

DESCRIPTIONS OF SOME INDO-AUSTRALIAN PSENULUS AND
REVISION OF THE GROUP OF PSENULUS PULCHERRIMUS
(BINGHAM) (HYMENOPTERA, SPHECIDAE, PSENINI)

by

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ABSTRACT

New material of the group of *Psenulus pulcherrimus* (Bingham) has become available since 1966. New species and subspecies are described, viz. *pulcherrimus eburneus*, from India; *xanthonotus*, from Formosa; *melanonotus*, from Sumbawa; *carinifrons malayanus*, from Malaya, Vietnam, Sumatra, and Borneo. *P. extremus* Van Lith, from New Guinea is regarded as a distinct species, as is *P. xanthognathus* Rohwer (Luzon). *P. xanthognathus centralis* subsp. nov. has been found in SE Luzon, and the Philippine Is. south of Luzon. The male genitalia of some species are figured. A revised key to the species and subspecies of the group is provided.

Psenulus mauritii, from Malaya, belonging to the group of *P. antennatus* (Rohwer), and *Psenulus yoshimotoi*, from Borneo, provisionally placed in the group of *P. rugosus* Van Lith, are described as new.

The group of *Psenulus pulcherrimus* (Bingham) is distributed over the whole Indo-Australian area. In Japan one species occurs. Also in the Bismarck Islands one form has been found, closely related to *P. carinifrons* Cameron. It will be described in a separate paper, together with other Psenini, collected in 1961/1962 by the Danish Noona Dan Expedition.

I am grateful to the following institutions and entomologists: Dr. Clare R. Baltazar, who sent me the material of the Bureau of Plant Industry, Manila (BPIM); Dr. G. R. Ferguson, Scarsdale, New York (Coll. Ferguson); Dr. J. L. Gressitt and Dr. Carl M. Yoshimoto of the Bernice P. Bishop Museum, Honolulu (BISH); Dr. C. A. W. Jeekel of the Zoölogisch Museum, Amsterdam (MA); Dr. E. Köningsmann of the Zoologisches Museum der Humboldt-Universität, Berlin (ZMB), who kindly lent me interesting material from Formosa and Sumbawa; Dr. M. A. Lieftinck of the Rijksmuseum van Natuurlijke Historie, Leiden (ML); Dr. B. Petersen of the Universitetets Zoologiske Museum of Copenhagen; and Dr. Henry K. Townes, Ann Arbor, U.S.A. (Coll. Townes).

GROUP OF *Psenulus pulcherrimus* (BINGHAM)

REVISED KEY TO SPECIES AND SUBSPECIES

(the extent of the yellow colour of femora and tibiae is indicated as seen in dorsal aspect)

- 1. Scutum partly yellow, back of propodeum partly or completely yellow, gastral tergites red or reddish-brown. Median part of clypeal margin of female much protruding, projection triangular or bidentate 2
- Scutum black, propodeum black or with yellow markings, gastral tergites not completely red. Clypeus of female less projecting, almost blunt (female of *P. melanonotus* unknown) 5

2. Scutum yellow, with three black longitudinal lines, median line as long as anterior two-thirds of scutum; back of propodeum yellow; petiole and gaster reddish, petiole slightly darkened at apex. Male unknown (Formosa) *xanthonotus*
- Scutum black with yellow marks, back of propodeum black, usually with two yellow spots 3
3. Scutum laterally with elongate yellow mark above the tegulae and with median yellow spot in front of scutellum. Petiole yellowish, darkened at apex (Tenasserim, Vietnam) *pulcherrimus pulcherrimus*
- Scutum with one yellow mark only, in front of scutellum 4
4. Petiole yellowish, brown at apex. Markings pale yellow or ivory-coloured. Male unknown (India) *pulcherrimus eburneus*
- Petiole black or dark brown. Markings yellow (Java, Krakatau, Kangean Is.) *pulcherrimus projectus*
5. Propodeum with two yellow spots. Pronotum and metanotum with pale yellow marking; legs partly pale yellow. Gaster black. Female unknown (W. Sumbawa) *melanonotus*
- Propodeum black. Markings darker yellow 6
6. Female: mandibles quadridentate. Male: frons above antennae indistinctly punctate, back of propodeum not very coarsely carinate (less than in *P. xanthognathus* and *P. carinifrons rohweri*), underside of antennae reddish or brownish, not yellowish-brown. Both sexes: gaster completely black, fore and mid trochanters and femora yellow, basal two-thirds of hind tibiae yellow; pronotum, scutellum and metanotum yellow but sometimes partly or completely darkened. Male sometimes difficult to distinguish from *P. carinifrons rohweri* or *P. carinifrons scutellatus* (Malaya, Thailand, ? Assam) *sogatophagus*
- Female: mandibles tridentate (including inner tooth). Both sexes: gaster not always completely black, in some forms fore and mid femora partly black or brown 7
7. Pronotum, scutellum and metanotum black or nearly black. Gaster black. Propodeum of male not coarsely carinate 8
- Pronotum, scutellum and metanotum more or less yellow, never all these parts completely black. Gaster black or second tergite with red spots. Propodeum of male in some forms coarsely carinate 9
8. Anterior corners of pronotum not distinctly dentate. Female: fore and mid trochanters, femora and tibiae yellow, basal 3/5 of hind tibiae yellow. Male: fore and mid trochanters black, fore and mid femora dorsally black with yellow knees, fore and mid tibiae yellow, basal half of hind tibiae yellow (Japan) *iwatai*
- Anterior corners of pronotum distinctly dentate. Fore and mid trochanters and femora in both sexes black or brown, fore femora partly yellow below. Scape of antennae darkened. Female: fore and mid tibiae yellow, basal third of hind tibiae yellow. Male: fore tibiae yellow or partly darkened, mid tibiae partly brown, hind tibiae almost completely dark brown or black, base paler (NE and W New Guinea). *extremus*
9. Male (probably also unknown female) with red spots on second gastral tergite (cf also female of *P. xanthognathus*). Pronotum and scutellum yellow, sometimes with a tendency to reduction, metanotum yellow 10
- Gaster of male black, rarely with some irregular red on second tergite; gaster of female black or black with red parts on second tergite 11

10. Male with distinct red markings on second tergite. Fore and mid trochanters and femora completely yellow. Basal 6/7 of hind tibiae yellow. Scutum finely punctate. Back of propodeum moderately carinate, gradually sloping. Female unknown (North India) *carinifrons carinifrons*
- Red markings of males less distinct. Fore and mid trochanters yellow. Base of fore and mid femora black or dark brown. Basal 3/4 of hind tibiae yellow. Scutum strongly punctate. Back of propodeum more coarsely carinate. Female unknown (South India) *carinifrons*
11. Pronotum, scutellum and metanotum yellow with tendency to reduction of yellow markings, pronotum sometimes completely black or dark brown. Fore and mid trochanters and femora yellow (in the females from Ambon and Mindanao more or less brown). Gaster black. Female: basal half or even less of hind tibiae yellow. Male: about basal two-thirds of hind tibiae yellow. Back of propodeum as in nominate subspecies (NE Australia, Papua, Ambon, Buru, Mindanao)
. *carinifrons scutellatus*
- Pronotum, scutellum and metanotum yellow with tendency to reduction of markings but never completely black. Female: more than basal half of hind tibiae yellow (cf *P. carinifrons rohweri* ♀ from Formosa). Male: hind tibiae with more yellow or femora partly black. Back of propodeum coarsely carinate, in lateral view more angular 12
12. Gaster in both sexes usually black or dark brown. Frons flat, finely punctate . 13
- Gaster of female with two red lateral spots which are sometimes confluent. Frons more or less swollen, puncturation stronger or much stronger (in males differences often indistinct) 14
13. Fore and mid trochanters and femora yellow. Hind basitarsus brown in female, yellowish in male. Underside of antennae of male yellowish-brown (Java, Kangean Is., Luzon, Formosa) *carinifrons rohweri*
- Fore and mid trochanters and base of femora black or brown. Hind basitarsus dark in both sexes. Underside of antennae usually darker (Malaya, Singapore, Sumatra, Borneo, Vietnam) *carinifrons malayanus*
14. Frons shining, distinctly and densely punctate, much swollen on both sides of frontal carina. Interocellar area raised. Fore and mid trochanters and base of fore and mid femora dorsally brown (in female basal third of fore femora; in male about half of fore femora) (Luzon, except SE part) . . *xanthognathus xanthognathus*
- Puncturation and swelling of frons weaker or much weaker and interocellar area less raised. Fore and mid legs as in nominate subspecies (SE Luzon, Masbate, Samar, Leyte, Cebu, Panay, Busuanga) *xanthognathus centralis*
- Similar to *xanthognathus centralis*, but fore and mid femora of female, sometimes also of male, completely yellow. Trochanters yellow or slightly darkened (Sibuyan, Negros) *xanthognathus centralis* form A
- Similar to *xanthognathus centralis*, but dark parts of femora and hind tibiae larger (in female about basal half of fore femora, in male about 3/4). Yellow markings of pronotum and scutellum often reduced (Palawan, Mindanao).
. *xanthognathus centralis* form B

***Psenulus pulcherrimus pulcherrimus* (Bingham)**

1896, Bingham, J. Linn. Soc. Zool. 25 : 443, ♀ (*Psen pulcherrimus*).

1897, Bingham, Fauna of British India 1 : 263.

1962, Van Lith, Zool. Verh. Leiden 52 : 101 (*Psenulus pulcherrimus*).

A male from Vietnam agrees quite well with the description of the female from Tenasserim and is certainly conspecific.

The scape of the antenna and the second antennal segment are yellow, underside of flagellum from yellowish-brown at base to light brown at the end, dorsal side dark brown. Colour of thorax (Fig. 1) and of legs and gaster as given in the original description of the female.

Clypeal margin (Fig. 2) with two blunt teeth as in the male of *P. pulcherrimus projectus*. Apical half of fore side of antennal segments swollen, apex of last segment flattened.

Vietnam: 1 ♂, 20 km N of Pleiku, 650 m, 9 May 1960, coll. L. W. Quate (BISH).

***Psenulus pulcherrimus projectus* Van Lith**

1962, Van Lith, Zool. Verh. Leiden 52 : 102-103 (Java, Krakatau).

New record: 1 ♀ Kangean Isl., Tambajangan, March 1936, coll. M. E. Walsh, BM 1938-99 (BM).

***Psenulus pulcherrimus eburneus* subsp. nov.**

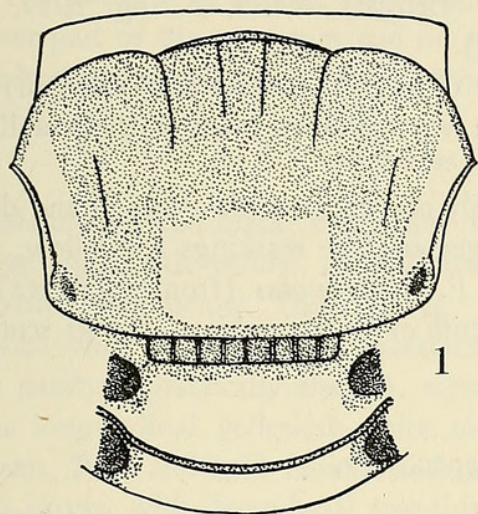
Female. — Black; the following parts are ivory-coloured: mandibles except dark tips, palpi, upper part of pronotum and pronotal tubercles, rectangular mark on scutum near posterior margin (with slight anterior emargination), posterior margin of scutellum (with median triangular projection), metanotum, two elongate markings on back of propodeum, each with complete or more or less reduced second mark on outer side (the two pairs of markings fully connected or confluent at base only), fore and mid legs including trochanters, trochanters of hind legs and hind tibiae except a dark brown streak on apical half of inner side. Hind basitarsi and tegulae yellowish-brown. Under-side of antennae brown. Petiole yellowish, brown at apex. Gaster reddish.

Scutum with fine puncturation, denser than in *P. pulcherrimus projectus*. Pubescence dense.

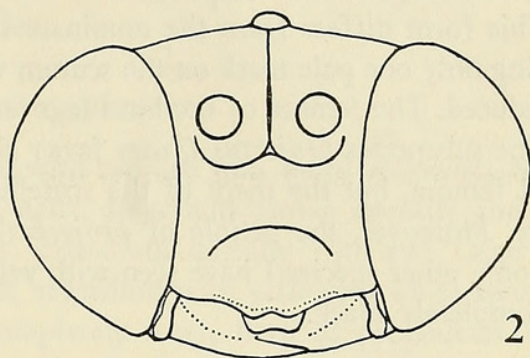
Length about 7 mm.

Male unknown.

Fig. 1-10. Species of Indo-Australian *Psenulus*. 1-2, thorax and head of male of *P. pulcherrimus pulcherrimus* (Bingham); 3-5, pygidial area, pronotum and scutum, head of female of *P. xanthonotus* sp. nov.; 6-10, male genitalia; 6, *P. xanthognathus xanthognathus* Rohwer, Manila; 7-8, *P. xanthognathus centralis* subsp. nov., Leyte, dorsal and ventral view; 9, *P. carinifrons rohweri* Van Lith, Manila, dorsal view of right stipes; 10, *P. carinifrons malayanus* subsp. nov., Malaya, dorsal view of right stipes



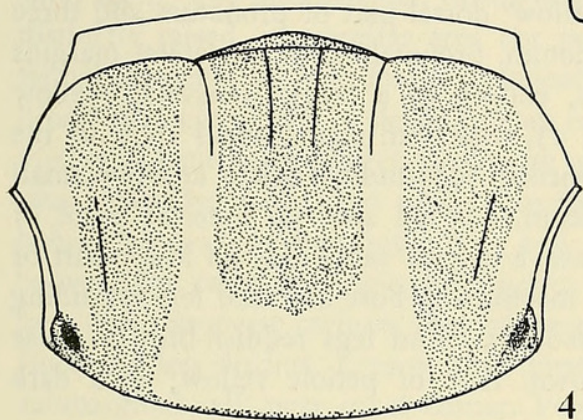
pulcherrimus ♂



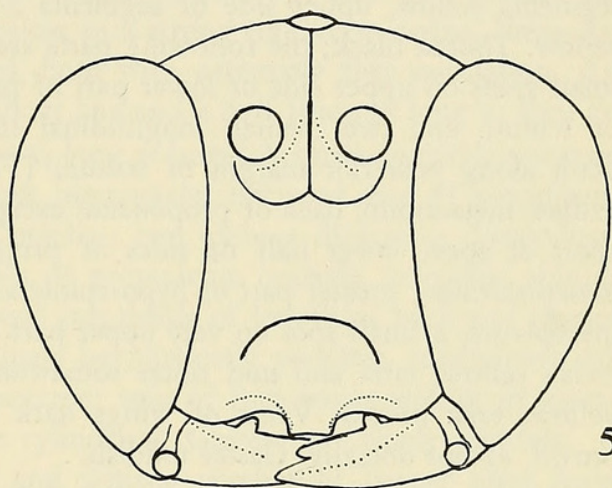
pulcherrimus ♂



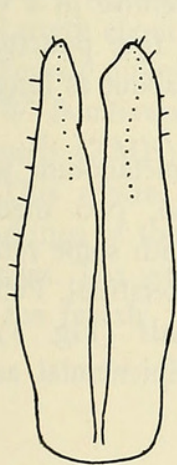
xanthonotus ♀



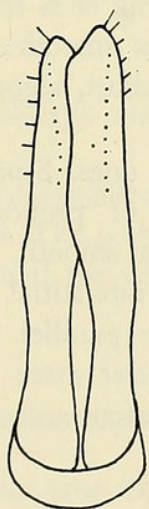
xanthonotus ♀



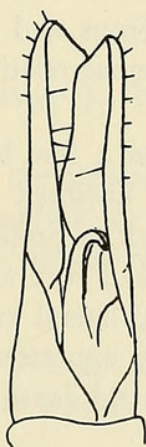
xanthonotus ♀



xanthognathus
(Manila)



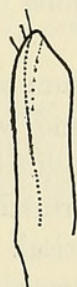
centralis
(Leyte)



rohweri
(Manila)



9



malayanus
(Malaya)

10

India: 5 ♀ (holotype and paratypes), Ranchi (Bengal), Karra, 9 Aug. 1957, on Jack fruit, coll. V. K. Gupta and C. Tirky (UDE).

This form differs from the nominate subspecies (from Tenasserim and Vietnam) in having only one pale mark on the scutum whilst the ivory-coloured mark on the scutellum is reduced. The femora of the hind legs are darker.

The subspecies *projectus* (from Java) also has only one mark on the scutum, and dark hind femora, but the mark of the scutellum is larger and the markings are yellow, not ivory. Moreover, the petiole of *projectus* is black. *P. melanonotus* (from Sumbawa) is the only other species I have seen with yellowish-white or ivory markings, but its scutum is completely black.

***Psenulus xanthonotus* spec. nov.**

Female. — Head black; anterior margin of clypeus somewhat brown, palpi yellow, mandibles yellow with dark tips, scape of antennae and underside of following two segments yellow, upper side of segments 2—12 brown, underside of segments 4—12 yellow. Thorax black; the following parts are yellow: dorsal part of pronotum and three small spots on upper side of lower part of pronotum, pronotal tubercles, lateral margins of scutum and two median longitudinal lines, ending in a large, transverse, yellow mark along posterior margin of scutum (Fig. 4), scutellum and a small spot on the axillae, metanotum, back of propodeum except median longitudinal sulcus and two small spots at apex, lower half of sides of propodeum, a small spot on anterior plate of mesepisternum, greater part of hypo-epimeral area, a narrow vague line on lower part of mesopleura, a small spot on very upper part of metapleura. Fore and mid legs including coxae yellow, tarsi and mid tibiae somewhat reddish. Hind legs reddish-brown, coxae yellow, tarsi brown. Veins of wings dark brown. Base of petiole yellow; apex dark brown, except dorsally. Gaster reddish.

Anterior margin of clypeus with two deep emarginations, leaving a projecting narrow median part, with a small tooth on the sides (Fig. 5). Disk and projection of clypeus distinctly punctate. The narrow interantennal carina ends below the antennae in a very fine, bilobed, transverse carina. Frons and vertex smooth with a few fine punctures. Mandibles bidentate at apex. Antennae relatively short, segments 7—10 about as long as broad.

Scutum with fine punctures and a few larger ones. Scutellum and metanotum with fine and widespread punctures. Enclosed area of propodeum normal, two median longitudinal carinae diverging. Back of propodeum smooth, sides only with some reticulate carination. First recurrent vein of fore wings interstitial or nearly interstitial. Petiole cylindrical. Pygidial area narrow, lateral carinae parallel on apical half (Fig. 3).

Pubescence whitish, face silvery appressed, gaster more yellowish. Epicnemial areas below with a large patch of short and dense pubescence.

Length about 7,5 mm.

Male unknown.

Formosa: 2 ♀ (holotype and paratype), Taihorin, Oct. 1910, coll. H. Sauter (ZMB).

This is the most yellow coloured representative of the group of *P. pulcherrimus* I have seen so far. Because of the peculiar clypeal projection and the smooth back of the propodeum the species should certainly be considered as belonging to this group but it is specifically different from *P. pulcherrimus*.

The paratype is slightly darker than the holotype. There are no yellow spots on the lower part of the pronotum and no spots on the anterior plate of the mesepisternum, on the lower part of the mesopleura, or on the axillae.

Psenulus melanonotus spec. nov.

Male. — Head black; mandibles pale yellow with reddish tips, palpi yellowish. Scape of antennae pale yellow, dorsally with brown apex, flagellum brown dorsally and yellowish-brown below. Thorax (Fig. 11) black; pronotum dorsally with two large yellowish-white spots, pronotal tubercles yellowish, scutellum with yellowish-white spot (in the paratype practically absent), metanotum completely ivory. Back of propodeum with two longitudinal yellowish-white marks along the median groove. Tegulae reddish-brown. Fore and mid femora and trochanters yellowish-white, but brown below; hind legs brown with dorso-basal two-thirds and ventro-basal half of tibiae yellowish-white. Veins of wings brown. Gaster, including petiole, black.

Median part of anterior margin of clypeus hardly protruding, with two distinct but short teeth. The interantennal carina ends below in a strong transverse carina. Frons not distinctly raised, interocellar area not raised, both with extremely fine punctation. Antennal segments of usual length, segments about one and a half times as long as they are broad, last segment more slender, about twice as long as broad. Scutum distinctly punctate, punctures centrally stronger. Scutellum almost impunctate. Enclosed area of propodeum much concave, with short oblique carinae, median two carinae diverging. Propodeum behind enclosed area smooth; back and sides of propodeum coarsely reticulate, shining between the carinae. Longitudinal sulcus about two-thirds of length of back and crossed by a few transverse carinae. Mesosternum finely but distinctly punctate, mesopleura still finer and less distinct. Legs normal. First recurrent vein of fore wings ending in second submarginal cell, near inner corner. Petiole cylindrical. Gaster very finely punctate.

Face with silvery appressed pubescence and with a number of longer erect hairs. Frons above antennae and tempora also with appressed silvery pubescence. Thorax whitish, gaster yellowish-grey pubescent.

Length about 7 mm.

Female unknown.

W Sumbawa: 2 ♂ (holotype and paratype), 24 April—2 May 1927, coll. Dr. Rensch (ZMB).

This species is easily distinguished by the yellowish-white or ivory colour of the markings of thorax and legs. The scutum is black, as in *P. carinifrons* and closely allied species. The systematic place of the wasp in the group can only be given after the study of the female.

Psenulus carinifrons scutellatus Turner

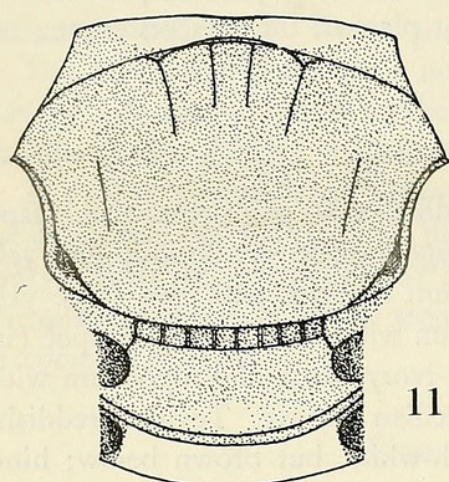
1912, Turner, Ann. & Mag. Nat. Hist. (8) 10 : 54, ♀ (*Psenulus?* *scutellatus*).

1916, Turner, Ann. & Mag. Nat. Hist. (8) 17 : 128 (*Neofoxia scutellatus*).

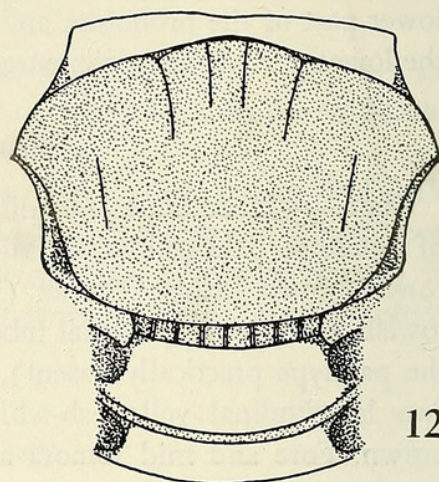
1962, Van Lith, Zool. Verh. Leiden 52 : 108 (*Psenulus scutellatus*).

1966, Van Lith, Tijdschr. v. Ent. 109 : 43-44 (*Psenulus carinifrons scutellatus*).

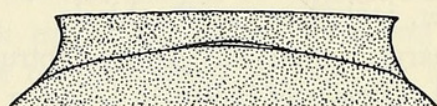
This subspecies is characterized by the yellow fore and mid trochanters and femora whilst the hind tibiae are darker than in the closely allied forms with yellow fore and



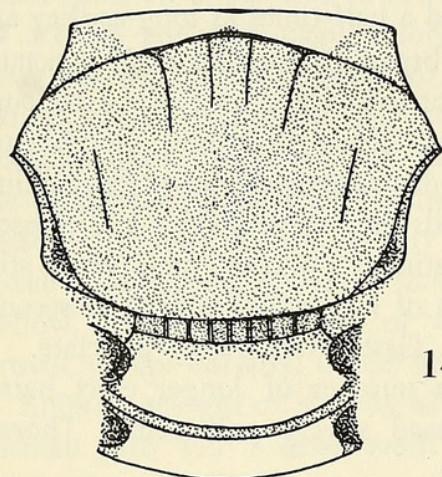
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melanonotus ♂

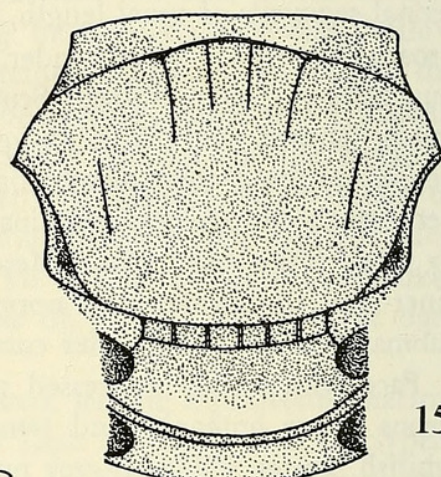
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malayanus ♂

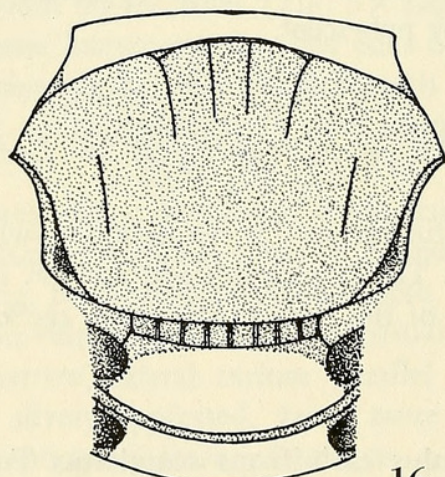
13

extremus ♂

14

scutellatus ♀

15

scutellatus ♂

16

centralis ♂
(Palawan)

Fig. 11-16. Dorsal side of thorax or pronotum of species of Indo-Australian *Psenulus*. 11, *P. melanonotus* sp. nov., male, Sumbawa; 12, *P. carinifrons malayanus* subsp. nov., male, Borneo; 13, *P. extremus* Van Lith, male, New Guinea; 14-15, *P. carinifrons scutellatus* Turner, female and male, Mindanao; 16, *P. xanthognathus centralis* subsp. nov. form B, male, Palawan

mid legs. In the female slightly more than the apical half of the hind tibiae is black, in the male about one third to one fourth. Moreover, the NE Australian specimens and the female from New Guinea have more or less darkened pronotum and scutellum.

So far it was only recorded from NE Australia. Its occurrence in New Guinea (Papua) as now could be ascertained, is not surprising. *P. extremus*, recorded from W and NE New Guinea, is easily distinguished as the thorax of this subspecies is much darker and its fore and mid trochanters and femora are almost completely brown. Moreover, the anterior corners of the pronotum of *P. extremus* are distinctly dentate. This is not the case in *P. carinifrons* and its subspecies.

A female from Ambon and a pair from Mindanao are provisionally considered as also belonging to the same subspecies. The fore and mid trochanters and femora of the female from Ambon are for the greater part very light brown; about two-fifth part of the hind tibiae and the scape of the antennae are yellow. The yellow band on the pronotum and on the posterior margin of the scutellum are slightly reduced. After re-examination of the female recorded from Buru in 1962 as *P. carinifrons rohweri* it is now considered to belong to *scutellatus*.

The female from Mindanao is similar but the fore and mid legs have the trochanters slightly darkened dorsally and the femora have a brown patch on the outer side of their bases. In the male from Mindanao the greater part of the outer side of the fore and mid femora is pale brown while the greater part of the hind tibiae is yellow, and the hind basitarsus brown. Pronotum and scutellum of both specimens are less darkened (Fig. 14 and 15).

New records. New Guinea: 1 ♀, Papua, C. Dist., Otomata Plantation, 1 mile E of Moresby, 2 Nov. 1960, Malaise trap, coll. J. L. Gressitt (BISH).

Ambon: 1 ♀, 70 m, 14 March 1962, coll. A. M. R. Wegner (ML).

Buru: 1 ♀, Station 21, 12 Jan. 1922, coll. L. J. Toxopeus (MA).

Mindanao: 1 ♀ and 1 ♂, Marawi City, Lanao del Sur, Mindanao State University, 2800 ft, 1 Dec. 1964, coll. C. R. Baltazar (BPIM). This locality has a cool climate, rainy in the afternoons, as Dr. Clare R. Baltazar kindly informed me.

Psenulus carinifrons rohweri Van Lith

1962, Van Lith, Zool. Verh. Leiden 52 : 108, partim (Java, Kangean).

1966, Van Lith, Tijdschr. v. Ent. 109 : 45, partim (Java).

All specimens which I consider to belong to this subspecies have yellow fore and mid trochanters and femora. In the female the apical third or fourth part of the hind tibiae is black; in the male one fifth or one sixth part is black. *P. carinifrons scutellatus* has also yellow fore and mid legs but the female at least has darker hind tibiae and a tendency to melanism of pronotum and scutellum. It is easily distinguished from *P. xanthognathus xanthognathus* Rohwer from Manila (Luzon), where both species have been collected, by the finer puncturation of the frons, which is also less swollen. The hind basitarsus is brown in the female, yellowish in the male. The females have no distinct red markings on the second gastral tergite.

Genitalia of male: Fig. 9.

New record from Java: 1 ♀, Bogor, coll. J. van der Vecht (ML).

Luzon: 2 ♀ and 5 ♂, Manila, 21 Dec. 1952—25 Jan. 1953, coll. Townes family (Coll. Townes); 1 ♀, Manila, 21 Dec. 1952, coll. Townes family (Coll. Ferguson).

Formosa: 1 ♀, Taihorin, Oct. 1910, coll. H. Sauter (ZMB). In this female almost the apical half of the hind tibiae is black. In this respect it resembles *P. carinifrons scutellatus* and it might also be a bright-coloured representative of the latter subspecies. Undoubtedly the two subspecies are closely allied.

The specimens recorded earlier (1962) from Malaya, Singapore, Sumatra and Borneo as *P. carinifrons rohweri*, have not been designated as paratypes of *rohweri* at the time, because of the difference in the colour of the fore and mid legs. They are now classified as a distinct subspecies (cf. *P. carinifrons malayanus*). The female recorded from Buru (1962) is darker than *rohweri* and certainly belongs to *scutellatus*.

***Psenulus carinifrons malayanus* subspec. nov.**

1962, Van Lith, Zool. Verh. Leiden 52 : 108 (*Psenulus carinifrons rohweri*, partim; Malaya, Singapore, Sumatra, Borneo).

1966, Van Lith, Tijdschr. v. Ent. 109 : 45 (*Psenulus carinifrons rohweri*, partim; Borneo).

1967, Van Lith, Ent. Ber. 27 : 20 (*Psenulus carinifrons rohweri*; Borneo).

This subspecies has been separated from *P. carinifrons rohweri* since fore and mid trochanters are not yellow, but black or dark brown. Fore and mid femora are not completely yellow, as in *rohweri*, but about basal half of femora is dark brown or black (in male even more). Apical third or fourth part of hind tibiae black. Hind basitarsi brown in both sexes. Underside of antennae, at least their apical half, darker than in *rohweri*. These characters seem to be constant in all the specimens I have seen from Malaya, Vietnam, Sumatra, and Borneo.

Genitalia of male: Fig. 10.

SE North Borneo: 1 ♀ (holotype) and 1 ♂ (allotype), Forest Camp, 19 km N of Kalabakan, 30 Nov. 1962, coll. Y. Hirashima (BISH). Thorax of male: Fig. 12.

Malaya: 2 ♂, Pahang, King George V National Park, Kuala Tranggan, 15-17 Dec. 1958, coll. T. C. Maa (BISH).

Vietnam: 1 ♂, Ban-Me Thuot, 500 m, 16-18 May 1960, coll. L. W. Quate (BISH).

The specimens which have been recorded earlier from Malaya, Singapore, Sumatra and Borneo as *P. carinifrons rohweri* (1962, 1966, 1967) are now considered to belong to this new subspecies.

***Psenulus extremus* Van Lith**

1966, Van Lith, Tijdschr. v. Ent. 109 : 45-46 (*Psenulus carinifrons extremus*; New Guinea).

On re-examination of the female and the males recorded in 1966, I discovered that the anterior corners of the pronotum are distinctly dentate (Fig. 13). This distinguishes *P. extremus* from *P. carinifrons scutellatus*, recorded from NE Australia and Papua, and from any other known form of the group of *P. pulcherrimus*.

P. extremus is now considered as a distinct species.

***Psenulus xanthognathus xanthognathus* Rohwer**

1910, Rohwer, Proc. U.S. Nat. Mus. 37 : 660, ♂ (*Psenulus (Neofoxia) xanthognathus*).

1962, Van Lith, Zool. Verh. Leiden 52 : 104-107, partim (*Psenulus carinifrons xanthognathus*).

1966, Van Lith, Tijdschr. v. Ent. 109 : 44-45, partim (*Psenulus carinifrons xanthognathus*).

This form is now reclassified as a distinct species. The nominate subspecies, which seems to occur only in Luzon (except in the southeastern peninsula Camarines del Sur), has a relatively strongly punctate frons. On either side of the frontal carina the frons is swollen, but not so strongly that a distinct tubercle is formed, as for instance in *P. bakeri*. Also the interocellar area is distinctly raised. The trochanters of the fore and mid legs are black or dark brown, as well as the bases of the femora.

Genitalia of male: Fig. 6.

New records from Luzon: 3 ♀ and 2 ♂, Manila, 10-18 Jan. and 31 Oct. 1953; 1 ♀ and 1 ♂, Tagaytay, Batangas, 9 Nov. 1952; 1 ♂, near Kias, Mount Province, 24 Nov. 1953, all coll. Townes family (Coll. Townes); 1 ♂, Ft. Bonifacio, Makati, Rizal, 8 Jan. 1965, 2 ♂, Pateros, Rizal, 11 May 1965, coll. A. B. Dagan (BPIM).

The female which was recorded from Manila in 1966 and which was specially mentioned because of its yellow fore and mid trochanters and femora, certainly belongs to *P. carinifrons robweri*. I was misled by the somewhat reddish-brown colour of the second gastral tergite, but there are no distinct red markings.

The earlier records (1962, 1966) of *xanthognathus* from the Philippine islands other than Luzon pertain to *P. xanthognathus centralis*.

Psenulus xanthognathus centralis subsp. nov.

1962, Van Lith, Zool. Verh. Leiden 52 : 104-107 (*Psenulus carinifrons xanthognathus*, partim; Samar, Cebu).

In the populations of *P. xanthognathus* from the Philippine Islands south of Luzon, the frons is less or much less swollen, and the puncturation is finer. The interocellar area is less raised. Trochanters and bases of femora are black or dark brown, as in the nominate subspecies.

They can certainly all be separated from the nominate subspecies. There is some difference between the populations from the various islands in regard to the puncturation and the swelling of the frons. The material is insufficient, however, to recognize more distinct subspecies. Therefore all the specimens in which the frons is less swollen and punctate than in the Luzon form are treated as one subspecies only. Exception is made for the material from a few islands which differs in the fore and mid femora being either completely yellow or much darker than in the specimens from the other Philippine islands south of Luzon. The characters seem to be constant but these forms are provisionally indicated as form A and form B.

P. xanthognathus centralis has been recorded as *P. carinifrons xanthognathus* from Samar and Cebu (1962). Females are only known from Samar and are easily recognizable as belonging to *P. xanthognathus* by the red markings on the second gastral tergite. From four other Philippine islands and from SE Luzon the following new records can be given. Unfortunately they all relate to males only and females would be welcome to confirm the identifications.

Genitalia of male: Fig. 7-8.

SE Luzon: 1 ♂ (holotype), Mt. Iriga (Camarines del Sur), 500 m, 31 March 1962, coll. H. M. Torrevillas (BISH).

Masbate: 1 ♂, Mobo, 31 Aug. 1952, coll. Henry Townes (Coll. Townes).

Leyte: 5 ♂, Abuyog, 20 May 1966, coll. C. R. Baltazar (BPIM).

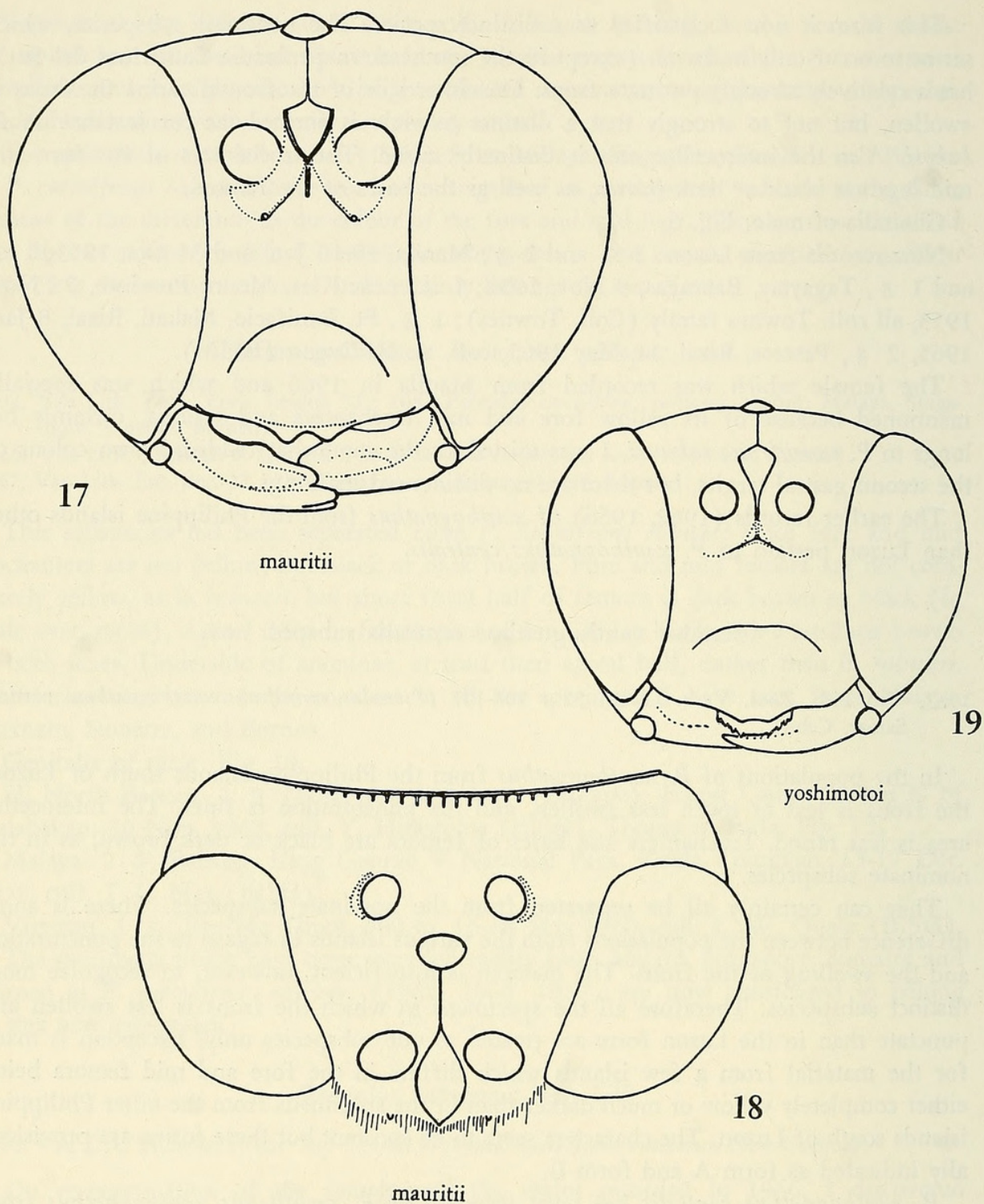


Fig. 17-19. Head of Indo-Australian *Psenulus*. 17-18. *P. mauritii* sp. nov., female, Malaya, frontal and dorsal view; 19. *P. yoshimotoi* sp. nov., female, Borneo

Panay: 1 ♂, Numancia, Aklan Province, 9 May 1966, coll. C. R. Baltazar (BPIM).

Busuanga: 3 ♂, 4 km N of San Nicolas, 22-31 May 1962, coll. H. Holtmann, Malaise trap (BISH).

***Psenulus xanthognathus centralis* subsp. nov. form A**

1962, Van Lith, Zool. Verh. Leiden 52 : 105-107 (*Psenulus carinifrons xanthognathus*, partim; Negros, Sibuyan).

1966, Van Lith, Tijdschr. v. Ent. 109 : 44-45 (*Psenulus carinifrons xanthognathus*, partim; Negros, Sibuyan).

In the females of *P. xanthognathus* from Negros and Sibuyan fore and mid femora are yellow; trochanters of fore and mid legs at most slightly darkened. In the males the femora are also more or less darkened. Frons as in *P. xanthognathus centralis*.

A great number of females and males has already been recorded from Negros Or. and from Sibuyan.

New records from these islands: 2 ♀, Negros Occ., La Granja, 13 May 1966 and La Carlotta, 19 May 1966, both coll. C. R. Baltazar (BPIM); 1 ♀, Negros Or., L. Balinsasayo, 1-7 Oct. 1959, coll. C. M. Yoshimoto (BISH).

***Psenulus xanthognathus centralis* subsp. nov. form B**

1962, Van Lith, Zool. Verh. Leiden 52 : 105-107 *Psenulus carinifrons xanthognathus*, partim; Mindanao, Palawan).

1966, Van Lith, Tijdschr. v. Ent. 109 : 44-45 (*Psenulus carinifrons xanthognathus*, partim; Mindanao).

This is also a form which should be provisionally separated until its systematic status is more clear. Frons as in *P. xanthognathus centralis*. The yellow markings of fore and mid femora and of hind tibiae are smaller and in the males the yellow markings of pronotum, scutellum and metanotum are sometimes reduced (Fig. 16).

It has already been recorded in 1962 and 1966 as a darker form of *P. carinifrons xanthognathus* from Mindanao and Palawan. The following additional material has been studied:

Mindanao: 2 ♂, Agusan, 10 km SE S. Francisco, 12 Nov. 1959, coll. L. W. Quate (BISH).

Palawan: 1 ♀, 3 km NE Tinabog, 14 May 1962, coll. H. Holtmann, Malaise trap (BISH); 1 ♂, Bacungan, 11 Jan. 1965, coll. C. R. Baltazar (BPIM).

Species and subspecies of the group of *Psenulus pulcherrimus*

<i>pulcherrimus pulcherrimus</i> (Bingham), ♀ ♂ . . .	Tenasserim, Vietnam
<i>pulcherrimus projectus</i> Van Lith, ♀ ♂ . . .	Java, Krakatau, Kangean Is.
<i>pulcherrimus eburneus</i> subsp. nov., ♀ . . .	North India
<i>xanthonotus</i> sp. nov., ♀ . . .	Formosa
<i>melanonotus</i> sp. nov., ♂ . . .	West Sumbawa
<i>carinifrons carinifrons</i> (Cameron), ♂ . . .	North India
<i>carinifrons scutellatus</i> Turner, ♀ ♂ . . .	NE Australia, Papua, Ambon, Buru, Mindanao
<i>carinifrons rohweri</i> Van Lith, ♀ ♂ . . .	Java, Kangean Is., Luzon, Formosa
<i>carinifrons malayanus</i> subsp. nov., ♀ ♂ . . .	Malaya, Vietnam, Sumatra, Borneo
<i>carinifrons</i> subsp. ?, ♂ . . .	South India
<i>sinclairi</i> Lal, ♂ . . .	India (Bombay)
<i>sogatophagus</i> Pagden, ♀ ♂ . . .	Malaya, ? Thailand, ? Assam
<i>extremus</i> Van Lith, ♀ ♂ . . .	New Guinea
<i>xanthognathus xanthognathus</i> Rohwer, ♀ ♂ . . .	Luzon
<i>xanthognathus centralis</i> subsp. nov., ♀ ♂ . . .	SE Luzon, Masbate, Samar, Leyte, Cebu, Panay, Busuanga
<i>xanthognathus centralis</i> subsp. nov. form A, ♀ ♂ .	Negros, Sibuyan
<i>xanthognathus centralis</i> subsp. nov. form B, ♀ ♂ .	Palawan, Mindanao
<i>iwatai</i> Gussakovskij, ♀ ♂ . . .	Japan

GROUP OF *Psenulus antennatus* (Rohwer)*Psenulus mauritii* spec. nov.

Female. — Head and thorax black; mandibles except black tips dark reddish, palpi yellowish-brown, upper two-thirds of scape yellowish-brown, underside of flagellum reddish-brown, humeral tubercles yellowish-brown, tegulae yellowish-red. Legs reddish but back of fore and mid femora dark brown. Veins of wings black-brown. Petiole black, apex dorsally and ventrally reddish, also ventral plate of petiole; rest of gaster reddish.

Median part of anterior margin of clypeus with two distinct teeth. Disk of clypeus finely and densely punctate. Interantennal carina much broadened between antennae, this part somewhat depressed medianly (Fig. 18). It ends below in a short and fine longitudinal carina. There is no transverse carina, but the lateral wings of the projection below the antennae are clearly visible. On the inner side these wings end ventrally in a small but distinct, shining tooth or tubercle (Fig. 17). Frons shining, with dense and fine puncturation. Vertex with a few finer and some larger punctures, posteriorly with tendency to transverse striation. Tempora with indistinct puncturation. Antennae short, somewhat clavate, third segment slightly more than twice as long as broad at apex, median segments as long as broad, last segment in dorsal view twice as long as broad at base. Mandibles quadridentate (Fig. 17).

Scutum shining, with fine puncturation and also a few larger punctures. Prescutal sutures connected with hind margin by an indistinct suture and an irregular row of punctures; scutum centrally between sutures impunctate. Scutellum shining, with some irregular puncturation. Metanotum with somewhat transverse sculpture. Enclosed area of propodeum narrow, concave between the short longitudinal carinae, area between median two longitudinal carinae pentagonal. Median longitudinal sulcus with about eight transverse carinae. Back of propodeum shining, lower half with minute piliferous punctures: edge between back and sides of propodeum with coarse irregular sculpture. Sides of propodeum and mesopleura smooth with extremely fine piliferous punctures. Apex of mid tibiae with a row of at least ten small reddish thorns. Hind tibiae with a few short thorns on outer side. First recurrent vein of fore wings interstitial, second recurrent vein ending in third submarginal cell at about one fourth of the bottom of the cell. Petiole slightly longer than hind femora, with distinct upper and lower lateral edges. Gaster with fine and wide-spread punctures. Pygidial area indistinct, with short, indistinct lateral carinae, a sharp apical carina and fine puncturation.

Pubescence of clypeus silvery and appressed, pubescence on dorsal side of thorax yellowish-grey, more whitish on back, also on mesosternum, where it is much denser. Epicnemial areas below with a round patch of yellowish-white pubescence.

Length about 9 mm.

Male unknown.

Malaya: 1 ♀ (holotype), W Kedah, Kedah Peak (Djerai), 800 m, 16-19 Febr. 1963, coll. M. A. Lieftinck (ML).

P. mauritii is certainly closely allied to *P. antennatus* (Rohwer) (sensu Van Lith, 1962), with which it has the following characters in common: quadridentate mandibles, distinctly bidentate clypeal margin, indistinct pygidial area. As in *P. antennatus* there is no distinct transverse carina below the antennae, but the lateral parts of the projection

below the antennae end each in a small and shining tubercle or tooth. Even if this latter character should prove to be an individual aberration — which does not seem very likely — the greater size and the yellowish colour of the pubescence of the thorax (instead of silvery-white as in *P. antennatus* from Java) would be sufficient reasons to classify the female from Kedah at least as a different subspecies.

We remain faced with the problem whether this female might be associated with the male holotype of *P. antennatus* (Rohwer) from Singapore, type number 25039 in the United States National Museum in Washington, which I have not seen. The pubescence of this male being described by Rohwer as silvery, not yellowish, and as it is much smaller, it is at least doubtful that they belong to the same subspecies. Because of the sexual differences in the structure of the head no certainty can be obtained without the study of a female from Singapore.

This species is dedicated to the collector, Dr. Maurits A. Lieftinck, Rijksmuseum van Natuurlijke Historie, Leiden.

GROUP OF *Psenulus rugosus* Van Lith

Psenulus yoshimotoi spec. nov.

Female. — Head and thorax black; yellowish-brown are: labrum, part of mandibles, palpi, scape and underside of flagellum of antennae, tegulae, fore and mid tibiae and tarsi and hind tarsi. Pronotal tubercles very dark brown. Femora except apex and apical half of hind tibiae brown; base of hind tibiae pale yellow. Veins of wings black-brown. Petiole, including ventral plate and greater part of first tergite black; base of second tergite and sternites 3—6 brown, rest of gaster reddish.

Median part of clypeal margin very finely transversely striate and protruding, only very slightly emarginate (Fig. 19), lower fifth part of clypeal disk over the whole width smooth and shining, rest of disk opaque, finely and densely punctate. Interantennal carina broadened into a rhombus and depressed, as in *P. antennatus*. Below the antennae this carina ends in a short, transverse, arched carina (Fig. 19). Frons and vertex shining, frons regularly finely punctate, punctures on vertex more wide-spread. Tempora with coriaceous sculpture, a somewhat irregular carina runs from the back of the head obliquely downwards to the base of the mandibles. Antennae short, slightly clavate.

Scutum, scutellum and metanotum with very fine punctures, interspaces many times diameter of punctures. Prescutal sutures complete, running from the anterior margin of the scutum to the posterior margin, but not very distinct, certainly not as distinct as in *P. rugosus*. Enclosed area of propodeum depressed, upper part of longitudinal sulcus on back of propodeum broad, lower part of sulcus broad but not sharply defined and almost lost in the irregular carination on the lower two thirds of the back. Upper part of back of propodeum bare, smooth and shining. Mesosternum on both sides of median longitudinal carina depressed, anteriorly with transverse striae. Second submarginal cell of fore wings triangular, shortly petiolate. First recurrent vein of fore wings ending just in second submarginal cell. Petiole shorter than hind femora, depressed laterally, with distinct upper and lower carina, dorsally with V-shaped carina. Gaster with fine piliferous punctures. No distinct pygidial area.

Pubescence of face silvery-white and appressed, with a few longer hairs; pubescence of rest of head and of thorax whitish, not appressed. Hairs on mesosternum long and directed backwards, especially on the depressed median part. Pubescence of gaster yellowish-grey. Fourth and fifth gastral sternites with a fringe of long, yellow hairs, sixth sternite with a patch of dense pubescence, directed backwards.

Length about 7,5 mm.

Male unknown.

SE North Borneo: 1 ♀ (holotype), Forest Camp, 19 km N. of Kalabakan, 60 m, 25 Oct., 1962, coll. K. J. Kuncheria (BISH).

On superficial examination this wasp resembles *P. antennatus*. It is easily distinguished by the shape of the clypeal margin and the transverse carina below the antennae. The triangular, evenly petiolate, second submarginal cell is unusual, also the irregular sculpture of the tempora. *P. rugosus* has about the same sculpture of the tempora and there are more characters which these two species have in common (shape of clypeal margin, transverse carina below antennae and absence of a pygidial area). *P. rugosus*, however, has much more distinct prescutal sutures and a coarser sculpture of the thorax. It is therefore, provisionally, that I have placed *P. yoshimotoi* into the group op *P. rugosus*.

It is dedicated to Dr. Carl M. Yoshimoto of the Bernice P. Bishop Museum, Honolulu, in acknowledgement of his work to stimulate the study of Indo-Australian Psenini.



Lith, J P V. 1969. "Descriptions of some Indo-Australian *Psenulus* and revision of the group of *Psenulus pulcherrimus* (Bingham) (Hymenoptera, Sphecidae, Psenini)." *Tijdschrift voor entomologie* 112, 197–212.

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