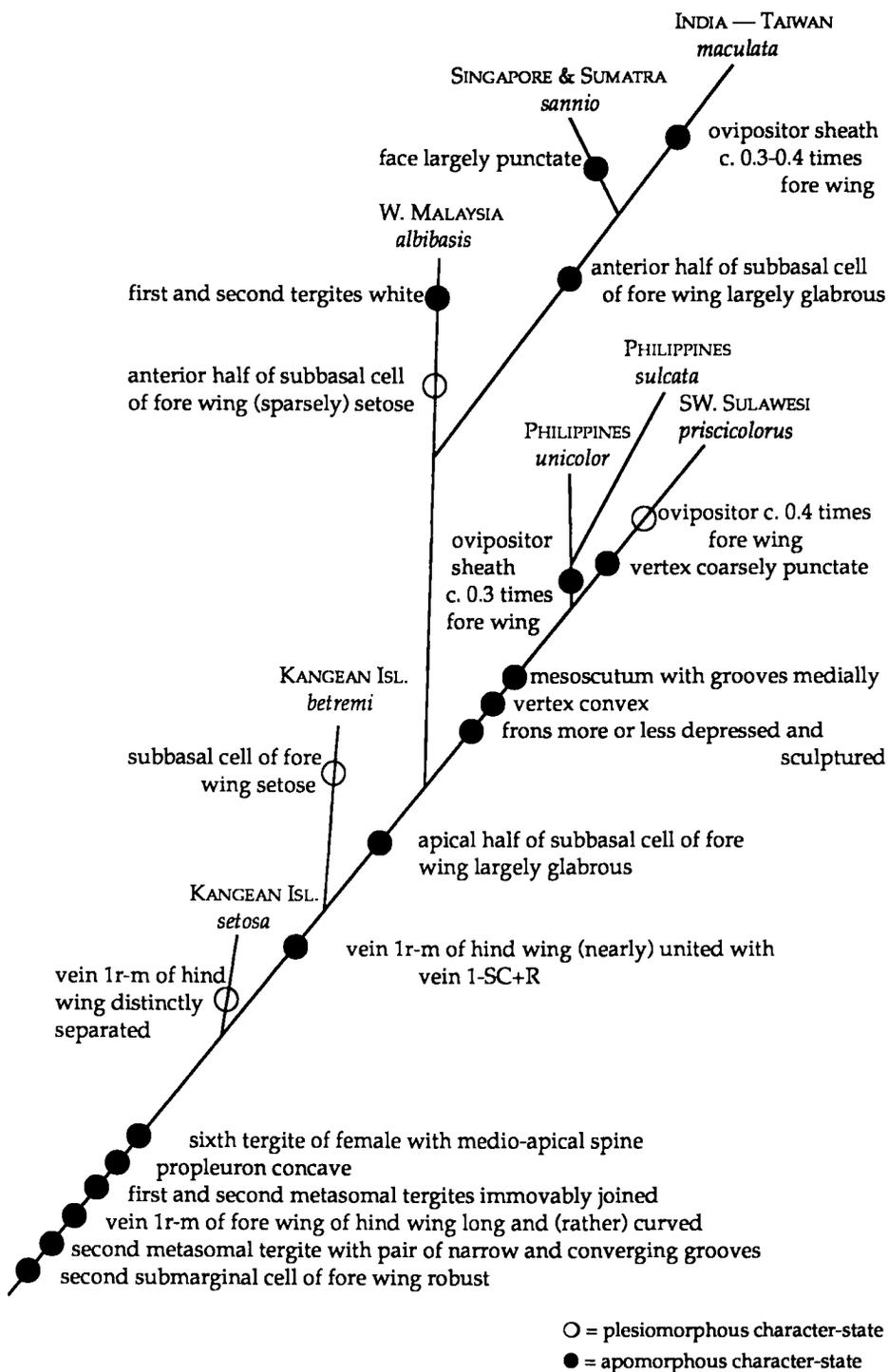


Fig. 45. Phylogeny and distribution of species of the genus *Trispinaria*.

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