Yakuza, a new genus of Typhlocybinae from the Oriental Region, morphological and behavioural characteristics (Hemiptera, Auchenorrhyncha, Cicadellidae)

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Abstract

New genus of Erythroneurini from the area between East Himalayas and Sumatra, with 8 new species, described and illustrated. Known host plants belong to the family Araceae. Males of the most of the known species deposit thick layer of brochosomes on frontoclypeus or on both, frontoclypeus and anteclypeus. The description of the new genus made once in terms of comparative morphology and again in terms of convention.

Keywords: Typhlocybinae, new taxa, Oriental Region, comparative morphology, behaviour.

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Introduction

The present account utilizes insect material collected by me in India, Taiwan and Sumatra, one species from the collection of the Bishop Museum in Honolulu and one species collected in Myanmar by H. Nickel.

Abbreviations used to indicate curators of the type-series of newly described species:

SMTD Staatliches Museum für Tierkunde in Dresden, Germany

MM Moravian Museum in Brno, Czech Republic

HMNH Hungarian Museum of Natural History, Budapest, Hungary

USNM National Museum of Natural History, Smithsonian Institution, Washington, USA

BPBM Bernice P. Bishop Museum, Honolulu, USA.

The drawings are shown in different magnifications. Terminology of parts of wings is after DWORAKOWSKA (1993) and terminology of convenience in the alternative description of the new genus is after YOUNG (1952). Description of male genitalia, partly in terms of comparative morphology uses abbreviations of names of segments of insect leg. Descriptions of this kind, along with explanation and examples are in my papers (1994a-1997).

Yakuza gen.nov.

Type-species: *Yakuza taiwana* sp.nov.

Head with eyes narrower than maximum width of pronotum (Figs 2, 3). Vertex parallel sided, slightly arcuate anteriorly, about half as long as pronotum in midline, with coronal suture almost reaching its anterior margin and dorsal ends of lateral frontal sutures visible in dorsal view at anterior margin as contrastingly light patches. Eyes short. Face short, strongly convex in profile, even more so in male (Figs 11, 12). In profile, very long transition between vertex and face (Fig. 4). In face of female ventral extremes of genae confluent with these of anteclypeus (Fig. 10), in male slightly protruding latero-ventrally (Fig. 9).

Fore wing slightly broadening apicad, rounded apically (Figs 7, 109, 117), veins prominent. On clavus AA distinct. Subapically CuA'+ MP" do not reach the wing margin. Longitudinal veins subparallel, cells subequal. The 4th apical cell the shortest, as wide as 2nd apical cell but only half that long (Figs 7, 117).

Hind wing narrowing gradually toward narrowly rounded apex (Fig. 8). Ambient vein distinct at costal margin but there is no av on the anal area (AA+AP' are not exceeding the claval fold), neither mesad of CuP .

Genital capsule almost spherous, with long dorsal bridge (Figs 5, 6). In the anal tube the segment 10 very short, segment 11 longer than 10.

In pygofer antero-dorsal sclerite very large, with its medial ledge, demarcated by ledges (Fig. 13), free lobe of CX about quarter of the length of pygofer, paramere as long as pygofer, its cephalic end slightly protruding into body cavity, subgenital plate slightly exceeding pygofer caudally, sternite 9 as long as half of the length of pygofer lobe (Fig. 5).

Pygofer side shorter than its height basally, basal part occupies half of its length, acrotergite 9 & antecosta with distinct apodeme; tergite consolidated with mesocoxite, well separated from CX by ledges (Figs 13, 19, 51). Subcoxa (SCX) with its medial ridge distinct; coxa (CX) forms most of the free pygofer lobe, usually well distinguishable from trochanter (TR) which is short, narrow and folded mesad ventrally. Sensory structures comprise feeble microsetae on the disk of CX, a few short rigid microsetae on the free lobe of CX caudally; a cluster (usually smaller feeble setae on the disk of TR and sensory pits of varied size on antero-dorsal sclerite; sensory pits also on dorsal pygofer appendage (Figs 46, 70, 92, 94, 97). Acrotergite 10 well sclerotized, situated meso dorso-caudally, participates in dorsal pygofer appendage which is movably articulated.

Subgenital plate broader basally, with maximum expansion close to its base, apex broadly rounded, basal lateral knob small, lateral plica distinct (Figs 18, 20, 53). All categories of setae well represented, shaped typically of Erythroneurini (Figs 18, 137); marginal microsetae numerous, basal group

not easily distinguishable, bases of setae in caudal half of the marginal row shielded with cuticular outgrowths. Plates articulated with sternite 9 apart from each other, their articulation with parameres narrow, close to their bases.

Paramere resembling that of *Salka*, but central part shorter, extension of caudal part adorned with oblique ridges and furrows (Figs 16, 35).

Connective (Figs 22, 126, 132) with large central lobe, sclerotized ledge in midline and short manubrium bearing apodemes subterminally (Fig. 126).

Penis with basal section produced dorsolaterally to meet mesal elongations of segment 10 and apodeme which is single or double; sections 1-3 well consolidated, forming penis stem with gonopore subapical, ventral (Figs 14, 15, 27, 113, 118); borders between the sections sometimes detectable as ledges (Fig. 15); manubrium uniform.

Sternite 9 nearly parallel sided, slightly convex caudad, with cephalic desclerotization in midline (Fig. 20).

Segment 10 with mesocoxite narrow, sclerotized, fused with tergite (acrotergal component of dorsal pygofer appendage), sending off short sclerotized mesal elongations which join lateral dorsal protrudings of basal section of penis (Figs 5, 6, 130). Segment 11 with very large sternite (Fig. 5), other parts as in most of genera of Erythroneurini.

In female terminalia apex of valva protruding beyond coleostron on a considerable stretch (Fig. 17).

Basal abdominal apodemes of sternite 3 in male long (Figs 21, 124).

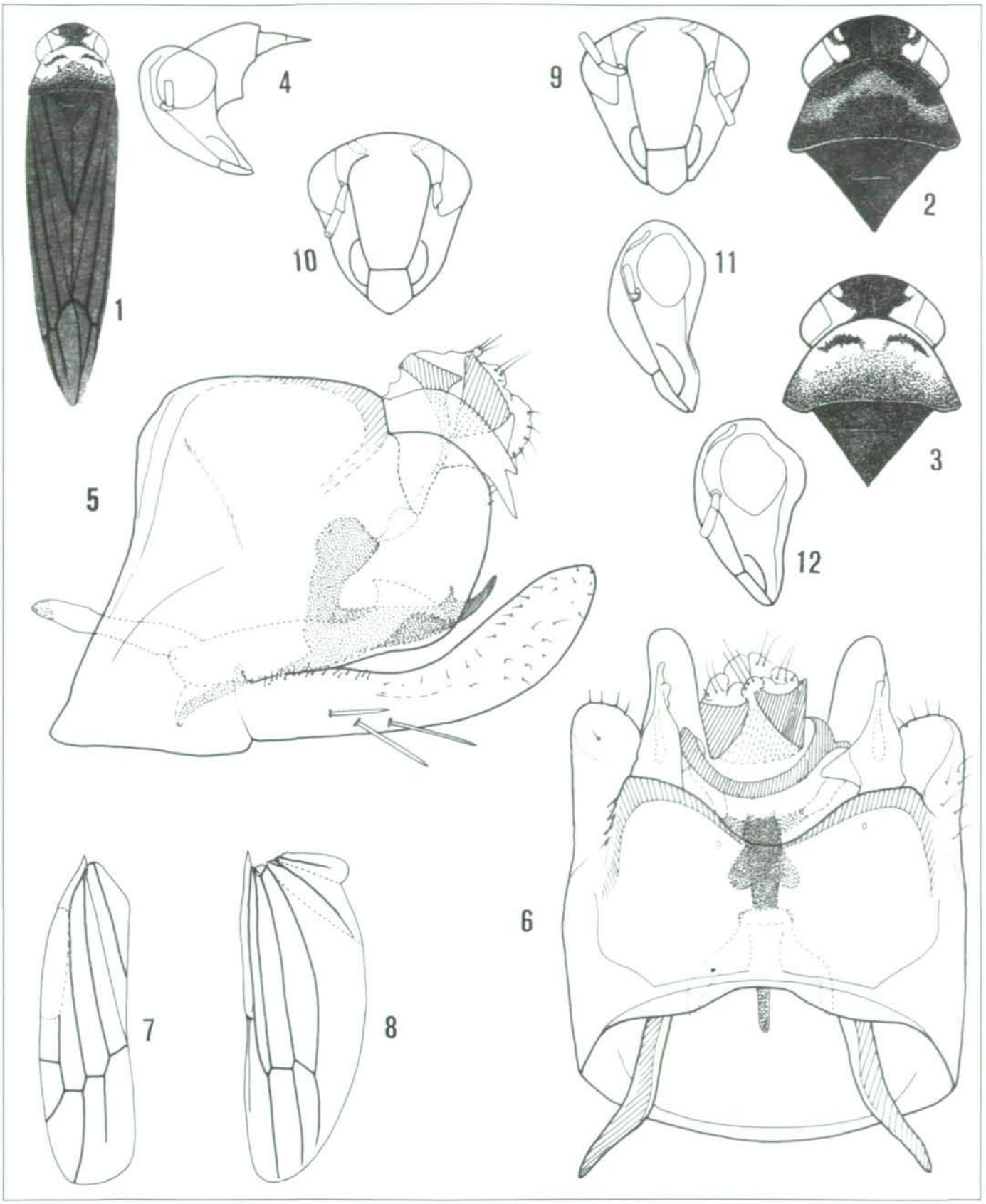
The generic name is to be treated as arbitrary combination of letters. Gender: Feminine.

Comparison: *Yakuza* gen.nov. belongs to a cluster of genera distinguishable by their predominantly dark colouration, head with eyes narrower than pronotum and rounded anteriorly which temporarily I call „Salka mimics". This group of genera contains *Salka* DWOR. (DWORAKOWSKA 1972) and *Nitta* DWOR. (DWORAKOWSKA 1995b) as well as 11 other genera known to me which await description. Among known genera *Yakuza* gen.nov. is the closest to *Salka* from which differs externally by reduction in wing venation, short face and very distinct sexual dimorphism. Males have frontoclypeus more convex in profile (Figs 4, 11) and (in most of the species) darker colouration (Figs) than females. Structures of male genitalia comparable with those of *Salka* DWOR. (SOHI & MANN 1994).

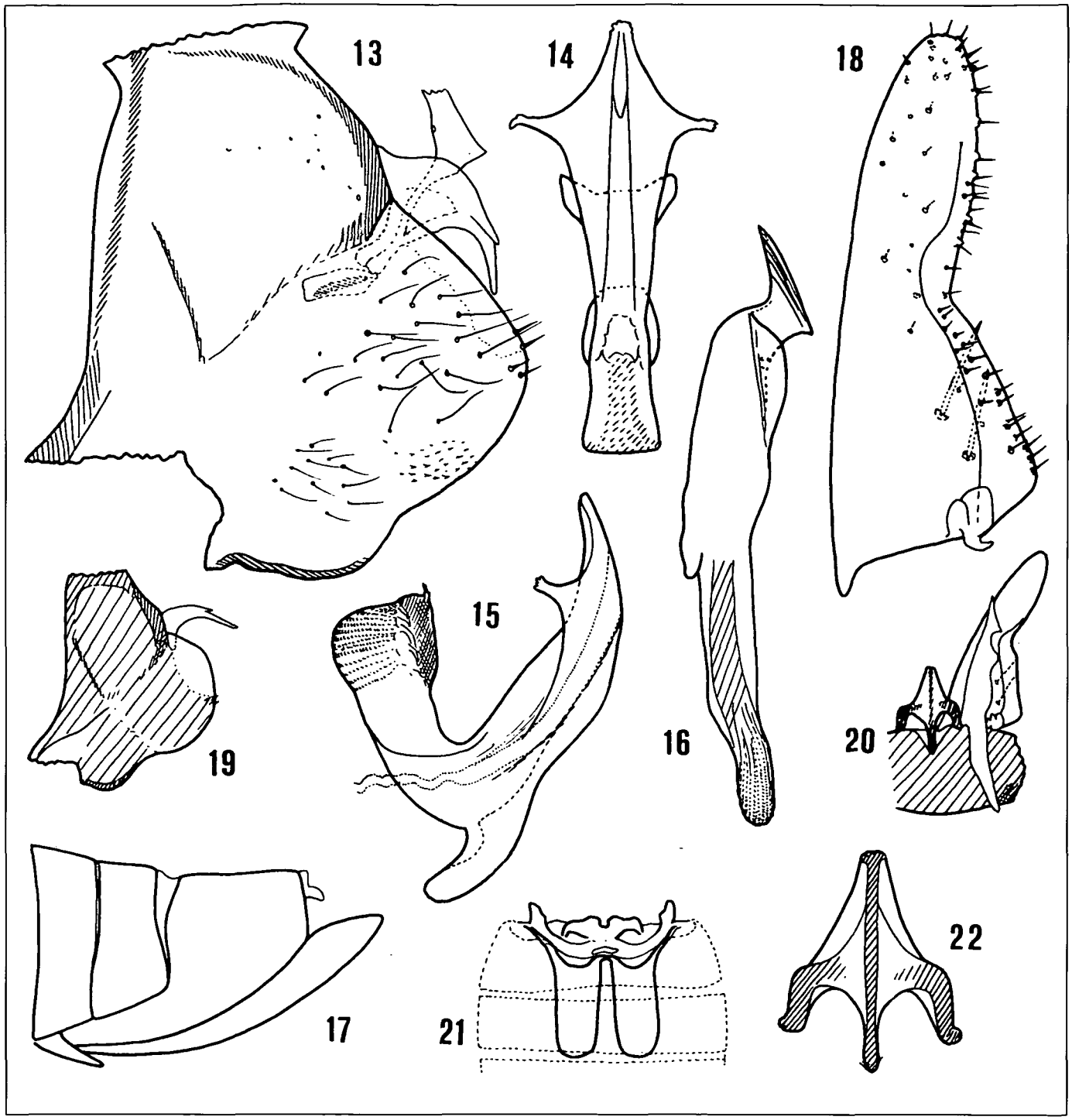
Bionomics: Host plants are Araceae. In Sumatra *Y. sumatrana* sp.nov. was taken from *Alocasia macrorrhisa*; in NE India *Y. indica* sp.nov. was collected on *Arisaema* (*A. nepenthoides* or *A. tortuosum*) and in Taiwan *Y. obscura* sp.nov and *Y. taiwana* sp.nov. were on *Alocasia cucullata*. In Autumn 1999 I was collecting Typhlocybinae in Sichuan and Yunnan (China) and this material is deposited in Museum of Entomology (Yangling, Shaanxi). Among close to 9000 specimens representing very diverse fauna I obtained blackish *Yakuza* from *Colocasia antiquorum* (syn. *C. esculenta*) cultivated in Emei Shan at the altitude 600 m and 950 m and also (the same or different species) on *Alocasia macrorrhisa* in Xishuangbanna (Yunnan), Jinghong (500 m) and Menglun (670 m)[1]. All collections of this genus, as known until now, were made on the altitudes from 200 m to 1600 m asl. Species of *Yakuza* may be able to produce several generations a year as their host plants are evergreen in wild conditions and the temperatures and humidity of biota inhabited by them remains similar all over the year. In field adults and immature stages of these insects were spotted throughout the whole year (collections in February, March, April, June, August, October and December) over the known range, they usually abound on the underside of leaves of their host plants and their feeding produces stipulation well visible on upper side of leaves.

Males of many (at least darkly coloured) species are depositing thick layer of brochosomes on their frontoclypeus or on frontoclypeus and anteclypeus; this deposit is much thicker than the one on the wax-field on wings not only in this genus but also in any other Typhlocybinae seen by me. The effect is striking as the cuticle of centre of face is black and the deposited brochosomes make it looking white and even shining because the surface is polished by the insect. Only mature males exhibit this kind of appearance and it

[1] The research project has been sponsored by CIDA (1999-2000) to address environmental issues



Figs 1-12: (1) Habitus of *Yakuza gaunga*, female; (2) head and thorax of male, dorsal view; (3) same, of female; *Y. taiwana*, head and thoracic tergites of male, side view, dried specimen (4); male genital segments, lateral view (5); male genital segments, dorsal view (6); fore wing (7); hind wing (8); face of male of *Y. obscura* (9); face of female (10); head of male, lateral view (11); the same of female (12); Figs 9-12 show specimens cleared in KOH.



must take time to accumulate the material. Maybe this kind of behaviour has function as specific mate recognition signals if the excretion is a carrier of sex pheromones as mentioned by DAY (1993). It may also constitute a factor in speciation functioning as ethologically isolating mechanism along with the acoustic behaviour.

Phylogenetic relationships and biogeography: Three groups of species can be distinguished: the group of *Y. obscura* (*Y. obscura*, *Y. centralis*, *Y. sumatrana*, *Y. gaunga*), the group of *Y. taiwana* (*Y. taiwana*, *Y. indica*) and the group of *Y. balclutha* (*Y. balclutha*, *Y. albicans*). Among them the group of *Y. obscura* shows the most generalized characters: the lowest degree of consolidation of sclerites in pygofer, detectable components of the dorsal pygofer appendage, demarcation between TI (tibia ends caudally with the „neck" bearing sensory pits) and

Figs 13-22:

***Yakuza taiwana*, pygofer side, on slide (13); penis, caudal view (14); same, latewral view (15); paramere, on slide (16); female segments 7-11, side view (17); *Y. obscura*, subgenital late, dordal view, on slide (18); pygofer side showing sclerotizations and relative size of parts (19); relative size of subgenital plate, paramere, connective and 9 sternite, on slide (20); basal abdominal apodemes of male, on slide (21), connective (22).**

TA (tarsus – striated apical part of paramere) and numerous well developed primary (unmodified as of genitalia) sensillae on pygofer (e.g. the feeble microsetae not differentiated), on paramere and on dorsal pygofer appendage.

At the present knowledge of distribution no distinct geographic centre can be found for any groups except that the group of *Y. obscura* seems to be rather tropical. There is a distinct gap in distribution over the Philippines where supposedly all the groups of species of *Yakuza* are well represented.

The comparative morphology studies are continued and their bearing on classification may influence the building up of the complete phylogenetic tree of *Yakuza* and may enable inferring the pattern of distribution. At present the vicariance hypothesis can explain the speciation within this genus the best. The four species of the *Y. obscura* group form two pairs of closely related species: *Y. obscura* and *Y. centralis* and *Y. sumatrana* and *Y. gaunga*, the two species of the group of *Y. taiwana* show group similarities but are not closely related to one another and the two species of the *Y. balclutha* group are very closely related to each other. The last example, taking into account considerable distance between localities from which they are known and presence of numerous geographic barriers in between, suggests that there should exist numerous species that form outgroups comparable with these two.

If the evolution rate was similar in all branches of speciation of *Yakuza* (the complete phylogenetic tree is symmetrical), there were no extinctions (as suggested by other detaily studied genera of Typhlocybinae) and the known species show complete set of diversity within the genus (what is very doubtful) there should be expected 8 other, yet unknown species, mostly in the groups of *Y. taiwana* and *Y. balclutha*. If the presently known species do not represent the whole diversity within the genus, what is much more probable, the number of species of the genus *Yakuza* to discover is much higher than that.

The above description of the genus *Yakuza* applies level of precision and uses terminology that has been proposed in my earlier papers dealing with comparative morphology while referring to the Palaeozoic insects. The homologization of wing parts and main wing veins of Auchenorrhyncha led to devising detailed system of nomenclature of wings of Typhlocybinae (DWORAKOWSKA 1993). The male genitalia nomenclature, although incompletely yet, emphasizes homologous structures of modified segments 9 and 10. The main difference in interpretation as compared with traditional systems, is the present assuming that pleuron is made of upper leg segments (forming also mesocoxite in segment 9 of male), leg of segment 9 is completely retained in *Membracoidea* (DEITZ & DIETRICH 1993 replaced the synonymous name Cicadelloidea) and sternite 10 is highly transformed. My papers (1994a, 1994b, 1995a, 1995b and 1997) contain discussion of results obtained so far on homologization of male genital structures in Typhlocybinae. The basis and methodology is the same as in my paper on main wing veins and essential are references to the Palaeozoic insects.

Below is given description of *Yakuza* gen.nov. following the pattern devised by YANG (1952) and applied to diverse Typhlocybinae genera by MAHMOOD (1967). I found this style to be representative of the terminology of convenience.

Type: *Yakuza taiwana* gen. nov.

Hind wing: vannal veins fused, submarginal vein absent at wing apex and not confluent with apex of vein Cu1 apically; posterior branch of R fused with vein M1+2; vein Cu2 not confluent with submarginal vein in basal half of wing.

Fore wing: inner apical cell with base oblique to obliquely angulate, more proximal than base of 2nd apical cell, 2nd apical cell subequally wide when compared with 1st apical cell; 1st and 2nd apical cella open apically; 3rd apical cell broader; outer apical cell short and small, not attaining wing apex.

Genital capsule: male plate with a row of stout setae on outer margin, few macrosetae at outer basal angle, slightly curved dorsad in midlength to narrowing tip; pygofer with microsetae on posterior portion of disc, macrosetae and anal hooks absent, dorsal process present.

Internal male genitalia: style broad with a

distinct praeapical lobe and apical extension (in 5 out of 8 species), apex pointed; connective well sclerotized, stoutly Y shaped with long median cephalic lobe; aedeagus with dorsal apodeme distinct, sometimes prominent, reversely proportional to size of praeatrium or equally large, shaft directed dorsad and caudad, gonopore subterminal.

The genus is described from 8 species in South-East Asia.

It may be related to *Erythroneura* in having second extension and a praeapical lobe in style.

Yakuza obscura sp.nov. (Figs 9-12, 18-46)

Male blackish with anteocular areas in face brown-beige. Brochosomes deposited on frontoclypeus and also on part of anteclypeus). Female (Figs with vertex sordid brown anterocentrally and sordid beige sides suffused with brownish laterally. Pronotum light beige (sometimes with an ochre tint) anteriorly, dark sordid brown patches at sides and sordid brownish broad transverse fascia caudally expanding cephalad. Scutum and scutellum brownish-black. Fore wing sordid brown, veins darker. Face blackish, anteocular areas and antennae ochre-beige; ventral 1/3 of anteclypeus and lateral margins of genae pale beige.

Thorax beneath sordid beige, legs lighter. Fore- and hind tibiae brownish on the outside, claws darker.

Length ♂ 2.80-3.10; ♀ 2.85-3.20 mm.

Penis stem compressed laterally (Figs 25, 29) its apical portion, in posterior view, with margins irregularly serrated (Figs 33, 34). Dorsal pygofer appendage bent ventrad, bifurcated in apical 2/5 (Figs 40-46). Caudal part of paramere straight, triangularly broadened, bearing numerous small ledges (Figs 35-38).

Holotype male, Taiwan, Meisi, 700 m, *Alocasia cucullata*, 24.VIII.1990, I. Dworakowska (SMTD). Paratypes 16♂♂, 35♀♀, same data as the holotype; 1 female Chitou, 1200 m, *Alocasia cucullata*, 28.VIII.1990, I. Dworakowska (SMTD, HMNH, MM, USNM, BPBM).

Females of this species, when very lightly coloured, are very similar to *Y. sumatrana* sp.nov. but the present species is more robust and with the protruding part of valva shorter (Fig. 39). When the females are very darkly coloured they resemble *Y. taiwana* sp.nov. but their lighter sides of pronotum are always larger and the light hind margin of pronotum is always uniformly very narrow while in *Y. taiwana* it is distinctly broader laterally.

Yakuza centralis sp.nov. (Figs 47-57)

Male blackish, with pronotum centrally and anteriorly lighter and small beige roundish patches on vertex basally, close to eyes. Antennae and anteocular areas on face light beige, darker by the light bordering of the lateral frontal sutures. Brochosomes deposited on frontoclypeus, dorsal part of anteclypeus as well as on lateral parts of pronotum and in the depression between scutum and scutellum.

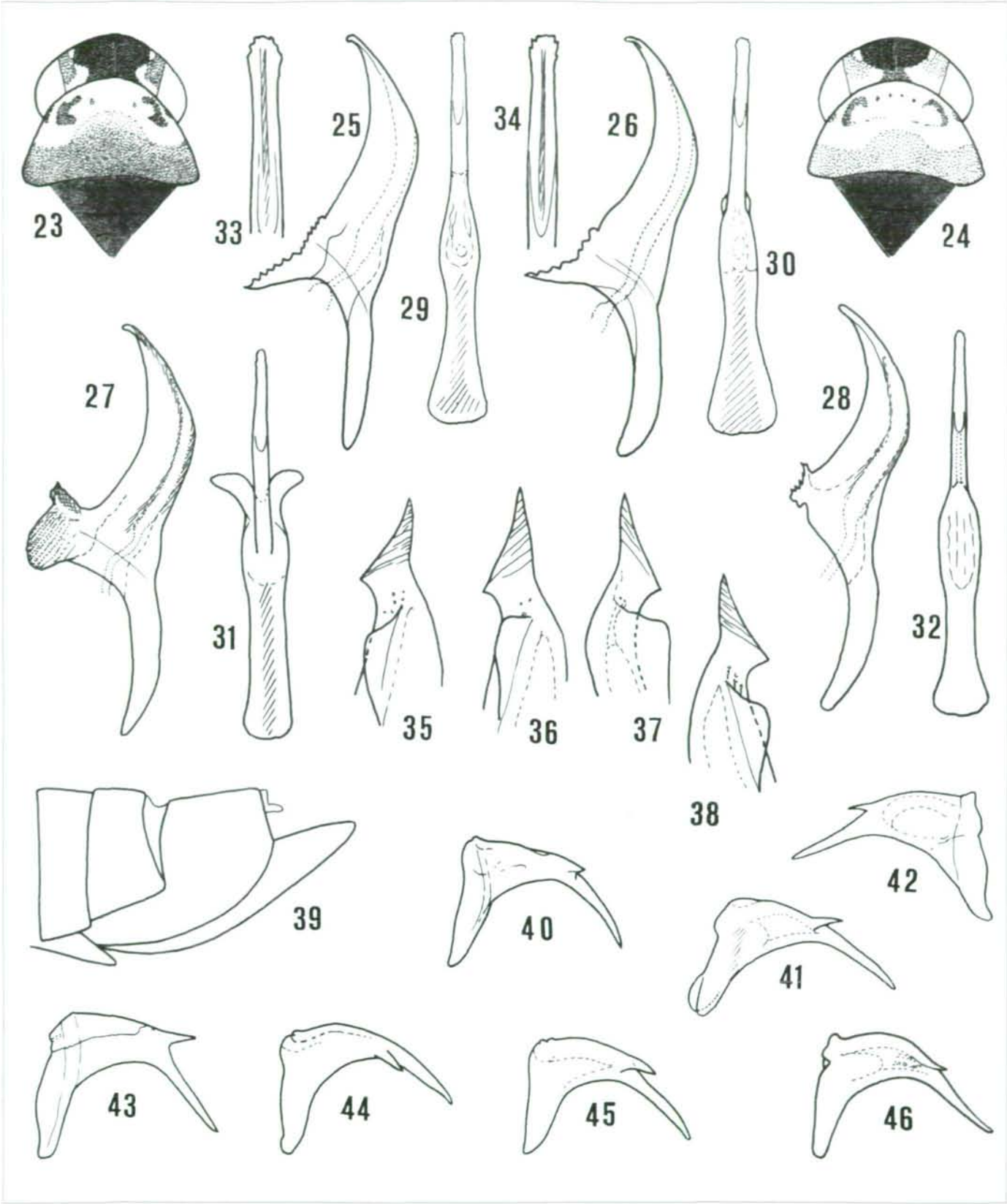
Female coloured lighter (Fig. 47) than female of *Y. obscura*. Vertex dark brown anteriorly, brown laterally, with large ivory patches basally. Face dark brown centrally, blackish-brown on sides of frontoclypeus basally and on anteclypeus, margins of anteclypeus light ventrally; most of lorae and inner parts of genae dark brown, outer parts of genae sordid beige. Pronotum mostly light beige with some brownish suffusions caudally and centrally, brown patches behind eyes and transverse ones laterally at about half of length of lateral margin. Scutum blackish. Scutellum blackish as sides, dark brown centrally.

Length ♂ 3.6; ♀ 3.5 and 3.6 mm.

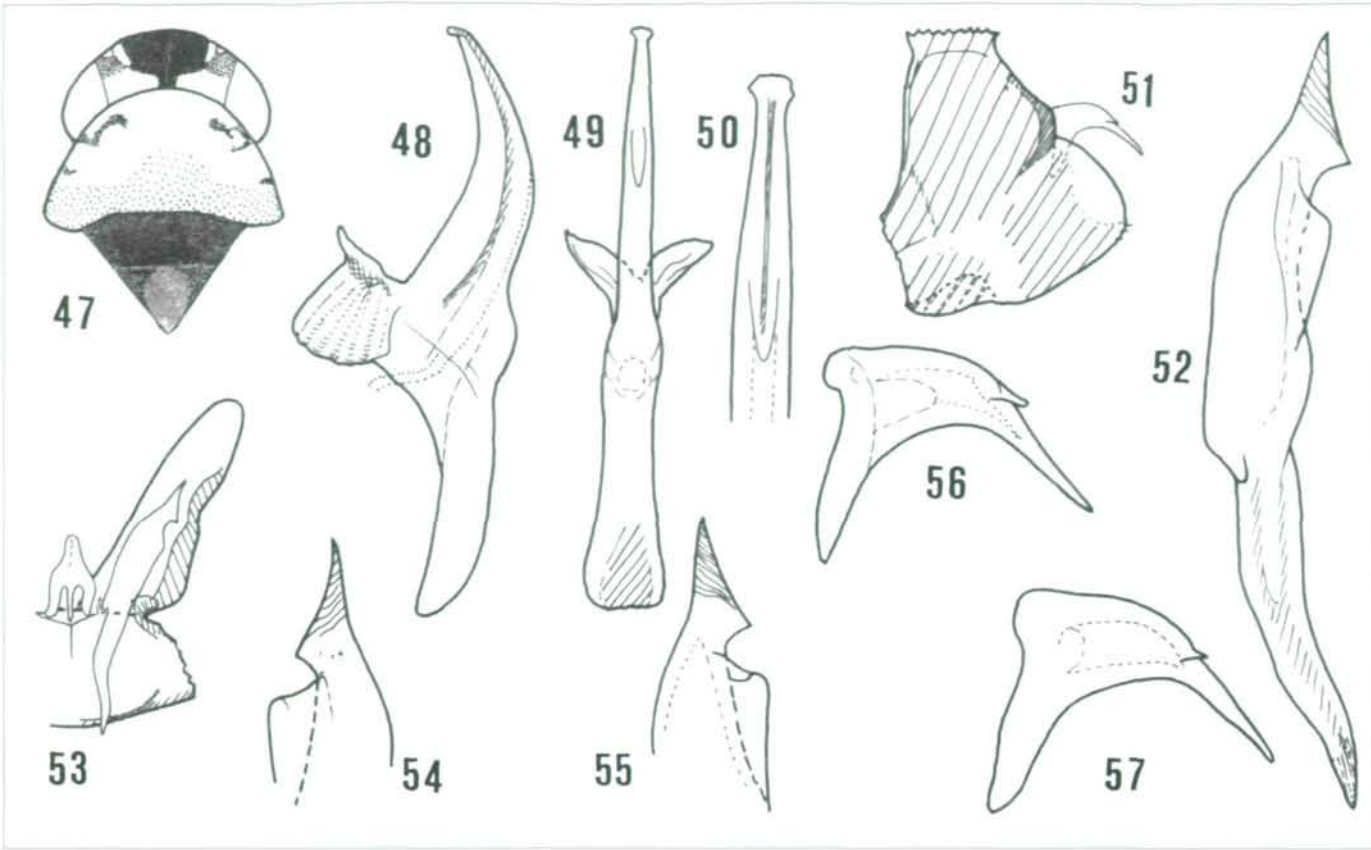
Male genitalia very similar to *Y. obscura* but penis stem, seen in posterior view, is broadened before abrupt termination (Fig. 50), its base, seen in lateral view, is broader and the stem itself more straight (Fig. 48) than in the previous species (Fig. 26) and dorsal pygofer appendage with its larger branch rather straight (Figs 56, 57). Basal abdominal apodemes in the two males examined do not reach margins of segment 5.

The new species differs from *Y. obscura* by lighter colouration of male and female, frontoclypeus of male more expanded (when seen in profile), bigger size and details of male genitalia as above mantioned.

Holotype male: Taiwan, Chiayi Hsien, Fenkihu, 1370 m, 10.-12.IV.1965, C.M. Yoshimoto and B.D. Perkins (BPBM). Paratypes: 1♂, 2♀♀, same data as the holotype (BPBM).



Figs 23-46: *Yakuza obscura*, head and thorax of female, dorsal view (23, 24); penis, lateral view (25-28); penis, posterior view (29-32); penis apex, higher magnification, posterior view (33, 34); caudal quarter of paramere, on slide (35-38); female abdominal segments 7-11, side view (39); dorsal pygofer appendage, on slide (40-46); (region of penis apodeme damaged except in Figs 27 and 31).



Figs 47-57: *Yakuza centralis*, head and thorax of female, dorsal view (47); other illustrations as explained in previous plates.

Yakuza sumatrana sp.nov. (Figs 58-77)

Male with vertex sordid brown except its ochre-beige margins at eyes. Face mostly sordid brownish; anteocular areas, antennae, margins of lateral parts of genae and ventral 1/3 of anteclypeus sordid beige; ventral part of frontoclypeus brownish-beige. Mature males with thick layer of brochosomes on frontoclypeus and dorsal 1/3 of anteclypeus, in some specimens it expands dorsad up to the dorsal parts of lateral frontal sutures. In live specimens this deposit is polished and shining. Pronotum dark sordid brown, scutum and scutellum blackish.

Female vertex light beige with smaller (Fig. 59) or larger (Fig. 58) sordid brown patch centrally. Face sordid brownish, ventral part of frontoclypeus and dorsal 2/3 of anteclypeus darker, sides lighter; dorsal parts of lateral frontal sutures surrounded by beige with an ochre tint. Sometimes more brochosomes are deposited at dorsal limits of face and visible in dorsal view. Pronotum light beige with sordid brown patches as in Figs 58 and 59. Scutum and scutellum sordid brown. Protruding part of valva subequal to the dorsal length of 9 segment (Fig. 77).

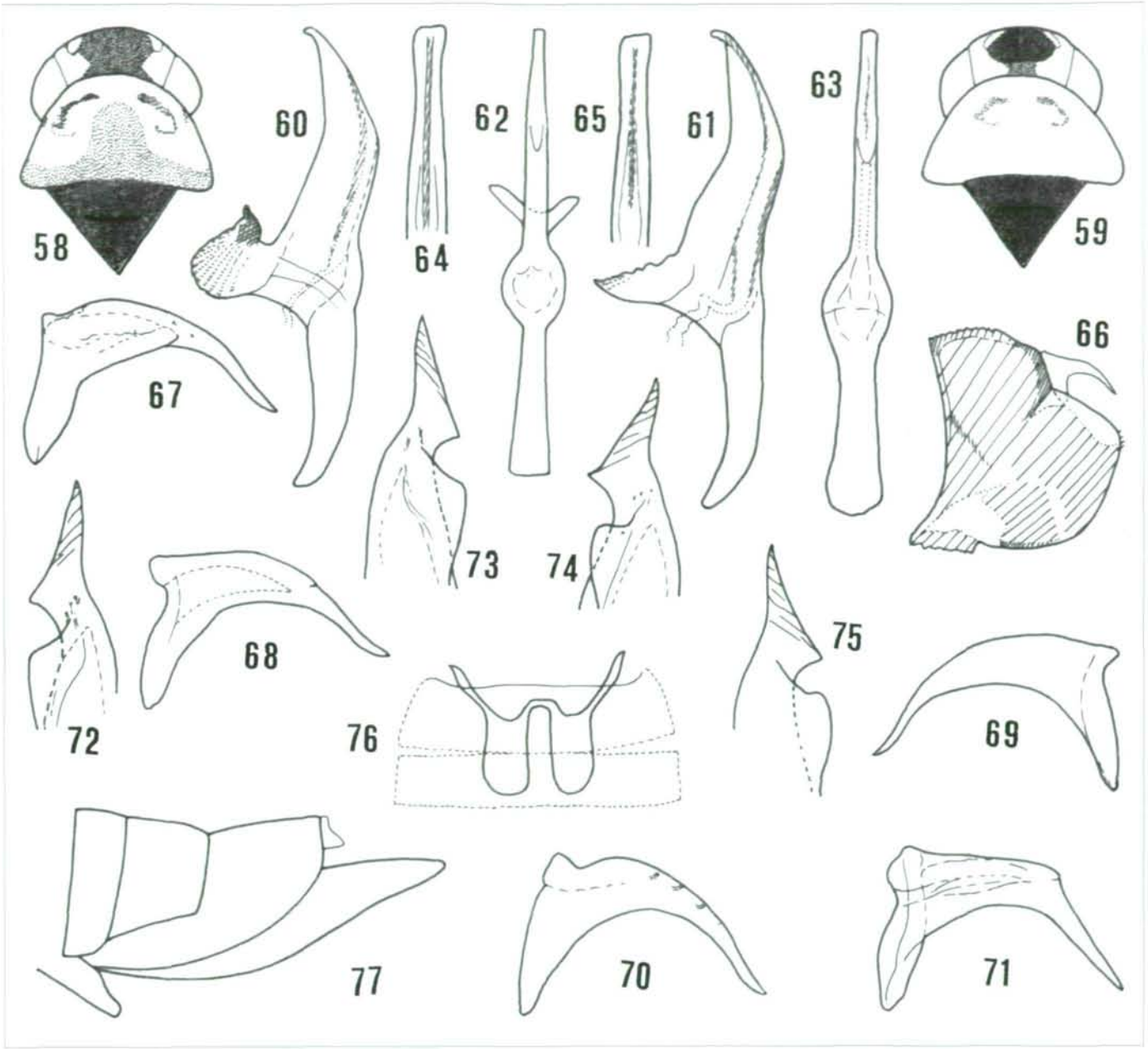
Length ♂ 3.0-3.3; ♀ 3.0-3.4 mm

Male genitalia very similar to these of *Y. obscura* but differing by presence of only long branch of dorsal pygofer appendage which is slightly sinuate (Figs 68-71) , by caudal extension of paramere bearing fewer ledges (Figs 72-75) and by penis stem different. Profile of the stem sinuate dorsally, with a distinct angle, manubrium in posterior view narrow and apex rather abrupt, without distinct serration (Figs 60-65).

Holotype male: Indonesia, Sumatra, Lake Kewar, volcano Sinabung, 1600m, *Alocasia macrorrhisa*, 9. VI. 1990, I. Dworakowska (SMTD). Paratypes: 20♂♂, 27♀♀, same data as the holotype ; 8♂♂, 12♀♀, volcano Sinabung, 1450-1500m, *Alocasia macrorrhisa*, 10.VI.1990, I. Dworakowska (SMTD, HMNH, MM, USNM).

Yakuza gaunga sp. nov. (Figs 1-3, 78-97)

In male dorsal side of head, thorax and fore wing mostly sordid blackish-brown, with slightly lighter arcuate area on pronotum sub-



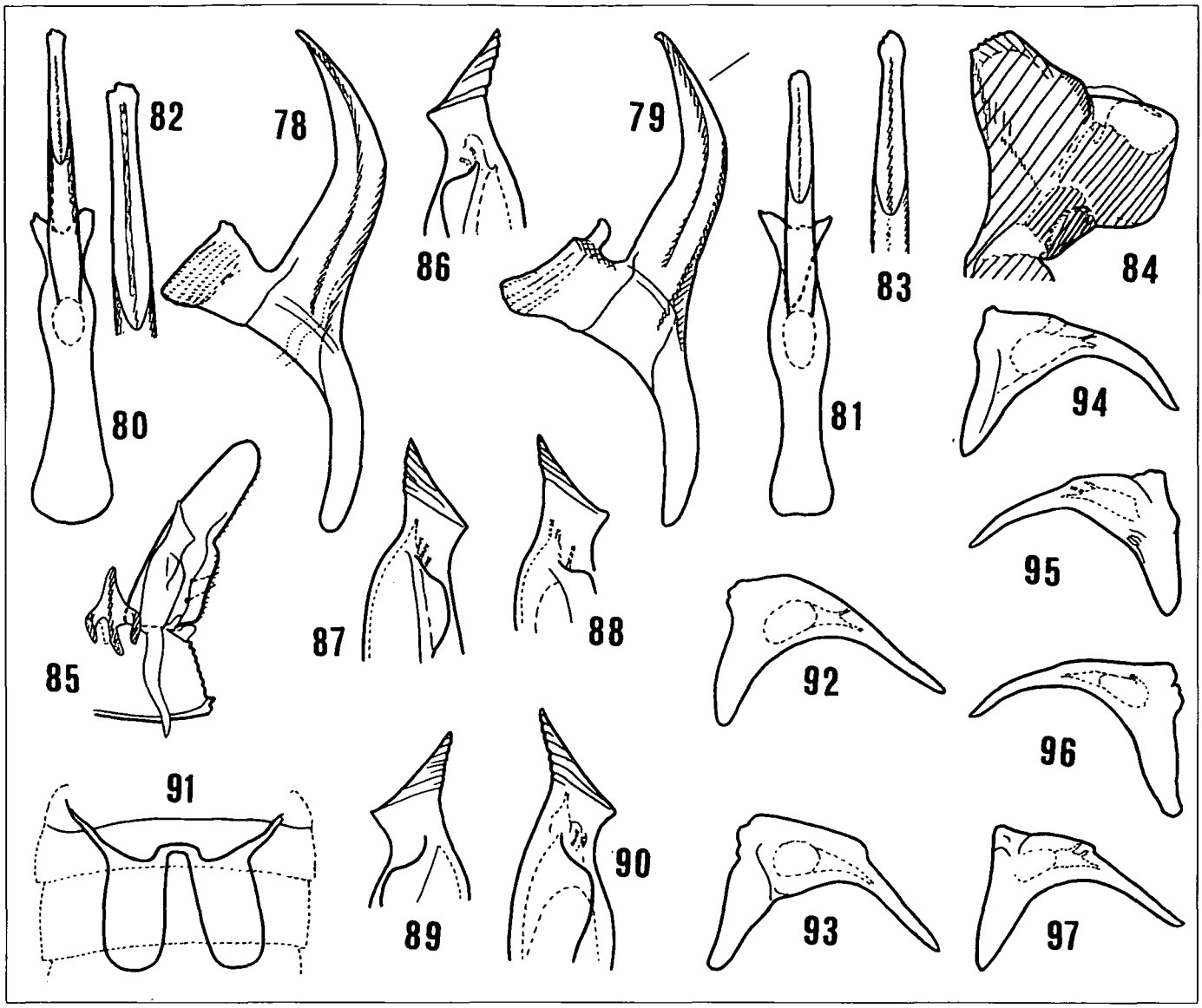
Figs 58-77: ***Yakuza sumatrana*****, head and thorax of female, dorsal view (58, 59); other illustrations as explained in previous plates.**

anteriorly and sordid brownish-beige sides of vertex basally at eyes (Fig. 2). Face blackish-brown with beige anteocular areas and antennae and outer margins of genae sordid whitish. Thick layer of brochosomes on frontoclypeus and whole anteclypeus.

Female with vertex sordid brownish-beige and a large blackish-brown central patch expanding cephalad deliminating laterally the brownish-beige borderings of dorsal extremes of lateral frontal sutures (Fig. 3). Pronotum in the darker specimen brownish-beige anteriorly, darkening caudad, with dark sordid brown arcuate transverse marks subanteriorly. Scutum and scutellum blackish-brown. In the lighter specimen (destroyed when dissected for SEM study) the dark patch on vertex reduced in size and most of the pronotum beige. Face coloured as in male, dark brown.

Length ♂ 3.05-3.40; ♀ 3.10 and 3.50 mm.

Male genitalia very similar to these of *Y. sumatrana* but dorsal pygofer appendage shorter with its part almost straight (Figs 92-97), caudal part of the paramere shorter (Figs 85-90) and penis different. Penis stem in profile narrow, slightly compressed laterally, manubrium short and arcuate (Figs 78-81) and apex in posterior view club-like with its margins irregularly notched (Figs 82, 83). In *Y. sumatrana* penis stem is broader when seen in lateral



view and its apical part in posterior view lamellate and apex abrupt.

Holotype male: Myanmar, San Gaung, 600-800 m, forest patch, 12. II. 1998, H. Nickel (MM). Paratypes 4♂♂, 1♀, same data as the holotype (SMTD, MM). Another female and a few males undergone destructive dissection and are not included to the type-series.

Yakuza taiwana sp. nov. (Figs 4-8, 13-17, 98-103)

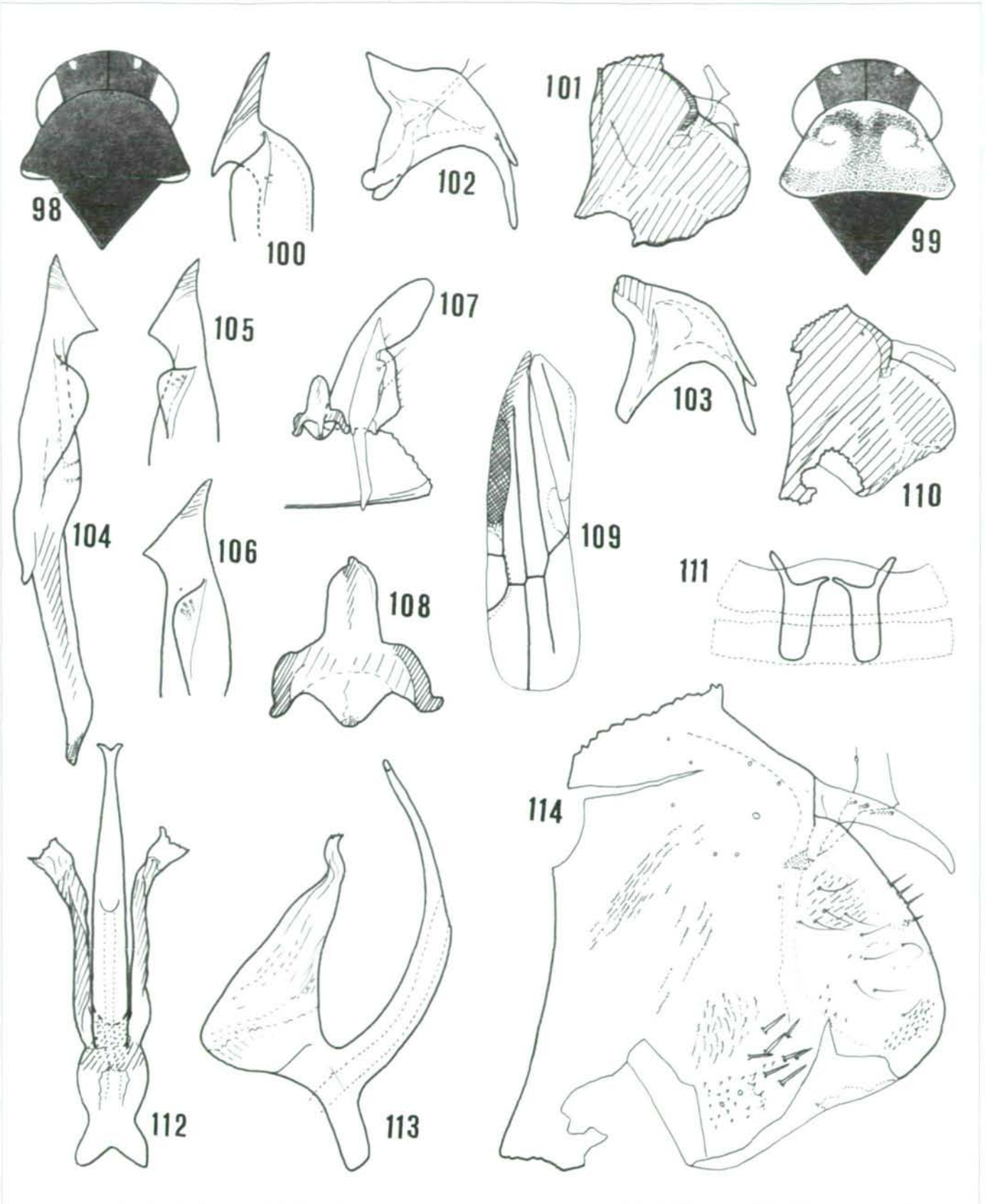
Male blackish with light ochre patches at anterior margin of vertex and sordid beige bordering of the hind margin of pronotum (Fig. 98). Face blackish with antennae light beige. Brochosomes deposited in thick layer on frontoclypeus and seldom and only slightly on anteclypeus.

Female lighter than male dorsally (Fig. 99), blackish with some brown patches antero-laterally on pronotum. Face in male as well as in female blackish, antennae light beige, lateral frontal sutures dorsally bordered with beige suffused with ochre. Thorax beneath sordid whitish; legs sordid yellowish, anterior tibiae sordid brownish.

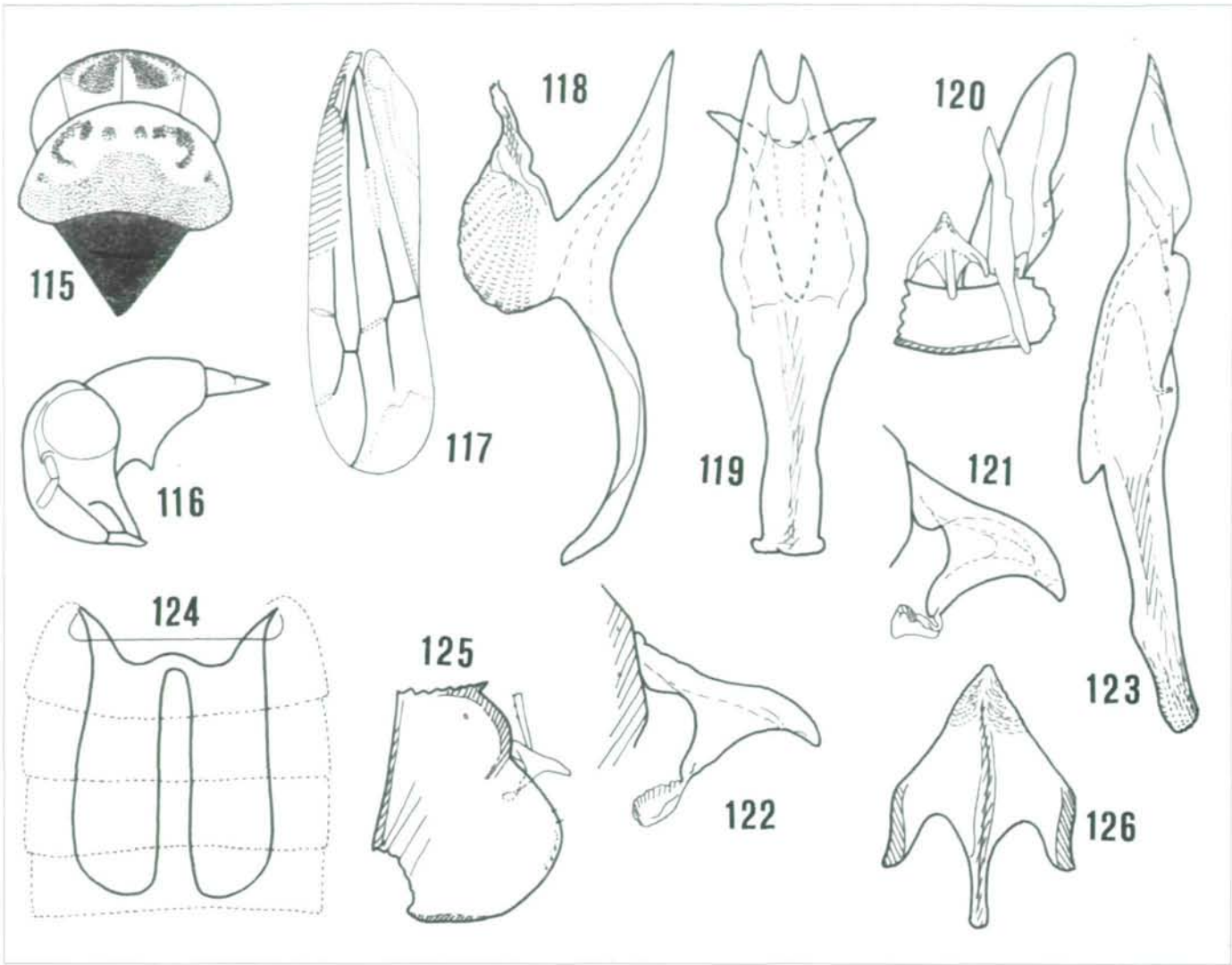
Length ♂ 2.8-3.2; ♀ 2.7-3.2 mm.

In male genitalia characteristic is broad base of bifurcated dorsal pygofer appendage (Figs 5, 13, 102), short caudal part of paramere with broad apical extension (Figs 16, 100) and broad penis stem with lamellate lateral processes (Figs 14, 15). The penis apodeme is double what resembles *Y. indica* and helps to group them together.

Figs 78-97: *Yakuza gaunga*, penis, postero-dorsal view (81 and 83); pygofer side sclerotizations and relative size of its parts and sternite 9, TR is folded mesad ventrally (84); other illustrations as explained in previous plates.



Figs 98-114: *Yakuza taiwana*, head and thorax of male, dorsal view (98); the same of female (99); apical quarter of paramere (100); pygofer side (101); dorsal pygofer appendage (102, 103); *Y. indica*, paramere, on slide (104); other illustrations as explained in previous plates.



Figs 115-126: *Yakuza balclutha*, head and thorax of female, dorsal view (115); head and dorsum of thorax of male, lateral view (116); other illustrations as explained in previous plates.

Holotype male: Taiwan, Chitou, 1200 m, *Alocasia cucullata*, 28. VIII. 1990, I. Dworakowsja (SMTD). Paratypes 13♂♂, 17♀♀, same data as the holotype; 3♂♂, 4♀♀, Shitzulu, 1600 m, 7.IX; 2♂♂, 2♀♀, 10 km below Wushe toward Meisi, 1000-800 m, 23.VIII; 4♂♂, 6♀♀, Meisi, 700 m, 24. VIII; 3♂♂, 3 km below Meisi, 700-600 m, 24. VIII; 2♂♂, 2♀♀, Sun Moon Lake, 800 m, 26.VIII; 2♀♀, Lungtou, 11. IX; 1♀, Jen-tse, 500 m, 26.IX; all specimens collected by me on *Alocasia cucullata* in 1990 (SMTD, HNHM, MM, USNM, BPBM).

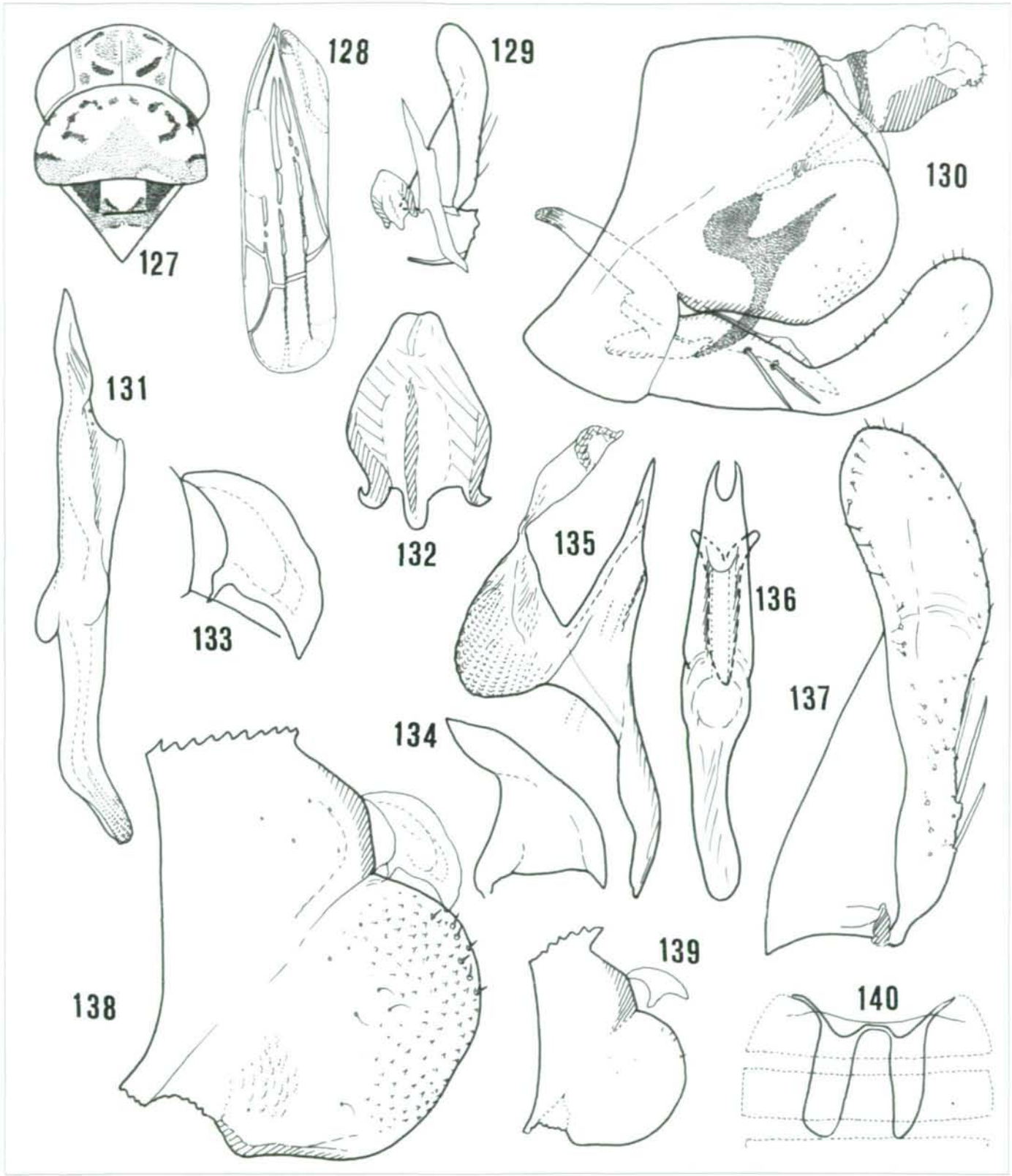
Females of this species, when not fully coloured, can be confused with *Y. obscura* from which they differ by protruding part of valva shorter (Fig. 17) and by the light bordering of the hind margin of pronotum slightly broader laterally (Fig. 99) as well as by entirely dark face and medial darkening on pronotum expanding further cephalad.

Yakuza indica (Figs 104-114)

Male with head and dorsal side of thorax sordid dark brown; antennae and narrow indistinct stripe on anteocular area close to eye sordid beige, this lighter patch passing on vertex becoming ochreous and wider at its base. Dorsal parts of lateral frontal sutures bordered with ochre-beige, apex of anteclypeus lighter than remaining parts of face. Ventral side of thorax sordid brown, parts of leg segments which are ventral at rest whitish, remaining parts of leg segments dark brown.

Fore wing sordid brown, dark brown on wax-field and area basad of it, basal 2/3 of c cell and main veins infuscated; reddish-ochre tint on apical 1/3 of costal margin, at claval angle and at base of stem vein; apex of clavus and adjacent area in cua and 1st apical cells light sordid beige; parts of commissural margin close to claval angle brownish-beige; 4th apical cell and areas adjacent to it sordid whitish (Fig. 109).

Length ♂ 2.3-2.4 mm.



Figs 127-140: *Yakuza albicans*, head and thorax of male, dorsal view (127); other illustrations as explained in previous plates.

Male genitalia allow to group this species together with *Y. taiwana* owing to double apodeme of penis, short penis manubrium, traceable bilateral composition of penis stem, broad and straight cephalic part of paramere, incomplete demarcation of TI-TA on paramere and advanced differentiation of setosity on CX and TR discs in pygofer.

Yakuza indica, however, shows characters in genitalia that suggest npt very close rela-

tionship with *Y. taiwana*. Penis stem elongated, tubular, with dorsal process bifurcated apically (Figs 112, 113). Dorsal pygofer appendage almost straight, single, elongated (Figs 110, 114). Paramere with caudal part broad, lamellate apically (Figs 104-107). Connective (Fig. 108) with broad central lobe.

Holotype male: India, Meghalaya, Mawsmai Cave, 1200 m, *Arisaema* sp., 25. II. 1991, I. Dworakowska (SMTD). Paratypes 12♂♂, same data as the holotype (SMTD, HMNH, MM).

Remark. The brochosomes were not observed to be in extraordinary mass on face of male and specimens appear to be darker coloured than other *Yakuza* species mentioned so far. This might result from immaturity of all specimens in the sample as there were no adult females collected at the same time; sometimes not fully sclerotized specimens of pigmented species became not typically darkened during process of drying.

The two following species, which seem to be quite closely related to one another, form a separate group within the genus *Yakuza*. This group differs from two other groups by body very robust; relatively light colouration; short lamellate, well consolidated dorsal pygofer appendage (Fig. 133); considerable consolidation of pygofer side sclerites, reduced setosity on discs of CX and TR, TR not folded mesad ventrally (Fig. 138); short and broad penis stem (Figs 118, 135) and TI and TA not demarcated in caudal part of paramere (Figs 123, 131).

Yakuza balclutha sp. nov. (Figs 115-126)

Body very robust, head with eyes only slightly narrower than pronotum (Fig. 115). Face in profile dilated, its transition to vertex almost vertical in profile (Fig. 116). Vertex and most of pronotum ochre-brownish with darker patches as in Fig. 115; the pattern shown in varying shadows what has to represent blackish (at the midline of vertex and on anterior part of pronotum) to sordid brown (transverse fascia on posterior part of pronotum); very hind margin of pronotum milky grey and scutum and scutellum sordid blackish-brown. Ventral side of head and thorax sordid blackish-brown; antennae and small adjoining areas on frontoclypeus sordid ochre-brown; legs paler.

Fore wing brown with clavus and costal area dark brown and wax-field still darker (Fig. 117). Large whitish-grey patch at base of clavus extending along AA, bordering of CuP and partly CuA, MP" proximally, Sc+RA and RP as well as patch in postero-apical region sordid whitish to light greyish.

Female coloured as male. Valva only slightly protruding beyond coleostron.

Length ♂ 2.75; ♀ 2.80 mm.

In male genitalia characteristic is very short, hooked dorsal pygofer appendage (Figs 121, 122, 125); leaf-like caudal part of paramere (Figs 120, 123) and penis stem short, compressed antero-posteriorly, on relatively long narrow manubrium and with prominent single penis apodeme (Figs 118, 119).

Basal abdominal apodemes very large, extending into 6 abdominal segment (Fig. 124).

Holotype male: Indonesia, Sumatra, Mt. Sinabong, 1450-1500 m, *Alocasia macrorrhisa*, 10.VI. 1990, I. Dworakowska (SMTD). Paratype 1♀, same data as the holotype (SMTD).

Remarks. There was not observed any excessive deposition of brochosomes on face of any of these specimens, which seem to be fully sclerotized and fully coloured.

Yakuza albicans sp. nov. (Figs 127-140)

Vertex and dorsal side of thorax beige to sordid whitish or beige-ochre with dark brown and beige-brown patches as in Fig. 127 (the transverse subterminal fascia on pronotum brownish-grey, areas caudad of it milky grey). Face yellowish-beige, apically with two brownish=beige fasciae at sides parallel to these visible at anterior margin of vertex, a darker transverse fascia below, much above bases of antennae expanding dorsad at the midline and on anteocular areas; sides and centre of face below the transverse fascia sordid brown to blackish-brown on anteclypeus.

Fore wing brown, darker costad, the darkest on the wax-field and on area basad of it, lighter on postero-apical angle. All transverse veins and most of longitudinal veins completely or partly bordered with whitish, remaining parts of these veins as well as veins in apical third of wing blackish (Fig. 128).

Length ♂ 2.0; ♀ 2.1 mm.

Male genitalia resemble *Y. balclutha* very much. They differ by dorsal pygofer appendage lamellate (Figs 133, 134), penis stem tubular (Figs 135, 136), caudal part of paramere narrower (Figs 129, 131) and connective lamellate (Figs 129, 132). Basal abdominal apodemes narrow, reaching anterior margin of 5 segment only (Fig. 140).

This species differs from *Y. balclutha* very distinctly also by its light colouration.

Holotype male: India, W Bengal, Teesta, 200 m, sweeping vegetation by the stream, 26. XII. 1990, I. Dworakowska (SMTD). Paratypes 1♂, 2♀♀ (one damaged), 1 specimen without abdomen, same data as the holotype (SMTD), HNHM). Also not included in the type-series 2♂♂, India, Assam, Kameng, Bhairabkunda, 3-4, 7. III. 1961, F. Schmid.

Zusammenfassung

Eine neue Gattung der Erythroneurini mit acht neuen Arten wird aus der Region zwischen dem östlichen Himalaya und Sumatra beschrieben. Die bisher bekannten Nährpflanzen zählen zur Familie Araceae. Die Männchen der meisten bekannten Arten besitzen eine dicke Schicht von Brochosomen am Frontoclypeus bzw. Fronto- und Anteclypeus.

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