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THE *TERPSICHORE*-GROUP OF THE GENUS *DUNDUBIA* AMYOT & SERVILLE, 1843

(HOMOPTERA, CICADIDAE)

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ABSTRACT

The *terpsichore*-group is proposed here for five species of the genus *Dundubia* Amyot & Serville, 1843. Redescriptions are provided for two species of this group, viz. *D. terpsichore* (Walker, 1850) from South Birma, Thailand and North Laos and *D. kebuna* (Moulton, 1923) from the Malay Peninsula. Three new species are described, viz. *D. ensifera* from East Pakistan and North-East India, *D. euterpe* from the Malay Peninsula and *D. rhamphodes* from Sumatra. A key to the species included in the *terpsichore*-group is presented.

INTRODUCTION

The range of the genus *Dundubia* Amyot & Serville, 1843, extends from India through South-East Asia to Indonesia, where it reaches its eastern limit at the Makassar street between Borneo and Celebes. Overmeer & Duffels (1967) published a revisionary study of this genus and recorded 15 species, which were mainly separated on account of the opercula

and the male genitalia.

Two species, viz. *D. terpsichore* (Walker, 1850) and *D. kebuna* (Moulton, 1923) are easily separated from the other species of the genus by the very sharply pointed male operculum. The males of *kebuna* are distinguished at first glance from the males of *terpsichore* by the castaneous brown body and the black-brown timbal coverings of the male, whereas the whole body of *terpsichore*, including timbal coverings, is greenish to ochraceous or dull brownish in colour.

When recently more material of *D. terpsichore* became available, the present authors restarted a study of this species. An examination of old and new material revealed that *D. terpsichore* must be splitted in fact into four species. For naming these we first must solve the nomenclatural question, which of the four species has to bear the name *terpsichore*. Thereafter we shall introduce the

name *terpsichore*-group for *terpsichore*, the three new species closely resembling *terpsichore*, and *D. kebuna*. Finally we present a key to the species and descriptions, respectively redescriptions, of the species concerned.

For the loan of material we are most grateful to the following persons and institutions. In the lists of material we have used the abbreviations as given below.

BIN	Koninklijk Belgisch Instituut voor Natuurwetenschappen, Brussel; Dr. H. Synave.
BM	British Museum (Natural History), London; Dr. W.J. Knight.
RMNH	Rijksmuseum van Natuurlijke Historie, Leiden; Dr. P.H. van Doesburg.
ZMA	Instituut voor Taxonomische Zoölogie (Zoölogisch Museum), Amsterdam.
ZMH	Zoologisches Institut und Zoologisches Museum, Hamburg; Dr. H. Strümpel.

For tracing the localities we have used the "Times Atlas of the World", 1973, the "Andrees Allgemeiner Handatlas", 7th edition, 1921, the map of South-East Asia of the National Geographic Magazine, 1965, and the most useful gazetteer in Moore & Tate, 1965. We are indebted to Dr. P.J.H. van Bree, Amsterdam for bringing this gazetteer to our attention.

In spite of many efforts we have not succeeded in tracing the localities Ban Lahan (French Laos), Ban Na Gnan and Xieng Om (Luang Prabang) and Ban Silah (Haut Mékong).

THE IDENTITY OF *DUNDUBIA TERPSICHORE*

Dundubia terpsichore was described after one female from the collection of the British Museum (Nat. Hist.), London. This holotype, still preserved in a good condition in the same institution, bears the labels: "E. Ind." (handwritten on round label with on reverse side:) "43", "10. Cephaloxys terpsichore" (print) and "Type" (print within green circle).

Walker (1850) gives "East Indies" as type locality of *Cephaloxys terpsichore*, but in later times Moulton (1923), Overmeer & Duffels (1967) and other authors misinterpreted "E. Ind." as East India. Dr. W.J. Knight (British Museum Nat. Hist., London) was so kind to check the acquisition num-

bers "43" in the registers of his institution. He informed us that alongside the concerning entry are the words: "E. Indies (Moulmein)". In Walker's time East Indies was a very large area extending from the present India to the Moluccas. All species of the *terpsichore*-group are recorded from this area, so that no geographical indications exist for attributing the name *terpsichore* to one particular species.

The species of the so-called *terpsichore*-group are separated in the first place by the characters of the males. The distinction of the females is much more difficult and mainly based on differences in the shape of the operculum. Reexamination of the holotype showed that the widely distributed species from Birma, Laos and Thailand is the true *terpsichore*.

THE *TERPSICHORE*-GROUP

The group contains *D. terpsichore*, a geographically central species with a wide distribution in Birma, Laos and Thailand, *D. ensifera* n. sp. from East Pakistan and North-East India, *D. euterpe* n. sp. from the Malay Peninsula, *D. rhamphodes* n. sp. from North Sumatra and *D. kebuna* from the Malay Peninsula.

These species are mainly distinguished on account of the structure of the male genitalia, the shapes of the male and female opercula, the shape of the timbal covering and the measurements of the body.

The group as a whole is easily distinguished from the other *Dundubia*-species by the very characteristic male opercula. The basal half of the operculum is rather broad, the apical part tapers towards the sharply pointed apex, the medial margin is weakly to moderately convex, the lateral margin is very convex in the basal part, strongly sinuate about half-way its length, and more apically it is straight or slightly concave towards the sharp apex. The male opercula of the other *Dundubia*-species are either apically broadly rounded or somewhat pointed but none of them have such a long tapering, sharply pointed apex as found in the *terpsichore*-group.

The abdominal segment 9 is very long in the *terpsichore*-group, ratio middorsal length abd. segm. 9: middorsal length whole abdomen about 1 : 3. Two other species, *D. aerata* Distant, 1888,

and *D. emanatura* Distant, 1889, have the same ratio, but in these species the ovipositor reaches far beyond the apex of abd. segm. 9; in the *terpsichore*-group the ovipositor reaches just beyond abd. segm. 9. Moreover *aerata* is easily distinguished by its large size, *emanatura* by the dark markings on head, thorax and abdomen (Overmeer & Duffels, 1967). As far as the females of the other *Dundubia*-species are known to us, abd. segm. 9 is relatively short to fairly short, ratio abd. segm. 9: whole abdomen 1 : 4 in *vaginata* (Fabricius, 1787), *longina* Distant, 1917, *solokensis* Overmeer & Duffels, 1967, and *simalurensis* Overmeer & Duffels, 1967, and 1 : 6 in *rafflesii* Distant, 1883, and *rufivena* Walker, 1850.

In the following lines we present a key to the males of the *terpsichore*-group. Because the females of *D. kebuna* and *D. ensifera* are unknown, we have not constructed a key to the females of the other species. The differential female characters of the other species can be read from the descriptions of the different species.

KEY TO THE MALES

- 1a. Timbal covering black-brown. Operculum dark-brown. Malay Peninsula *kebuna*
 b. Timbal covering and operculum ochraceous to light-brown 2
- 2a. Timbal covering fairly narrow (fig. 16).
 Width of timbal covering about as long as length of pronotum. Lateral margin of timbal covering makes a right angle with the posterior border. Malay Peninsula *euterpe*
 b. Timbal covering broad (fig. 4). Width of timbal covering at least 1.3 as long as length of pronotum. Lateral margin of timbal covering makes an angle of less than 90° with the posterior border 3
- 3a. Point of inflexion of the lateral margin at three fifths of length and at a level of half-way abd. segm. 3. Uncus lobe with one beak-shaped lateral process (fig. 13).
 Sumatra *rhamphodes*
 b. Point of inflexion of the lateral margin usually at half of its length, sometimes at three fifths of its length, and at a level of the posterior margin of abd. segm. 2. Uncus lobe differently shaped (figs. 8-10) 4
- 4a. Uncus lobe apically rounded, sometimes provided with a distinct lateral tooth (figs. 8, 9). Lateral margin of operculum strongly to fairly strongly concave at half of its length, sometimes at three fifths of its length. Apical part of operculum fairly slender. Width of head: 9.4-10.0 mm. South Birma, Thailand and North Laos *terpsichore*

- b. Uncus lobe apically bicuspidate (figs. 10, 11). Lateral margin of operculum strongly concave at half of its length. Apical part of operculum very slender. Width of head: 10.3-11.3 mm. East Pakistan, North-East India *ensifera*

Dundubia terpsichore Walker, 1850
 (figs. 1-9, 22)

Cephaloxys terpsichore Walker, 1850: 239; Dohrn, 1859: 75; Distant, 1906a: 54 (in syn. of *Dundubia mannifera* Stål, 1866); Banks, 1910: 35 (ditto); Wu, 1935: 12 (ditto).

Dundubia terpsichore; Stål, 1862: 483; Atkinson, 1885: 117; Atkinson, 1886: 165; Breddin, 1905: 220; Moulton, 1923: 84, 90; Overmeer & Duffels, 1967: 31, 34, 38, 52-55 [partim], figs. 45, 46.

Mogannia terpsichore; Atkinson, 1884: 233.

*) *Dundubia intemerata* [nec Walker, 1856]; Walker, 1857: 141; Atkinson, 1884: 224 [partim]; Distant, 1889: 42, pl. 4, fig. 1, a, b [partim]; Distant, 1906b: 57, 96, fig. 32-1 [partim]; Moulton, 1923: 83-86, 90 [partim].

NOT: *Dundubia mannifera* var. a Distant, 1889: 39, nom. nov. pro *Cephaloxys terpsichore* [= *Dundubia vaginata* Fabricius, 1787] Distant, 1912: 43 (in syn. of *Dundubia mannifera*) [= *Dundubia vaginata*].

Dundubia mannifera var. *terpsichore*; Distant, 1892: pl. 12, figs. 1, a, b [= *Dundubia vaginata*]; Distant 1906b: 94 (in syn. of *Dundubia mannifera*) [= *Dundubia vaginata*]; Distant, 1917: 101 [= *Dundubia vaginata*]; Kato, 1932: 165 [= *Dundubia vaginata*].

Dundubia terpsichore; Overmeer & Duffels, 1967: 31, 33, 34, 38, 52-55 [partim: North Khasia = *D. ensifera*; Sumatra = *D. rhamphodes*] figs. 20, 21 [= *D. rhamphodes*].

*) Remark: Overmeer & Duffels (1967) stated that the female holotype of *Dundubia intemerata* Walker, 1856, proved to belong to *Dundubia rufivena* Walker, 1850, so that *intemerata* was synonymized with *rufivena*. Atkinson (1884), Distant (1889, 1906b) and Moulton (1923) described *Dundubia intemerata* in the male sex and distinguished this species in the first place on account of the acute, triangular opercula of the male. Overmeer & Duffels (1967) proved that these male specimens of the so-called *intemerata* belong to *Dundubia terpsichore*. As *D. terpsichore* has been splitted now in four species forming part of the *Dundubia terpsichore*-group, we may conclude that most records of *D. intemerata* refer to one of these species of the *terpsichore*-group. It appeared however hardly possible to trace which species was recorded in the different publications dealing with *intemerata*. For this reason we give a few references only of *intemerata* and refer to Metcalf (1963: 530) for a complete list of publications on *D. intemerata*.

Material examined.- E. Ind., 4 $\frac{3}{3}$, 10. *Cephaloxys terpsichore*, Type, ♀ holotype of *Cephaloxys terpsichore*, EM. B I R M A: Nieder-Burma oberhalb Rangoon a. Unterl. d. Irawati, H. Schrader leg. 1913, Dr. M. Knoth ded. Eing. Nr. 193, 1930, *Dundubia spiculata* Nou. Prof. Dr. A. Jacobi determ. 1932, 64, 1 ♂, ZMH, same locality, H. Schrader leg. 1913, Dr. M. Knoth ded., Eing. Nr. 43, 1932, 1 ♂ 2 ♀, ZMH; Tenass[erim] Vall[ey], Myitta, Doherty, Distant coll. 1911-383, 3 ♂, BM; Burma, Karen Hills [Kayah State]?, Doherty, Distant coll. 1911-383, 1 ♂, BM; Birmah, 1 $\frac{7}{7}$, 1 ♂, BM. L A O S: French Laos, Ban Lahan, J.F. Godfrey, 1920-244, 2 ♂ 4 ♀, BM; Haut Mekong, Ban Silah, 8.IV.1918, R.V. de Salvaza, 1 ♂, BM; Haut Mekong, Vien Paukha, 3.V.1918, R.V. de Salvaza, 1 ♀, BM; Luang Prabang: Ban Na Gnan, 24.III.1920, R.V. de Salvaza, 1920-280, *Neodundubia elongata* Dist. type MSS, manuscript name only = *intemerata* Walk. Det. W. E. China, 1 ♂, BM; Luang Prabang: Mnong Nga, 12.III.1918, R.V. de Salvaza, 1 ♂, BM; Luang Prabang: Ban Nam Mo, 30.III.1918, R.V. de Salvaza, 2 ♂, BM, same data but with: *Dundubia intemerata* Walk., Det. W. E. China, 1 ♂, BM; Luang Prabang: Ban Nam Mo, 3.IV.1918, R.V. de Salvaza, 1 ♂, BM; Luang Prabang: Xieng Om, 30.III.1920, R.V. de Salvaza, Indo-China, R.V. de Salvaza, 1920-280, 2 ♀, BM; Laos, Xieng Khouang, 18.IV.15, Indo-China, Tonkin, R.V. de Salvaza, 1917-1918, 1 ♀, BM. T H A I - L A N D: Siam, Muok-Lek, 1000', Januar, H. Fruhstorfer, Don de Mr. Fruhstorfer, 3 ♂ 5 ♀, BIN, same data but with: *Dundubia spiculata*, 1 ♂, BIN; Siam, Muok-Lek, 1000', Januar, H. Fruhstorfer, collectie C. et O. Vogt Acq. 1960, 2 ♀, ZMA.

The type of *Cephaloxys terpsichore*.- The single, female, type specimen bears the following labels: "E. Ind." [handwritten on round label with on reverse side:] "4 $\frac{3}{3}$ ", "10. *Cephaloxys terpsichore*" [printed] and "Type" [printed within green circle].

Description

Head, thorax and abdomen coloured very variably either vividly green or yellow or dull-brownish.

Head often without markings. In a few specimens, including the holotype, the transverse ridges on the upper side of the postclypeus are somewhat darker than the ground colour. Some speci-

mens, including the holotype, have a pair of small brownish spots between the paired ocelli and the eyes. Rostrum with a dark tip just passing the middle coxae or reaching the hind coxae.

Thorax.- Pronotum without markings, with exception of the holotype, which has a short and narrow dark line behind the eye.

Mesonotum of the holotype with a pair of paramedian very narrow dark lines, which slightly converge from the anterior margin of the mesonotum to half-way the mesonotum disk, a pair of faint, small, triangular spots more laterally against the anterior margin of the mesonotum and a pair of small round black-brown dots in front of the lateral angles of the cruciform elevation. Mesonotum of the other specimens without distinct lines or spots. Some specimens have two pairs of obconical figures, which are somewhat differently coloured than the remaining part of the mesonotum. The paramedian obconical figures reach from anterior margin to one third of the mesonotum disk, the lateral figures reach nearly the hind margin of the mesonotum. The obconical figures represent the impressions of the flight muscles.

Operculum.- Operculum of the male (figs. 1-3) rather variable in shape. Medial margin weakly to moderately convex. Lateral margin slightly to fairly strongly sinuate. This margin is very convex in the basal part, fairly strongly concave at either half of its length or sometimes at three fifths of the length, and then straight or weakly concave towards the sharp apex. Point of inflexion of the lateral margin at a level of the posterior margin of segm. 2. The opercula of the specimens from Thailand, Muok-Lek are somewhat differently shaped. The lateral margin is stronger incurved and the apical sharp point of the operculum is somewhat narrower than in the other specimens. The operculum is rather variable in length, in the specimens from Thailand, Muok-Lek (fig. 3) and some others the apex reaches to the anterior margin of segm. 6 but more often it reaches to the middle of segm. 7.

Operculum of the female (figs. 5-7) with a sharp apex - especially very sharp in the specimens from Thailand, Muok-Lek - pointing in most specimens straightly distad but in a few specimens in a somewhat mediodistal direction. The lateral margin is fairly strongly convex, the medial margin weakly convex. The apex of the operculum

reaches to half-way segm. 3.

Abdomen.- Abdomen of the male often unicoloured; posterior margin of the segments in darkly coloured specimens sometimes black-brown coloured, extreme laterally often distinctly broader than mediodorsally. The male specimen from Karen Hills deviates in having more distinct castaneous markings on the upper side of the abdomen: a pair of rather large oblique spots on segm. 2, and a pair of smaller spots on segm. 3-5, becoming more faint hindwards. The timbal coverings are very broad. The width of the timbal covering is distinctly longer (at least 1.3 as long as) than the length of the pronotum. The lateral margin of the timbal covering makes an angle of less than 90° (fig. 4) with the posterior border. In dorsal view the projections of the timbal coverings partly cover the basal parts of the lateral margins of the opercula. Abdomen of the female also unicoloured. One specimen from Xieng Khouang has a more or less broad fascia running along the posterior margins of the segm. 3-8. In the holotype segm. 9 is dorsally somewhat darker coloured than ventrally.

Male genitalia (figs. 8-9).- The uncus bears two lobes, which are distinctly torded half-way their length. The lateral margin of the basal half is fairly convex. The apical half of the uncus lobe is very variable in shape, and may be armed with a variable number of teeth of different strength. In the specimens from Ban Lahan (Laos) (fig. 9) the apical part of the uncus is very broad and provided laterodistally with a more or less sharp point. In the material of Ban Na Gnan (Laos) and Ban Nam Mo (Laos), the apical half of the uncus is somewhat narrower and the lateral tooth more distinct. In the specimens of Ban Silah (Laos) the uncus lobe is narrow and provided with a series of more distinct teeth on its surface.

The specimens from Birma viz. those from Birma, Lower Birma (= Nieder Birma) (fig. 8), Tenasserim, Myitta, and Karen Hills have apart from the laterodistal tooth, either one tooth, or more small teeth on the longitudinal ridge running over the middle of each, fairly narrow uncus lobe. The specimens from Thailand, Muok-Lek are perhaps most different by having apart from a strong laterodistal thorn, another strong thorn placed more medially on the uncus lobe.

Measurements.- Length of body ♂: 26.3-31.5 mm, ♀: 24.8-32.4 mm; width of head ♂: 9.4-10.0 mm,

♀: 8.5-10.5 mm; width of pronotum ♂: 9.8-10.7 mm, ♀: 9.5-11.5 mm; width of mesonotum ♂: 7.8-9.2 mm, ♀: 8.0-9.8 mm; length of tegminum ♂: 33.2-38.5 mm, ♀: 33.0-41.0 mm.

Distribution (fig. 22).- *D. terpsichore* is recorded from the southern part of Birma, Thailand and northern Laos.

Discussion.- *D. terpsichore* is a very variable species especially with regards to the male genitalia and the opercula. Generally speaking, three groups can be recognized: (1) the specimens from Birma, the western part of the distributional area, characterized by a distinct longitudinal ridge on the uncus lobe, which is more or less strongly armed with teeth, (2) the specimens from northern Laos having a rather narrow uncus lobe; in the material from Ban Lahan (an untraced locality in Laos) the uncus lobe is rather broad, and (3) the material from Muok-Lek, Thailand which has the usual laterodistal thorn on the uncus lobe, but also an extra, strong thorn, placed more medially on the uncus lobe; moreover the material from this locality is characterized in the male sex by the very narrow apical part of the operculum and in the female by the somewhat sharper apex of the operculum.

We have considered to assign a separate taxonomic position to, for instance, the rather different population from Thailand. However, for the time being we refrain from this step, because the material available represents a somewhat poor sample, since the specimens of the three groups distinguished are from localities widely apart. More material from intermediate localities will probably give more insight in this taxonomic puzzle.

Dundubia ensifera n. sp.
(figs. 10-12, 22)

Dundubia terpsichore (nec Walker, 1850); Overmeer & Duffels, 1967: 31, 33, 38, 52-55 [partim: specimens from North Khasia and Silhet only].
Dundubia intemerata (nec Walker, 1856); Distant 1889: 42, pl. 4, fig. 1a, b [partim]; Distant, 1906b: 57, 96, fig. 32-1 [partim]; Moulton, 1923: 83-86, 90 [partim].

Material examined.- HOLOTYPE: "Assam" [printed], "Sibs." [agar] [handwritten], "Atkinson Coll. 92-6" [printed], ♂, EM. PARATYPES: Nth. Khasia, 1500 to 3000, Chenell, Distant coll. 1911-383

intemerata Walk., 1 ♂, BM. Silhet, 10⁴/₇, 1 ♂, BM.

It is not quite easy to separate *D. ensifera* from the highly variable *D. terpsichore* on account of external characters. The features of the male operculum, viz. its narrow apical half and the strong incurvation of the lateral margin at half the length of the operculum appeared generally to be useful to separate *ensifera*. The identification can be ascertained by examination of the male genitalia, which have a highly characteristic structure.

D. ensifera is described below in the male sex only.

Description of the male

Head and thorax dull brownish with a lightly olivaceous tinge. Abdomen above and beneath light-brownish in the paratypes, but castaneous brown in the holotype.

Head.- Without markings. Rostrum with a dark tip just reaching the hind coxae.

Thorax.- Pronotum without markings. Mesonotum without distinct spots or lines but with two pairs of obconical figures as described in *terpsichore*.

Operculum (fig. 12).- Medial margin weakly convex. Lateral margin fairly strongly sinuate. The lateral margin is very convex in the basal part, strongly concave at half of its length and then nearly straight or weakly convex towards the sharp apex. Point of inflexion at a level of the posterior margin of segm. 2. Apical part of the operculum very slender. Apex reaching to half-way abd. segm. 6 or half-way abd. segm. 7.

Abdomen.- Without distinct markings; colour as described above. Timbal coverings very broad. Width of timbal covering at least 1.3 as long as length of pronotum. Shape of timbal covering as described for *terpsichore*. In dorsal view the timbal covering covers partially the lateral margin of the operculum.

Genitalia (figs. 10-11).- The uncus lobe has a slender bicuspidate apex. The two cusps are visible in a ventrolateral view only, as the cusps are placed behind each other. In a ventral view the lateral margin of the uncus lobe is fairly convex at its base and concavely sinuate towards

the slender somewhat outcurved apex.

Measurements.- Length of body: 30.5-33.3 mm; width of head: 10.3-11.3 mm; width of pronotum: 11.2-11.5 mm; width of mesonotum: 9.4-9.8 mm; length of tegminum: 38.2-39.1 mm.

Distribution (fig. 22).- *D. ensifera* is recorded from Silhet in East Pakistan and the adjacent part of North-East India.

Dundubia rhamphodes n. sp. (figs. 13-15, 22)

Dundubia terpsichore (nec Walker, 1850); Overmeer & Duffels, 1967: 31, 33, 34, 38, 52-55 [partim: material from Sumatra only] figs. 20, 21.

Material examined.- HOLOTYPE:

"Langkat (Sumatra) E. Versmann leg. 85-86, Senator Versmann, ded. 25.VIII.[18]86" [printed] ♂, ZMH. PARATYPES: same data as holotype, 1 ♂ 1 ♀, ZMH; Tusschen Serdang en het Tobameer [between Serdang and Toba Lake], N.O. Sumatra, 1 ♂, RMNH.

The description of this species is based on three males and one female from Sumatra. These four specimens were apparently temporarily kept in spirit, as their bodies are dull ochraceously coloured and considerably shriveled, particularly the mesonotum and the abdomen.

D. rhamphodes most closely resembles the two preceding species of the *terpsichore*-group. It can be separated from these species by the shape of the male operculum. In *rhamphodes* the point of inflexion of the lateral margin of the operculum is situated more distad than in *terpsichore* and *ensifera* (see key to the species).

In the male genitalia the present species is easily distinguished by the beak-shaped lateral processes of the uncus lobes.

Description

Body uniformly dull ochraceous, pronotum collar and timbal coverings somewhat lighter coloured. Body without markings. Rostrum with a dark tip, just reaching the hind coxae.

Operculum.- Operculum of the male (fig. 15) very uniform in the three specimens examined. Medial margin weakly convex. Lateral margin weakly sinuate, fairly convex in the basal part, fairly concave at three-fifths of its length and then

straight or very weakly concave towards the sharply pointed apex, which reaches the posterior margins of either abd. segm. 6 or 7. Point of inflexion of the lateral margin at a level of half the height of segm. 3.

Operculum of the female (fig. 14) reaching to half-way abd. segm. 3. Apical two-third of the operculum semicircular. Lateral margin fairly strongly convex, medial margin slightly convex.

Abdomen.- Timbal coverings of the male very broad, at least 1.3 as long as the length of the pronotum. In dorsal view the timbal coverings do not cover the lateral margins of the operculum.

Male genitalia (fig. 13).- The uncus lobe bears one beak-shaped lateral process, pointing in lateral direction. Lateral margin of the uncus lobe convex in the basal part, but more apically strongly concave up to the lateral beak. Medial margins of the uncus lobes diverging, apically strongly rounded.

Measurements.- Length of the body ♂: 25.6-27.0 mm, ♀: 26.4 mm; width of head ♂: 9.4-10.0 mm, ♀: 9.2 mm; width of pronotum ♂: 10.0-11.0 mm, ♀: 9.8 mm; length of tegminum ♂: 34.7-36.2 mm, ♀: 33.7 mm.

Distribution (fig. 22).- *D. rhamphodes* has been found in Sumatra.

Dundubia euterpe n. sp.
(figs. 16-19, 22)

Dundubia intemerata (nec Walker, 1856); Distant, 1889: 42, pl. 4, fig. 1a, b [partim]; Distant, 1906b: 57, 96, fig. 32-1 [partim]; Moulton, 1923: 83-86, 90 [partim].

Material examined.- HOLOTYPE: "Perak A. Grubauer leg., B. Jachan vend. 10.XII.1901" [printed], "Perak" [handwritten], ♂, ZMH. PARATYPES: same data as holotype, 1 ♀, ZMH; Perak, II-III.1900, Kwala Kangsar, 15.VII.1900, B. Jachan vend., 3 ♂ 2 ♀, ZMH; Kwala Kangsar, Perak, 1.IV.1901, B. Jachan vend., 1 ♂ 2 ♀, ZMH.

D. euterpe is a fairly small-sized species with a vividly ochraceous ground colour. The males are easily separated externally from the other species of the *terpsichore*-group by the narrow timbal coverings.

Description

Head, thorax and abdomen vividly ochraceous, often with a greenish tinge.

Head.- Without markings. Rostrum with a dark tip generally just passing the middle coxae and sometimes just reaching the hind coxae.

Thorax.- Pronotum without markings. Mesonotum without distinct markings, but some specimens have two pairs of faint obconical figures on the mesonotum, which are somewhat darker coloured than the remaining part of the mesonotum. The paramedian obconical figures are fairly short, the lateral ones are nearly as long as the mesonotum. These figures are differently coloured by the impression of the flight muscles.

Operculum.- Operculum of the male (fig. 17) fairly variable in shape. Medial margin weakly convex. The lateral margin is very convex in the basal part, weakly to fairly strongly concave at half or three-fifths of its length, and then straight or weakly concave towards the sharply pointed apex, that usually reaches to half-way abd. segm. 7, but in one specimen to half-way abd. segm. 6. Point of inflexion of the lateral margin at a level of half the height of segm. 3.

Operculum of the female (fig. 18) oblique, apex somewhat rounded and pointing mediodistad. Lateral margin strongly convex. Medial margin nearly straight. Apex of the operculum just passing the posterior margin of abd. segm. 2 or reaching to half-way segm. 3.

Abdomen.- Abdomen of the male unicoloured. Abdomen of the female unicoloured, but some specimens have a light-brownish suffused fascia along the lateral sides of the abd. segm. 2-8. Timbal coverings of the male fairly narrow. Width of timbal covering about as long as length of pronotum. The lateral margin of the timbal covering makes an about right angle with the posterior border (fig. 16). In dorsal view the projections of the timbal coverings do not partially cover the lateral margins of the opercula.

Male genitalia (fig. 19).- The fairly broad uncus lobe bears two sharply pointed spurs, one medial spur, which is juxtaposed to the medial spur of the other uncus lobe, and a slightly curved lateral one pointing sideways. Lateral margin of the uncus lobe convex near its base, more apically straight up to the lateral spur; apical

margin of the uncus lobe between the lateral and medial spur concave.

Measurements.- Length of body ♂: 22.4-25.3 mm, ♀: 26.4-29.8 mm; width of head ♂: 7.8-8.8 mm, ♀: 8.6-9.6 mm; width of pronotum ♂: 8.0-9.2 mm, ♀: 9.0-10.0 mm; length of tegminum ♂: 28.7-32.3 mm, ♀: 32.5-34.5 mm.

Distribution (fig. 22).- *D. euterpe* is recorded from Perak in the Malay Peninsula (West-Malaysia).

Dundubia kebuna Moulton, 1923
(figs. 20-22)

Dundubia kebuna Moulton, 1923: 69, 86, 167, pl. 4, figs. 17a, b; Overmeer & Duffels, 1967: 31, 33, 54, 55.

Material examined.- "Peninsular Siam Nakon Sri Tamarat Khad Ram at light, Tai Sai River Feb. 19th 1922 H. M. Pendlebury" [partly printed, partly handwritten], "Pres. Raffles Mus. Singapore Brit. Mus. 1922-302" [printed], "*Dundubia kebuna* Moulton Type 13.V.22" [handwritten] "Type" [printed; round label with red margin], ♂ holotype of *Dundubia kebuna*, BM; Siam Ronpibun, 4.III.1922, Pres. Raffles Mus. Singapore, Brit. Mus. 1922-302, 1 ♂, BM.

The present species is quite easily separated from the other species of the *terpsichore*-group by the black-brown timbal coverings and the dark-brown male opercula.

D. kebuna was described by Moulton (1923) after one male specimen from Siamese Malaya, preserved now in the collection of the British Museum (Nat. Hist.). This and one other male specimen from Malaya in the same collection are the only specimens of this species known to us. Overmeer & Duffels (1967) already studied these two specimens of *kebuna*, but because their description is fairly short and incomplete, we provide below a more extended one; moreover, we add figures of the male operculum and the male genitalia.

Apart from the type-specimen, Moulton (1923) recorded "Other examples from the same neighbourhood in [Federated] [Malay] [States] Mus[eums] and Raffles Museum", among which at least one female. We have made no attempt to borrow these specimens from these museums.

Description of the male

Head.- Light-reddish-brown without distinct markings. Brown tip of the rostrum reaching beyond the middle coxae or just reaching the hind coxae.

Thorax.- Pronotum light-reddish-brown, pronotum collar light-brown, lacking the reddish-brown tinge. Two somewhat darker patches are situated between the anterior and posterior fissures of the pronotum.

Mesonotum light-reddish-brown with a pair of slightly darker, lateral obconical figures reaching from the anterior margin of the mesonotum to the cruciform elevation and a pair of very faint paramedian obconical figures, which reach from the anterior margin of the mesonotum to half the length of the mesonotum disk.

Operculum (fig. 20).- Dark-brown with a black tinge. Medial margin straight. Lateral margin sinuate, fairly convex in the basal half, fairly concave at about half of its length and then straight up to just below the sharp apex; the extreme tip of the operculum is slightly curved mediad. Point of inflexion of the lateral margin at a level of the posterior margin of segm. 2. Apical part of the operculum very slender. Apex reaching the anterior margin of abd. segm. 7.

Abdomen.- Ground colour of the upper side castaneous. Posterior one-fifth of segm. 3, posterior one-fourth of segm. 4, the greater part of segm. 5 and the whole dorsal surfaces of segm. 6-8 darker brown or black-brown. Ground colour of the underside ochraceous. All sternites with a faint to very distinct, light-brown to dark-brown mark. Paratergites dark-brown with exception of the ochraceous coloured, medial and posterior margin. Timbal coverings large and black-brown coloured. Width of timbal coverings 1.3 times as long as the length of the pronotum. The lateral margin makes an angle of less than 90° with the posterior border.

Genitalia (fig. 21).- Surface of the uncus lobes slightly convex. The uncus lobe narrows from its base to about half-way its length; the apical half maintains about the same width, being about one-fourth of the length of the uncus lobe. The lateral margin is rather convex in the basal half, concavely sinuate about half-way and then straight to the apex, which is somewhat outcurved, broadly rounded and bicuspidate laterodistally.

Measurements.- Length of the body of the holotype: 35.0 mm. Measurements of the specimen from Ronpibun: length of body: 31.3 mm, width of head: 10.5 mm; width of pronotum: 11.2 mm; width of mesonotum: 9.4 mm; length of tegminum: 39.4 mm.

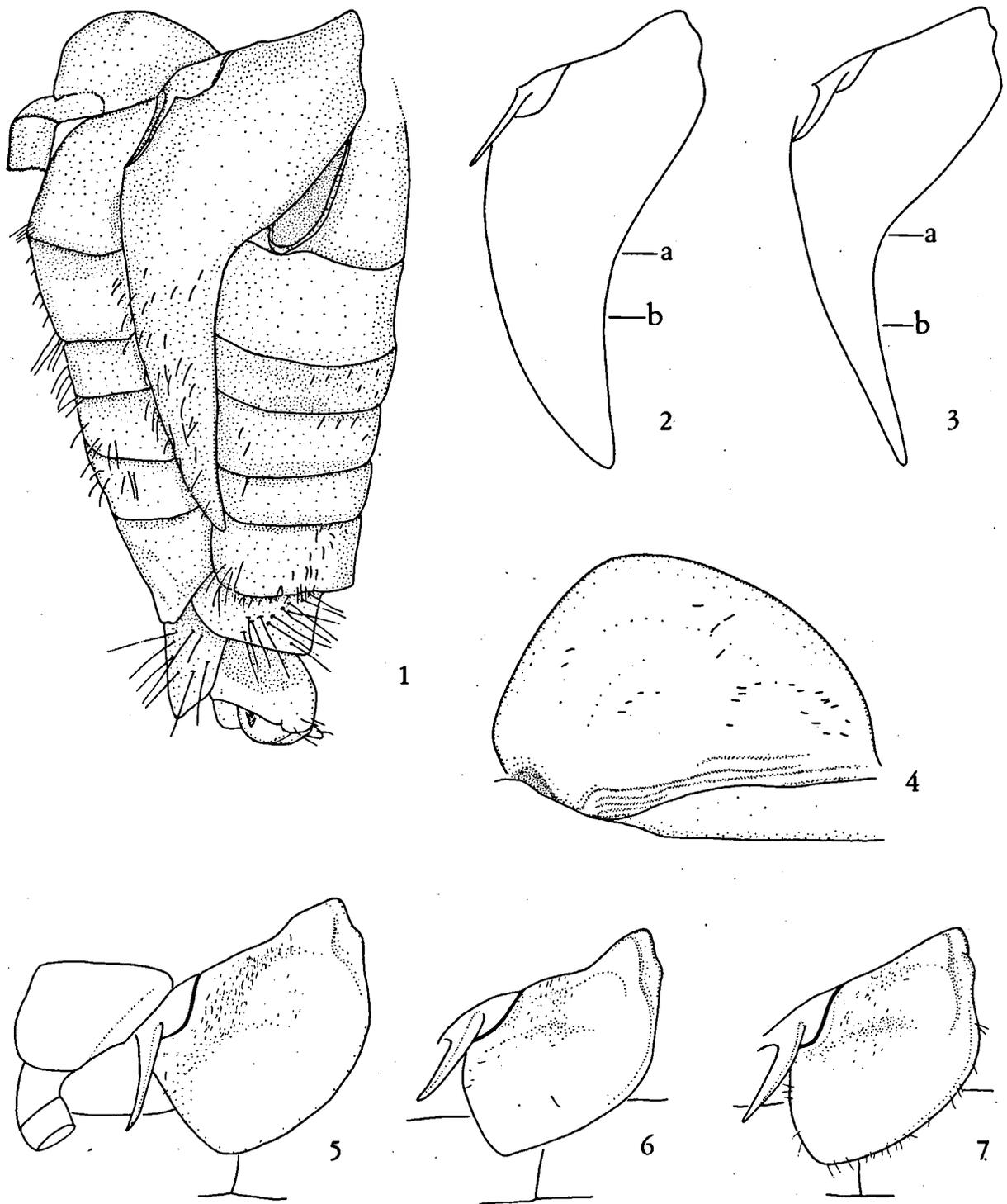
Distribution (fig. 22).- *D. kebuna* is recorded from the Siamese part of the Malaya Peninsula.

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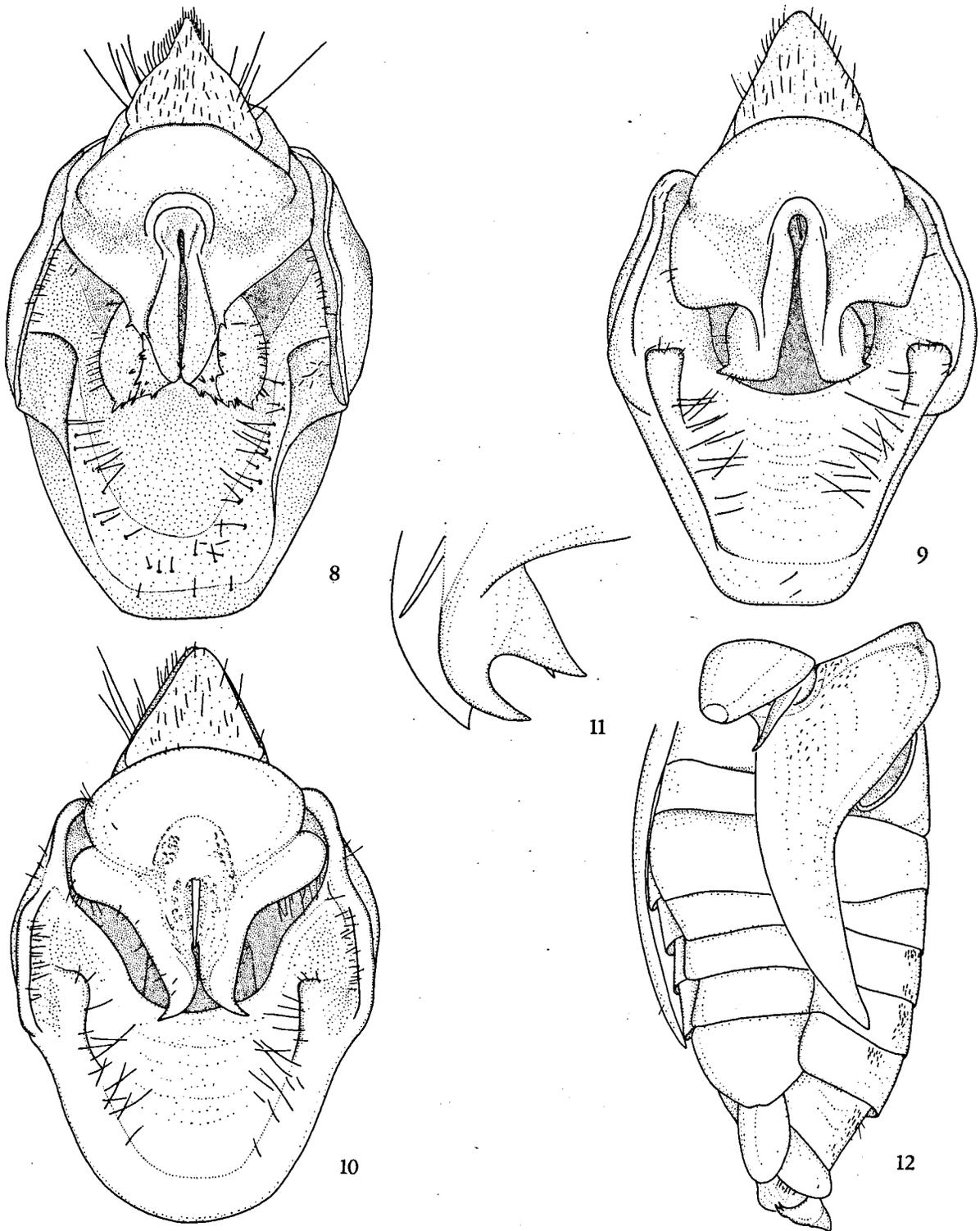
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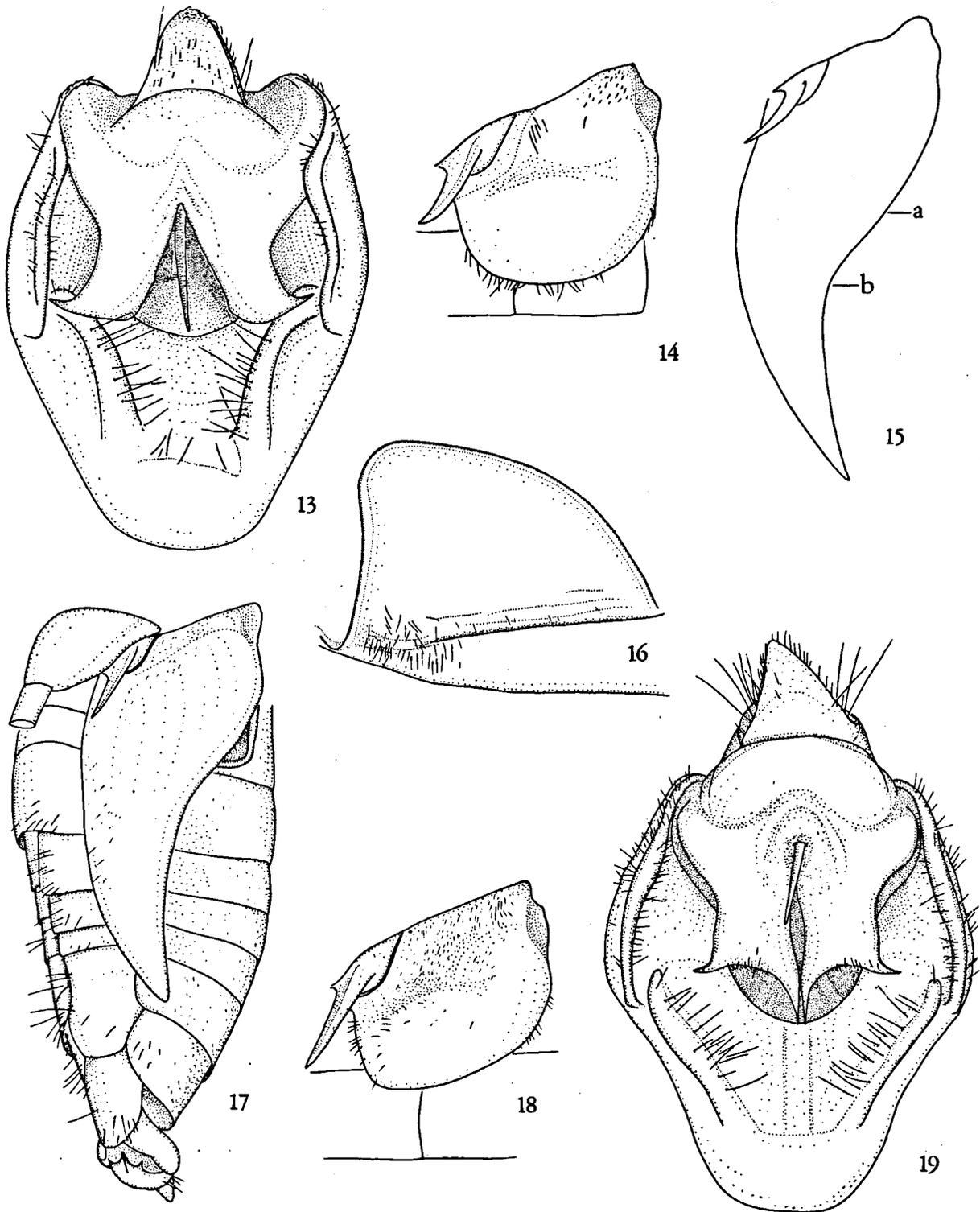


Figs. 1-7. *Dundubia terpsichore* (Walker, 1850): 1, male abdomen with operculum in ventrolateral view, Lower Burma; 2-3, male operculum in ventrolateral view, a, anterior margin of abd. segn. 3, b, posterior margin of abd. segn. 3, 2, Laos; 3, Thailand, Muok-Lek; 4, left timbal covering in dorsolateral view, Thailand, Muok-Lek; 5-7, female operculum in ventrolateral view: 5, holotype; 6, Thailand, Muok-Lek; 7, Laos, Ban Lahan.



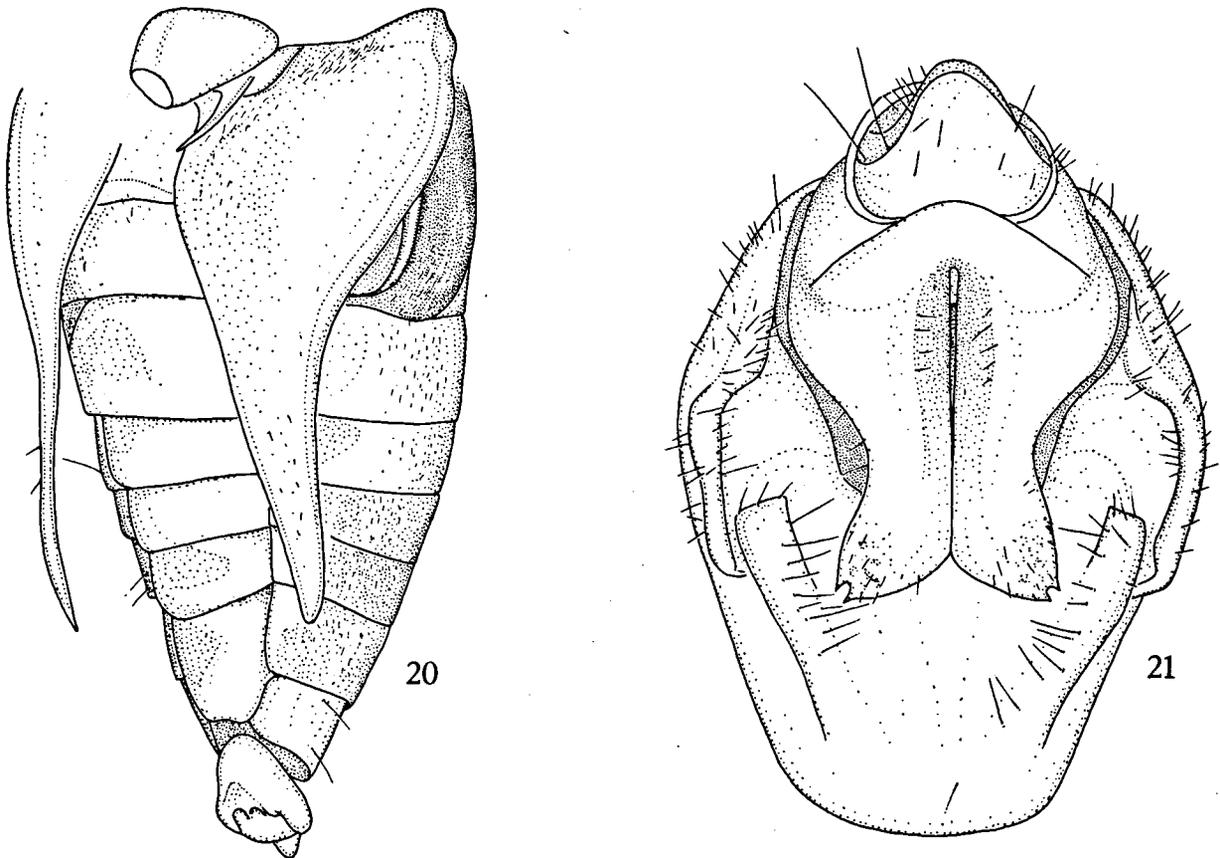
Figs. 8, 9. *Dundubia terpsichore* (Walker, 1850), pygofer in ventral view: 8, Lower Burma; 9, Laos, Ban Lahan.

Figs. 10-12. *Dundubia ensifera* n. sp., holotype: 10, pygofer in ventral view; 11, apical part of right uncus lobe in ventrolateral view; 12, male abdomen with operculum in ventrolateral view.



Figs. 13-15. *Dandubia ramphodes* n. sp.: 13, pygofer in ventral view, holotype; 14, female operculum in ventrolateral view, paratype; 15, male operculum in ventrolateral view, holotype, a, anterior margin of abd. segn. 3, b, posterior margin of abd. segn. 3.

Figs. 16-19. *Dandubia euterpe* n. sp.: 16, left timbal covering in dorsolateral view, holotype; 17, male abdomen with operculum in ventrolateral view, holotype; 18, female operculum in ventrolateral view, paratype from Kwala Kangsar, 15.VII.1900; 19, pygofer in ventral view, holotype.



Figs. 20-21. *Dundubia kebuna* Moulton, 1923: 20, male abdomen with operculum in ventrolateral view, Siam, Rongpibun; 21, pygofer in ventral view, holotype.

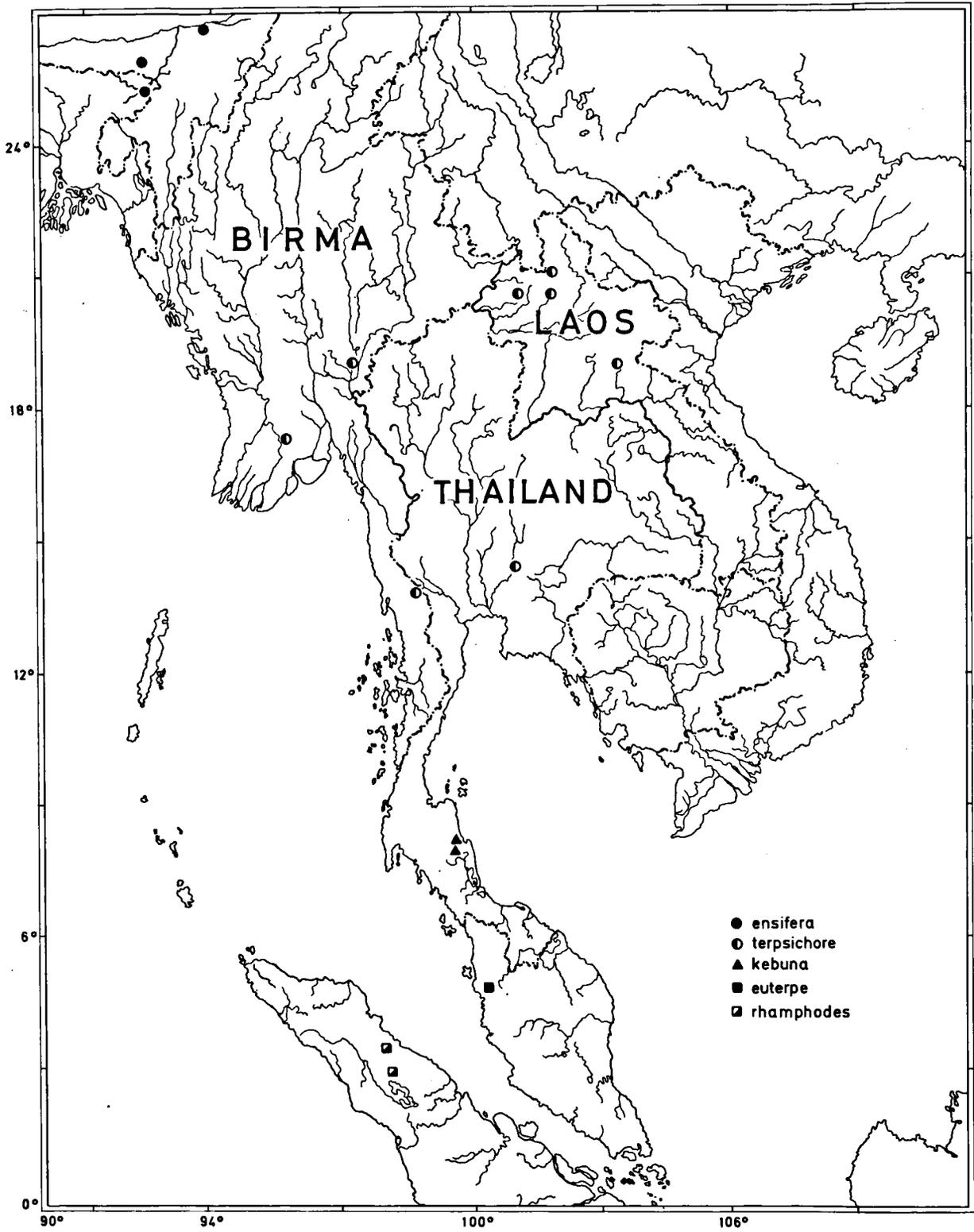


Fig. 22. Distribution of the species of the *Dundubia terpsichore*-group, del. J. Zaagman.