Indo-Malayan Zoology 4 (1987) 303-315

A review of *Interamma* Walker, 1870 and *Vivaha* Distant, 1906 with descriptions of two new species from Sulawesi (Homoptera, Derbidae)

Jan Van Stalle
Koninklijk Belgisch Instituut voor Natuurwetenschappen, Afdeling Entomologie, Vautierstraat 29, 1040 Brussel, Belgium

ABSTRACT: The genera *Interamma* Walker and *Vivaha* Distant are revised. The following new combinations are given: *I.saniosa* (Walker) (from *Vivaha*), and *I.leucocrota* (Fennah) (from *Vivaha*). A lectotype is selected for *I.saniosa*, *I.delicata* and *Vivaha facialis*, and the male genitalia of *I.ascendens*, *I.angusta* and *I.saniosa* are described. *I.moati* and *I.sulawesiensis* are newly described from Sulawesi (Indonesia).

1. INTRODUCTION

Few Oriental species of the family Derbidae have ever been the subject of a revision. A generic revision for the new world fauna was published by Fennah (1952) while Synave (1973) published a revision of the Afrotropical species. For Oriental groups only the Philippine species of Rhotanini were recently revised by Zelazny (1981).

As regards the species group of *Interamma*, so far 9 species have been recorded, occurring between Sri Lanka and Queensland. These taxa are listed in this paper and where possible taxonomic notes are added and illustrations are given of the male genitalia of each species. In addition to this two further new species are described from Sulawesi. For *Vivaha* we have retained one species from India.

It is clear that the species listed in this paper represent only a fraction of the total number of species present in the Indomalayan Archipelago; moreover, the known species have only been recorded from males or females and in some cases their types are not available for study or badly damaged. Accordingly we have not elaborated a key to the species because it would be outdated as soon as further material becomes available.

While revising the species of *Interamma* it was soon clear that the concept of several otiocerine genera has been the subject of many confusions. A wrongly interpreted sexual dimorphism and the lack of males and females for many species descriptions might be one of the factors which have led up to this

situation. A good example in point is the case of the genera *Interamma* and *Vivaha* discussed below.

The present study highlights some of the problems of generic definitions in otiocerine derbids. The concept adopted here for *Interamma* is as follows: males with biramose antennae (both parts equal or subequal) and females uniramose. Head projected anterior to eyes over more than length of an eye. Anal segment and genital styles as illustrated and pygofer without a distinct medioventral process. Aedeagus with three pairs of spinose processes as illustrated. The genus *Vivaha*, treated at the end of this paper, differs from *Interamma* in the presence of biramose antennae in the females and in the particular foliaceous shape of the head. Unfortunately males of *Vivaha* are unknown which is a great handicap in order to redefine this genus. The structure of the male genitalia can be adopted as a synapomorphous character for *Interamma*. The shape of the antennae and head in males and females is very helpful, but these characters might be evolved several times in the tribe Otiocerini.

The material discussed below is deposited in the collections of the Koninklijk Belgisch Instituut voor Natuurwetenschappen (KBIN) and British Museum, Natural History (BMNH).

2. SYSTEMATIC ACCOUNT

The genus *Interamma* Walker, 1870 was erected to accomodate four new species: *I.ascendens* from Morty, *I.angusta* from Mysol, *I.delicata* from New Guinea, and *I.subvaria* from Mysol. Melichar (1903) added *I.rubrofasciata* from Sri Lanka while Schmidt (1926) described *I.karnyi* from Buru Island. Distant (1906) erected the genus *Vivaha* to accomodate *Vivaha facialis* described as a new species from the Andaman Islands and Tenasserim. The genus is placed near *Interamma* and Distant (1906: 307) mentions that 'the extraordinary cephalic process is its principal distinctive character'. Distant (1907) describes *Vivaha saniosa* from Queensland and transferred *I.delicata* to *Vivaha*. Between 1926 and now only two further species have been described in the *Vivaha/Interamma* group: one by Anufriev (1968) from southern Russia and one by Fennah (1978) from Vietnam.

Genus Interamma Walker, 1870

Interamma Walker, 1870: 118, type species: *Interamma ascendens* Walker, 1870.

Large (10-15 mm) otiocerine Derbidae. General colour pale ochreous to yellowish with brown and red colour marks. Head laterally compressed, foliaceous, produced anterior to eyes over 1.5 or more length of an eye in dorsal view; lateral borders of face meeting each other on median line, genae often with a red or orange streak anterior to eyes; These reniform; no ocelli. Borders of vertex

separate or meeting each other apically. Second segment of antennae in male branched into two subequal parts, each long and cylindrical, in female not branched, usually shorter than in male; no subantennal process. Pronotum with a small median keel, without lateral keels or foliaceous structures. Mesonotum without longitudinal keels. Tegmina long, appreciably exceeding abdomen; costal margin covered with granules; Sc+R fork in middle of tegmina and sectors of M situated in apical 1/3. Wings normally developed. Male genitalia bilaterally symmetrical; anal segment without an apical ventral process, deeply excavated apically on dorsal margin. Pygofer with straight lateral margins and without a medioventral process. Aedeagus with three apical processes.

The species of *Interamma* are sexually dimorphic; in the female the head is smaller and the second segment of the antennae is smaller and not branched.

Diagnostic characters: the genus *Interamma* can be distinguished from related otiocerine genera by a combination of the following characters: tegmina with M arising basad of Sc+R fork, Sc and R forking at or basad of middle, thus forming a long subcostal cell. Sectors of M four in total and confined to apical 1/3 of tegmina. Vertex produced anterior to eyes over length of an eye or more, antennae biramose in male, not forked in female. Male with anal segment not produced into a distinct apical lobe, pygofer with straight lateral margins and without a medioventral process.

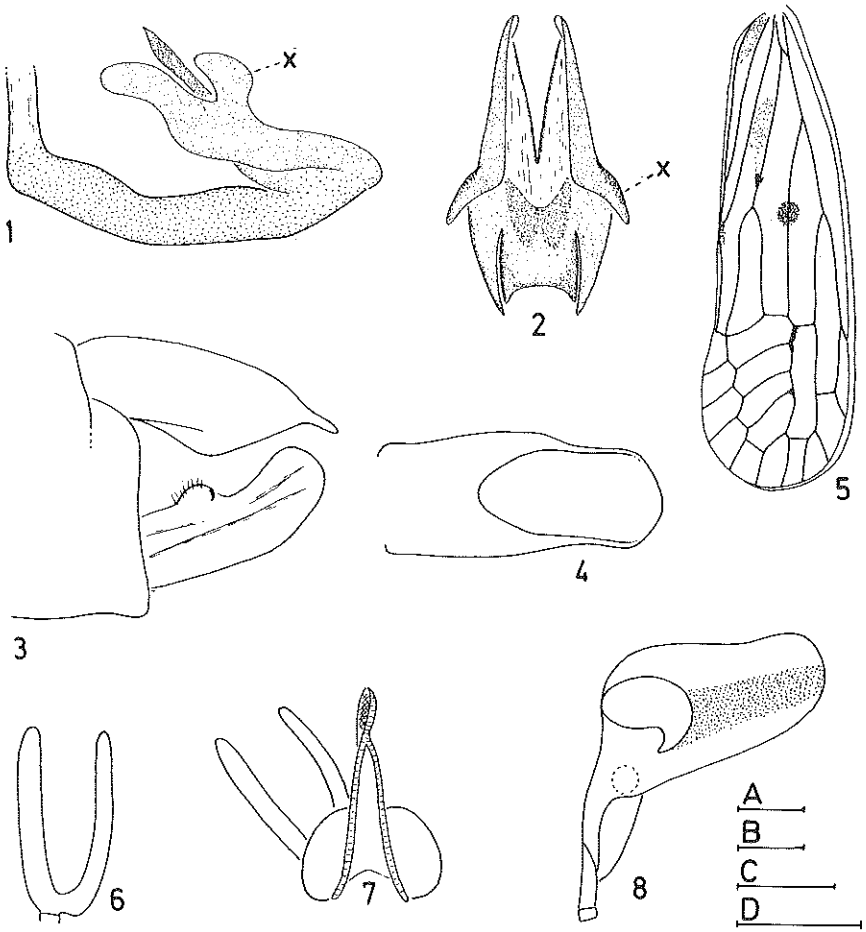
Interamma is closely related to *Nicerta* Walker, 1857, *Megatropis* Muir, 1913 and *Vivaha* Distant, 1906, with which it completely agrees in the shape and venation of the tegmina, as it is shown in *Nicerta submentiens* Walker, 1857, *Megatropis coccineolinea* Muir, 1913 and *Vivaha facialis* Distant, 1906, the respective type species of the above mentioned genera. *Interamma* differs from *Megatropis* and *Nicerta* in the longer head (produced anterior to eyes over more than length of an eye) and in the fact that its dorsal margin is situated in about the same plane as the dorsal margin of pronotum and mesonotum. In *Interamma* the antennae are biramose in the male, while generally uniramose in *Megatropis* and *Nicerta*, as far as can be deduced from our present knowledge of these genera (N.B. The genera *Nicerta* and *Megatropis* have never been revised). *Interamma* differs from *Vivaha* in the presence of biramose antennae in the female and in the shape of the head in lateral view. *Interamma* differs from *Robigus* in the venation of the tegmina (short subcostal cell, see Wilson 1987), and from *Pyrrhoneura* in the short head of the latter, and in the position of the median sectors which are placed in a sharper angle in comparison to the main stem.

Within the genus *Interamma* the species are distinguished from each other by the outline of the head in lateral view, the colour pattern of the tegmina, and the form of the aedeagus; nothing is known about infraspecific variability.

Interamma ascendens Walker, 1870 (Figs 1-8)

Interamma ascendens Walker, 1870: 118.

Interamma ascendens; Distant 1906: 306, Muir 1918: 241.



Figures 1-8. *Interamma ascendens* Walker, 1870, holotypes. 1. Aedeagus, left lateral view; 2. Aedeagus, dorsal aspect of flagellum; 3. Pygofer, anal segment and genital style, left lateral view; 4. Anal segment, dorsal view; 5. Right tegmen; 6. First and second segment and antenna; left fork corresponds with inner branch; 7. Head, dorsal view; 8. Head, right lateral view. Scale A (0.2 mm): 3, 4; B (1 mm): 5; C (0.2 mm): 1, 2; D (1 mm): 6-8.

Material. Holotype male, 'Mys, Wallace'; left tegmen missing BMNH (examined).

Note. General colour ivory white, a spot on the genae and antennae orange. Tegmina with brown spots as illustrated in Figure 5. Second segment of antennae forked (male), densely and equally covered with small sensilla. Vertex with foliaceous margins, these densely covered with sensilla.

Length: 8 mm.

Male genitalia: pygofer and anal segment as illustrated in Figures 3 and 4. Genital styles with a small spine halfway along their length. Aedeagus as illustrated in Figures 1 and 2, marked process situated in a vertical level.

Interamma angusta Walker, 1870 (Fig. 9)
Interamma angusta Walker, 1870: 118
Interamma angusta; Distant 1907: 405, Muir 1918: 241.

Material. Holotype male, Mysol, Wallace, BMNH (examined).

Note. The unique specimen of this species (the holotype) is severally damaged and the only diagnostic character left is the colour of the tegmina because head and abdomen are missing; accordingly we are unable to give a good redescription of this species without further topotypic material. The head is damaged and only the postclypeus is left which is irregularly fumated with red in the proximal half. Legs, pronotum and mesonotum pale ochreous. Tegmina hyaline with veins pale ochreous.

Total length (without head): 8mm.

Male and female genitalia unknown; in the only available specimen, the male holotype, the abdomen is missing.

The generic position of this species is uncertain and it might as well be congeneric with *Nicerta*. Because all diagnostic characters are lacking we have left this species in *Interamma*.

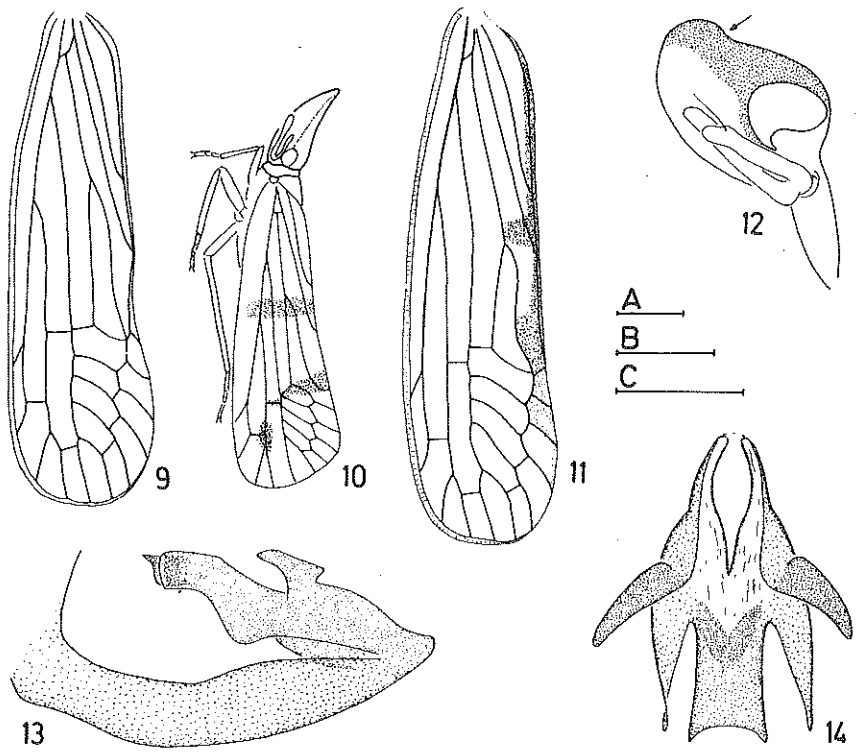
Interamma subvaria Walker, 1870
Interamma subvaria Walker, 1870: 119.
Interamma subvaria; Muir 1918: 241.

Material. Female type, Mysol, BMNH?

Note. The unique type is lacking in the collections of the British Museum, where it should be deposited.

Interamma karnyi Schmidt, 1926
Interamma karnyi Schmidt, 1926: 238

Note. Schmidt (1926) does not mention the number of specimens in his original description but there is no indication that the species was described on more than one female. According to the introduction in his paper the unique type should be deposited in the 'Stettiner museum' which does not exist any more. It is absent in the collections of the museum of the Humboldt University (Göllner-Scheiding, in litteris) nor did we get any news of the Zoological Institute in Warsaw (Poland) where some Schmidt types might be deposited (Göllner-Scheiding, in litteris).



Figures 9-14. *Interamma* species. 9. *Interamma angusta* Walker, 1870, holotype, left tegmen; 10. *Interamma rubrofasciata* Melichar, 1903, figure copied from Melichar (1903). 11-14. *Interamma saniosa* (Distant, 1907), lectotype: 11. Left tegmen; 12. Head, lateral view; arrow indicates point where lateral borders of vertex meet; 13. Aedeagus, left lateral view; 14. Flagellum, dorsal view. Scale A (1 mm): 9, 11; B (0.2 mm): 13, 14; C (1 mm): 12.

From the original description, mainly based on colour, the following part might be worth mentioning for the identification of this species: '... auf der Ader in der Coriummitte vor der Vorderflügelmitte steht ein runder schwarzer fleck, ein zweiter, länglicher zu Beginn der Apicalteiles, am Grunde der zweiten Subapicalzelle auf den Adern – weniger deutlich ein ähnlicher Fleck am Grunde der vierten Subapicalzelle, gleichfalls auf den Adern. ...'

As can be derived from the specific name, the species has been recorded from Buru Island. It has never been recaptured since its description.

Interamma rubrofasciata Melichar, 1903 (Fig. 10)
Interamma rubrofasciata Melichar, 1903: 61, Pl. II, Fig. 8.
Interamma rubrofasciata; Distant 1906: 306, Fig. 147, Muir 1913: 57.

Note. This species was described from a male and female from Sri Lanka ('Ceylon', Uva and Gamaduwa). We have not been able to examine the type of this species; it is not present in the collections of the Colombo National Museum in Sri Lanka (D.P.Wijesinghe, in litteris) nor in the collections of the Moravske Museum (P.Lauterer, in litteris), where one female is deposited which might belong to the type series, labelled as follows: '274' '2' 'Ceylon' '*Interamma rubrofasciata*'. According to the description and illustration given by Melichar the species might be recognised by the presence of two red marks on the tegmina and by the shape of the head, being long and tapering in lateral view; the figured specimen is a male, as indicated by the branched second segment of the antennae. We have copied here Figure 8, Taf. II in Melichar (1903). Distant (1906) records this species from 'Ceylon, Kandy', based on a male with mutilated head and deposited in the collections of the British Museum; this identification is tentative and has to be confirmed by the record of undamaged specimens.

Interamma septentrionalis Anufriev, 1968
Interamma septentrionalis Anufriev, 1968: 143, Figs 4, 8-9.

Note. This species was described from two females from the USSR, Maritime Terr., Yakovlevka. I have not examined the type of this species which is stored in the Zoological Institute in Leningrad. The number of apical veins and the position of the median sectors (first one branching at middle of tegmina) suggest that this species might belong to another genus related to *Interamma*.

Interamma saniosa (Distant, 1907) comb. n. (Figs 11-14)
Vivaha saniosa Distant, 1907: 405.
Vivaha saniosa; Kirkaldy 1907: 172.

Material. Lectotype male, here disignated, Queensland, F.P.Dodd, '1902-319', BMNH (examined). Paralectotypes: 2 males, same data as lectotype (not examined), BMNH.

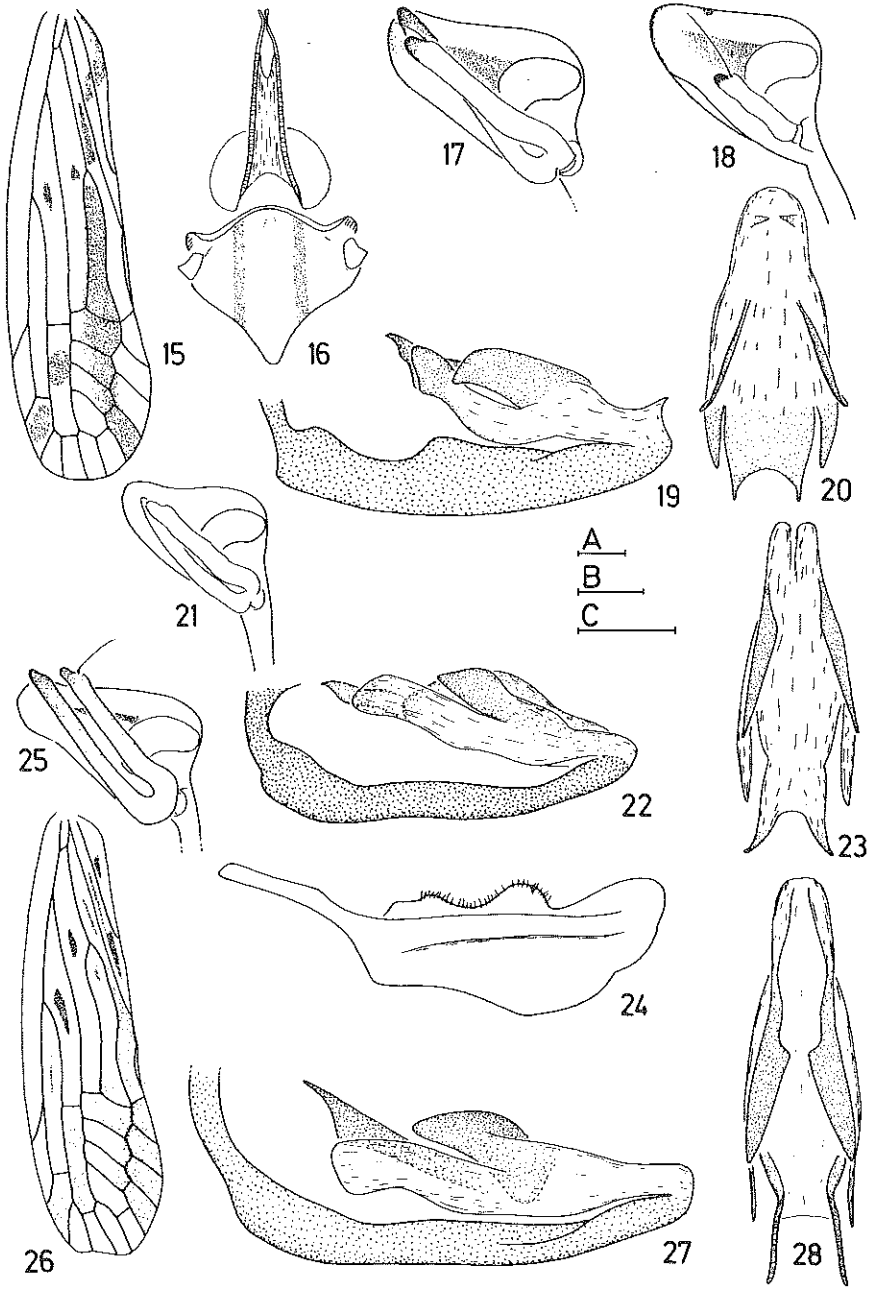
Note. General colour ochreous, no spots on antennae. Genae red in upper part (Fig. 12). Tegmina (Fig. 11) with an oblong red streak on commisural suture.

Length tegmina: 8 mm.

Male genitalia: anal segment, pygofer and genital styles like those of *Lascendens*. Aedeagus as illustrated; apical and dorsal lobe not in the same plane.

Interamma moati sp. n. (Figs 15-20).

Material. Holotype male, Sulawesi Utara, Gunung Moat (1100 m), 29.X.1985, KBIN. Paratypes: 1 female, same data as holotype; 1 female, Danau alia (1300 m), 30.X.1985, KBIN; 1 female, G.Mogogonipa, summit, 1008 m, 20.V.1985, BMNH.



Description. General colour pale ochreous. Genae with a distinct red streak. Second segment of antennae branched in male, pale ochreous, both ends black; second segment of antennae of female not branched, with a brown apex. Mesonotum with two red oblong streaks and a few smaller red colour marks as illustrated in Figure 16. General colour of tegmina yellowish with concolorous veins and brown spots as illustrated in Figure 15. Legs pale ochreous, last segment of all tarsi black in male, yellowish in females.

Total length: male 12 mm; female: 13.5-14.5 mm. Male genitalia: aedeagus illustrated in Figures 19 and 20.

Diagnosis. I.moati differs from other *Interamma* species by the combination of the following characters: the outline of the head (triangular), the presence of black spots on the antennae and tarsi (in males), the colour of the tegmina, and the structure of the aedeagus.

Interamma sulawesiensis sp. n. (Figs 21-28)

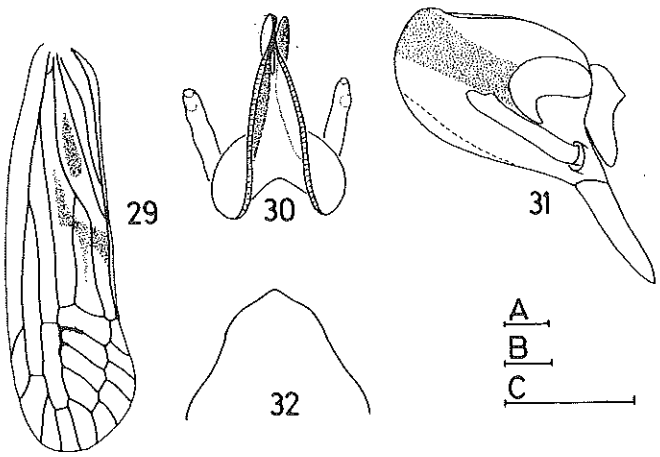
Material. Holotype male, Dumoga-Bone National Park, 'Edwards subcamp' (1140 m), X.1985, KBIN. Paratype: 1 male, Dumoga Bone National Park, 'Clarck's Camp', 1140 m, 13.IV.1985, leg M.R.Wilson, BMNH.

Description. General colour pale ochreous, an indistinct red band before eyes on genae; antennae reddish, branched in male (female unknown), apex not black as in *I.moati*. Pronotum and mesonotum pale ochreous. Tegmina pale yellowish, with about the same colour pattern as in *I.moati* but very indistinct. Legs including all tarsi pale yellowish.

Length: about 9 mm (tegmina not in resting position).

The male paratype is slightly different from the holotype: it bears a streak on the genae, the antennae are slightly longer (Fig. 25) and the tegmina have brown spots as illustrated in Figure 26. The aedeagus is slightly different in details of the proportions of the spinose processes (Figs 27-28). We tentatively consider both specimens as conspecific.

Figures 15-28. *Interamma* species. 15-20. *Interamma moati* sp. n.: 15. Left tegmen; 16. Head and thorax, dorsal view; 17. Head, male; 18. Head, female; 19. Aedeagus, holotype, left lateral view; 20. Flagellum, dorsal view. 21-28. *Interamma sulawesiensis* sp. n.. 21-24. Holotype: 21. Head, male; 22. Aedeagus, left lateral view; 23. Flagellum, dorsal view; 24. Left genital style. 25-28. Paratype: 25. Head; 26. Left tegmen; 27. Aedeagus, left lateral view; 28. Flagellum, dorsal view. Scale A (1 mm): 15, 26; B (0.2 mm): 19, 20, 22, 23, 24, 27, 28; C (1 mm): 16-18, 21, 25.



Figures 29-32. *Interamma delicata* Walker, 1870: 29. Left tegmen; 30-31. Head, lateral and dorsal view; 32. Pregenital sternite of female. Scale A (0.2 mm): 32; B (1 mm): 29; C (1 mm): 30, 31.

Diagnosis. I.sulawesiensis differs from other *Interamma* species by the outline of the head, the absence of black spots on antennae and tarsi (in males), the lack of a distinct colour pattern on the tegmina, and the structure of the aedeagus.

Interamma delicata Walker, 1870 (Figs. 29-31)
Interamma delicata Walker, 1870: 118.
Vivaha delicata; Distant 1907: 405.

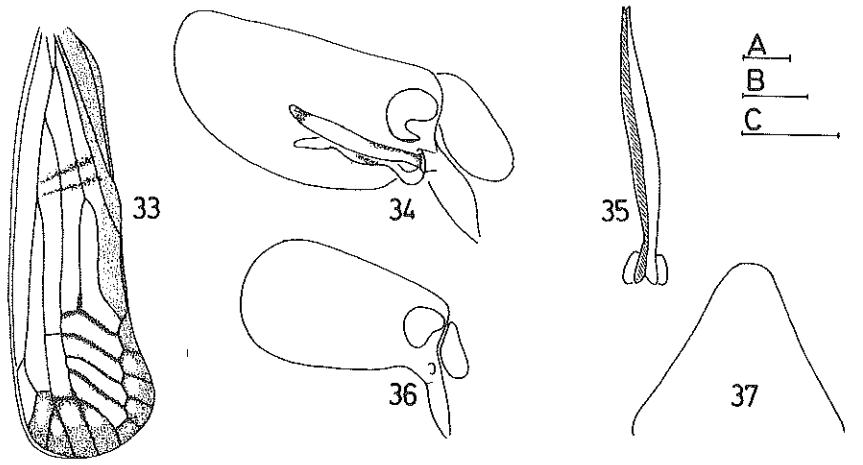
Material. Lectotype female, here designated, New Guinea, BMNH (examined). Additional: 1 female, 'N. Dutch Guinea', Waigeu. Camp Nok. 2.500 ft, IV.1938, L.E.Cheesman, compared to lectotype and identical (KBIN).

Note. Postclypeus pale yellowish. Genae with a red band before eyes. Antennae not branched, cylindrical. Pronotum pale yellowish, without prominent carinae. Tegmina subhyaline, with orange colour marks as illustrated in Figure 29 and a brown spot on the first branch of M. Legs pale stramineous.

The male of this species is unknown, but might have biramose antennae as observed in other species of this group.

Length: 10.5 mm.

Interamma leucocrota (Fennah, 1978) comb. n.
Vivaha leucocrota Fennah, 1978: 246, Figs 168-175



Figures 33-37. *Interamma facialis* Distant, 1906. 33-35. Lectotype: 33. Left tegmen; 34. Head and pronotum, lateral view; 35. Head, dorsal view. 36-37. Paralectotype; 36. Head and pronotum; 37. Pregenital sternite of female. Scale A (1 mm): 33; B (0.2 mm): 37; C (1 mm): 34-36.

Note. We have not examined the holotype, deposited in the collections of the Institute of Zoology, Polish Academy of Sciences, Warsaw. The species, described from Vietnam has been adequately illustrated by Fennah.

Genus Vivaha Distant, 1906
Vivaha Distant, 1906: 307, type species: *Vivaha facialis* Distant, 1906.

The generic description is the same as the one given for *Interamma*. *Vivaha* differs in the larger shape of the head and in the fact that the females have biramose antennae instead of uniramose as is the case in *Interamma*. The male genitalia of *Vivaha* are unknown and are indespensable to study the affinities between *Vivaha* and *Interamma*.

Vivaha facialis Distant, 1906 (Figs. 33-37)
Vivaha facialis Distant, 1906: 308, Fig. 148.
Vivaha facialis; Fennah 1956: 480, Fig. 13, A-C.

Material. Lectotype female, here designated, Andaman, BMNH (examined). Paralectotype: 1 female, Tenass. Vall., Myitta (Doherty), BMNH (examined).

Note. General colour of body pale ochreous. Frons red, postclypeus yellowish red. Antennae yellowish, with red spots as indicated in Figure 34, second segment forked, straight part cylindrical, bent part flattened, both parts regularly

covered with sensory organs. Borders of vertex (Fig. 35) covered with a single row of sensilla. Tegmina yellowish with orange veins, red spots as indicated in Figure 33 and a brown transverse mark at level of C1-fork.

Length tegmina: 9 mm.

Male genitalia: unknown

Female genitalia: caudal border of pregenital sternite as illustrated in Figure 37.

Remarks. The type series consists of two specimens and apparently both have been used in the original description: the figure of the complete insect is based on the specimen selected here as lectotype, while the details of the head are based on the paralectotype. The lectotype, a female, is a complete insect. In the paralectotype both tegmina are missing. Both specimens however differ in the shape of the head and each probably belongs to a different species.

It is not sure whether the specimens listed and illustrated by Fennah (1956) belong to the same species; the outline of the vertex and frons is different. We would like to await further topotypical material from the Andaman Islands to redescribe this species and to figure the male genitalia.

ACKNOWLEDGEMENTS

This paper is based in part on material collected whilst the author was a participant on Project Wallace, sponsored by the Royal Entomological Society of London and the Indonesian Institute of Sciences (results of Project Wallace no. 00). The author wishes to express his sincere gratitude to the Nationaal Fonds voor Wetenschappelijk Onderzoek, and Leopold-III Fonds voor Natuuronderzoek en Natuurbehoud and the Koninklijk Belgisch Instituut voor Natuurwetenschappen for the financial support offered by these institutions. Finally I would like to express my sincere gratitude to Dr W.J.Knight, Mr M.D.Webb (BMNH) and Dr M.R.Wilson for the loan of material, and to Dr M.R.Wilson for critically reading the manuscript.

REFERENCES

Anufriev, G.A. 1968. Cicads of the family Derbidae (Homoptera, Auchenorrhyncha) in the fauna of the U.S.S.R. *Ent. Obozr.* 47(1): 133-146.

Distant, W.L. 1906. Rhynchota. Heteroptera-Homoptera. *Fauna Brit. India* 3: 1-503.

Distant, W.L. 1907. Rhynchotal notes XLII. *Ann. Mag. nat. Hist.* (7)19: 395-416.

Fennah, R.G. 1952. On the generic classification of Derbidae (Fulgoroidea), with descriptions of new neotropical species. *Trans. R. ent. Soc. Lond.* 103(4): 109-170.

Fennah, R.G. 1956. Fulgoroidea from Southern China. *Proc. Calif. Acad. Sci.* 28(13): 441-527.

Fennah, R.G. 1978. Fulgoroidea (Homoptera) from Vietnam. *Annls zool. Warsz.* 34: 207-279.

Kirkaldy, G.W. 1907. Leafhoppers supplement (Hemiptera). *Bull. Hawaiian Sug. Plrs Ass. Exp. Stn Div. Ent.* 3: 1-186.

Melichar, L. 1903. Homopteren-Fauna von Ceylon. 1903: 1-248.

Muir, F. 1913. On some new species of leafhoppers. Part II. Derbidae. *Bull. Hawaiian Sug. Plrs Ass. Exp. Stn Div. Ent.* 12: 28-92.

Muir, F. 1918. Notes on the Derbidae in the British Museum collection. II. Derbinae. *Entomologist's mon. Mag.* 54: 228-243.

Schmidt, E. 1926. Fauna Buruana. Homoptera. *Treubia* 7: 217-258.

Synave, H. 1973. Monographie des Derbidae africains. *Etud. Cont. afr.* 2: 1-223.

Walker, F. 1870. Catalogue of the Homopterous insects collected in the Indian archipelago by Mr. A.R.Wallace, with descriptions of new species. *J. linn. Soc. Zool.* 10: 82-193.

Wilson, M.R. 1987. African Derbidae (Homoptera, Fulgoroidea): taxonomic notes with descriptions of new species collected mainly from coconut. *J. nat. Hist.* 21: 567-595.

Zelazny, B. 1981. The Philippine species of Rhotanini (Homoptera: Derbidae) and their distribution outside the Philippines. *Pacif. Insects* 23(3-4): 213-283.