

Taxonomy of Podoscirtinae (Orthoptera: Gryllidae). Part 1: the male genitalia and Indo-Malayan Podoscirtini

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The morphology of the male genitalia of Podoscirtinae and the nomenclature of their structures are discussed. Six Indo-Malayan genera of Podoscirtini are characterized; 4 new genera, 2 new subgenera, 20 new species, and 5 new subspecies are described; several other species are revised (including the descriptions of some unknown females and new data on distribution). One generic name (*Calypotrypus* Sauss.) and one specific name (*Platydactylus helvolus* Serv.) are considered *nomina dubia*. New synonymy (*Zvenella nigrotibialis* Liu, Yin & Wang, *syn. n.* = *Z. geniculata*; *Madasumma obscuripennis* Chop., *syn. n.* = *Z. parcevenosa*; *Calypotrypus flavomarginatus* Hsia & Liu, *syn. n.* = *Valia pulchra*) is established. The lectotype for *Truljalia hofmanni* is designated.

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At present, the study of taxonomy and biology of Podoscirtinae is in an initial stage. Only the first steps towards the tribal and generic classifications of this group are made. The key to Indo-Malayan genera of Podoscirtinae recently published by Ingrisch (1997) includes 19 genera, but their number is much greater in reality. In this very good paper, Ingrisch correctly returned the genera *Noctitrella* Gor., *Phyllotrella* Gor., *Sonotrella* Gor., *Zvenella* Gor., and *Trelleora* Gor. to the tribe Podoscirtini. He considered that this tribe is characterized by the developed tegminal stridulatory apparatus in male, but the male of the monotypic type genus *Podoscirtus* Serv. from Madagascar is lacking this apparatus!

The disappearance of this apparatus in male is a very usual phenomenon in different branches of Podoscirtinae, and this process is probably correlated with the feminization of males (genetic change in the hormonal balance or similar phenomena). The reduction of stridulatory apparatus in male as a result of feminization may pass very quickly and without important genetic changes. For example, the male tegmina of different species of the Australian genus *Riatina* Otte & Alex. may have a normal stridulatory apparatus, strongly reduced one (almost female-like tegmina), and numerous intermediate variants (e.g., Otte & Alexander, 1983: Fig. 258). The other indirect evidence of this hypothesis is an anomalous hermaphrodite specimen of the genus

Sonotrella collected by me in Sumatra (apparently, hermaphroditism is caused by the parasitosis, as this specimen was parasitized, possibly by Strepsiptera). This specimen has almost normal male genitalia (evidently, it is a genetic male), small rudiments of ovipositor, and female tegminal venation. In connection with the above-mentioned reasonings, the Ingrisch's interpretation of the tribe Aphonoidini as the Indo-Malayan group without tegminal stridulatory apparatus in male is too simplified (numerous convergences are possible).

I described this tribe and some other tribes of Podoscirtinae on the basis of the most important changes in the modes of function of male genitalia (Gorochov, 1986). I consider that it is very difficult to understand the taxonomic significance of morphological structures without any functional interpretations. Therefore, it is reasonable to dwell upon the questions of functional morphology of the male genitalia in Podoscirtinae.

Nomenclature of the male genital structures

In the study of taxonomy of Grylloidea, I use the modified nomenclature by English language authors (Randell, 1964; Alexander & Otte, 1967). The Randell's idea of functionally-based terminology is more suitable in comparison with all others, as it allows one to use a few terms for numerous convergent structures of more or less

similar origin. Presently, this nomenclature is most elaborated in Russian (Gorochov, 1995). Therefore, it is reasonable to give here the modern variant of this nomenclature in English.

1) *Dorsal and ventral folds* (or *lobes*): two main membranous folds around the gonopore (dorsal fold above gonopore and ventral one under it) in the most primitive (for recent Ensifera) *Hagloid type* of genitalia (all recent Hagloidea, most of Stenopelmatoidea, numerous Tettigonioida, and only Mogoplistini among Grylloidea). These folds are divided into different lobes; all structures of spermatophore are formed in the special cavity between these folds (Figs I: 1, 2).

2) *Epiphallus*: the sclerotized part of dorsal fold consisting of one sclerite or several slightly movable sclerites (not separated from each other, i.e. not articulated or almost not articulated). In the *Grylloid type* of genitalia, the epiphallus occupies the most part of dorsal fold; in the *Tettigonioid type* of genitalia, the epiphallus is represented by small or rather large, paired or unpaired sclerites on the upper surface of dorsal fold (hooks, plate with denticles, etc.); sometimes these sclerites are named *titillators*, but the genital terminology of Tettigonioida is not elaborated up to now (Figs I: 3-9).

3) *Ampulla, neck, attachment plate, and tube*: the parts of spermatophore of Grylloidea. The large ampulla includes a *capsule* with sperm. All other structures of spermatophore are situated around the long and narrow *spermatophore canal* (this canal leads from capsule to apex of tube): the narrow neck, which may be reduced, the widened attachment plate with lobes for the adherence to female, and the thin tube usually inserted into the female *spermathecal canal* (Figs I: 10, 14). The ampulla may be covered with *spermatophylax* (special solidified secret), protecting the spermatophore from the premature destruction by female.

4) *Valvae*: the ventral fold of the Grylloid type of genitalia (Figs I: 5, 6). This fold usually consists of a pair of membranous lobes (Figs I: 8, 9); these lobes participate in formation of a spermatophore ampulla in the cavity between them only (Figs I: 14, 15), or between them and the special membranous mold on upper surface of the genital plate (Figs I: 10-13).

5) *Guiding rod*: the membranous or partly sclerotized process of lower membrane of the dorsal fold base. This process participates in formation of the spermatophore tube and helps to insert it into the female spermathecal canal (if guiding rod is changed into a thin and long sclerite, it is named *virga*) (Figs I: 8-16).

6) *Ectoparameres*: the paired sclerotized and distinctly articulated processes of lateral parts of dorsal fold, epiphallus, or guiding rod (Figs I: 7-9) (these structures may be absent or more numerous). The ectoparameres together with epiphallus usually participate in grasping of the sclerotized *copulatory papilla* of female (Figs I: 15, 16), or in a special kind of anchor-like fixation in the *genital chamber* of female (Figs I: 11, 13).

7) *Endoparameres*: the sclerotized paired parts of lower membrane of the dorsal fold base provided with special apodemes (Figs I: 7-9). Probably, these apodemes are always homologous; usually, they are very long, but sometimes slightly or strongly reduced. The endoparameres may be short or long, connected with each other by a sclerotized ribbon (Figs I: 8-11) or isolated from each other (Figs I: 14, 15). They ensure movable connection between the above-mentioned apodemes (and their muscles) and the guiding rod, ectoparameres, or some other structures.

8) *Mold of spermatophore attachment plate*: the special partly sclerotized structure (or complex of sclerites) on lower membrane of the dorsal fold base. This structure is situated proximally to the base of guiding rod; this mold participates in formation of the attachment plate of spermatophore (Figs I: 8, 10, 14).

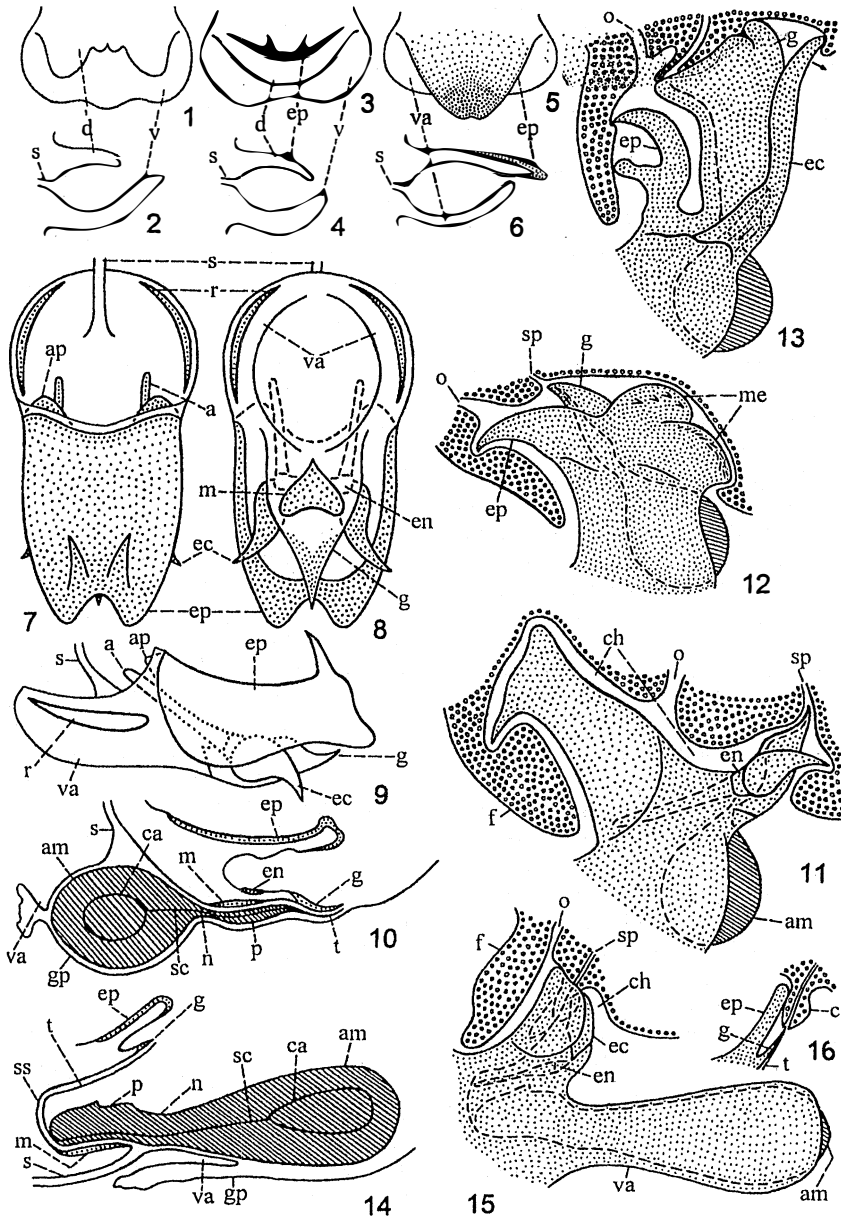
9) *Rami*: the paired elongated sclerites forming an interrupted or solid sclerotized ribbon around the base of ventral fold (rami may be articulated or fused with epiphallus, but sometimes they are strongly reduced) (Figs I: 7-9).

10) *Spermatophore sac*: the rounded or laterally compressed invagination of the basal part of guiding rod (or an invagination of lower surface of the dorsal fold base between the guiding rod and the mold of spermatophore attachment plate). The spermatophore sac participates in formation of the long spermatophore tube and appears for lengthening of spermatophore tube without lengthening of guiding rod (Fig. I: 14).

Characteristic features of the male genitalia in Podoscirtinae

Initially, the male genitalia of Podoscirtinae were possibly adapted for the special kind of anchor-like fixation in the genital chamber of female (Figs I: 11-13), as such structure of the genitalia is presumably, inherited from the possible ancestors belonging to the subfamily Pentacentrinae. Types of this fixation in recent forms are rather diverse.

(1) The guiding rod together with endoparameres may strongly deviate from the rest



Figs I (1-16). Scheme of male genitalia. 1, 2, Hagloid type; 3, 4, Tettigonioid type; 5, 6, primitive Grylloid type; 7-16, derivative Grylloid type (Podoscirtinae) [7-13, Podoscirtini: *Zvenella* Gor. (7-11), *Sonotrella* Gor. (12), *Truljalja* Gor. (13); 14-16, Aphonoidini: *Mistshenkoana* Gor.]. Genitalia (sclerotized parts black or dotted; spermatophore striped) from above (1, 3, 5, 7), from below (8), and in sagittal section together with spermatophore (10, 14) or without it (2, 4, 6); genitalia from side (9); their fixation in female genital chamber (genitalia dotted; spermatophore striped; female body in sagittal section covered with small circles): view from side (11-13, 15), sagittal section of epiphallus and adjacent structures (16).

Abbreviations: a, endoparameral apodeme; am, spermatophore ampulla; ap, epiphallic apodeme; c, copulatory papilla; ca, spermatophore capsule; ch, female genital chamber; d, dorsal fold (lobe); ec, ectoparamere; en, endoparamere; ep, epiphallus; f, female genital plate; g, guiding rod; gp, upper surface of male genital plate; m, mold of spermatophore attachment plate; me, membranous lobes around base of guiding rod; n, spermatophore neck; o, oviduct; p, spermatophore attachment plate; r, ramus; s, spermatid; sc, spermatophore canal; sp, spermathecal canal; t, spermatophore tube; v, ventral fold (lobe); va, valva.

position (erection); in this case, the ectoparameres (if they are developed) are situated in the distal part of this rod (Figs I: 9, 11).

(2) In *Sonotrella*, the ectoparameres are absent, and the guiding rod is almost immovable; probably, the fixation results from erection of the special membranous lobes around the base of guiding rod (Fig. I: 12).

(3) In some other genera characterized by the immovable guiding rod and the distinct ectoparameres articulated with the epiphallus, the fixation is possibly ensured with the help of more or less movable ectoparameres (Fig. I: 13).

However, in all genitalia with anchor-like fixation, the valvae are rather short; the valvae together with the special membranous mold of upper surface of the genital plate participate in formation of the spermatophore ampulla (possible plesiomorphy) (Figs I: 8-13). Moreover, in this type of genitalia the spermatophore sac is undeveloped (second possible plesiomorphy) (Fig. I: 10). This primitive type of genitalia is the basis for separation of the paraphyletic tribe Podoscirtini.

Crickets of the holophyletic tribe Aphonoidini have another method of fixation of the male genitalia in the female genital chamber giving rise to considerable changes in the function of genitalia. Their epiphallus and ectoparameres grasp the sclerotized copulatory papilla of female (Figs I: 15, 16); this type of fixation is often associated with the lengthening of spermatophore tube, appearance of spermatophore sac, and possible formation of spermatophore ampulla by the strongly enlarged valvae only (Figs I: 14, 15). These changes show the tribal level of divergence between Aphonoidini and Podoscirtini. Gryllinae and some other subfamilies of Gryllidae demonstrate a similar way of the genitalia evolution as well. Two other tribes of Podoscirtinae were described by Gorochov (1986) for the groups with the similar value of changes in the function of genitalia (including the convergent similarity to Aphonoidini).

Systematic part

The material considered in this paper is deposited at the following institutions: Zoological Institute, Russian Academy of Sciences, St. Petersburg (ZIAS); Natural History Museum, London (BMNH); Museum für Naturkunde der Humboldt-Universität, Berlin (MNHU); Museum National d'Histoire Naturelle, Paris (MNHN); Staatliches Museum für Naturkunde, Stuttgart (SMNS); Museum Nacional de Ciencias Naturel-

es, Madrid (MNCN); Institute of Systematics and Evolution of Animals, Polish Academy of Sciences, Kraków (ISEA).

Tribe **PODOSCIRTINI**

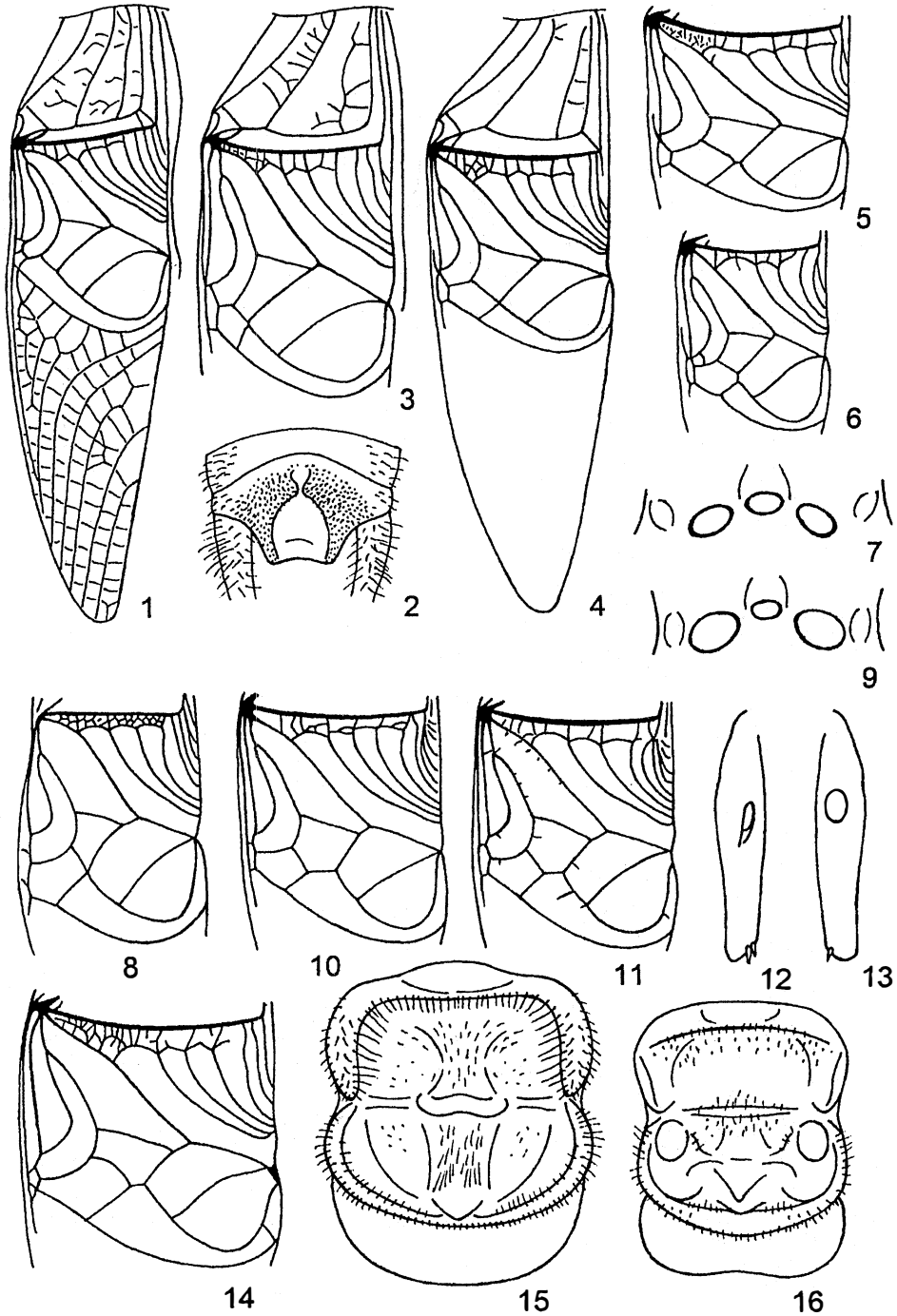
This tribe is united by the plesiomorphic type of the male genitalia (see "Characteristic features of the male genitalia..."). The generic composition of Podoscirtini is not quite clear at present, as many genera are in need of additional study. This part of the present work includes taxonomic information on some Indo-Malayan genera usually living on leaves of tropical trees, active at night, more or less phytophagous, and ovipositing into plant tissues.

Genus *Sonotrella* Gorochov, 1988, gen. dist.

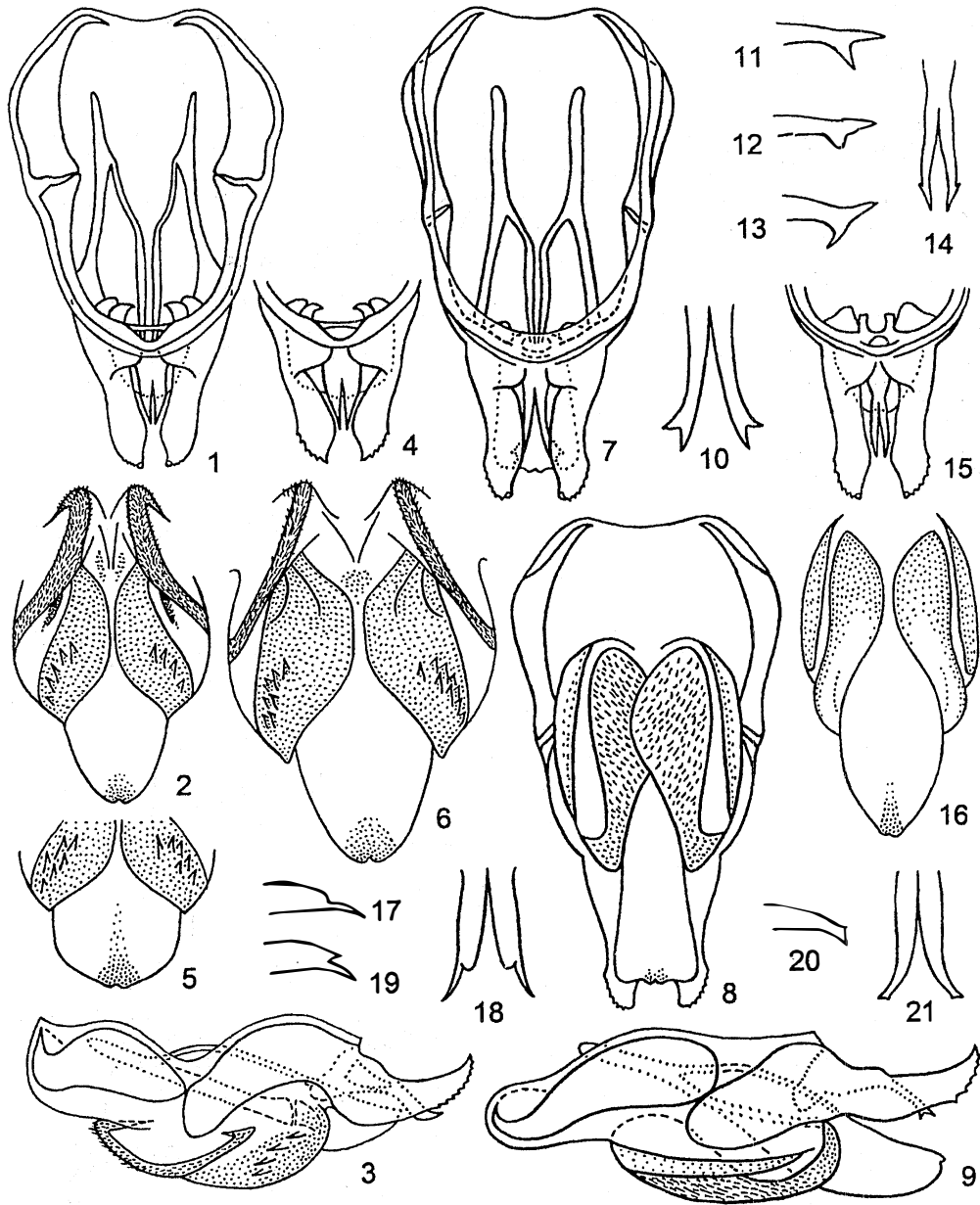
Type species: *Sonotrella mekongica* Gorochov, 1988.

Note. The genus was recently synonymized with *Calyptotrypus* Saussure, 1878 (Ingrisch, 1997). This synonymy is dubious, as Saussure (1878) included in his genus the representatives of eight or more modern genera belonging to two subfamilies and distributed from Africa to Australia. The type species of *Calyptotrypus* (*Platydictylus helvolus* Serville, 1839) was described from a single female without any geographical data (Audinet-Serville, 1839). This specimen from MNHN was examined by me; it is in rather bad condition and more or less similar to greenish or yellowish representatives of *Sonotrella* in the general appearance. Saussure (1878) and Chopard (1969) considered that this type originates from India (?), but all the species of *Sonotrella* known to me were collected only in Indochina (from Burma to Vietnam) including Malacca, the nearest islands (Sumatra, Java, Kalimantan), and South China. I think that it is necessary to consider the following: *P. helvolus* is *nomen dubium*, and *Calyptotrypus* is *nomen dubium* also, because numerous genera somewhat similar to *Sonotrella* are known from different continents (moreover, *Sonotrella* is in need of division into several subgenera).

Diagnosis. Size large. Body slightly depressed dorsoventrally. Head rather low (not high); rostrum slightly or distinctly narrower than scape; ocelli well developed, large, whitish, closely or very closely spaced (Figs II: 7, 9). Pronotum rather short, narrowed in front. Tegmina and hind wings well developed (not shortened); male tegmina with long and almost straight transverse stridulatory vein, more or less small mirror, and long apical area (Figs II: 1, 3-6, 8, 10, 11, 14); hind wings distinctly longer



Figs II (1-16). *Sonotrella*, male (1-6, 8-16) and female (7). 1, 2, *S. mekongica* Gor. (holotype); 3, *S. virescens* Gor. (holotype); 4, *S. omissa* sp. n.; 5, *S. spectata* sp. n. (holotype); 6, *S. bispinosa* (Chop.); 7, 8, *S. willemsei* (Chop.) (8, from Chopard, 1925); 9, 10, *S. typica* sp. n.; 11, *S. tenebra* (Ingr.); 12, 13, *S. diluta* sp. n. (holotype); 14, *S. remota* sp. n.; 15, *S. optima* sp. n.; 16, *S. inflata* sp. n. Dorsal part of tegmen (1); this part without apical area or venation of this area (3, 4) or without basal and apical areas (5, 6, 8, 10, 11, 14); anal plate from above and slightly from behind (2); ocelli from above (7, 9); fore tibia: inner side (12) and outer side (13); metanotal gland from above (15, 16).



Figs III (1-21). *Sonotrella* (*Sonotrella*), male. 1-3, *S. mekongica* Gor. (holotype); 4, 5, *S. crumbi* (Chop.); 6, *S. exculpta* Gor. (holotype); 7-12, *S. virescens* Gor. (7-11, holotype); 13-16, *S. diluta* sp. n. (holotype); 17-19, *S. proxima* Gor. (17, 18, holotype); 20, 21, *S. inflata* sp. n. Genitalia from above (1, 7), from below (8), and from side (3, 9); guiding rod with membranous lobes (2, 6, 16) or with part of these lobes (5) from below; epiphallus and apex of guiding rod from above (4, 15); hind medial processes of epiphallus from above (10, 14, 18, 21) and their distal part from side (11-13, 17, 19, 20).

than tegmina. Male metanotal gland in the shape of almost square large concavity with flat bottom (with only one exception) (Figs II: 15, 16). Legs rather short; fore tibiae distinctly (but not strongly) in-

flated, with rounded medium-sized outer and longer almost slit-like inner tympana (Figs II: 12, 13); hind legs with moderately thickened base of femora and long (almost as femora) tibiae with small spines.

Male anal plate with characteristic sclerotized lateral parts provided with numerous very small denticles. Male genital plate not long, with more or less widely rounded apex. Male genitalia with characteristic epiphallus consisting of V-shaped proximal part and two pairs of hind processes: large lateral and smaller medial; lower part of male genitalia with two pairs of characteristic membranous lobes around base of guiding rod: outer (proximal) and inner (distal); these lobes provided with numerous setae and/or various sclerotized structures (Figs III: 2, 6, 8, 16; IV: 2, 7, 12; V: 2, 7, 12; VI: 2, 8; VII: 2, 7); these lobes may originate from lateral parts of ventral fold (valvae) or from lower membrane of dorsal fold base (modification of mold of spermatophore attachment plate) and participate in anchor-like fixation in genital chamber of female (Fig. I: 12); in this connection, they may represent the structures analogous to ectoparameres of some other Podoscirtini; endoparameral apodemes well developed, long, narrow, connected by stronger sclerites with inner (distal) membranous lobes and by narrow ribbon with guiding rod; transverse endoparameral sclerites absent; guiding rod rather long and wide, but not high, more or less membranous (Figs III-VII). Ovipositor rather long, with elongated drilling apical part (Fig. VIII: 1).

Composition. Three subgenera: *Sonotrella* s. str., *Calyptotryella* subgen. n. and *Megatrella* subgen. n.

Subgenus *Sonotrella* s. str.

Diagnosis. Body medium-sized or large for this genus. Coloration more or less greenish, yellowish, or light brown. Male metanotal gland with small group of hairs in centre.

Male anal plate without additional lateral lobules and inflations (Fig. II: 2), similar in different species. Male genitalia with narrow and long hind medial processes of epiphallus (Figs III: 1, 4, 7, 10, 14, 15, 18, 21); inner (distal) membranous lobes of these genitalia larger (wider) than outer (proximal) ones; these inner lobes only with small sclerites (near articulation with endoparameres), or sometimes with small denticles (Figs III: 2, 3, 5, 6, 8, 9, 16).

Included species. *Calyptotrypus crumbi* Chopard, 1969, *S. mekongica* Gorochov, 1988, *S. virescens* Gorochov, 1990, *S. proxima* Gorochov, 1990, *S. exculta* Gorochov, 1992, *S. major* Liu et al., 1993, *S. diluta* sp. n., and *S. inflata* sp. n.

Sonotrella (Sonotrella) mekongica Gorochov, 1988

(Figs II: 1, 2; III: 1-3; VIII: 1, 2)

Sonotrella mekongica Gorochov, 1988: 19.

Material. **Vietnam:** 1 ♂ (holotype), env. of Mekong River, April (ZIAS). **Cambodia:** 1 ♂, 1 ♀, prov. *Campot*, env. of Sihanoukville (= Kampong Som), secondary forest, 14-21.II.1998 (♂: imago reared III.1998), A. Gorochov (ZIAS). **Thailand:** 5 ♂, 3 ♀, prov. *Trat*, Chang I. (Siam Bay), low mountains near sea, forest, 5-20.XI.2000 (2 ♂ and 2 ♀: imagines reared XII.2000-III.2001), A. Gorochov & L. Anisutkin (ZIAS); 2 ♂, 1 ♀, prov. *Nakhon Ratchasima*, env. of National Park Khao Yai, 500-1000 m, primary forest, 26.X-4.XI.2000 (imago reared XII.2000-I.2001), A. Gorochov & L. Anisutkin (ZIAS); 1 ♂, "Nakhornratshasima [Nakhon Ratchasima?]", Dec. 3, 1957" (BMNH); 1 ♂, "Bangkok, Jan. 18, 1958" (BMNH).

Description of female (nov.). Body medium-sized. Coloration greenish (yellowish in dry specimens), with light brownish or greyish dorsal part of tegmina (sometimes with light brownish upper part of head and disc of pronotum separated from their lower parts by very light longitudinal lines from eyes to hind edge of pronotum or also along lateral edge in proximal half of tegminal dorsal part), dark line along proximal edge of tegminal base, black line along upper outer edge of lower valves of ovipositor, and blackish apical part of ovipositor. Venation of tegminal dorsal part with 13-15 branches.

Genital plate with rather deep apical notch and rounded hind lateral lobes (Fig. VIII: 2). Ovipositor slightly longer than hind femur; its apex as in Fig. VIII: 1.

Length (mm). Body 19-23; body with wings 33-40; pronotum 3.5-4.3; tegmina 23-28; hind femora 14.5-16; ovipositor 16-18.

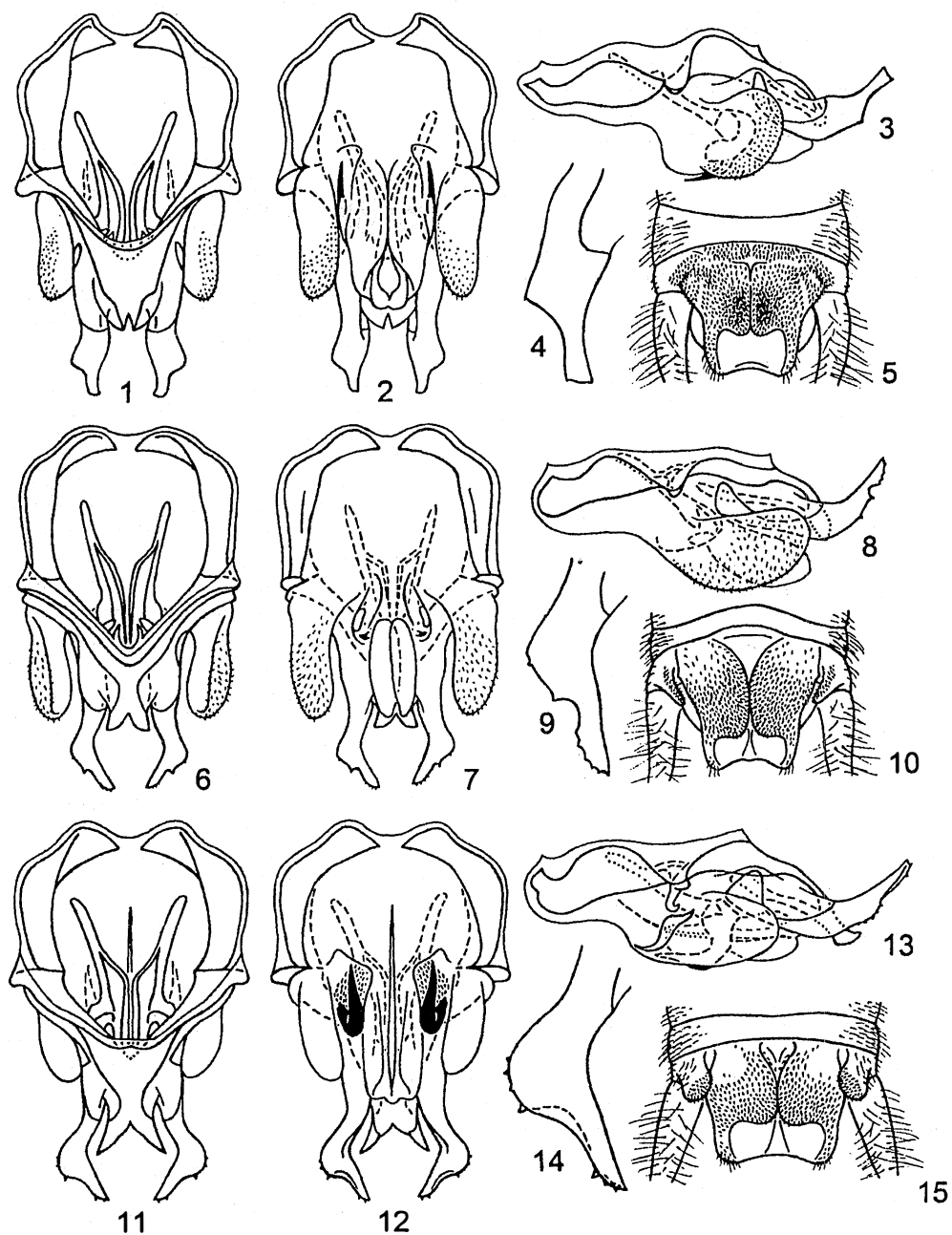
Note. The size and coloration of male are similar to those of female. The male genitalia (Figs III: 1-3) are usually with a few sclerotized denticles on the inner (distal) membranous lobes (Figs III: 2, 3). *S. mekongica* is distributed in lowlands and low mountains of Southern Indochina (from Bangkok to Lower Mekong).

Sonotrella (Sonotrella) crumbi (Chopard, 1969)

(Figs III: 4, 5)

Calyptotrypus crumbi Chopard, 1969: 333-334.

Material. **Burma:** 1 ♂ (paratype), "Toungoo, A.V.B. Crumb", "Paratype" (NMHN); 1 ♂, "Rangoon, F.J. Meggitt" [identified by Uvarov as *Madasomma plana* (Walk.)] (BMNH); 1 ♂, "Rangoon, Archbald Coll." (ZIAS). **Thailand:** 3 ♂, prov. *Phetchaburi*, 50 km SW of Phetchaburi, env. of National Park Kaeng Krachan, 400 m, secondary forest, 30-I.VII.1996, A. Gorochov (ZIAS); 1 ♂, "Siam" (BMNH).



Figs IV (1-15). *Sonotrella (Calyptotrella)*, male. 1-5, *S. omissa* sp. n.; 6-10, *S. lobata* (Chop.); 11-15, *S. spectata* sp. n. (holotype). Genitalia from above (1, 6, 11), from below (2, 7, 12), and from side (3, 8, 13); hind lateral lobe of epiphallus from above and slightly in front (4, 9, 14); anal plate from above and slightly from behind (5, 10, 15).

Note. This species is very similar to *S. mekongica* in size and coloration, but differs from the latter in the small details of the male genitalia: hind lateral lobes of epiphallus with distinctly narrower base (Fig. III: 4), guiding rod much

wider (Fig. III: 5), and sclerotized denticles of inner (distal) membranous lobes usually more numerous (Fig. III: 5). *S. crumbi* is distributed in the region of mountains separating Burma from Thailand (from Rangoon to Northern Malacca).

Sonotrella (Sonotrella) exulta Gorochov, 1992 (Fig. III: 6)*Sonotrella exulta* Gorochov, 1992: 14-15.

Material. Vietnam: 2 ♂ (holotype & paratype), prov. Hoa Binh, env. of Mai Chau, 250 m, forest, 30.X-4.XI.1990 (imago reared III.1991), A. Gorochov (ZIAS). Thailand, prov. Chiang Mai: 1 ♀, "Huei Kaeo-Monthatarn WF, 450-600 m, ex larva, 1.II.1997, S. Ingrisch" (S. Ingrisch's collection); 1 ♀, "Huei Kaeo, at night, 11.IX.1989, S. Ingrisch" (ZIAS); 1 ♂, "Chiengmai [Chiang Mai?], 16 Feb. 1962" (BMNH).

Description of female (nov.). Similar to *S. mekongica* including the shape of genital plate, but somewhat larger and with more contrast coloration: light brownish upper part of head and pronotal disc with darkish small spots or stripes on head and dark spots on lateral parts of disc, light longitudinal lines from eyes to hind edge of pronotum more distinct and more or less continued along lateral edge of tegminal dorsal part, apical part of femora with distinct darkenings on hind legs and smaller darkenings on all other legs (sometimes, lower surface of hind femora with longitudinal dark lines). Venation of tegminal dorsal part with 12-13 branches. Lengths of ovipositor and hind femur almost equal.

Length (mm). Body 26-30; body with wings 43-47; pronotum 4.2-4.7; tegmina 30-32; hind femora 17-18; ovipositor 17.5-18.5.

Note. The size and coloration of male are similar to those of female. The structure of the male genitalia is intermediate between that of *S. mekongica* and *S. crumbi*: the epiphallus is distinctly intermediate, the guiding rod is similar to that of *S. mekongica*, and the denticles of inner (distal) membranous lobes are more or less similar to those of *S. crumbi* (for comparison see Figs III: 2-6). This species is characteristic of Northern Indochina.

Sonotrella (Sonotrella) ?major Liu, Yin & Wang, 1993*Sonotrella major* Liu, Yin & Wang, 1993: 95-98.

Material. Vietnam: 1 ♀, prov. Vinh Phu, Tamdao, 800-900 m, forest, 17-31.V.1995, A. Gorochov (ZIAS).

Note. This species originally described from two males from Yunnan (China) is very similar to *S. exulta* in the size and details of body structure, but differs in the almost uniformly greenish coloration. From two other species with denticulated inner (distal) membranous lobes of the male genitalia, it differs in the slightly larger size. The identification of this female from Northern Vietnam as *S. major* is very problematical.

Sonotrella (Sonotrella) virescens Gorochov, 1990

(Figs II: 3; III: 7-12)

Sonotrella virescens Gorochov, 1990: 17-19.

Material. Vietnam: 1 ♂ (holotype), 3 ♀ (paratypes), prov. Gia Lai, 20 km N of Kannack, Buon Luoi, 700 m, forest, 17-20.XI.1988, A. Gorochov (ZIAS); 3 ♂, 1 ♀, same data, but 3-19.XI.1993 (ZIAS); 1 ♂, prov. Dong Nai, 250 km NE of Hochiminh, Nature Reserve Nam Cat Tien, 8-15.XII.1990, V. Badikov (ZIAS).

Note. This species differs from all above-considered congeners in the long and narrow hind medial processes of epiphallus bifurcated from their base and provided with two distinct apical spines (upper spine is stronger than lower one; both are directed more or less distally), as well as in the absence of any spines on inner (distal) membranous lobes (Figs III: 7-12). The general appearance (including the size and coloration) is very similar to those of *S. mekongica* and *S. crumbi*. Some of the darker specimens are similar in the coloration to *S. exulta*, but they have more uniformly-coloured (slightly darkened) pronotal disc and light apices of all femora. There are some variations in the shape of apex of hind medial processes of epiphallus (see Figs III: 11, 12; the latter specimen was collected in the Prov. Dong Nai).

Sonotrella (Sonotrella) proxima Gorochov, 1990 (Figs III: 17-19)*Sonotrella proxima* Gorochov, 1990: 19.

Material. Vietnam: 1 ♂ (holotype), 1 ♀ (paratype), prov. Gia Lai, env. of Kannack, 600 m, forest, 8-16.XI.1988, A. Gorochov (ZIAS); 1 ♂, prov. Gia Lai, 20 km N of Kannack, Buon Luoi, 700-800 m, forest, 24-30.IV.1995, A. Gorochov (ZIAS).

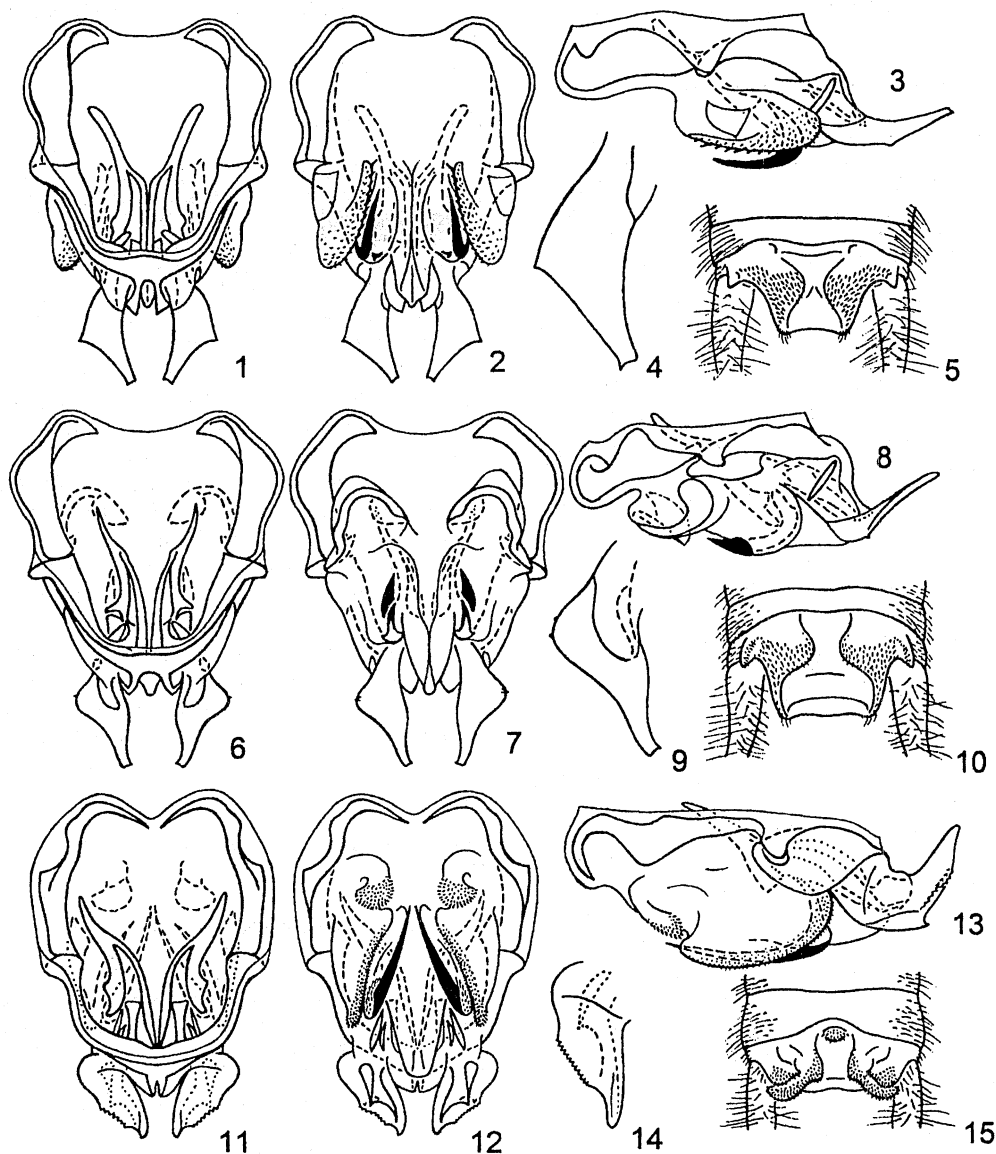
Note. *S. proxima* is very similar to *S. virescens*. It is distinguished from the latter species only by the slightly shorter and thicker hind medial epiphallic processes provided with the rather strong lower apical spine (upper apical spine of these processes is somewhat weaker or strongly reduced) (Figs III: 17-19).

Sonotrella (Sonotrella) diluta sp. n. (Figs III: 13-16)

Holotype. ♂, Vietnam, prov. Gia Lai, 20 km N of Kannack, env. of Buon Luoi, 800 m, primary forest, 30.IV.1995, A. Gorochov (ZIAS).

Paratypes. 1 ♂, 1 ♀, same data as in holotype, but 24.IV-10.V.1995 (ZIAS).

Description. Male (holotype). Very similar to light specimens of *S. virescens* and *S. proxima*.



Figs V (1-15). *Sonotrella* (*Calypotrella*), male. 1-5, *S. bipunctata* (Chop.); 6-10, *S. indicativa* sp. n. (holotype); 11-15, *S. bispinosa* (Chop.). Genitalia from above (1, 6, 11), from below (2, 7, 12), and from side (3, 8, 13); hind lateral lobe of epiphallus from above and slightly in front (4, 9, 14); anal plate from above and slightly from behind (5, 10, 15).

Coloration almost uniformly yellowish (greenish in living specimen) with greyish dorsal part of tegmina (this part with darker line along proximal and lateral edges).

Genitalia slightly narrower than in both mentioned species (Fig. III: 15), with long and narrow (as in *S. virescens*) hind medial epiphallic processes fused with each other by their bases

(not as in *S. virescens* and *S. proxima*) and provided with two distinct apical spines: upper spine stronger than lower one and directed distally (as in *S. virescens*), lower spine slightly smaller and directed proximally (not as in *S. virescens* and *S. proxima*) (Figs III: 13, 14); inner (distal) membranous lobes of genitalia without denticles; guiding rod shorter, its apical part distinctly nar-

rower than in both previous species lacking these denticles (for comparison see Figs III: 8, 16).

Variation. Tegmina of male paratype with short, darkish, nearly transverse line not far from distal edge of mirror.

Female. Similar to male, but with almost yellowish (greenish?) dorsal part of tegmina (this part with 16-17 oblique branches) and shorter darkish line only along proximal half of lateral edge of dorsal part.

Ovipositor almost as long as hind femur.

Length (mm). Body: ♂ 23-28, ♀ 29; body with wings: ♂ 36-37, ♀ 39; pronotum: ♂ 3.7-3.8, ♀ 4.2; tegmina: ♂ 24-25, ♀ 29; hind femora: ♂ 15.5-16, ♀ 16; ovipositor 15.5.

Comparison. The distinctions from all similar species of the subgenus are given above.

Sonotrella (Sonotrella) inflata sp. n.
(Figs II: 16; III: 20, 21; VIII: 3)

Holotype. ♂, Vietnam, prov. Gia Lai, 20 km N of Kannack, env. of Buon Luoi, 800 m, primary forest, 3-11.XI.1993, A. Gorochoy (ZIAS).

Paratype. ♀, same data as in holotype (ZIAS).

Description. *Male* (holotype). Similar to *S. virescens*, *S. proxima*, and *S. diluta* in size and shape of body, but coloration light brown with upper part of head and pronotal disc uniformly brown, separated from lower parts by distinct light lines (these lines extending from eyes to hind edge of pronotum and continuing along proximal half of lateral edge of tegminal dorsal part); these tegminal parts greyish brown, slightly lighter than pronotal disc, with dark lines along proximal and lateral edges; apical parts of all femora light. Metanotal gland very characteristic, distinguished from that of all other species of *Sonotrella* by presence of a pair of distinct inflations in posterior half; these inflations with round whitish impression on anterior surface (Fig. II: 16).

Genitalia very similar to those of *S. virescens* and *S. proxima*, but differing in the shape of hind medial epiphallic processes, being somewhat narrower and longer than in *S. proxima* and with reduced upper apical spine (not as in *S. virescens*) (for comparison see Figs III: 10-12, 17-19, 20, 21).

Female. Similar to male, but without dark lines along proximal and lateral edges of tegminal dorsal part.

Ovipositor hardly shorter than hind femora; genital plate as in Fig. VIII: 3.

Length (mm). Body: ♂ 21, ♀ 23; body with wings: ♂ 33, ♀ 39; pronotum: ♂ 3.3, ♀ 3.8; tegmina: ♂ 23, ♀ 28; hind femora: ♂ 14.5, ♀ 15; ovipositor 14.

Comparison. The new species differs from all other species of *Sonotrella* s. str. in the darkish coloration, very characteristic male metanotal gland, and small details of the male genitalia.

Subgenus **Calyptotrella** subgen. n.

Type species: *Sonotrella (Calyptotrella) omissa* sp. n.

Diagnosis. Similar to previous subgenus in the general appearance (coloration, shape of body) and wing venation (for comparison see Figs II: 1, 3, 4-6), but size usually somewhat smaller, male metanotal gland slightly varied, male anal plate with additional lateral lobules or small inflations (Figs IV: 5, 10, 15; V: 5, 10, 15), male genitalia with wide hind medial processes of epiphallus (Figs IV: 1, 6, 11; V: 1, 6, 11) and inner (distal) membranous lobes smaller than outer (proximal) ones; these inner lobes with a pair of large sclerotized hooks articulated with endoparameres (except one species with reduced hooks) (Figs IV: 2, 3, 7, 8, 12, 13; V: 2, 3, 7, 8, 12, 13).

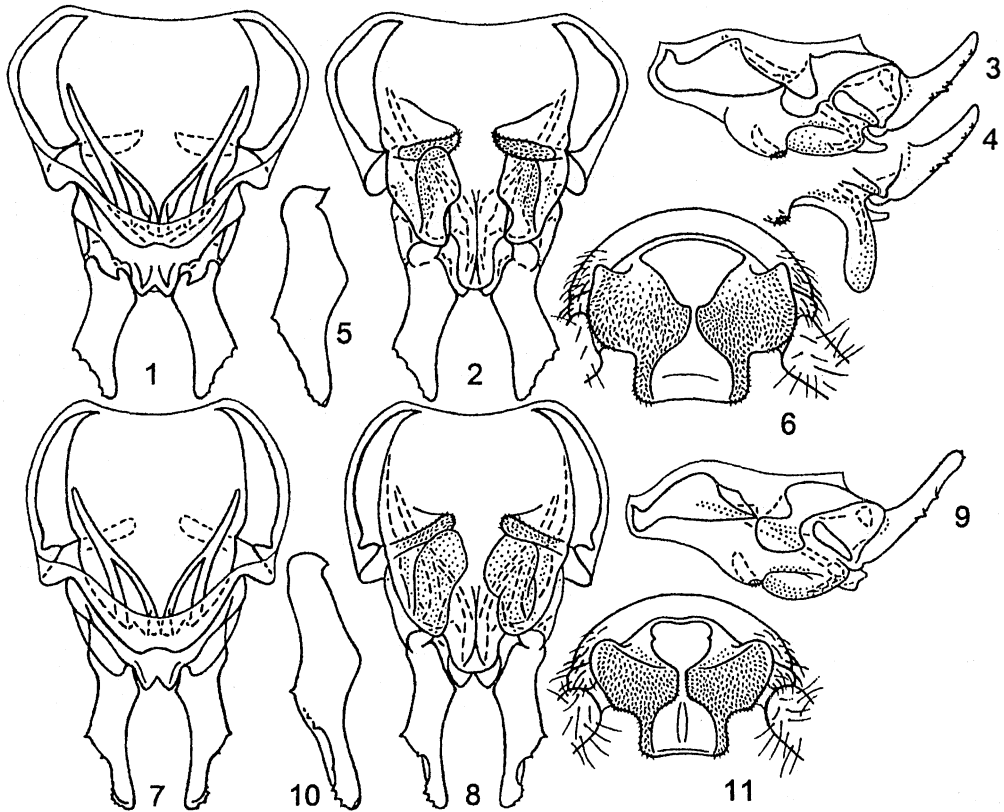
Included species. *Calyptotrypus lobatus* Chopard, 1969, *C. bipunctatus* Chopard, 1969, *C. bispinosus* Chopard, 1969, *C. bicolor* Ingrisich, 1997, *S. omissa* sp. n., *S. spectata* sp. n., and *S. indicativa* sp. n.

Sonotrella (Calyptotrella) omissa sp. n.
(Figs II: 4; IV: 1-5)

Holotype. ♂, Java, 20-25 km SE of Bogor, Pangrango Mountains, env. of Cemanda, 1000 m, forest, 9.XI-7.XII.1999, A. Gorochoy (ZIAS).

Description. *Male* (holotype). Body medium-sized for this subgenus. Coloration yellowish (in living specimens, greenish) with brownish grey upper part of head and pronotal disc, darkish dots along fore edge of pronotum and along hind edge of pronotal disc, darkened stripes along lateral sides of this disc, very light (but scarcely distinct) yellowish lines along upper edge of pronotal lobes (these lines contacting with mentioned darkened stripes throughout their extent), greyish dorsal part of tegmina, and dark line along lateral and partly along fore edges of this part. Venation of tegminal dorsal part as in Fig. II: 4; hind wings distinctly longer than tegmina. Metanotal gland with rather abundant hairs in centre.

Anal plate with rather long, widened, denticulated lateral parts contacting with each other and with a pair of small additional lateral inflations near bases of cerci (Fig. IV: 5). Male genitalia with hind processes of epiphallus characteristic in shape and comparatively short and thin hooks of inner (distal) membranous lobes (Figs IV: 1-4).



Figs VI (1-11). *Sonotrella* (*Megatrella*), male. 1-6, *S. tenebra* (Ingr.); 7-11, *S. typica* sp. n. Genitalia from above (1, 7), from below (2, 8), and from side (3, 9); distal part of genitalia with straightened inner (distal) membranous lobes (4); hind lateral lobe of epiphallus from below (5, 10); anal plate from above and slightly from behind (6, 11).

Female unknown.

Length (mm). Body 21; body with wings 35; pronotum 3; tegmina 24; hind femora 14.5.

Comparison. The species is clearly distinguished from all other known species of this subgenus by the absence of distinct additional lateral lobules of the male anal plate and by the shape of the above-mentioned structures of the male genitalia.

Sonotrella* (*Calypotrella*) *lobata (Chopard, 1969) (Figs IV: 6-10)

Calypotrypus lobatus Chopard, 1969: 331-332.

Material. South Malacca and its nearest environs: 1 ♂ (holotype?), "Pulou Jarak" [identified by Chopard as *Calypotrypus lobatus* Chp.] (MNHN); 2 ♂, "Perak, Hulu, Belum Expedition, B. Camp, 5°30'07"N, 101°26'21"E, IV-VI.1994" (ZIAS); 1 ♂, "Penang 96-126" (BMNH); 1 ♀, "Malaya, Sungei Sleh, 16.XII.1934" [identified by Chopard as *Calypotrypus lobatus* Chop.] (BMNH); 1 ♂,

"Malaya, Langkawi Is., 12.IV.1936, H.T. Pagden", "prey of *Sphex maurus* Sss." [identified by Dirsh as *Calypotrypus helvolus* (Serv.)] (BMNH); 2 ♂, "Singapore, H.N. Ridley, 1900" (BMNH, ZIAS); 1 ♂, "Singapore" [identified by Chopard as *Calypotrypus bipunctatus* Chop.] (BMNH).

Note. Male genitalia of the specimen from MNHN are similar to the picture from the original description (Chopard, 1969: Fig. 213); this specimen bears also the geographical label similar to that of the holotype, but any type label is absent. *S. lobata* is very similar to *S. omissa* in the general appearance (including the size, coloration and venation), but clearly differs in the presence of distinct transverse membranous projection in the centre of the male metanotal gland and long narrow additional lateral lobules of the male anal plate (near bases of cerci) (Fig. IV: 10), differently shaped hind processes of epiphallus, and strongly reduced hooks of inner (distal) membranous lobes of the male genitalia (Figs IV: 6-9).

The female of this species is similar to the females of all above-considered species of *Sonotrella* except for the small details of size and coloration, which allow its distinguishing from some of them.

Sonotrella (Calypotrella) spectata sp. n.
(Figs II: 5; IV: 11-15)

Holotype. ♂, Kalimantan, "Brunei, Bukit Puan, dry river bed, 100 m, VIII.1979, I. Gauld" (BMNH).

Paratype. ♂, same data as in holotype (ZIAS).

Description. Male (holotype). Similar to both above-considered species of this subgenus, but upper part of head slightly lighter and with darkish ornament (brown spot between eyes contacting with ocelli, two pairs of brown medial and one pair of almost whitish lateral longitudinal lines), median part of pronotal disc with darkish spots, male tegmina wider, their venation somewhat modified (transverse stridulatory vein longer, diagonal vein more transverse, chords more strongly curved, mirror slightly smaller) (Fig. II: 5), anal plate with long wide additional lateral lobules near bases of cerci (Fig. IV: 15), and male genitalia with larger hooks of inner (distal) membranous lobes, longer hind medial and characteristic hind lateral processes of epiphallus (Figs IV: 11-14). Metanotal gland as in *S. lobata*.

Variation. In paratype, ornament of head almost indistinct and above-mentioned lobules of anal plate slightly smaller.

Female unknown.

Length (mm). Body 21-24; body with wings 35-36; pronotum 3-3.2; tegmina 23-24; hind femora 14.5-15.

Comparison. *S. spectata* differs from *S. omissa* and *S. lobata* in the characters listed above. From all other known species of *Calypotrella*, it differs in the other type of male anal plate and in some genital characters.

Sonotrella (Calypotrella) bipunctata (Chopard, 1969)
(Figs V: 1-5)

Calypotrypus bipunctatus Chopard, 1969: 332-333.

Material. **South Malacca**: 1 ♂ (paratype), "Kuala Lumpur, at light, Mani, 23rd 1931, H.M. Pendlebury", "Cotype" (MNHN); 1 ♂, "Kuala Lumpur" [identified by Bhowmik as *Calypotrypus helvolus* (Serv.)] (BMNH); 1 ♂, "Singapore, H.N. Ridley, 1904" (BMNH); 1 ♂, "Singapore, VIII.1920" (ZIAS). **Sumatra**: 1 ♂, "Deli, Martin G." (MNHU); 1 ♂, "Sumatra, v. Faber" (ZIAS). **Kalimantan**: 1 ♂, "Sarawak, foot of mt. Dulit, junction of rivers Tinjar & Lejok, 19.IX.1932", "Oxford Univ. Exp.

B.M. Hobby & A.M. Moore" [identified by Chopard as *Calypotrypus bipunctatus* Chop.] (BMNH); 1 ♂, Sabah, "Bettotan, Nr. Sandakan, Aug. 27, 1927, C.B.K. & H.M.P., F. M. S. Museums [designated by Chopard as "cotype" of undescribed *Calypotrypus angustirostrus*] (MNHN).

Note. This rather widely distributed species is a representative of the second group of *Calypotrella* distinguished from all previous species by the male anal plate with rather short, widened, denticulated lateral parts separated from each other by the comparatively wide membranous area (Figs V: 5, 10, 15). The coloration of *S. bipunctata* is as in *S. omissa* and *S. lobata*, but the pronotal disc is almost uniformly brownish. The male metanotal gland is as in *S. omissa*, but with less abundant hairs. The male tegmina are similar to those of *S. omissa* and *S. lobata*.

The additional lateral lobules of the male anal plate are tubercle-like (Fig. V: 5). The male genitalia are with characteristic hind epiphallic processes, long narrow hooks of inner (distal) membranous lobes, and short spine-like setae along the medial edge of outer (proximal) lobes (Figs V: 1-4).

Sonotrella (Calypotrella) indicativa sp. n.
(Figs V: 6-10)

Holotype. ♂, Kalimantan, "Sabah, Sandakan district, Rumidi estate, river Labuk, 50-150 ft, 14-31.IX.1973, C.J.M. Pruet" (BMNH).

Paratype. ♂, same data as in holotype (ZIAS).

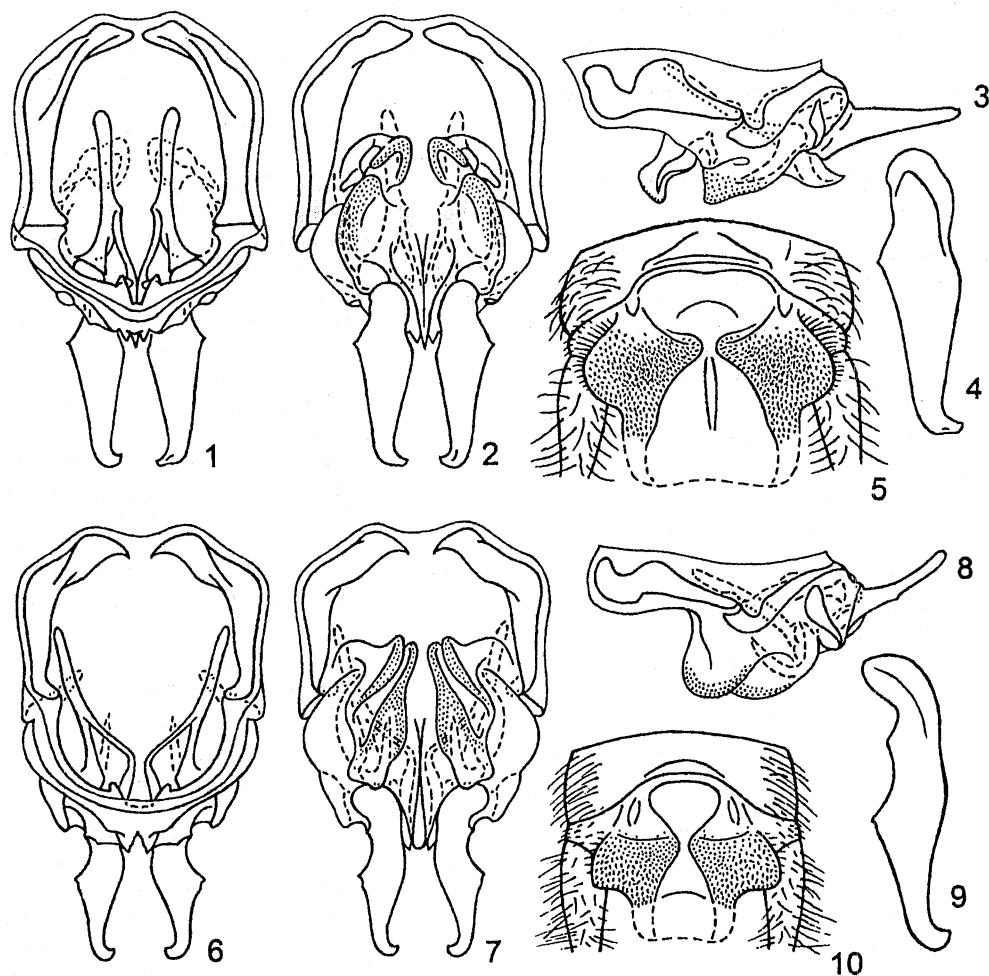
Description. Male (holotype). Very similar to *S. bipunctata*, but differs in coloration of pronotal disc (which is coloured as in *S. omissa*), wider membranous area along hind edge of anal plate (Fig. V: 10), and details of male genitalia: wider notch between hind median processes of epiphallus, less angular hind lateral epiphallic processes, short and thick hooks of inner (distal) membranous lobes, and directed proximally outer (lateral) membranous lobes provided with characteristic arched sclerites (Figs V: 6-9).

Variation. Paratype with slightly smaller additional lateral lobules of anal plate.

Female unknown.

Length (mm). Body 19-20; body with wings 32-34; pronotum 2.8-3; tegmina 22-23; hind femora 13-13.5.

Comparison. The similarity of the male anal plate and the male genitalia in *S. indicativa* and *S. bipunctata* shows that these species are the nearest relatives within the second group of *Calypotrella*. The distinctions between them are listed above; the distinctions from *S. bicolor* are numerous (the presence of additional lateral lobules of the male anal plate, differently shaped hind



Figs VII (1-10). *Sonotrella* (*Megatrella*), male. 1-5, *S. optima* sp. n.; 6-10, *S. remota* sp. n. Genitalia from above (1, 6), from below (2, 7), and from side (3, 8); hind lateral lobe of epiphallus from below (4, 9); anal plate from above and slightly from behind (5, 10).

epiphallic processes, and some others); the distinctions from *S. bispinosa* are given below (see the note on *S. bispinosa*).

Sonotrella* (*Calyptotrella*) *bispinosa (Chopard, 1969)
(Figs II: 6; V: 11-15; VIII: 4)

Calyptotrypus bispinosus Chopard, 1969: 334.

Material. **South Malacca:** 1 ♂ (paratype), "Kuala Lumpur, Aug. 26, 1934, H.M. Pendlebury", "Cotype" (MNHN); 1 ♂, "Kuala Lumpur" [identified by Chopard as *Calyptotrypus bispinosus* Chop.] (BMNH); 7 ♂, 2 ♀, "Perak, Hulu, Belum Expedition, B. Camp, 5°30'07"N, 101°26'21"E, II-VI.1994" (ZIAS).

Description of female (nov.). Coloration more or less similar to that of holotype of *S. spectata*, but ornament of head more contrasting, pronotal disc very light and with darkish stripes along lateral and hind edges. Venation of tegminal dorsal part with 12-13 branches.

Genital plate characteristic: short and with four angular hind projections (Fig. VIII: 4). Ovipositor similar to that of *S. mekongica* in coloration, almost equal to hind femur in length.

Length (mm). Body 16-18; body with wings 29-32; pronotum 2.9-3.2; tegmina 22-24; hind femora 12.5; ovipositor 11-13.

Note. *S. bispinosa* also belongs to the second group of *Calyptotrella*, but it is not closely related

to *S. indicativa*, *S. bipunctata*, and *S. bicolor*, as the characteristic peculiarity of male anal plate of these species, the rather wide membranous median area, is a possible plesiomorphy. *S. bispinosa* is clearly distinguished from all other species of this subgenus by the characteristic coloration (similar in both sexes), clearly narrower dorsal part of the male tegmina with a longer mirror (Fig. II: 6), distinctive male anal plate provided with short thick additional lateral lobules and small median denticulated sclerite (Fig. V: 15), very characteristic hind processes of the epiphallus, very long thin hooks of inner (distal) membranous lobes of the male genitalia (Figs V: 11-14), and transverse female genital plate with four angular projections.

Subgenus **Megatrella** subgen. n.

Type species: *Sonotrella (Megatrella) typica* sp. n.

Diagnosis. Size usually larger than in the previous subgenera. Coloration rather dark, brown. Male metanotal gland with distinct membranous projection in centre.

Male anal plate varied, but more or less similar to that of *Sonotrella* s. str. (Figs VI: 6, 11; VII: 5, 10). Male genitalia with hind medial epiphallic processes very short and inner (distal) membranous lobes larger than outer (proximal) ones; these inner lobes with more or less long sclerites articulated with endoparameres, but without any sclerotized hooks and denticles (Figs VI: 1-4, 6-9; VII: 1-5, 7-10).

Included species. *Madasumma willemsei* Chopard, 1925, *M. grandipennis* Chopard, 1929, *Calyptotrypus tenebrus* Ingrisch, 1997, *S. typica* sp. n., *S. remota* sp. n., and *S. optima* sp. n.

***Sonotrella (Megatrella) typica* sp. n.**
(Figs II: 9, 10; VI: 7-11)

Holotype. ♂, South Malacca, Singapore (possibly from O. John's collection) (ZIAS).

Description. Male (holotype). Coloration almost uniformly brown (not very dark) with light transverse stripe on eyes and yellowish spots at base of tegmina. Lateral ocelli large, much larger than median ocellus (Fig. II: 9). Tegmina with not very wide dorsal part, not very long transverse stridulatory vein, slightly longitudinal mirror, four longest oblique veins connected with each other by transverse veinlets at proximal part, and long apical area (Fig. II: 10). Hind wings distinctly longer than tegmina, with darkish distal part.

Anal plate with widened and denticulated lateral parts provided with rounded upper lateral

projections (Fig. VI: 11). Genitalia with long denticulated hind lateral epiphallic processes; apical parts of these processes not hook-shaped (Figs VI: 7-10).

Female unknown.

Length (mm). Body 24; body with wings 39; pronotum 4.2; tegmina 28; hind femora 18.

Comparison. *S. typica* differs from *S. willemsei* in the size of ocelli (see Figs II: 7, 9) and from the latter species and *S. grandipennis*, in the wider dorsal part of the male tegmina (this part is especially narrow in *S. grandipennis*). The new species differs from *S. tenebra* mainly in details of the male anal plate and the male genitalia (see note on *S. tenebra*).

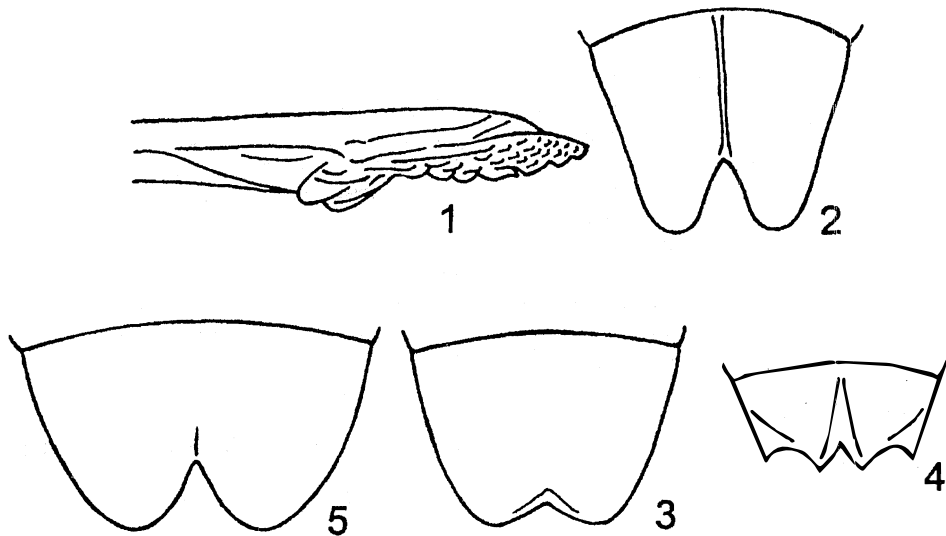
***Sonotrella (Megatrella) willemsei* (Chopard, 1925)**
(Figs II: 7, 8; VIII: 5)

Madasumma willemsei Chopard, 1925: 324-325.

Material. Sumatra: 1 ♀, West Sumatra, 20 km E of Sasak, env. of National Park Harau Valley, equator, 600 m, primary forest, 24-26.XII.1999, A. Gorochoy (ZIAS).

Note. This species is undoubtedly known only from Sumatra. It is similar to *S. typica*, but clearly differs in the almost equal and not very large ocelli (Fig. II: 7), as well as in the details of the male tegminal venation: the diagonal vein is distinctly shorter, only three longest oblique veins are connected with each other by the transverse veinlets at proximal part, the shape of membranous stridulatory areas is slightly different (Fig. II: 8).

S. willemsei was described from one male from Sumatra (Chopard, 1925). The original description was provided with the drawings of head, pronotum, and tegmina of the holotype, but the genitalia were not studied. Later, Chopard (1969) identified some specimens from South Malacca and Kalimantan (Sarawak) as this species. The drawing of the male genitalia from the latter work is very similar to the male genitalia of *S. optima* sp. n. (Fig. VII: 1) from Sarawak, but the venation of the male tegmina of this new species is very different from that of the holotype of *S. willemsei* (for comparison see Figs II: 8, 10). It is possible that Chopard figured the genitalia of a specimen from Sarawak misidentified by him as *M. willemsei* (but actually belonging to *S. optima* sp.n.). Chopard's specimens from South Malacca may belong to *S. typica* or to *S. tenebra* (see below). In this case, the female of *S. willemsei* is possibly undescribed, and it is reasonable to give some of its characters: the coloration and general appearance as in male of *S. typica* (but



Figs VIII (1-5). *Sonotrella*, female. 1, 2, *S. mekongica* Gor.; 3, *S. inflata* sp. n.; 4, *S. bispinosa* (Chop.); 5, *S. willemsei* (Chop.). Apex of ovipositor from side (1); genital plate from below (2-5).

head, pronotum and legs slightly darker, and lateral ocelli distinctly smaller), venation of tegmina with 18 branches in dorsal part, ovipositor 1.1 times as long as hind femur, and genital plate as in Fig. VIII: 5.

***Sonotrella (Megatrella) tenebra* (Ingrisch, 1997)**

(Figs II: 11-13; VI: 1-6)

Calypotrypus tenebrus Ingrisch, 1997: 50, 52.

Material. South Malacca: 1 ♂, 1 ♀, Malaysia, env. of Jerantut, secondary forest, 11-12.VII.1996, A. Gorochov (ZIAS); 1 ♂, 2 ♀, Pahang, Kuala Tahan near Tembeling River, env. of National Park Taman Negara, primary forest, 12-16.VII.1996, A. Gorochov (ZIAS); 1 ♂, "Malaya, Kuala Tahan" [identified by Chopard as *Madasumma willemsei* Chop.] (BMNH); 1 ♂, "Perak, Hulu, Belum Expedition, B. Camp, 5°30'07"N, 101°26'21"E, 1-3.IV.1994" (ZIAS).

Description of female (nov.). Almost identical to *S. willemsei*, but size of lateral ocelli more or less intermediate between those of *S. willemsei* and *S. typica* (see Figs II: 7, 9), upper part of rostrum except apex slightly lighter (reddish), and venation of tegminal dorsal part with 15-16 branches.

Note. This species, well described from a single male from Thaiandian part of South Malacca, is widely distributed also in the adjacent part of Malaysia. The male of *S. tenebra* differs from that

of *S. willemsei* in small details of the tegminal venation (for comparison see Figs II: 8, 10, 11). *S. tenebra* and *S. typica* are closely related to each other, as they have similar (but not identical) male anal plate and the male genitalia with sac-like and rather movable inner (distal) membranous lobes (Figs VI: 3, 4). The differences between these species consist also in the shorter hind lateral epiphallic processes and more angular upper lateral projections of the male anal plate in *S. tenebra* (Figs VI: 7-11).

***Sonotrella (Megatrella) remota* sp. n.**
(Figs II: 14; VII: 6-10)

Holotype. ♂, Kalimantan, "Sabah, Sandakan district, Rumidi estate, river Labuk, 50-150 ft, 14-31.IX.1973, C.J.M. Pruet", "heavy forest near plantations" [identified by Townsend as *Madasumma willemsei* Chop.] (BMNH).

Description. Male (holotype). Coloration uniformly reddish brown, rather dark, but with narrow reddish stripe along ocelli and less distinct transverse stripes on eyes. Lateral ocelli medium-sized, but somewhat larger than median ocellus (as in *S. tenebra*). Tegmina with tegminal dorsal part wider than in all species of *Megatrella* considered above (transverse stridulatory vein long, mirror not longitudinal, only three oblique veins connected with each other by transverse veinlets at proximal part, diagonal vein more transverse than in all previous species) (Fig. II: 14) and very

long apical area. Hind wings distinctly longer than tegmina, with strongly darkened distal part.

Shape of anal plate almost as in *Sonotrella* s. str., without additional lobules and projections (Fig. VII: 10). Genitalia with hooked apical part of hind lateral epiphallal processes and characteristic shape of inner (distal) and outer (proximal) membranous lobes (Figs VII: 6-9).

Female unknown.

Length (mm). Body 29; body with wings 43; pronotum 4; tegmina 32; hind femora 17.5.

Comparison. This species is clearly distinguished from all above-considered species of *Megatrella* by the wider dorsal part of the male tegmina with somewhat differently shaped stridulatory areas, simple shape of the male anal plate, and hook-shaped apical parts of hind lateral epiphallal processes.

***Sonotrella (Megatrella) optima* sp. n.**
(Figs II: 15; VII: 1-5)

Holotype. ♂, Kalimantan, "Sarawak, foot of Mt. Dulit, junction of rivers Tinjar & Lejok, 4.VIII.1932", "Oxford Univ. Exp. B.M. Hobby & A.W. Moore" [identified by Chopard as *Madasomma willemsei* Chop.] (BMNH).

Description. Male (holotype). Very similar to *S. remota*, but dorsal part of tegmina slightly narrower, widened part of anal plate with more rounded lateral sides (in *S. remota*, these sides almost angular; for comparison see Figs VII: 5, 10), genitalia with distinctly proximal position of lateral angular projection of hind lateral epiphallal processes (in *S. remota*, this projection situated in central part of these processes) and horseshoe-shaped distal semimembranous part of outer (proximal) membranous lobes (Figs VII: 1-4).

Female unknown.

Length (mm). Body 31; body with wings 45; pronotum 4.3; tegmina 34; hind femora 18.

Comparison. *S. optima* and *S. remota* are close relatives, which differ from all previous species in the widened tegminal stridulatory areas and hooked apical part of hind lateral epiphallal processes (probable synapomorphies), as well as in the plesiomorphic structure of the male anal plate. The distinctions between these two species are listed above.

Genus *Abaxitrella* gen. n.

Type species: *Abaxitrella hieroglyphica* sp. n.

Diagnosis. Body medium-sized, strongly depressed dorsoventrally. Coloration variegate (Fig. IX: 1). Head rather small, low (not high), with normal (for this tribe) size of eyes, large antennae (scape almost 2.5 times as wide as rostrum

between antennal cavities), and characteristic narrow, low, curved carina between eyes (this carina probably consists of fused ocelli; outlines of ocelli indistinct). Pronotum very low, strongly narrowed in front, indistinctly carinated along lateral edges of disc (i.e., along upper edge of lateral lobes). Male tegmina (Fig. IX: 2) with well developed stridulatory apparatus provided with almost straight and rather long transverse stridulatory vein, rather numerous arched and regularly spaced oblique veins, and more or less round mirror; tegminal *Sc*, *R*, *M*, and *CuA* not fused with each other; apical area of tegmina long; hind wings distinctly longer than tegmina. Male metanotal gland not large, rather simple, consisting of shallow concavity with fore and hind groups of hairs (Fig. IX: 3). Legs typical of this tribe (their main features similar to those of *Sonotrella*) (Figs IX: 4, 5).

Male anal plate with four longitudinal sclerotized stripes fused with each other in proximal part; these stripes with numerous very small denticles (Fig. IX: 6). Male genital plate simple: moderately elongated and with more or less rounded apex. Male genitalia with epiphallus provided with long hind lateral processes, prominent proximal lateral lobes, and angular proximal median projection; ectoparameres well developed, elongated, but distinctly shorter than epiphallus; endoparameral apodemes well developed, long and rather narrow; guiding rod almost membranous, rather long, with numerous distinct setae (or hairs) on lower side; mold of attachment plate of spermatophore fused with base of guiding rod (Figs IX: 7-9).

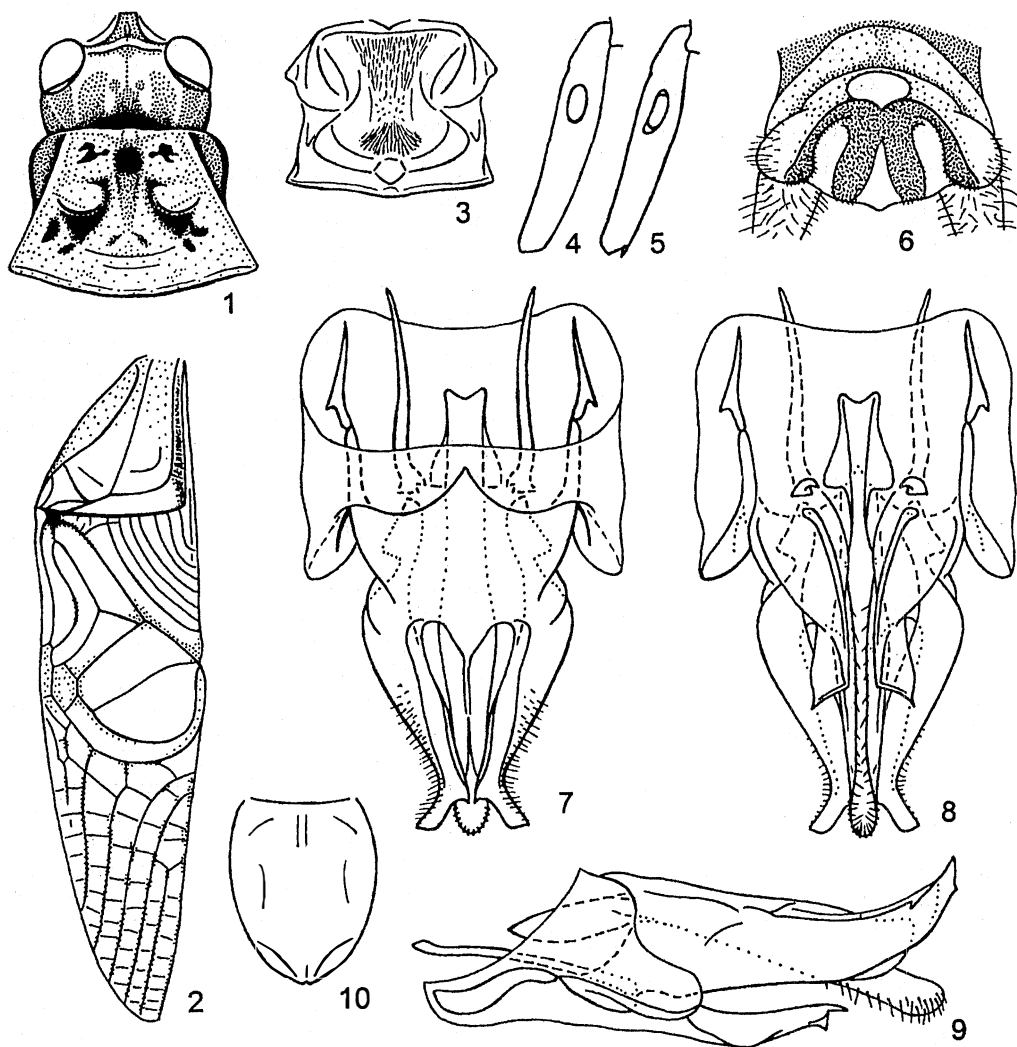
Included species. Type species only.

Comparison. *Abaxitrella* clearly differs from all other Podoscirtini in the characteristic shape of epiphallus, distinctive structure of guiding rod, and some other characters mentioned above.

***Abaxitrella hieroglyphica* sp. n.**
(Figs IX: 1-10)

Holotype. ♂, Vietnam, prov. Ha Tinh, vill. Huon Son near Rao An River, 18°21'N, 105°13'E, primary forest, IV.2000, N. Orlov (ZIAS).

Description. Male (holotype). Head light brownish with dark brown spot on hind part of vertex, yellowish transverse carina between eyes and stripes behind eyes, several hardly distinct darkish stripes and spots on upper part of head and under antennae. Antennae brownish with several dark spots on scape and sparse whitish areas (occupying from 1 to 7 segments) of flagellum. Pronotum very light brownish with yellowish stripes along lateral edges of disc, brown lines



Figs IX (1-10). *Abaxitrella hieroglyphica* sp. n., male. 1, head and pronotum from above; 2, dorsal part of tegmen; 3, metanotal gland from above; 4, 5, outer (4) and inner (5) sides of fore tibia; 6, anal plate from behind and slightly from above; 7-9, genitalia from above (7), from below (8), and from side (9); 10, genital plate from below.

along upper edge of lateral lobes (contacting with above-mentioned stripes throughout their extent), dark brown lines along lower edge of these lobes and hieroglyphic ornament on central part of disc (Fig. IX: 1). Tegmina (Fig. IX: 2) light brown with very light (almost yellowish) apical area, darker (almost brown) proximal part of basal area, and dark brown (almost blackish) sparse small spots and narrow stripes on basal, apical, and lateral areas, as well as on some stridulatory areas. Distal part of hind wings with slight brownish spots. Metanotal gland as in Fig. IX: 3.

Legs light brownish with following dark parts: line along upper side of all tibiae, apical part of hind femora, and sparse small spots on upper and outer sides of these femora. Abdomen light brown with following dark parts: lateral areas on 2nd-4th tergites, upper part of 5th-8th tergites, and denticulated parts of anal plate (with very light membranous areas between them) (Fig. IX: 6).

Genitalia and genital plate as in Figs IX: 7-10. Female unknown.

Length (mm). Body 18; body with wings 31; pronotum 3.3; tegmina 21; hind femora 14.5.

Genus **Furcitrella** gen. n.

Type species: *Furcitrella conformis* sp. n.

Diagnosis. Body small, moderately depressed dorsoventrally. Coloration light greenish (yellowish in old dry specimens), almost uniform. Head not very small and low, with comparatively large eyes and antennae (scape almost 2.5 times as wide as rostrum between antennal cavities); lateral ocelli rather large, much larger than median ocellus (all ocelli distinct). Pronotum moderately narrowed in front, not very low, indistinctly carinated along lateral edges of disc (these carinae more rounded and less distinct than in *Abaxitrella*). Male tegmina (Fig. X: 13) more or less similar to those of *Abaxitrella*, but with longer basal area and mirror; hind wings also similar to those of *Abaxitrella*. Male metanotal gland larger than in *Abaxitrella*, shallow, with less developed pubescence (Fig. X: 6). Legs differ from those of above-considered genera mainly in strongly inflated fore tibiae provided with rather large rounded outer and large almost slit-like inner tympana (Figs X: 4, 5).

Male anal plate with a pair of very long thin processes somewhat dilatated at apex and with characteristic denticles (small hooks) on inner surface of these processes (Figs X: 7, 14, 15). Male genital plate more or less similar to that of *Abaxitrella*. Male genitalia superficially similar to those of *Abaxitrella*, but proximal part of epiphallus with distinct median notch and not prominent lateral lobes, guiding rod without distinct setae or hairs on lower side, mold of spermatophore attachment plate indistinct, and rami much stronger and fused with each other by their apices (Figs X: 1-3, 10-12). Ovipositor normal: not shortened, with drilling apical part (Fig. X: 9).

Included species. Type species, *Calyptotrypus furcifer* Chopard, 1930, and *F. sabahensis* sp. n.

Comparison. *Furcitrella* differs from all other Podoscirtinae in the characteristic shape of the male anal plate, details of the male genitalia, and some other characters.

Furcitrella conformis sp. n.

(Figs XII: 1-9)

Holotype. ♂, **Kalimantan**, "Sarawak, National Park Gunung Mulu, R. G. S. Exped. 1977-8, J.D. Holloway et al.", "Site 16. March, Long Pala (Base), 70 m. 324450, Alluv./second. for. MV-on batu-Canopy" (BMNH).

Paratypes. 1 ♂, 1 ♀, same data as in holotype (ZIAS, BMNH).

Description. **Male** (holotype). Uniformly yellowish (possibly greenish in living specimens). Venation of tegmina very similar to that in Fig.

X: 13, but apical area slightly shorter. Metanotal gland as in Fig. X: 6.

Anal plate with characteristically hooked apical part of paired processes, as in Fig. X: 7; genital plate simple, gradually narrowing to rounded apex. Genitalia with short ectoparameres (almost half as long as lateral epiphallic processes) and hardly curved distal parts (Figs X: 1-3).

Variation. Paratype with a pair of whitish narrow longitudinal stripes from eyes to middle part of tegmina (along lateral edges of pronotal disc and tegminal dorsal part).

Female. Similar to holotype in general appearance, but anal plate simple. Dorsal part of tegmina with 15 branches of longitudinal veins.

Ovipositor clearly shorter than hind femora; its apex and genital plate as in Figs X: 8, 9.

Length (mm). Body: ♂ 12.5-14.5, ♀ 13.5; body with wings: ♂ 20-22.5, ♀ 22; pronotum: ♂ 1.9-2.1, ♀ 2.3; tegmina: ♂ 13.5-15, ♀ 16; hind femora: ♂ 7.5-9, ♀ 8; ovipositor 6.5.

Furcitrella sabahensis sp. n.

(Figs X: 10-15)

Holotype. ♂, **Kalimantan**, "Borneo-Sabah, Benjaran Maitland Sepulut, 22-24.05.1995, leg. J. Stolarczyk" (ISEA).

Description. **Male** (holotype). Coloration yellowish green with whitish stripes similar to those of male paratype of *F. conformis*, but head with reddish narrow border around hind half of ocelli. Tegmina and metanotal gland similar to those of *F. conformis*, but tegminal apical area slightly longer (Fig. X: 13).

Anal plate with practically not hooked apical parts of paired processes (Fig. X: 14); genital plate hardly narrowing to almost truncated apex. Genitalia with long ectoparameres (almost 0.7 times as long as lateral epiphallic processes) and strongly curved distal part (Figs X: 10-12).

Female unknown.

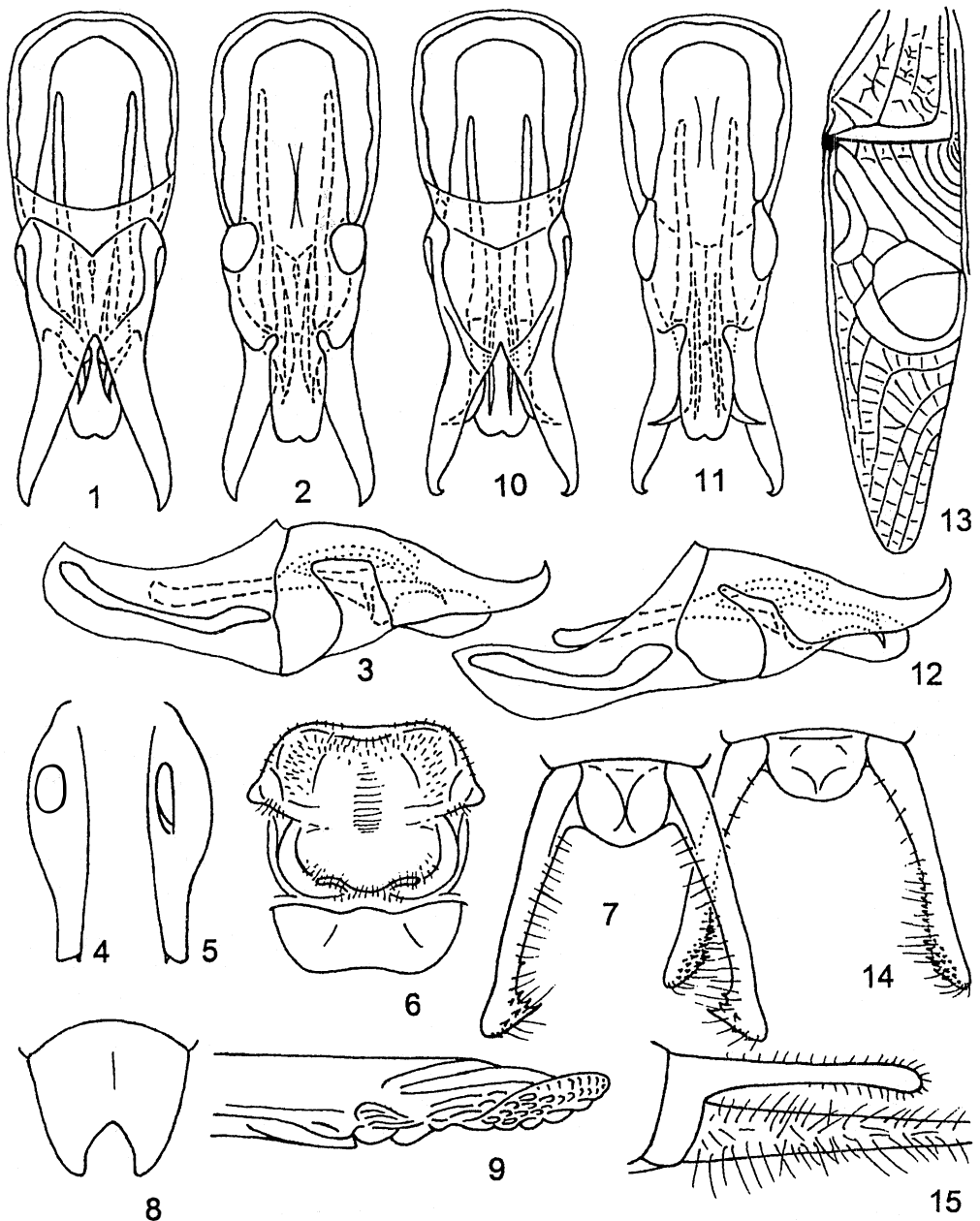
Length (mm). Body 15; body with wings 23.5; pronotum 2.2; tegmina 16 (hind legs missing).

Furcitrella furcifer (Chopard, 1930)

Calyptotrypus furcifer Chopard, 1930: 35-36.

Material. **Kalimantan:** 1 ♂ (syntype), "Sarawak, Mt. Penrissen", "Cotype" [identified by Chopard as *Madasumma furcifer* (Chop.)] (MNHN); 1 ♂, 1 ♀, "Sarawak, foot of Mt. Dulit, junction of rivers Tinjar & Lejok, 26.IX.1932", "Oxford Univ. Exp. B.M. Hobby & A.M. Moore" [identified by Chopard as *Calyptotrypus furcifer* Chop.] (BMNH).

Note. This species is similar to both previous species, but the male tegmina and anal plate are



Figs X (1-15). *Furcitrella*. 1-9, *F. conformis* sp. n. (1-5, holotype); 10-15, *F. sabahensis* sp. n. Male genitalia from above (1, 10), from below (2, 11), and from side (3, 12); outer (4) and inner (5) sides of fore tibia; male metanotal gland from above (6); male anal plate from above (7, 14); female genital plate from below (8); apex of ovipositor from side (9); dorsal part of male tegmen (13); male abdominal apex without genital plate from side (15).

very similar to those of *F. conformis*, the head coloration and the male genitalia are more similar to those of *F. sabahensis* (but the ectoparameres are slightly shorter, almost intermediate

between those of two previous species), and the male genital plate gradually narrowed to almost angular apex. The female of *F. furcifera* is almost not distinguished from that of *F. conformis*.

Genus *Truljalia* Gorochov, 1985

Type species: *Calyptotrypus citri* Bey-Bienko, 1956.

Note. This genus is strikingly distinguished from all other genera of Podoscirtini by the very characteristic male genitalia: the epiphallus small, with a pair of not large upper (proximal) lobes and a pair of large lower (distal) hooks, the guiding rod very large, but vertically lamellar, immovable with respect to the epiphallus, the ectoparameres long or very long and movable, the endoparameral apodemes well developed and connected with the ectoparameral bases; the rami short (Figs XI; XII; XIII: 1, 2; XIV: 1-11). The females of this genus are more difficult for distinguishing from those of some other genera with the greenish coloration. Their genital plate is somewhat varied (Figs XV: 3, 8, 14, 17), the copulatory apparatus consists of a special papilla and paired sclerotizations for the male ectoparameres (Fig. XV: 11), and the apex of ovipositor as in Fig. XV: 25.

Composition. *Truljalia* is divided into two groups. The first group is characterized by the rather deeply bifurcated male anal plate with the rounded bristly inner (lower) additional lobules (Figs XV: 6, 9, 10, 12, 13, 15, 16, 18) and by the truncated or almost truncated male genital plate (Fig. XV: 7). It includes 10 species: type species, *Calyptotrypus hofmanni* Saussure, 1878, *C. forceps* Saussure, 1878, *Madasumma hibinonis* Matsumura, 1919, *T. meloda* Gorochov, 1992, *T. bispinosa* Wang & Woo, 1992, *T. tylacantha* Wang & Woo, 1992 (= *T. sigmaparamera* Hsia & Liu, 1992), *T. prolongata* Wang & Woo, 1992, *T. versicolor* Ingrisch, 1997, and *T. viminea* sp. n.

The second group is characterized by the rather simple male anal plate (not bifurcated or almost not bifurcated and without additional lobules; Figs XV: 1, 2, 4) and the distinctly bifurcated male genital plate (Fig. XV: 5). It includes only two species: *C. parvispinosus* Chopard, 1930 and *C. ornatus* Chopard, 1969.

SPECIES GROUP I

Truljalia hofmanni (Saussure, 1878)
(Figs XIV: 9; XV: 6-8; XVII: 4)

Calyptotrypus hofmanni Saussure, 1878: 569-571.

Material. Java: 1 ♂ (lectotype, designated here), "C. Hofmanni Sauss. n. 44. Sauss. nov. sp. Java, Scholl 64", "Typus" (SMNS); 1 ♂, 1 ♀, "Tengger-Geb. Ostjava, Fruhstorfer S." (ZIAS); 1 ♂, 1 ♀, "Java occident. Sukabumi, 2000, 1893, H. Fruhstorfer" (MNHU); 2 ♂, "Java, Hagenbach" [identified as *Calyptotrypus fastigata* N.]

(MNHU); 1 ♀, "Java, Fruhstorfer" (MNHU).

Note. This species is known in fact only from Java. The records of this species from Upper Burma (Chopard, 1969) and South China (Wang & Woo, 1992) possibly apply to *T. versicolor* or *T. viminea* sp. n. described from Thailand and Vietnam, respectively, and possibly also to some other similar species. The record of *T. hofmanni* from Arunachal Pradesh in India (Bhowmik, 1977: Fig. 3D) probably applies to *T. bispinosa* described from China.

T. hofmanni is similar to three above-mentioned species in the shape of epiphallus (with characteristic upper lobes and a pair of lateral denticles on lower hooks), ectoparameres (with thick proximal half and thin curved distal half), and guiding rod (without projection at upper edge) (Figs XI: 5, 6; XIV: 8, 9), but it differs from *T. bispinosa* and *T. versicolor* in the absence of any processes or hooks on the lower surface of ectoparameres (distinctions from *T. viminea* sp. n. are given below).

Truljalia viminea sp. n.
(Figs XI: 5, 6; XIV: 8; XV: 15; XVI: 1)

Holotype. ♂, Vietnam, prov. Vinh Phu, Tamdao, 800-900 m, forest, 17-31.V.1995, A. Gorochov (ZIAS).

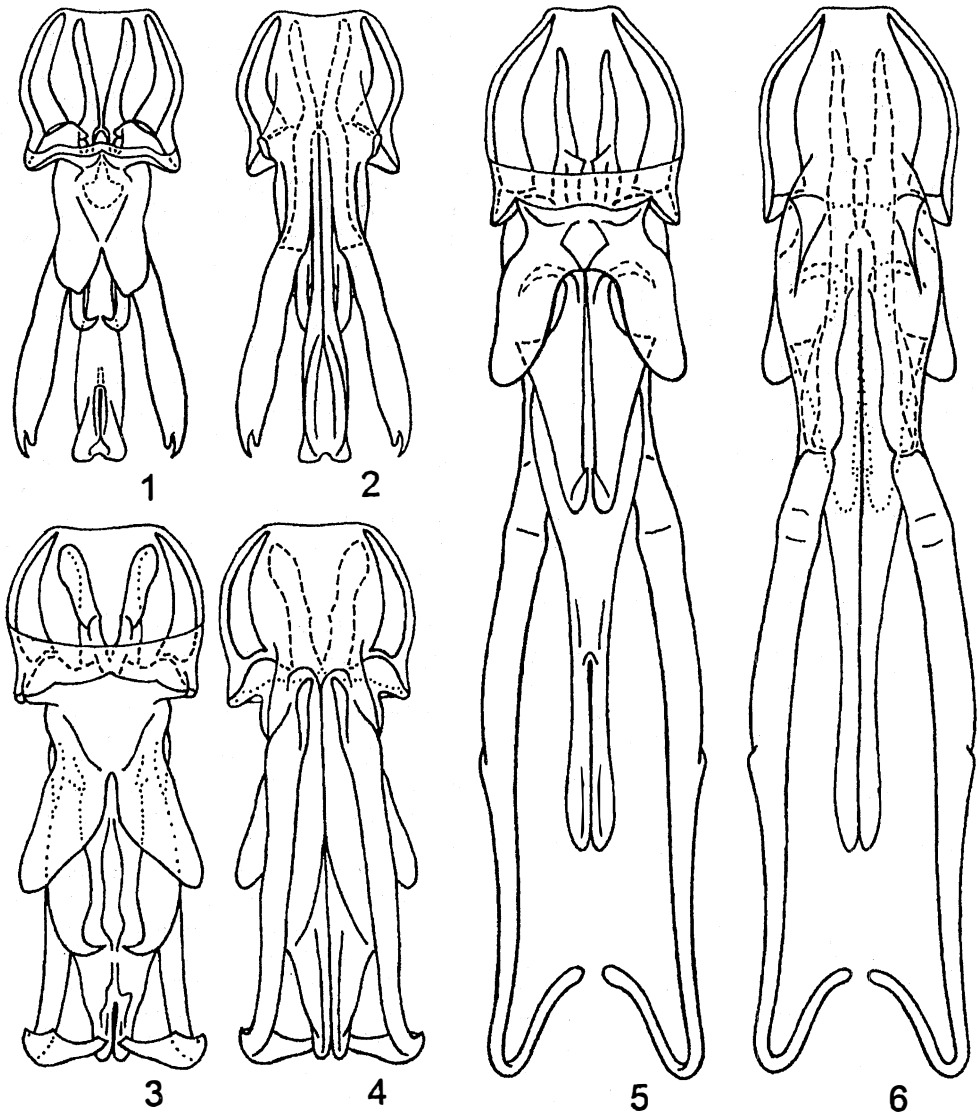
Description. Male (holotype). Rather large. Greenish with dark brown spots on hind part of vertex, behind eyes, on pronotal lateral lobes (one in fore upper corner and other one in hind upper corner), slight darkish spots on antennae, some dark veins and veinlets in dorsal part of tegmina (parts of main veins in stridulatory apparatus, veins and veinlets in basal and apical areas), greyish membranes in this dorsal part, light (almost yellowish) stripe along upper edge of lateral part of tegmina, brown transverse spot along fore edge of abdominal tergites, and brownish anal plate. Shape of head and pronotum typical of this genus. Tegmina long, with rather narrow dorsal part; their venation as in Fig. XVI: 1. Hind wings distinctly longer than tegmina.

Anal plate as in Fig. XV: 15. Genitalia very long, with lateral denticles in proximal position on lower hooks of epiphallus; ectoparameres without processes or hooks on lower surface and with very long curved distal part lacking apical inflation (Figs XI: 5, 6; XIV: 8).

Female unknown.

Length (mm). Body 21; body with wings 33; pronotum 3.6; tegmina 25; hind femora 12.

Comparison. *T. viminea* differs from *T. bispinosa* and *T. versicolor* in the absence of any processes or hooks on lower surface of the ecto-



Figs XI (1-6). *Truljalia*, male. 1, 2, *T. forceps* (Sauss.); 3, 4, *T. parvispinosa* (Chop.); 5, 6, *T. viminea* sp. n. Genitalia from above (1, 3, 5) and from below (2, 4, 6).

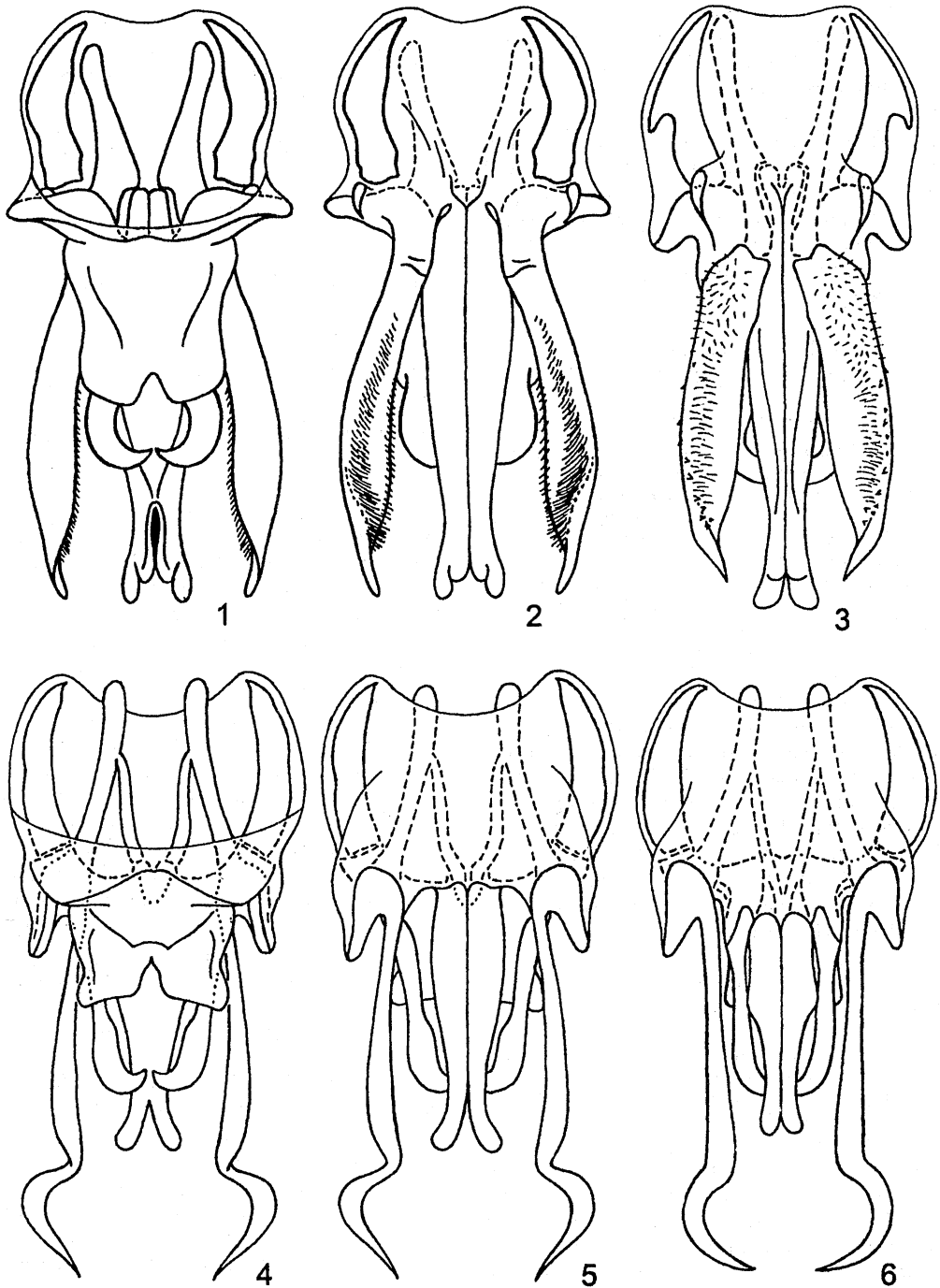
parameres and the proximal position of lateral denticles on lower hooks of the epiphallus (*T. bispinosa* is characterized by two ectoparameral hooks and middle position of epiphallic denticles, whereas *T. versicolor*, by one ectoparameral process and more or less distal position of epiphallic denticles). *T. viminea* differs from *T. hofmanni* in the longer and slenderer ectoparameres lacking apical inflation, as well as in the proximal position of lateral epiphallic denticles (in *T. hofmanni*,

they are in the middle position), higher distal part of the guiding rod (see Figs XIV: 8, 9), and distinctly longer apical area of the male tegmina.

Truljalia forceps (Saussure, 1878)
(Figs XI: 1, 2; XIV: 2; XV: 9)

Calypotrypys forceps Saussure, 1878: 571-572.

Material. China: 1 ♂, "prov. Kuangtung [Guangdong], Tsha Him Sau near Canton, V-VI.1912, R. Mell S. V., N



Figs XII (1-6). *Trujalia*, male. 1, 2, *T. hibionis hibionis* (Mats.); 3, *T. hibionis amota* subsp. n. (holotype); 4, 5, *T. ornata ornata* (Chop.) (holotype); 6, *T. ornata adunca* subsp. n. Genitalia from above (1, 4) and from below (2, 3, 5, 6).

478", in alcohol (MNHU); 1 ♂, South China (?), "Walker coll. Nimrod Sd. 92-196", "8739" (BMNH).

Note. This species described from South China is similar to another species from South China, *T. citri*, in the distinctly bifurcated apical part of ectoparameres of the male genitalia (Figs XI: 1, 2; XIII: 1, 2; XIV: 1, 2), but it is distinguished by the different shape of this ectoparameral part, smaller upper projection of the guiding rod, and characteristic male anal plate modified in a pair of strong hooks with small upper denticle near their apices (Fig. XV: 9) (the structure of this plate clearly distinguishes *T. forceps* from all other congeners).

***Truljalia meloda* Gorochov, 1992**
(Figs XIV: 3, 4; XV: 16, 17; XVII: 2, 3)

Truljalia meloda Gorochov, 1992: 12-14.

Material. Vietnam: 3 ♂ (including holotype), 1 ♀, *prov. Hoa Binh*, distr. Dabak, Tu Ly, 200 m, 16-23.X.1990 (1 ♂: paratype reared I.1991), A. Gorochov (ZIAS); 1 ♂, *prov. Ha Tay*, Nature Reserve Ba Vi, 400 m, 21-24.XI.1990, A. Gorochov (ZIAS); *prov. Gia Lai*, 40 km N of Kannack, Tram Lap, 12-14.XI.1993, A. Gorochov (ZIAS); 3 ♂, same data, but 11-14.IV.1995 (ZIAS); 3 ♀, *prov. Gia Lai*, 20 km N of Kannack, Buon Luoi, 22.III-30.IV.1995, A. Gorochov (ZIAS). *Cambodia:* 1 ♂, "Cambodja, Indo-China, S. Vitalis" (BMNH).

Note. This species is rather widely distributed in Indo-China (from environs of Hanoi to central parts of Vietnam and Cambodia). It is very similar to *T. prolongata* known from China in the structure of the male genitalia, but there are some distinctions: in *T. meloda*, the guiding rod is shorter, about 1.5 times as long as epiphallus (in *T. prolongata*, this rod almost twice as long as epiphallus), the proximal part of ectoparameres is narrower, the male anal plate has much longer lateral lobes (for comparison see Figs XV: 16, 18).

***Truljalia hibinonis amota* subsp. n.**
(Figs XII: 3; XIV: 7; XV: 13, 14)

Holotype. ♂, *Vietnam, prov. Vinh Phu*, Tamdao, 9.XI.1990, A. Gorochov (ZIAS).

Paratypes. 1 ♂, 1 ♀, same data as in holotype, but 10-12.X.1994, I. Darevsky (ZIAS).

Description. Male (holotype). Very similar to *T. hibinonis hibinonis* known from Japan and Palaeartic part of China, but distinguished by slightly narrower apex of lateral lobes of anal plate (Figs XV: 12, 13) and small details of genitalia: lower hooks of epiphallus narrower in proximal half, ectoparameres clearly thicker and somewhat shorter, with more distinct denticles on their lower surface, apex of guiding rod widely rounded (almost angular in nominotypical subspecies) (see Figs XII: 1-3; XIV: 6, 7).

Female practically indistinguishable from that of *T. hibinonis hibinonis*, in particular in the shape of genital plate (Fig. XV: 14) and length of ovipositor.

Length (mm). Body: ♂ 18-20, ♀ 18; body with wings: ♂ 27-29, ♀ 33; pronotum: ♂ 3.3-3.7, ♀ 4; tegmina: ♂ 22-23, ♀ 25; hind femora: ♂ 10.3-10.7, ♀ 10.8; ovipositor 11.

SPECIES GROUP II

***Truljalia ornata ornata* (Chopard, 1969)**
(Figs XII: 4, 5; XIV: 10; XV: 1; XVI: 2; XVII: 1)

Calypotrypus ornatus Chopard, 1969: 340-341.

Material. Malacca: 1 ♂ (holotype), "Malaya, Kalumhang, 19.4.1939, N.C.E. Miller, at light", "Type" (BMNH); 1 ♀, "Perak, Hulu, Belum Exped., 5°30'07"N, 101°26'21"E, 250 m, VIII-XII.1993, leg. Rothamsted light trap" (ZIAS).

Description of female (nov.). Shape of body typical of this genus, but pronotal disc with well developed angular hind projection and distinct granular ridges along lateral edges. Coloration very characteristic, greenish yellow, with brown: proximal part of antennae, antennal cavities, base of fore and middle tarsi, and upper side of hind tibiae; with blackish: spots behind eyes (the latter ones divided into wide upper and narrow lower parts by longitudinal light line), granular ridges along lateral edges of pronotal disc, small median spot near fore edge of this disc, larger median spot near its hind edge (Fig. XVII: 1), and hind tibial spines; with very light (whitish) stripe along lateral edge of dorsal tegminal part; and finally, with light brownish antennal apical parts, fore and middle legs, and distal halves of hind legs (from apices of their femora). Tegmina long, but hind wings distinctly longer.

Genital plate very similar to that in Fig. XV: 3.

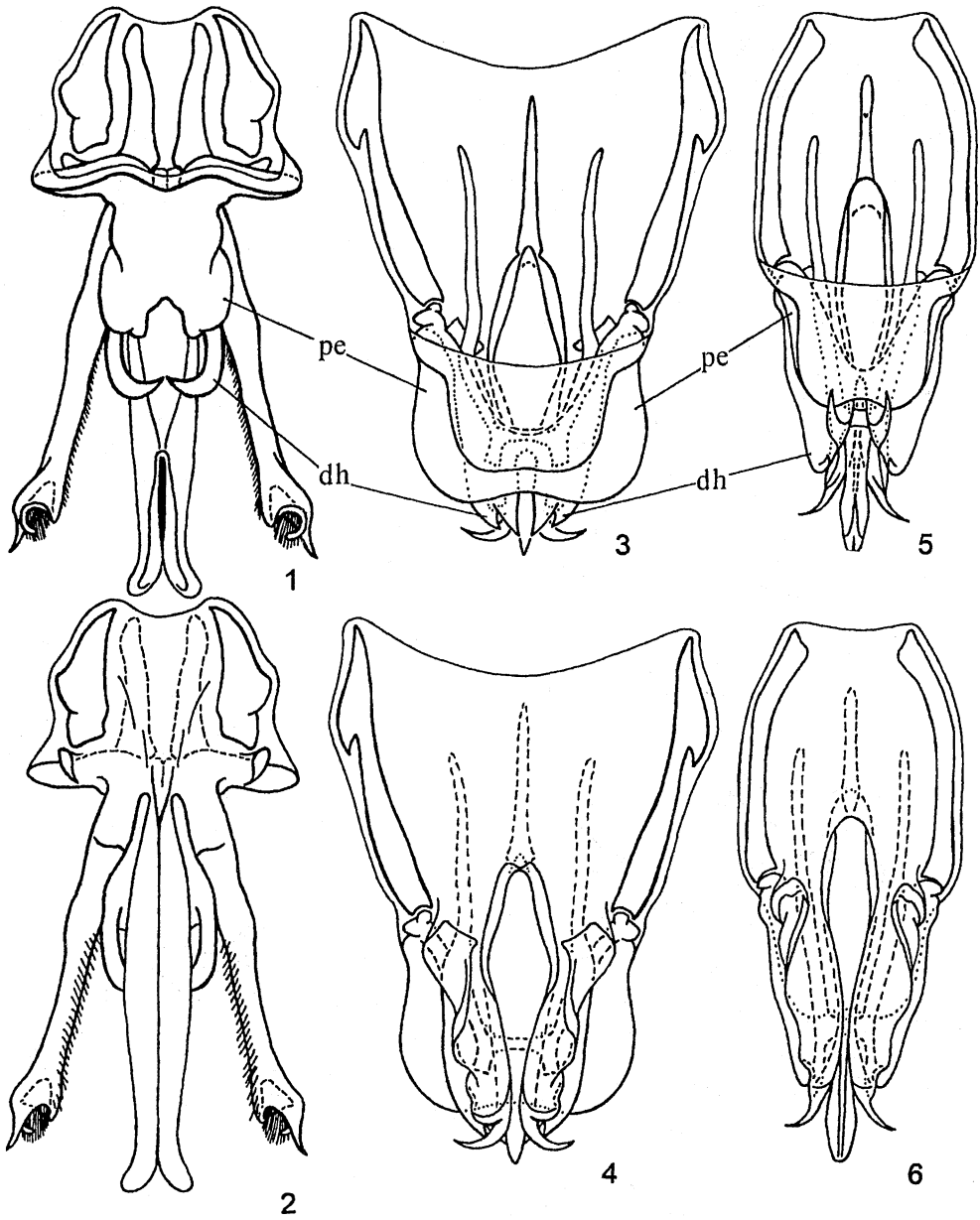
Length (mm). Body 16.5; body with wings 32; pronotum 3.7; tegmina 24; hind femora 10; ovipositor 10.5.

Note. The male of this species is similar to the female in the coloration and body structure, but the dorsal part of its tegmina with transparent stridulatory areas, several large brownish spots, and some of veins dark (Fig. XVI: 2).

The male anal plate and genitalia are very characteristic (Figs XII: 4, 5; XIV: 10; XV: 1) and readily distinguish *T. ornata* from all other congeners.

***Truljalia ornata adunca* subsp. n.**
(Figs XII: 6; XIV: 11; XV: 2, 3)

Holotype. ♂, *Kalimantan*, "North Borneo, Watterstradt" (ZIAS).



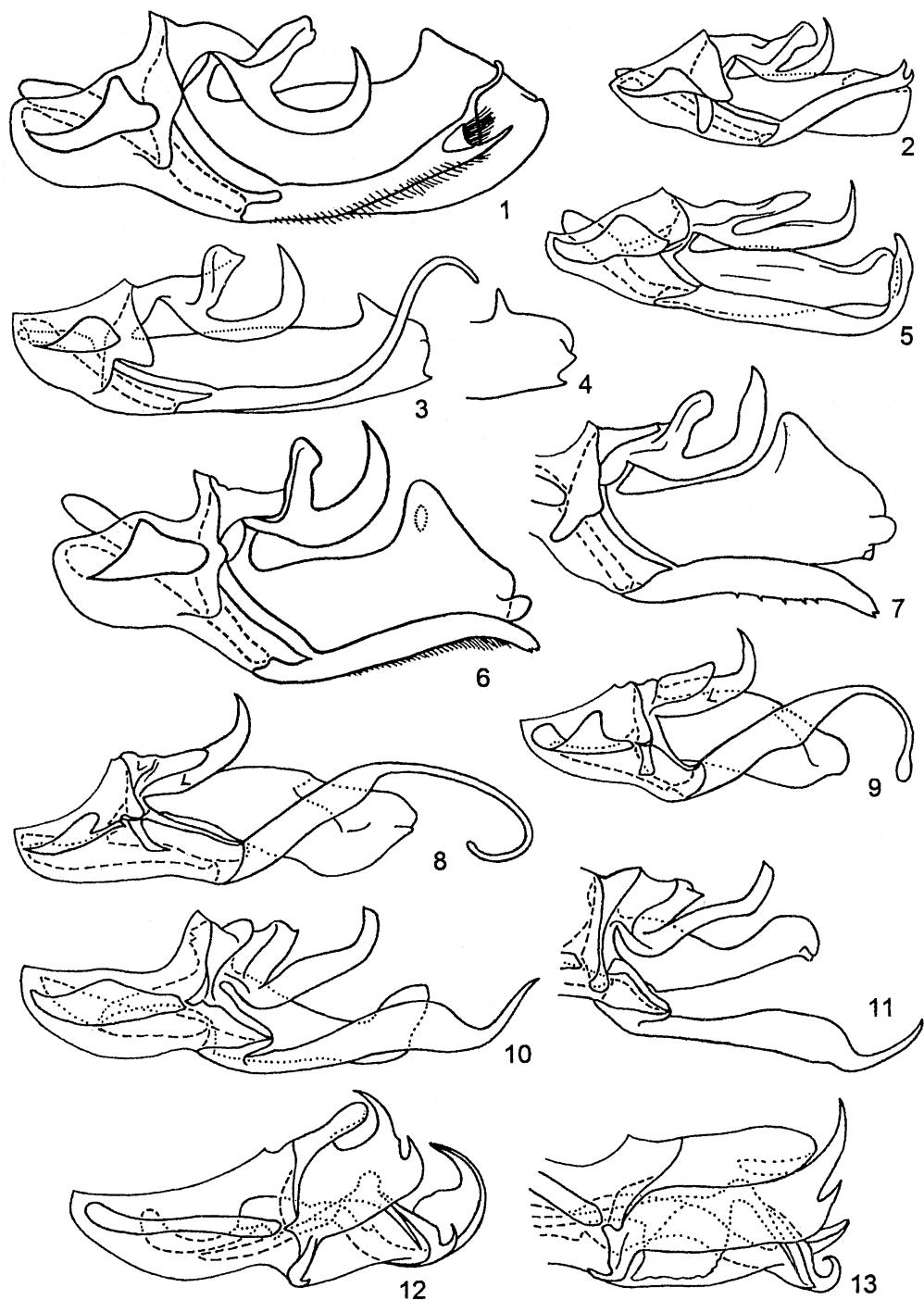
Figs XIII (1-6). *Truljalia* and *Madasumma*, male. 1, 2, *T. citri* (B.-Bien.) (holotype); 3, 4, *M. plana* Walk.; 5, 6, *M. ventralis* Walk. Genitalia from above (1, 3, 5) and from below (2, 4, 6).

Abbreviations: *pe*, proximal (upper) lobe of epiphallus; *dh*, distal (lower) hooks of epiphallus.

Paratype. 1 ♀, same data as in holotype (ZIAS).

Description. Male (holotype). Very similar to nominotypical subspecies, but dorsal part of tegmina with larger brownish spots occupying almost entire basal area and region of chords, anal

plate as in Fig. XV: 2, and male genitalia with narrower proximal part of lower epiphallic hooks, somewhat shorter guiding rod, differently shaped apex of this rod (in profile), and distinctly arched apical parts of ectoparameres (Figs XII: 6; XIV: 11).



Figs XIV (1-13). *Truljalia* and *Madasumma*, male. 1, *T. citri* (B.-Bien.) (holotype); 2, *T. forceps* (Sauss.); 3, 4, *T. meloda* Gor. (3, holotype); 5, *T. parvispinosa* (Chop.); 6, *T. hibernonis hibernonis* (Mats.); 7, *T. h. amota* subsp. n. (holotype); 8, *T. viminea* sp. n.; 9, *T. hofmanni* (Sauss.) (lectotype); 10, *T. ornata ornata* (Chop.); 11, *T. o. adunca* subsp. n.; 12, *M. ventralis* Walk.; 13, *M. plana* Walk. (lectotype). Genitalia from side (1-3, 5, 6, 8-10, 12); apical part of guiding rod from side (4); genitalia without proximal part from side (7, 11, 13).

Female (Fig. XV: 3) practically indistinguishable from that of *T. ornata ornata*, but legs somewhat lighter.

Length (mm). Body: ♂ 14.5, ♀ 16; body with wings: ♂ 26, ♀ 30; pronotum: ♂ 3, ♀ 3.6; tegmina: ♂ 20, ♀ 24; hind femora: ♂ 9, ♀ 10; ovipositor 11.

***Truljalia parvispinosa* (Chopard, 1930)**
(Figs XI: 3, 4; XIV: 5; XV: 4, 5)

Calypotrypus parvispinosus Chopard, 1930: 34-35.

Material. **Kalimantan:** 1 ♀ (syntype), "Sarawak, Mt. Murud", "Cotype" [identified by Chopard as *Madasumma parvispinosa* Chop.] (MNHN); 1 ♂, "Borneo" (MNHN); 1 ♂, "Sabah, Mt. Kinabalu, Mesilau" [identified by Tinning as *Madasumma parvispinosus* (Chop.) and by Chopard as *Calypotrypus parvispinosus* Chop.] (BMNH). **Malacca:** 1 ♂, "Malay Peninsula, Selangor" (MNHN).

Note. This widely distributed species is rather similar to *T. ornata* in the coloration and body structure, but with dark lower edge of lateral pronotal lobes, widely interrupted dark stripe along the lateral edges of pronotal disc, the male genital and anal plate as in Figs XV: 4, 5, and the characteristic male genitalia (Figs XI: 3, 4; XIV: 5).

Genus *Madasumma* Walker, 1869

Type species: *Madasumma ventralis* Walker, 1869.

Note. Many previous authors include in this genus numerous and very diverse Asian and Australian Podoscirtini with the developed stridulatory apparatus (Chopard, 1968; Otte, 1994). The generic revision of this "genus" was begun by me in 1988 (Gorochoy, 1988). At present, *Madasumma* includes only two (or three) similar Indo-Malayan species related to *Truljalia*. In connection with this opinion, a new diagnosis is necessary for this genus.

Diagnosis. Similar to *Truljalia* in characteristic structure of male genitalia: epiphallus divided into upper (proximal) plate and a pair of large lower (distal) hooks, guiding rod more or less vertically lamellar, ectoparameres, endoparameral apodemes, and rami well developed (for comparison see Figs XIII and XIV). However, *Madasumma* readily distinguished from *Truljalia* by greyish brown coloration, slightly shorter head, hardly arched hind edge of pronotal disc, rounded bend between disc and lateral lobes of pronotum, slightly slenderer fore tibiae, well developed male metanotal gland (for comparison see Figs XVII: 1-9), elongated and rather narrow lobe-like distal part of male genital plate (Figs

XV: 20, 21, 23, 24), and some details of male genitalia (Figs XIII: 3-6; XIV: 12, 13): upper (proximal) epiphallic plate without any distinct lobes, lower (distal) epiphallic hooks with additional smaller hooks, mold of spermatophore attachment plate well developed and with long apodeme, endoparameral apodemes and rami distinctly longer, guiding rod partly sclerotized, not very large, and quite movable with respect to epiphallus, and finally, ectoparameres not long, partly membranous, and less movable with respect to guiding rod (these features of guiding rod and ectoparameres are very important, as they correspond to the other functional type of the genitalia than in *Truljalia*). Ovipositor with normal for this tribe drilling apex (Chopard, 1969: Figs 240, 243).

Included species. Type species and *Platy-dactylus planus* Walker, 1869 (*M. darjilingensis* Chopard, 1928 is possibly a synonym of *M. plana*).

***Madasumma ventralis* Walker, 1869**
(Figs XIII: 5, 6; XIV: 12; XV: 19-21; XVI: 3; XVII: 5-9)

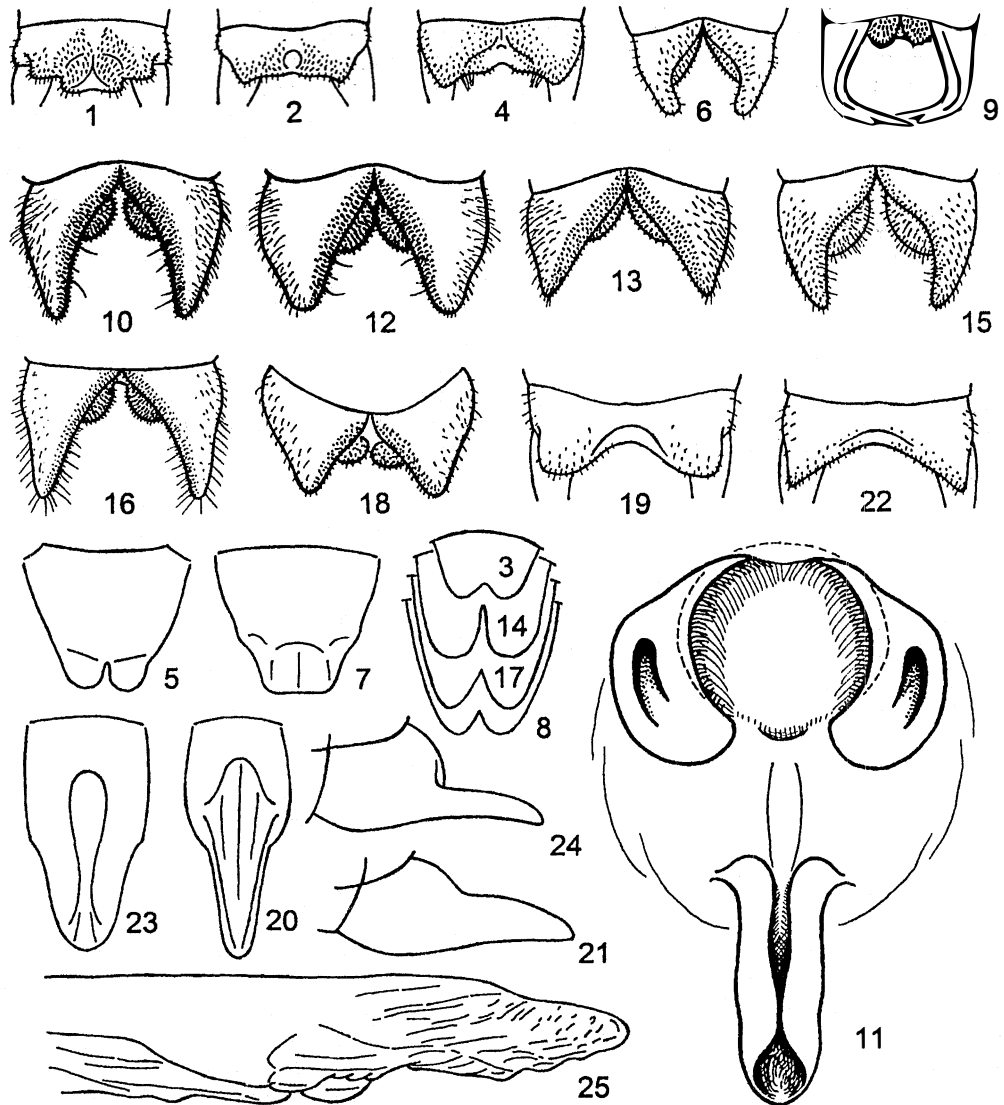
Madasumma ventralis Walker, 1869: 65.

Material. **North India:** 1 ♂ (holotype), "N. Ind. 55°76", "*Madasumma ventralis*. One of Walker's series so named. Type" (BMNH). **Tibet:** 1 ♂, "Tibet, S. Landor. 98-154" (BMNH).

Note. The genitalia of the holotype are missing. The male from Tibet is very similar to the holotype, but it has normal dividing vein of the tegminal mirror (anomalous structure of this vein in the holotype is evidently an individual aberration; Fig. XVI: 3). The genitalia of the second specimen are similar to those pictured by Chopard (1969: Fig. 242).

This species is characterized by the greyish brown coloration with some slightly lighter parts of the head, pronotum (Figs XVII: 5, 6), and tegmina (their lateral parts light brown with yellowish stripe along upper edge), by the structure of male metanotal gland, the venation of dorsal part of the male tegmina, and the shape of anal and genital plates of male (as in Figs XV: 19-21; XVI: 3; XVII: 9). If the above-mentioned males belong to the same species, it is characterized also by the comparatively small upper (proximal) epiphallic lobe, strongly curved lower (distal) epiphallic hooks, and rather long guiding rod strongly curved upwards (Figs XIII: 5, 6; XIV: 12).

Length of holotype (mm). Body 15.5; body with wings 22; pronotum 2.9; tegmina 15; hind femora 10.5.



Figs XV (1-25). *Truljalia* and *Madasumma*. 1, *T. ornata ornata* (Chop.) (holotype); 2, 3, *T. o. adunca* subsp. n.; 4, 5, *T. parvispinosa* (Chop.); 6-8, *T. hofmanni* (Sauss.) (6, 7, lectotype); 9, *T. forceps* (Sauss.); 10, 11, *T. citri* (B.-Bien.) (10, holotype); 12, *T. hibinonis hibinonis* (Mats.); 13, 14, *T. h. amota* subsp. n. (13, holotype); 15, *T. viminea* sp. n.; 16, 17, *T. meloda* Gor. (16, holotype); 18, *T. prolongata* Wang & Woo (from Wang & Woo, 1992); 19-21, *M. ventralis* Walk. (19, holotype); 22-24, *M. plana* Walk.; 25, *T. versicolor* Ingr. (from Ingrisch, 1997). Male anal plate from above (1, 2, 4, 6, 9, 10, 12, 13, 15, 16, 18, 19, 22); male genital plate from below (5, 7, 20, 23) and from side (21, 24); female genital plate (3, 8, 14, 17) and female copulatory apparatus (11) from below; apical part of ovipositor from side (25).

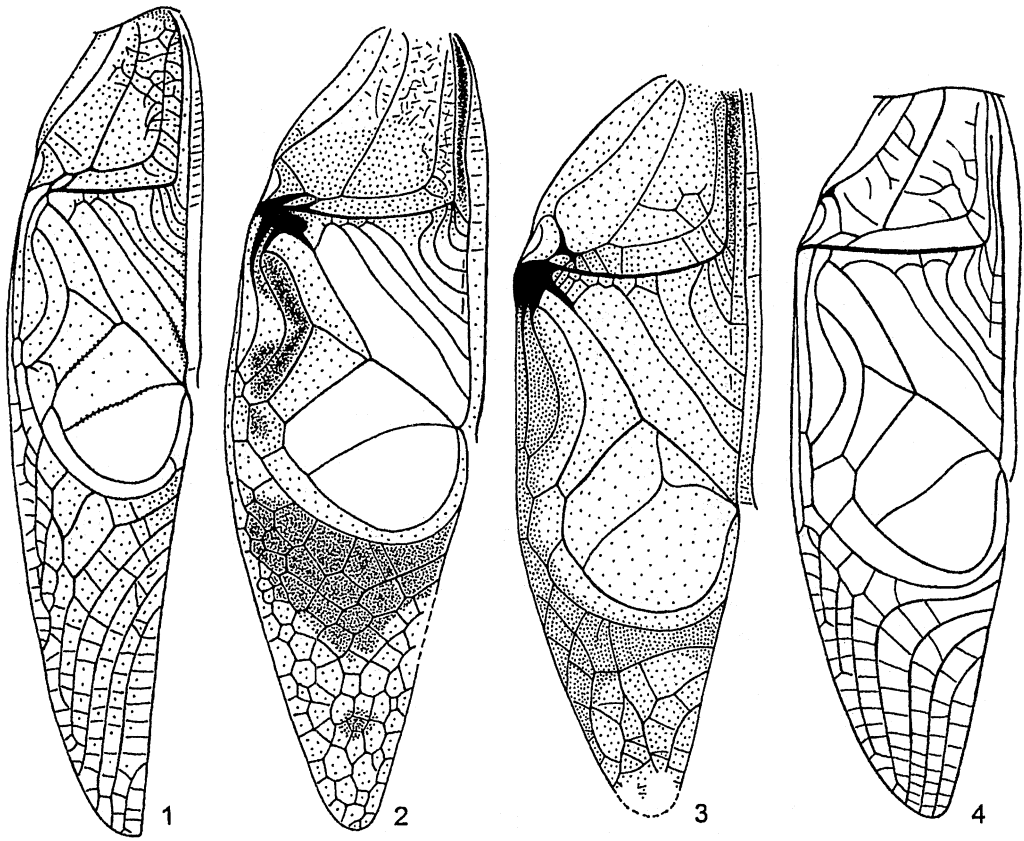
Madasumma plana (Walker, 1869)
(Figs XIII: 3, 4; XIV: 13; XV: 22-24; XVI: 4)

Platydictylus planus Walker, 1869: 81.

Material. **North India:** 1 ♂ (lectotype, designated here), "N. India 54°6'", "Syntype", "One of Walker's series named *planus*" (BMNH); 1 ♂, "Shillong, Sent. Oct.

18, Fletcher coll." [identified by Chopard as *Madasumma plana* Walk.] (BMNH); 1 ♂, "Shillong", "Fletcher", X. 1916 [identified by Chopard as *Madasumma darjilingensis* Chop.] (BMNH).

Note. The characters of the lectotype of *M. plana* are almost identical to those given in the first description of *M. darjilingensis* (Chopard, 1928), but there are slight distinctions in the



Figs XVI (1-4). *Trujalia* and *Madasumma*, male, dorsal part of tegmen. 1, *T. viminea* sp. n.; 2, *T. ornata ornata* (Chop.) (holotype); 3, *M. ventralis* Walk. (holotype); 4, *M. plana* Walk. (lectotype).

length of tegminal mirror. The above-mentioned males identified by Chopard as *M. plana* and *M. darjilingensis* differ from each other in the small fluctuations of mirror length; I consider that they belong to the same species. It is possible that these specific names are synonyms.

M. plana readily differs from *M. ventralis* in the less distinct lightish parts of head and pronotum, somewhat longer apical area of the male tegmina (Figs XVI: 3, 4), more angular lateral lobes of the male anal plate (Figs XV: 19, 22), and the following characters of the male genitalia: upper (proximal) epiphallic plate much larger, lower (distal) epiphallic hooks less curved, guiding rod much shorter and hardly curved upwards (Figs XIII: 3, 4; XIV: 13).

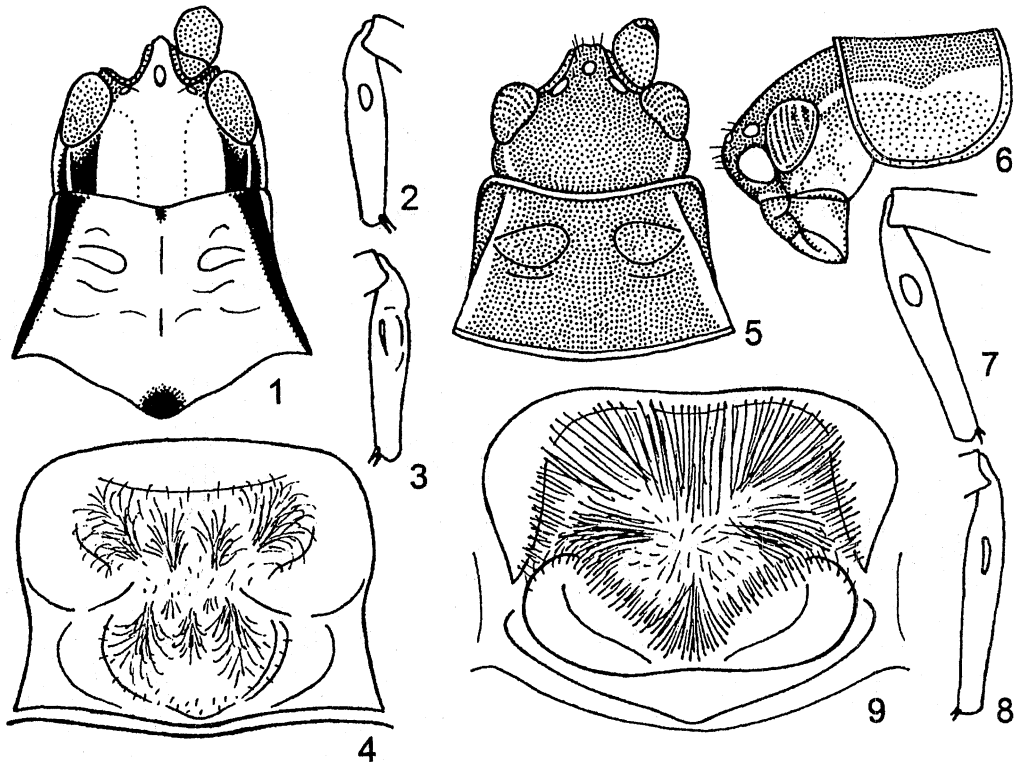
Genus *Valia* Gorochov, 1985

Type species: *Valia pulchra* Gorochov, 1985.

Note. This genus is similar to *Abaxitrella* (for

general appearance of *Valia* see Fig. XVIII: 1), but differs in the partly reduced ocelli (forming less distinct carinate curved structure similar to that of *Abaxitrella*), somewhat longer fore lobe of the male metanotal gland (Fig. XVIII: 2), more or less bifurcated male anal plate (Figs XVIII: 3, 5, 7), narrowed and almost acute apex of the male genital plate (Figs XIX: 5, 11), and the very characteristic male genitalia: the apex of epiphallus bears a pair of small upper acute hooks and a pair of larger lower hooks provided with an apical inflation and a distinct tuft of very long setae, the ectoparameres are more or less membranous, almost sac-like, and situated near the distal part of epiphallus, the guiding rod is rather small, almost membranous, without any distinct setae, the mold of spermatophore attachment plate is indistinct or almost indistinct (Figs XIX: 1-4, 6-10).

Species included. Type species, *Madasumma bimaculata* Chopard, 1928, and *V. sororia* sp. n.



Figs XVII (1-9). *Truljalia* and *Madasumma*. 1, *T. ornata ornata* (Chop.); 2, 3, *T. meloda* Gor.; 4, *T. hofmanni* (Sauss.) (lectotype); 5-9, *M. ventralis* Walk. (holotype). Head and pronotum from above (1, 5) and from side (6); outer (2, 7) and inner (3, 8) sides of fore tibia; male metanotal gland from above (4, 9).

***Valia pulchra* Gorochov, 1985**
(Figs XVIII: 1-4; XIX: 1-5)

Valia pulchra Gorochov, 1985b: 22-23.

Calypotrypys flavomarginatus Hsia & Liu, 1992, *syn. n.*

Material. Vietnam: 2 ♂ (holotype and paratype), *prov. Vinh Phu*, Tam Dao, 11-13.V.1975, L. Medvedev (ZIAS); 5 ♂, 1 ♀, same data, but 17.V-11.VI.1995, A. Gorochov, at light (ZIAS).

Note. This species is characterized by the very distinct coloration: upper part of head, proximal part of antennae, pronotum, most of dorsal and lateral parts of tegmina, tibiae of all legs, tibial spines and tarsi of hind legs are black with some yellow marks (the lines behind eyes, narrow stripes along fore and lateral edges of the pronotal disc, rather wide stripe along the proximal half of upper edge of tegminal lateral part, and several spots on the dorsal part of the male tegmina); the other parts of head and antennae, as well as all femora and the tarsi of fore and middle legs, are reddish brown, but the distal segments of

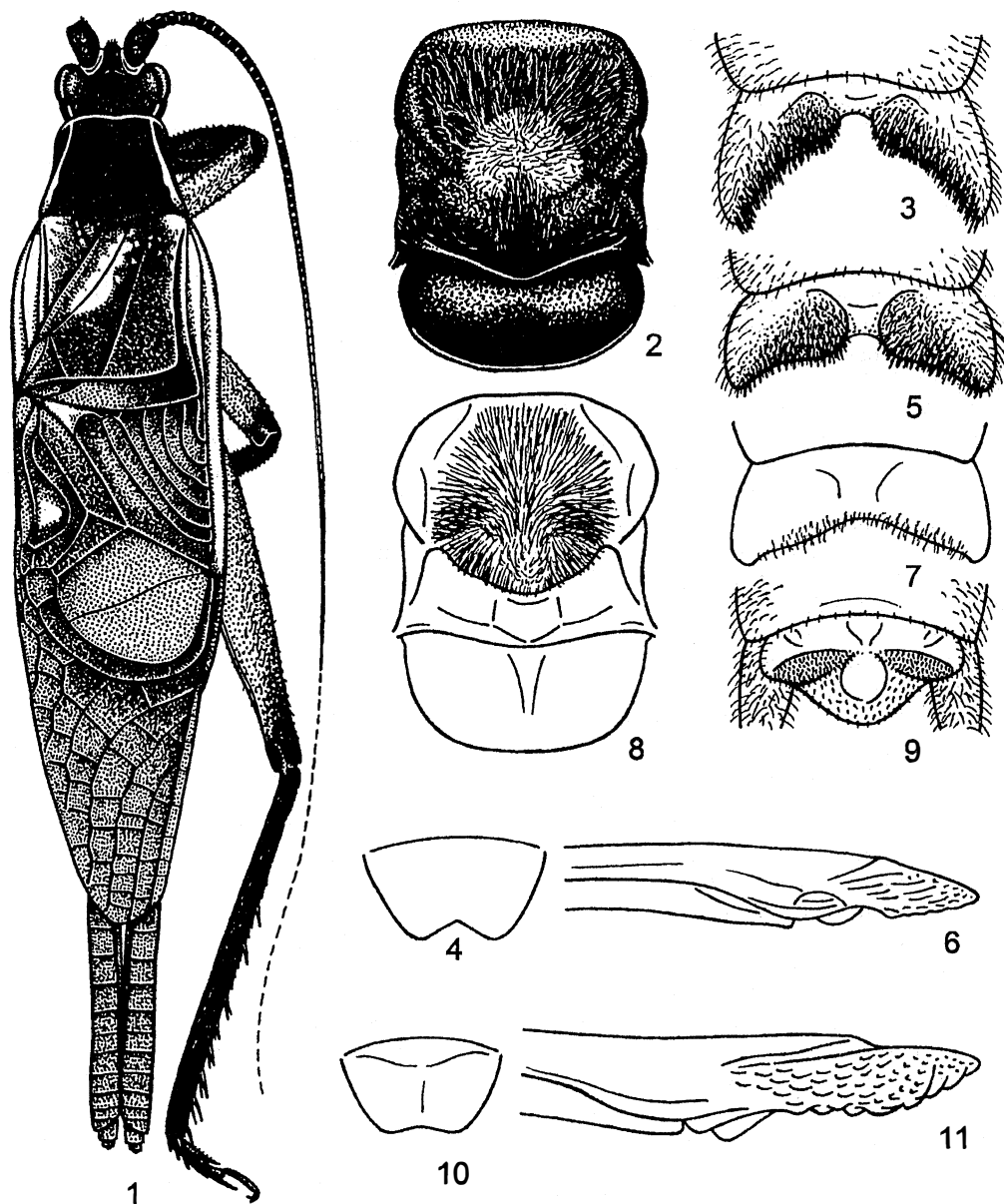
palpi are darkish and the apical part of hind femora is blackish; the hind wings are also blackish (Fig. XVIII: 1); the pterothorax and abdomen dark brown or blackish above; lower part of the body and the cerci are light brown. The other important characters of male are presented in Figs XVIII: 2, 3; XIX: 1-5.

The female was described by Xia & Liu (1992) from South China (Guizhou) as a new species *C. flavomarginatus*. This description corresponds strictly to the characters of the female from Tam Dao (including coloration). The genital plate of the Vietnamese female is pictured in Fig. XVIII: 4; the apex of its ovipositor is practically identical to that in Fig. XVIII: 6.

***Valia sororia* sp. n.**
(Figs XVIII: 5, 6)

Holotype. ♂, Vietnam, *prov. Vinh Phu*, Tam Dao, 800-900 m, 17-31.V.1995, at light, A. Gorochov (ZIAS).

Paratypes. 8 ♂, 5 ♀, same data as in holotype, but 17.V-11.VI.1995, and 1 ♀, 900-1000 m, 9-18.XI.1990 (ZIAS).



Figs XVIII (1-11). *Valia* and *Phyllotrella*. 1-4, *V. pulchra* Gor. (1, from Gorochov, 1995; 2, from Gorochov, 1985); 5, 6, *V. sororia* sp. n. (5, holotype); 7, *V. bimaculata* (Chop.); 8-11, *Ph. planidorsalis* Gor. Body of male from above (1); male metanotal gland from above (2, 8); male anal plate from above and slightly from behind (3, 5, 7, 9); female genital plate from below (4, 10); distal part of ovipositor from side (6, 11).

Description. Male (holotype). Very similar to *V. pulchra*, but clearly differing in coloration: head reddish brown with dark brown hind part of vertex, apex of rostrum, and distal segments of palpi; pronotum with reddish brown median part of disc and yellowish brown lateral lobes pro-

vided with dark brown upper stripe (under the yellow stripe separating disc from lateral lobe) and blackish lower edge; dorsal part of tegmina brownish grey with yellow base of basal area (provided with blackish veins) and spots in regions of chords and stridulatory vein (more or

less as in Fig. XVIII: 1); lateral tegminal parts more or less light, brownish yellow with dark brown and brown veins; hind wings greyish, rather light; all femora, lower sides of distal parts of fore tibiae, lower halves of middle tibiae, and fore and middle tarsi reddish brown; hind tarsi and tibiae, tibial spines, remaining parts of fore and middle tibiae dark brown (almost blackish); pterothorax and abdomen dorsally brown with dark parts of anal plate (Fig. XVIII: 5). Small distinctions present in the shape of tegminal mirror (mirror slightly wider than in *V. pulchra*: its width and length in *V. pulchra* almost equal, but mirror of the new species slightly transverse) and anal plate (its lateral lobes distinctly shorter than in *V. pulchra*; for comparison see Figs XVIII: 3, 5). Other characters (including the genital ones) almost identical to those of *V. pulchra*.

Variation. Coloration sometimes slightly lighter or darker, but upper part of head always not black, lateral lobes of pronotum not dark brown and not black, lateral parts of tegmina also not black and not dark brown.

Female. Similar to male, but different in the following details of coloration: tegminal dorsal part brown or light brown with darker veins; tegminal lateral part with yellowish stripe along proximal half of upper edge (but this stripe distinctly narrower than in male); pronotum sometimes with only several darkish spots on disc and dark lower edge of lateral lobes; legs sometimes rather light, but with dark upper half of fore tibiae, dark spot on upper side of proximal part of middle tibiae, dark line along upper surface of hind tibiae, and dark hind tibial spines. Venation of tegmina (dorsal part with 10-11 longitudinal veins), ovipositor (Fig. XVIII: 6), and genital plate almost identical to those of *V. pulchra*.

Length (mm). Body: ♂ 17-20, ♀ 14-18; body with wings: ♂ 26-29, ♀ 25-27; pronotum: ♂ 2.8-3.1, ♀ 2.8-3.2; tegmina: ♂ 1.9-2.4, ♀ 1.9-2.3; hind femora: ♂ 10.5-11.6, ♀ 10-10.6; ovipositor 5-5.5.

Comparison. The distinctions from *V. pulchra* are given above. The new species differs from *V. bimaculata* in the coloration and structure of the male genitalia.

Valia bimaculata (Chopard, 1928)
(Figs XVIII: 7; XIX: 6-11)

Madasumma bimaculata Chopard, 1928: 32-33.

Material. **Bhoutan:** 1 ♂ (holotype), "Pedong, R. Oberthur 1897", "Type" (MNHN); 1 ♂, "Phoobsering, Lebong, 5000 ft H.M.L. IX.10", "Pusa Coll." (BMNH).

Note. The coloration of this species is light brownish with whitish transverse line on the cari-

nate structure formed by the ocelli, a pair of rather small but distinct dark spots on the pronotal disc, darkish line along the upper edge of pronotal lateral lobes, and the dark proximal half of *R* in the male tegmina.

The outline of the male anal plate is more similar to that of *V. sororia*, than of *V. pulchra* (Fig. XVIII: 7); the male genital plate is as in Fig. XIX: 11; the male genitalia are distinguished from those of two previous species by the more curved upper apical hooks, proximal edge of epiphallus with three lobes (in *V. pulchra* and *V. sororia*, it has only one lobe), shorter guiding rod, larger apical inflation of lower distal hooks of the epiphallus, presence of traces of the mold of spermatophore attachment plate, and more simple and symmetrical ectoparameres (not acute at apex and not curved upwards or medially) with a single sloping notch under apex (Figs XIX: 6-9) (this notch is more distinct in the holotype, possibly, as a result of some deformation when drying; Fig. XIX: 10).

Genus Phyllotrella Gorochov, 1988

Type species: *Phyllotrellaplanidorsalis* Gorochov, 1988.

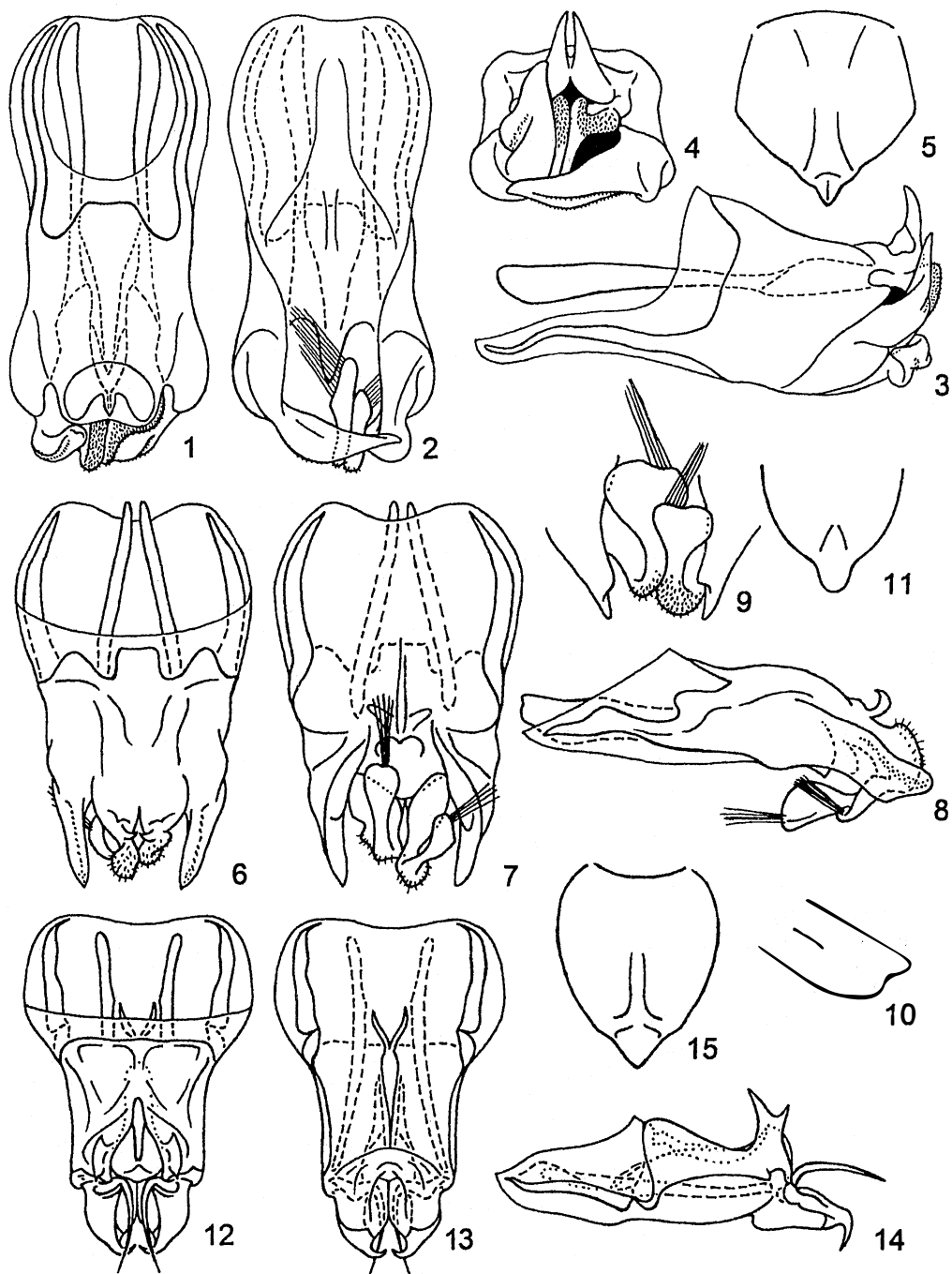
Note. This monotypic genus is related to *Abaxitrella* and *Valia*, but clearly differs in the structure of the male genitalia (Figs XIX: 12-14): the epiphallus is more or less similar to that of *Abaxitrella*, but with almost straight proximal edge and without lateral lobes in proximal part; the ectoparameres are situated near the distal part of epiphallus as in *Valia*; the guiding rod is represented by the transverse membranous fold (this state is more similar to that observed in *Valia*); the mold of spermatophore attachment plate is clearly visible, as in *Abaxitrella*, but different in shape. The male metanotal gland (Fig. XVIII: 8), ovipositor (Fig. XVIII: 11), and the male and female genital plates (Figs XVIII: 10; XIX: 15) are more or less similar to those of *Valia*; the male anal plate is not bifurcated, as in *Abaxitrella*, but different in structure (Fig. XVIII: 9).

Phyllotrella planidorsalis Gorochov, 1988
(Figs XVIII: 8-11; XIX: 12-15)

Phyllotrella planidorsalis Gorochov, 1988: 18.

Material. **Vietnam:** 1 ♂ (holotype), prov. Vinh Phu, Tam Dao, 900 m, 9-14.X.1979, Yu. Zaitsev (ZIAS); 17 ♂, 15 ♀, same data, but 17.V-11.VI.1995, at light, A. Gorochov (ZIAS).

Note. This species was recently recorded from China (Hainan) by Yin & Liu (1995), but these authors did not give any description of the un-



Figs XIX (1-15). *Valia* and *Phyllotrella*, male. 1-5, *V. pulchra* Gor. (1-4, from Gorochov, 1985); 6-11, *V. bimaculata* (Chop.) (9, 10, holotype); 12-15, *Ph. planidorsalis* Gor. Genitalia from above (1, 6, 12), from below (2, 7, 13), from side (3, 8, 14), and from behind (4); genital plate from below (5, 11, 15); distal part of genitalia from below (9); distal half of left ectoparamere from side (10).

known female of *Ph. planidorsalis* (possibly, females of this species were absent in the material of Yin & Liu).

Description of female (nov). Ocelli rather indistinct. Coloration greenish with narrow longitudinal yellowish stripes behind eyes, brownish antennae, a pair of small round black spots on pronotal disc, yellowish stripes along lateral edges of this disc, each bordered below with a narrow brown line on lateral pronotal lobes, yellowish stripe along proximal half of lateral edge of dorsal tegminal part, dark brown *R* in proximal part of tegmina, and very distinct darkish (greyish brown) longitudinal and transverse venation of dorsal tegminal part. Hind wings distinctly longer than tegmina, light.

Shape of genital plate and apex of ovipositor as in Figs XVIII: 10, 11.

Length (mm). Body: ♂ 16-20, ♀ 17-21; body with wings: ♂ 25-28, ♀ 28-32; pronotum: ♂ 2.9-3.3, ♀ 3.5-4; tegmina: ♂ 18-22, ♀ 20-25; hind femora: ♂ 10.5-12, ♀ 11-12.3; ovipositor 7.5-8.7.

Genus **Zvenella** Gorochov, 1988

Type species: *Madasumma yunnana* Gorochov, 1985.

Note. In *Zvenella*, the functional type of the male genitalia is similar to that of *Madasumma* Walk. (see also Figs I: 7-11): the guiding rod is quite movable with respect to the epiphallus, and the ectoparameres and endoparameral apodemes are connected with the guiding rod (not with epiphallus). *Zvenella* differs from all other genera with the same type of the male genitalia in the rather small size, more or less dark brown coloration with several lighter areas [two of them, yellowish or whitish spots on dorsal part of the male tegmina, are most typical (Figs XX: 4, 25, 27)], rounded bends of pronotum between the disc and lateral lobes, normal stridulatory apparatus of male with the stridulatory teeth only in short medial part of stridulatory vein and longitudinal mirror (Figs XX: 4, 25, 27), developed male metanotal gland (Figs XX: 1, 7-10, 12, 14, 17, 19, 21, 23), slightly inflated proximal part of fore tibiae provided with oval outer and slit-like inner tympana, rather simple male anal plate (Figs XX: 2, 11, 15, 18, 20, 24), narrowed distal part of the male genital plate (Fig. XX: 3), rather short epiphallus with characteristic processes and lobes in distal part, developed ectoparameres and mold of spermatophore attachment plate, short unpaired apodeme of this mold, long endoparameral apodemes (Figs XXI, XXII), drilling apex of ovipositor (Fig. XX: 5), and the female genital plate with distinct hind notch (Figs XX: 6, 13, 16).

Composition. This genus includes three groups of species. The first group includes 7-8 species: type species, *Madasumma geniculata* Chopard, 1931, *Z. acutangulata* Xia, Liu & Yin, 1991, *Z. cognata* Gorochov, 1992, *Z. transversa* Ingrisch, 1997, *Z. modesta* sp. n., *Z. chopardi* sp. n., and, possibly, *Z. pulchella* Gorochov, 1988. This group is characterized by the epiphallus with distinctly denticulate lower apical lobes, a pair of large upper processes, and rather short and/or wide hind lateral lobes (Figs XXI; XXII: 1-3).

The second group includes three species: *M. albomaculata* Chopard, 1969, *Z. taynguyena* Gorochov, 1990, and *Z. malayana* sp. n. It is characterized by the epiphallus with non-denticulate lower apical lobes, two pairs of large upper processes, and long narrow hind lateral lobes (Figs XXII: 6-8, 10, 12-14).

The third group including only two species (*M. parcevenosa* Chopard, 1931 and *Z. reticulata* sp. n.) differs from the previous ones in the epiphallus with upper processes as in the first group, but with non-denticulate or slightly denticulate lower apical lobes and characteristically curved hind lateral lobes (Figs XXII: 16-21).

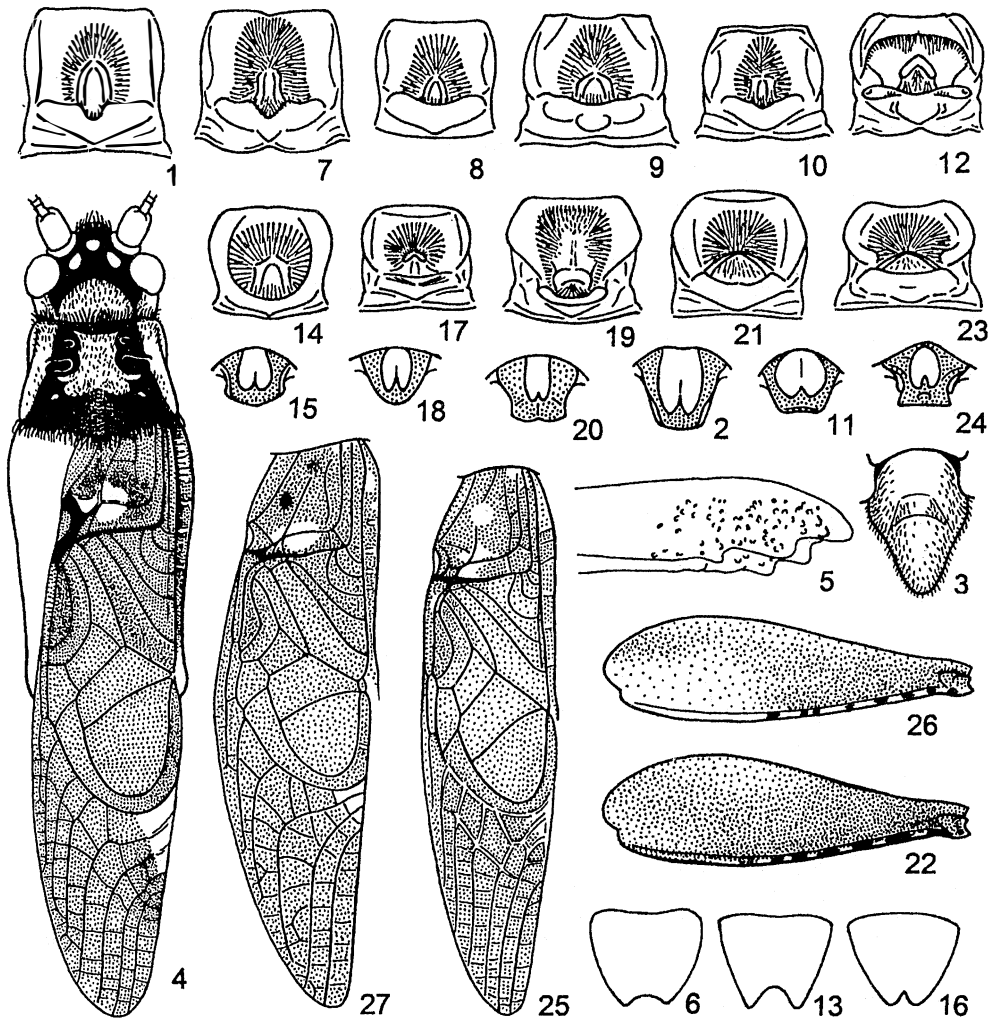
SPECIES GROUP I

Zvenella yunnana (Gorochov, 1985)
(Figs XX: 1-6; XXI: 1-5; XXII: 5)

Madasumma yunnana Gorochov, 1985a: 99.

Material. **China:** 5 ♂ (including holotype), 3 ♀, Yunnan, env. of Kington, 27.V-30.VI.1956, A. Zagulajev, O. Kryzhanovskij (ZIAS). **Vietnam:** 1 ♂, 1 ♀, prov. Son La, Song Ma, 400-600 m, secondary forest, 3-14.V.1986, A. Gorochov (ZIAS); 7 ♂, 10 ♀, prov. Hoa Binh, distr. Da Bac, Tu Ly, 200 m, secondary forest, 16-23.X.1990, A. Gorochov (ZIAS); 1 ♂, 3 ♀, prov. Hoa Binh, distr. Ky Son, Cao Phong, 250 m, secondary forest, 24-29.X.1990, A. Gorochov (ZIAS); 1 ♂, 6 ♀, prov. Hoa Binh, distr. Mai Chau, env. of Mai Chau, 250 m, secondary forest, 30.X-4.XI.1990, A. Gorochov (ZIAS); 1 ♀, prov. Hason Binh, Nature reserve Cuc-Phuong, 24.IV.1975, L. Medvedev (ZIAS).

Note. This species was recorded also from Northern Thailand (Ingrisch, 1997). It is rather large and light (from brown to light brown) with the pattern of head and pronotum usually as in Fig. XX: 4; the male tegmina are more or less light brown with some veins darker and only three whitish spots on dorsal part (Fig. XX: 4). *Z. yunnana* is more or less variable in the details of coloration, size of ocelli, and structure of lower median notch of the epiphallus (this notch is distinctly visible from behind, Fig. XXI: 4; sometimes it is slightly narrower or somewhat wider,



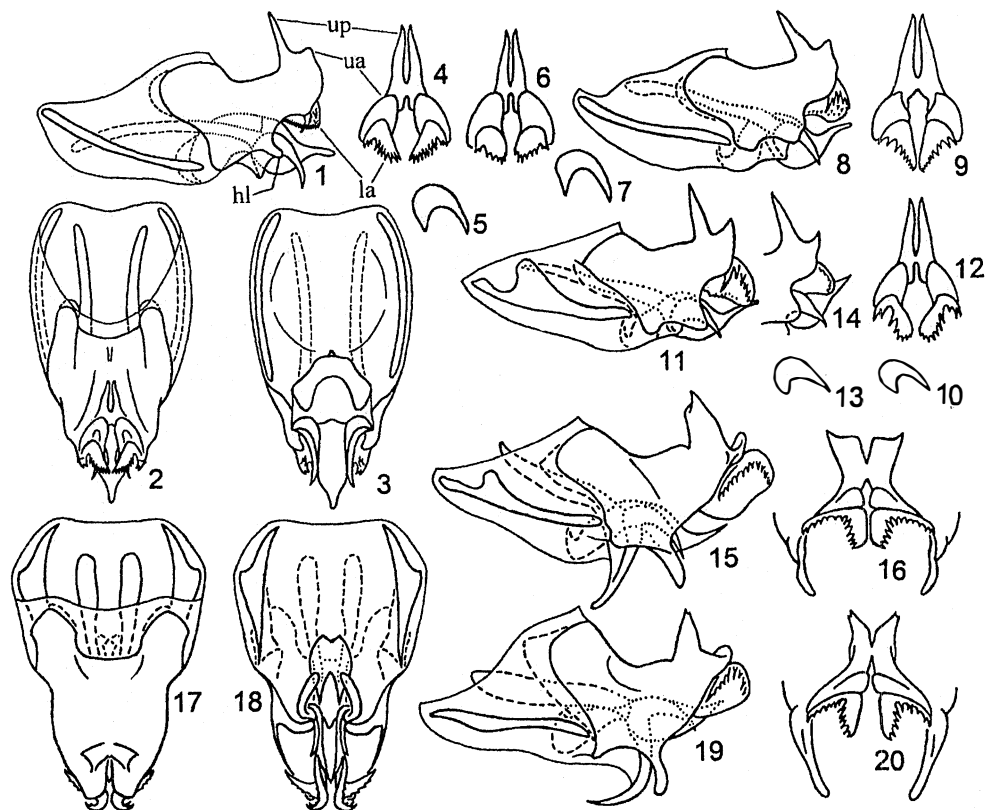
Figs XX (1-27). *Zvenella*. 1-6, *Z. yunnana* (Gor.) (1-4, holotype; 5, from Ingrisch, 1997); 7, *Z. modesta* sp. n.; 8, *Z. cognata* Gor. (paratype); 9, *Z. transversa* Ingr.; 10, 11, *Z. chopardi* sp. n. (holotype); 12, 13, *Z. geniculata* (Chop.); 14-16, *Z. pulchella* Gor. (14, 15, holotype); 17, 18, *Z. taynguyena* Gor. (holotype); 19, 20, *Z. malayana* sp. n. (paratype); 21, 22, *Z. parcevenosa* (Chop.); 23-26, *Z. reticulata* sp. n. (23, 24, holotype); 27, *Z. albomaculata* (Chop.) (holotype). Male metanotal gland (1, 7-10, 12, 14, 17, 19, 21, 23); male anal plate from above (2, 11, 15, 18, 20, 24); genital plate of male (3) and female (6, 13, 16) from below; head, pronotum, and tegminal dorsal part of male from above (4); apex of ovipositor from side (5); hind femur from side (22, 26); male tegminal dorsal part (25, 27).

but never as in Fig. XXI: 9). This species clearly differs from the congeners in the characteristic male metanotal gland (Fig. XX: 1), long male anal plate (Fig. XX: 2), shallow and wide apical notch of the female genital plate (Fig. XX: 6), and the details of the male genitalia: lower apical (denticulate) epiphallic lobes short but not rounded, upper processes and hind lateral lobes of epiphallus narrow, ectoparameres with short and very wide proximal part (Figs XXI: 1-5).

***Zvenella modesta* sp. n.**
(Figs XX: 7; XXI: 6, 7)

Holotype. ♂, **Thailand**, prov. *Nakhon Ratchasima*, env. of National Park Khao Yai, 500-1000 m, primary forest, 26.X-4.XI.2000 (imago reared XII.2000), A. Gorochov & L. Anisyutkin (ZIAS).

Description. Male (holotype). Very similar to *Z. yunnana*, but somewhat smaller, coloration slightly lighter (very light brown with pattern on



Figs XXI (1-20). *Zvenella*, male. 1-5, *Z. yunnana* Gor. (holotype); 6, 7, *Z. modesta* sp. n.; 8-10, *Z. cognata* Gor. (holotype); 11-13, *Z. transversa* Ingr.; 14, *Z. acutangulata* Xia, Liu & Yin (from Xia et al., 1991); 15, 16, *Z. geniculata* (Chop.); 17-20, *Z. chopardi* sp. n. (holotype). Genitalia from side (1, 8, 11, 15, 19), from above (2, 17), and from below (3, 18); distal part of epiphallus from behind (4, 6, 9, 12, 16, 20); inner side of ectoparamere (5, 7, 10, 13); distal part of genitalia from side (14).

Abbreviations (details of epiphallus): *hl*, hind lateral lobe; *la*, lower apical lobe; *ua*, upper apical lobe; *up*, upper process.

head, pronotum, and tegmina similar to that of *Z. yunnana*, but with more distinct darkening of hind femoral apex and dark stripes along tegminal *M* and lateral edge of mirror), ocelli distinctly smaller (lateral ocellus slightly shorter than the distance between the lateral and median ocellus; in *Z. yunnana*, lateral ocellus slightly or much longer than above-mentioned distance), metanotal gland with slightly shorter and distinctly concave medial keels, as well as with slightly concave lateral edges of central pubescent area (in *Z. yunnana*, these keels and lateral edges of central pubescent area convex) (for comparison see Figs XX: 1, 7), epiphallus with slightly smaller and almost rounded (from behind) apical denticulate lobes (for comparison see Figs XXI: 4, 6), and ectoparameres with less wide proximal part (for comparison see Figs XXI: 5, 7).

Female unknown.

Length (mm). Body 15; body with wings 19; pronotum 2; tegmina 12.5; hind femora 9.

Comparison. The distinctions from *Z. yunnana* are given above. *Z. modesta* differs from the other known congeners in the same characters as *Z. yunnana*.

***Zvenella cognata* Gorochov, 1992**
(Figs XX: 8; XXI: 8-10)

Zvenella cognata Gorochov, 1992: 11-12.

Material. Vietnam: 3 ♂ (including holotype), prov. Hoa Binh, distr. Da Bac, Tu Ly, secondary forest, 16-23.X.1990, A. Gorochov (ZIAS).

Note. *Z. cognata* is similar to the both above-considered species, but it is clearly distinguished by the almost uniformly dark upper part of head

and disc of pronotum, the male metanotal gland with sloping fore edge of its hind lobe (in *Z. yunnana* and *Z. modesta*, this edge has distinct median notch; for comparison see Figs XX: 1, 7, 8), and the epiphallus with distinctly longer lower apical (denticulate) lobes, almost acute upper apical lobes (rounded in the both previous species), distinctly wider hind lateral lobes, and much wider lower median notch visible from behind (for comparison see Figs XXI: 1, 4, 6, 8, 9). From two other similar species, *Z. acutangulata* and *Z. transversa*, the new species differs in the above-mentioned details of coloration, somewhat shorter lower apical (denticulate) lobes of the epiphallus, distinctly shorter hind lateral epiphallal lobes, and longer narrow part of the ectoparameres (Figs XXI: 8-14).

***Zvenella transversa* Ingrisch, 1997**
(Figs XX: 9; XXI: 11-13)

Zvenella transversa Ingrisch, 1997: 65-66.

Material. Thailand: 2 ♂, 2 ♀, prov. Surat Thani, 40 km WSW of Phanom, env. of National Park Khao Sok, secondary forest, 20-29.VII.1996, A. Gorochoy (ZIAS); 4 ♂, 3 ♀, prov. Phetchaburi, 50 km SW of Phetchaburi, env. of National Park Kaeng Krachan, 400 m, secondary forest, 30.VII-6.VIII.1996, A. Gorochoy (ZIAS).

Note. This species described from Central Malacca (Thailand) is the most similar to *Z. cognata* and especially to *Z. acutangulata*. The distinctions from the first species are given above; the examined males of two species have some additional distinctions: in *Z. transversa*, the metanotal gland with medial keels more widely spaced and lateral edges of central pubescent area convex (concave in *Z. cognata*; for comparison see Figs XX: 8, 9), the epiphallus with upper apical lobes acute in profile and rounded from behind (in *Z. cognata*, these lobes are less acute in profile and not rounded from behind), as well as with characteristic shape of lower apical (denticulate) lobes and much narrower lower median notch visible from behind (Figs XXI: 8, 9, 11, 12). The distinctions between *Z. transversa* and *Z. acutangulata* described from Hainan are unclear; these two species are very similar in the shape of ectoparameres and distal part of epiphallus, but the lower apical (denticulate) epiphallal lobes in *Z. acutangulata* have possibly only short denticles (Figs XXI: 11, 13, 14).

***Zvenella geniculata* (Chopard, 1931)**
(Figs XX: 12, 13; XXI: 15, 16)

Madasumma geniculata Chopard, 1931: 143.
Zvenella nigrotibialis Liu, Yin & Wang, 1993, **syn. n.**

Material. China: 4 ♂, Yunnan, env. of Kingtun, 2-14.VI.1956, O. Kryzhanovskij (ZIAS). **Vietnam:** 2 ♀, prov. Son La, env. of Song Ma, 400-600 m, secondary forest, 3-14.V.1986, A. Gorochoy (ZIAS).

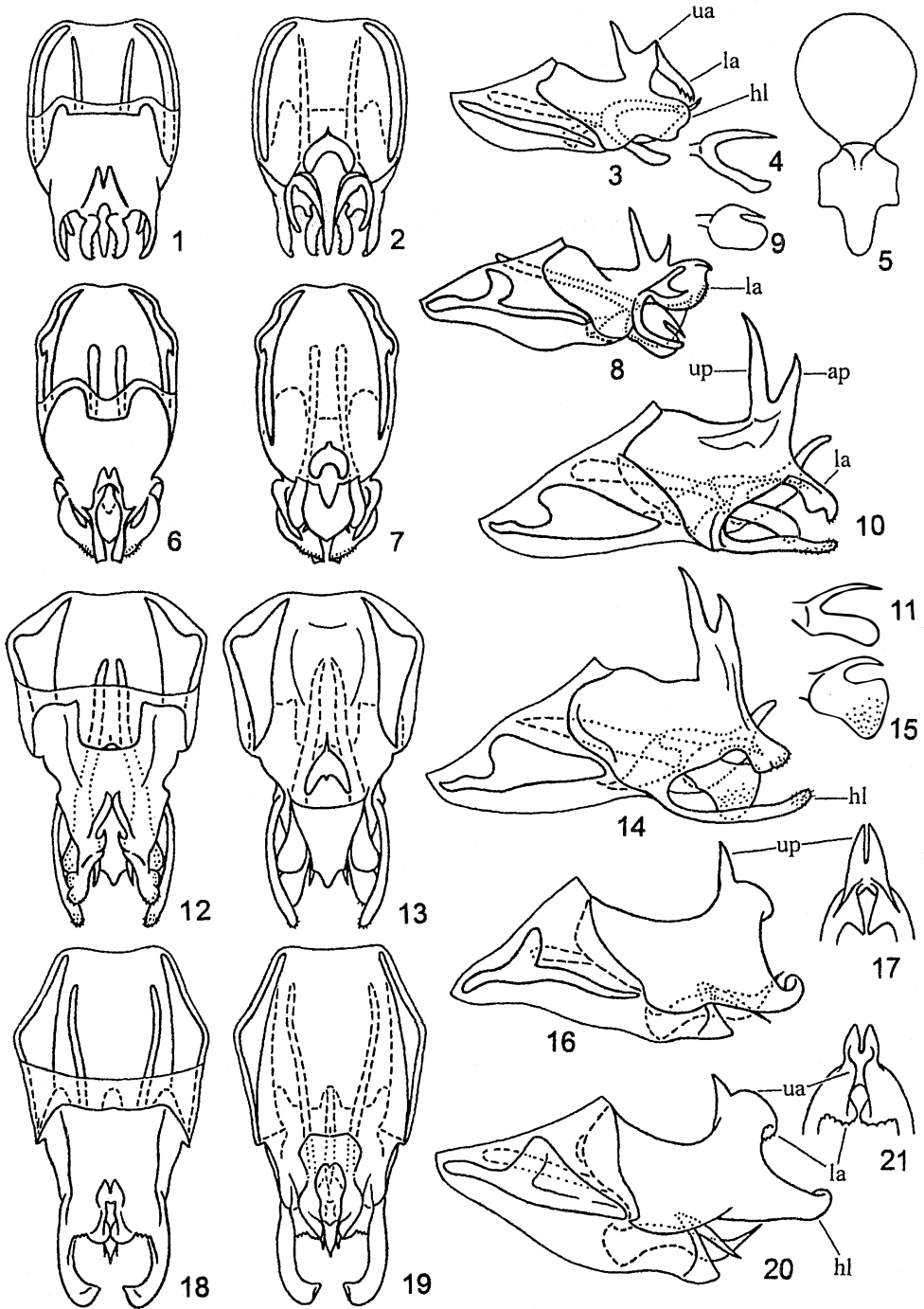
Note. This remarkable species described from Laos is readily distinguished from the other congeners by the very characteristic coloration (upper part of the head and disc of the pronotum are almost black, but with light brown spots behind the eyes and a pair of comparatively small yellowish spots on the pronotal disc; lower part of the head is brown; lateral lobes of the pronotum are yellowish; the tegmina are brown with yellowish stripe along their bends and, in male, with typical of *Zvenella*, yellowish or whitish spots on the dorsal part; distal parts of legs are dark brown from the middle part of femora, while the other parts of legs are light, brown), strongly modified male metanotal gland (with a deep main concavity, transverse row of distinct hairs along the fore edge of this concavity, reversed V-shaped central process, and hind glandular lobe provided with a pair of lateral small, but distinct concavities; Fig. XX: 12), short and almost truncated male anal plate (similar to that in Fig. XX: 11), very long ovipositor (which is almost 1.3 times as long as hind femur), and the female genital plate with rather deep apical notch (Fig. XX: 13). *Z. geniculata* was formerly recorded from China under the name *Z. nigrotibialis* (Liu et al., 1993); the great resemblance of the morphological characters (including the structure of male genitalia) and coloration of *Z. geniculata* and *Z. nigrotibialis* evidence their synonymy.

***Zvenella chopardi* sp. n.**
(Figs XX: 10, 11; XXI: 17-20)

Holotype. ♂, Cambodia, prov. Campot, env. of Sihanoukville (= Campong Som), secondary forest, 14-21.II.1998 (imago reared IV.1998), A. Gorochoy (ZIAS).

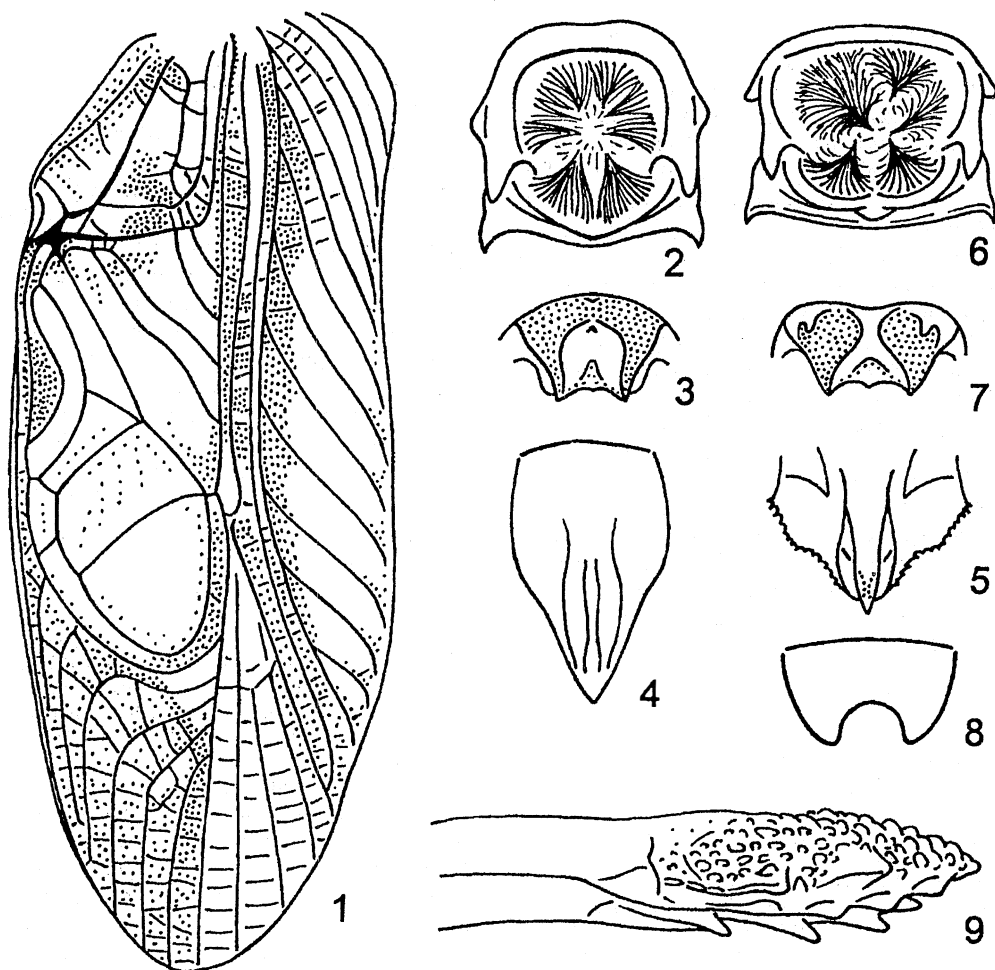
Paratypes. Thailand: 1 ♂, "Siam, Lot 205, 19 Jul. 1930" [designated by Chopard as type (holotype) of the undescribed *Madasumma triguttata* Chop.] (BMNH); 1 ♂, "Siam, Day Time Lot 4, 11.5.77" [designated by Chopard as paratype of the undescribed *Madasumma triguttata* Chop.] (BMNH).

Description. Male (holotype). Coloration and metanotal gland typical of first group of species and distinctly differing from those of *Z. geniculata*: head and pronotum rather light brown with dark pattern similar to that of *Z. yunnana* given in Fig. XX: 4, but hind part of pronotal disc light brown; tegmina almost uniformly brownish, with not very distinct light spots on dorsal part; legs uniformly light brown; abdomen brownish with darker upper part except apex. Metanotal gland with not deep main concavity, oval pubescent



Figs XXII (1-21). *Zyenella*, male. 1-4, *Z. pulchella* Gor. (holotype); 5, *Z. yunnana* Gor. (holotype); 6-9, *Z. taynguyena* Gor. (holotype); 10, 11, *Z. malayana* sp. n. (holotype); 12-15, *Z. albomaculata* (Chop.) (holotype); 16, 17, *Z. parvevenosa* (Chop.); 18-21, *Z. reticulata* sp. n. (holotype). Genitalia from above (1, 6, 12, 18), from below (2, 7, 13, 19), and from side (3, 8, 10, 14, 16, 20); inner side of ectoparamere (4, 9, 11, 15); spermatophore from below (5); upper part of epiphallus from behind (17, 21).

Abbreviations as in Figs XXI except the following: *ap*, additional upper process of epiphallus (= *ua*).



Figs XXIII (1-9). *Prozvenella*. 1-5, *P. ordinaria* sp. n.; 6, 7, *P. saussureana* (Chop.); 8, 9, *Prozvenella* sp. Dorsal part of male tegmen (1); male metanotal gland (2, 6); male anal plate from above and slightly from behind (3, 7); male genital plate from below (4); distal part of guiding rod of male genitalia from below (5); female genital plate from below (8); apex of ovipositor from side (9).

area, paired central keels, and simple hind glandular lobe similar to that of *Z. cognata* and *Z. transversa* (Figs XX: 8-10).

Anal plate and genitalia similar to those of *Z. geniculata* (Figs XX: 11; XXI: 15-20), but upper processes of epiphallus narrower and with two apices, long lower process of ectoparameres distinctly arched (almost straight in *Z. geniculata*).

Variation. Sometimes apical part of hind femora slightly darkened.

Female unknown.

Length (mm). Body 13.5-14.5; body with wings 19-21; pronotum 2.2-2.4; tegmina 13-14; hind femora 8.8-10.6.

Comparison. The distinctions from *Z. geniculata* are given above. *Z. chopardi* differs from the other similar species in the characteristic male genitalia.

***Zvenella pulchella* Gorochov, 1988**
(Figs XX: 14-16; XXII: 1-4)

Zvenella pulchella Gorochov, 1988: 14.

Material. Vietnam: 1 ♂ (holotype), 1 ♀, prov. *Dac Lac*, env. of Buon Ma Thuot, 26.IV-5.V.1986, L. Medvedev et al. (ZIAS); 1 ♀, prov. *Dac Lac*, 22.V.1979, M. Lyu (ZIAS); 2 ♀, prov. *Dac Lac*(?), forest Ma Da, XI.1990, V. Burakov (ZIAS).

Description of female (nov.). Similar to females of *Z. yunnana* and *Z. transversa*, but somewhat smaller and darker (head and pronotum brown with blackish pattern as in Fig. I: 4 or with entirely blackish upper part of head and disc of pronotum; tegmina dark brown with interrupted whitish line along lateral edge of distal half of dorsal part and several lightish transverse veinlets between proximal halves of *R* and *M*; legs brown, distal halves of hind legs dark from middle part of femora, but sometimes hind tibiae with almost light brown spines and spot near base; abdomen dark), genital plate with not deep and narrow apical notch (Fig. XX: 16), and ovipositor shorter (distinctly shorter than hind femur).

Length of female (mm). Body 13-15; body with wings 19-21; pronotum 2.6-2.8; tegmina 13.5-14.5; hind femora 9.5-10.5; ovipositor 7-8.

Note. The male is similar to some above-considered species (except for *Z. geniculata*) in the general appearance, but it differs strikingly in the structure of the metanotal gland (Fig. XX: 14), anal plate (Fig. XX: 15), and genitalia (Figs XXII: 1-4).

SPECIES GROUP II

***Zvenella taynguyena* Gorochov, 1990**
(Figs XX: 17, 18; XXII: 6-9)

Zvenella taynguyena Gorochov, 1990: 16-17.

Material. Vietnam: 2 ♂ (including holotype), 4 ♀, prov. Gia Lai, 40 km N of Kannack, Tram Lap, 800 m, primary forest, 21.XI-14.XII.1988 and (1 ♀) 24.IV.1995, A. Gorochov (ZIAS); 4 ♂, 8 ♀, prov. Gia Lai, 20 km N of Kannack, Buon Luoi, 700 m, primary forest, 17-20.XI.1988 (2 ♀), 3-11.XI.1993 (2 ♂, 5 ♀), 1-10.V.1995 (2 ♂, 1 ♀), A. Gorochov (ZIAS).

Note. This species is similar to most of the previous species (except for *Z. geniculata*) in the general appearance, but it is clearly distinguished from them by the structure of the male metanotal gland (Fig. XX: 17), male anal plate (Fig. XX: 18), and the male genitalia (Figs XXII: 6-9). The female genital plate is similar to that of *Z. yunnana* (Fig. XX: 6), and the ovipositor only slightly shorter than hind femur.

***Zvenella albomaculata* (Chopard, 1968)**
(Figs XX: 27; XXII: 12-15)

Madasumma bimaculata Chopard, 1931: 142-143 (non *bimaculata* Chopard, 1928).

Madasumma albomaculata Chopard, 1968: 369 (replacement name).

Holotype. ♂, Malaysia, "Malay Penin.: Selangor, F. M. S. Kuala Lumpur, at light, July 9th, 1926, H.M.

Pendlebury, ex coll: F. M. S. Museum", "*Madasumma bimaculata* Chop., type", "Holotype" (BMNH).

Note. This species is more or less similar to *Z. taynguyena* in the general appearance and structure of the male genitalia. However, it is clearly distinguished by the more uniform coloration (almost uniformly lightish brown, but with slightly darker upper part of the head, male anal plate, distal part of the male genital plate, and two small spots on basal area of the male tegmina, dark line along the bends of these tegmina, and yellowish white marks on their dorsal parts, as in Fig. XX: 27), fused proximal parts of the upper processes of epiphallus (left processes are fused with each other, but not with right processes, which are also fused with each other), distinctly narrower lower apical lobes and much longer hind lateral lobes of the epiphallus, and differently shaped ectoparameres (Figs XXII: 12-15).

***Zvenella malayana* sp. n.**
(Figs XX: 19, 20; XXII: 10, 11)

Holotype. ♂, Malaysia, Pahang, env. of Jerantut, secondary forest, 11-12.VII.1996, A. Gorochov (ZIAS).

Paratypes. Malaysia: 1 ♂, same data as in holotype (ZIAS); 3 ♂, "Perak, Hulu; Belum Expedition, B. Camp, 5°30'07"N, 101°26'21"E; IV-VI.1994; leg. Rothamsted light trap" (ZIAS).

Description. Male (holotype). Very similar to *Z. albomaculata*. Head with antennae and pronotum uniformly dark brown; tegmina brown (comparatively dark) with yellow spot at base of dorsal part, three whitish spots (near stridulatory vein, near lateral and apical edges of mirror), and light transverse veinlets between *R*, *M*, and *CuA*; legs also brown with dark brown distal halves, border between these colours indistinct; abdomen dark brown. Venation of tegmina almost identical to that of *Z. albomaculata*.

Metanotal gland and anal plate as in Figs XX: 19, 20. Genitalia differing from those of *Z. albomaculata* only in some details: upper processes of epiphallus almost entirely separated from each other, lower apical lobes of epiphallus with hook-shaped apices, and lower part of ectoparameres much narrower than in *Z. albomaculata* (for comparison see Figs XXII: 10, 11, 14, 15).

Variation. Sometimes coloration slightly lighter, but with uniform (brown or darkish brown) head and pronotum.

Female unknown.

Length (mm). Body 13-15; body with wings 20-22; pronotum 2.1-2.3; tegmina 13.5-14.5; hind femora 9-9.8

Comparison. *Z. malayana* differs from *Z. albomaculata* in the above-mentioned details of

the male genitalia and from all other congeners, in the same characters as *Z. albomaculata*, including the uniform coloration of the head and pronotum.

SPECIES GROUP III

Zvenella parcevenosa (Chopard, 1931) (Figs XX: 21, 22; XXII: 16, 17)

Madasumma parcevenosa Chopard, 1931: 143-144.

Madasumma obscuripennis Chopard, 1969, *syn. n.*

Material. **Malaysia:** 1 ♀ (holotype), "Malay Penin.: Selangor, Bukit Kutu, at light, 2500 ft, April 19th, 1926. H. M. Pendlebury", "*Madasumma parcevenosa* Chop., Type" (BMNH); 1 ♂, "Perak, Hulu; Belum Expedition, B. Camp; 5°30'07"N, 101°26'21"E; 13.II-10.III.1994, 270 m; leg. Rothamsted light trap" (ZIAS). **Indonesia:** 1 ♂, *prov. West Sumatra*, 20 km E of Sasak, env. of National Park Harau Valley, equator, 600 m, primary forest, 24-26.XI.1999, A. Gorochoy (ZIAS).

Note. The both Chopard's species (*M. parcevenosa* and *M. obscuripennis*) are described from the same locality (Bukit Kutu). Their characters are very similar, including the coloration of lower part of hind femora (Fig. XX: 22), and it is reasonable to synonymize these species. *Z. parcevenosa* is recorded from Sumatra for the first time.

It is clearly distinguished from species of two previous groups of *Zvenella* by the characteristic coloration of legs and the male tegmina. Tegmina are brownish with the following details: numerous darkenings on dorsal part, several distinct dark small spots between the bases of branches of *Sc*, yellowish transverse veinlets between *Sc*, *R*, *M*, and *CuA*, some lightish veins of stridulatory apparatus and veins at the base of apical area, three whitish spots near lateral and apical edges of mirror and on stridulatory vein. The coloration of other parts of body is somewhat varied: the head and pronotum are light brown with partly or almost entirely dark upper parts, including the pronotal disc; antennae are more or less spotted; legs are brown or dark brown with rather numerous and sometimes almost indistinct lightish spots (lightish spots along the lower edge of hind femora are always distinct, but small). *Z. parcevenosa* differs from species of two above-considered groups also in the details of the male metanotal gland (Fig. XX: 21), slightly widened and truncate apex of the male anal plate (almost as in Fig. XX: 24), and the very characteristic male genitalia (Figs XXII: 16, 17).

Zvenella reticulata sp. n. (Figs XX: 23-26; XXII: 18-21)

Holotype. ♂, **Indonesia**, "N. Sumatra, SW of Kisaran, 5.3.1994, 2°42'18"N, 99°22'42"E, leg. I. Sivec" (ZIAS).

Paratype. ♂, **Malaysia**, "Malaya, Perak, Gunong Kledang, 2500 [ft], 12 Feb. 1954, H.T. Pagden", "C. L. E. Coll. No. 164-88" (BMNH).

Description. Male (holotype). Very similar to *Z. parcevenosa*. Head light brown with dark brown upper part (including upper part of rostrum; this part with three lightish narrow longitudinal stripes between lateral ocelli and hind part of vertex) and small spots along medial edges of antennal cavities (under rostral apex), darkish apex of maxillary palpi and longitudinal marks on their third segments; antennae brown with dark brown scape and light brown spots on flagellum. Pronotum with uniformly dark brown disc and light brown lateral lobes (these lobes with dark line along lower edges and several darkish dots). Tegmina similar to those of *Z. parcevenosa*, but area between *R* and *M* almost entirely yellowish, area between *M* and *CuA* darker, dark small spots between bases of branches of *Sc* less distinct, and pattern of dorsal part as in Fig. XX: 25, but some veins of basal area, oblique veins, lateral chords, proximal lateral edge of mirror, and transverse veinlets partly lightish. Hind wing greyish, much longer than tegmina. Fore and middle legs dark brown with scarcely distinct lightish spots on tibiae and tarsi; hind legs brownish with partly darkened outer side of femora, small darkish spots along their lower edges (Fig. XX: 26), and almost indistinct lighter spots on tibiae and tarsi. Metanotal gland with more transverse fore lobe than in *Z. parcevenosa* (see Figs XX: 21, 23). Abdomen darkish with spotted cerci.

Anal plate as in Fig. XX: 24. Genitalia (Figs XXII: 18-21) different from those of *Z. parcevenosa* only in some details: upper epiphallic processes distinctly shorter, lower apical epiphallic lobes larger and slightly denticulate, hind lateral epiphallic lobes much longer.

Variation. Coloration of paratype slightly lighter (pronotal disc with lightish marks).

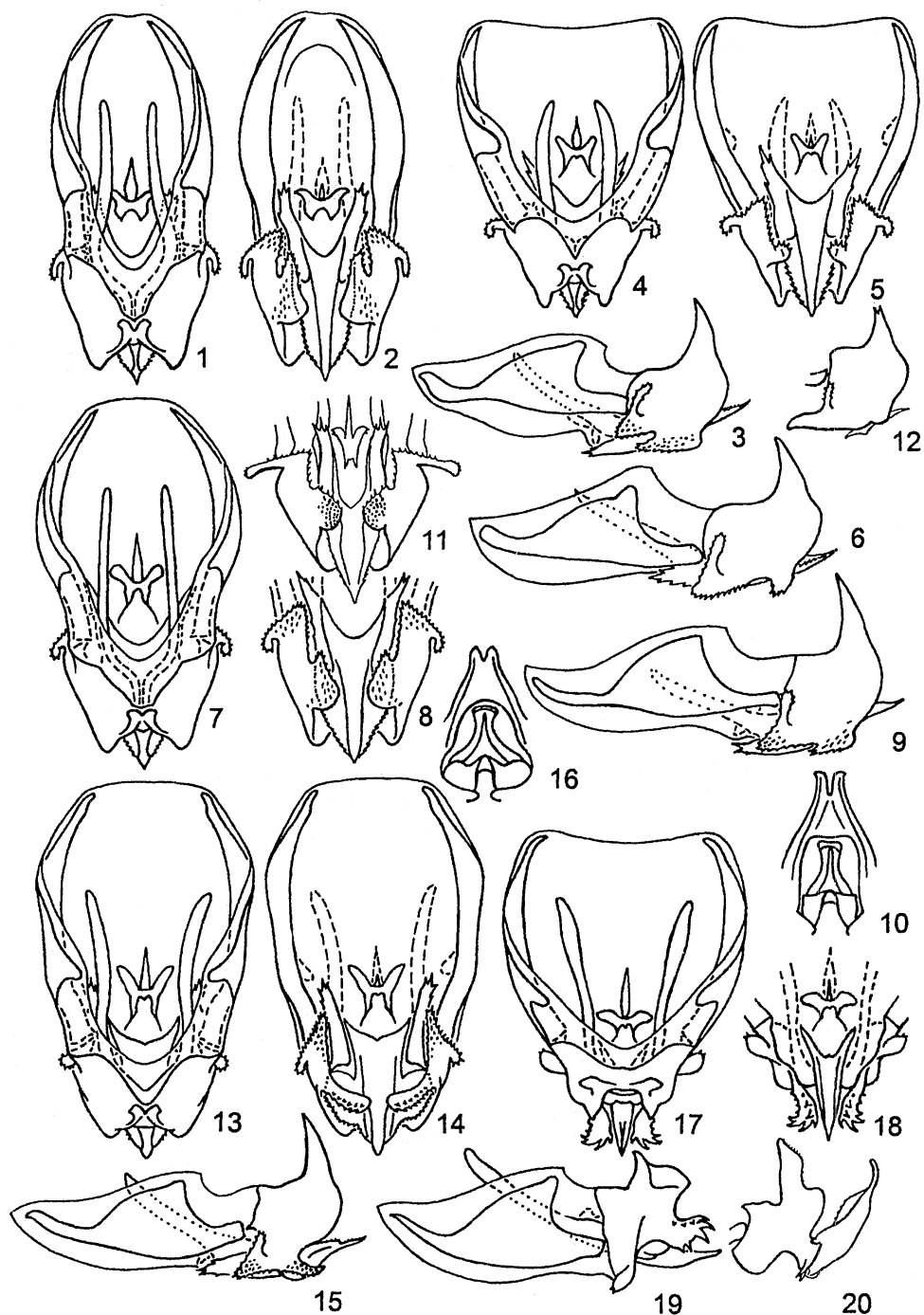
Length (mm). Body 13-14; body with wings 21-23; pronotum 2.1-2.3; tegmina 14-14.8; hind femora 9.5-10.

Comparison. *Z. reticulata* is closely related to *Z. parcevenosa*, but it differs easily in the above-mentioned details of the male genitalia and in size of light spots along the lower edge of hind femora (see Figs XX: 22, 26).

Genus *Prozvenella* gen. n.

Type species: *Prozvenella ordinaria* sp. n.

Diagnosis. Similar to *Zvenella* in general appearance and functional type of the male genitalia, but size larger, coloration usually more uni-



Figs XXIV (1-20). *Prozvenella*, male. 1-3, *P. similis meridionalis* subsp. n.; 4-6, *P. s. occidentalis* subsp. n.; 7-10, *P. s. orientalis* subsp. n.; 11, 12, *P. s. similis* (Chop.) (from Chopard, 1969); 13-16, *P. ordinaria* sp. n.; 17-19, *P. saussureana* (Chop.); 20, *P.? marginipennis* (Guér.) (from Chopard, 1969). Genitalia from above (1, 4, 7, 13, 17), from below (2, 5, 14), and from side (3, 6, 9, 15, 19); their distal half from below (8, 11, 18) and from side (12, 20); upper part of epiphallal apex from behind (10, 16).

form (from rather light to dark brown with three more or less distinct yellowish or whitish spots on dorsal part of tegmina, as in *Zvenella*, and diverse light and dark marks along tegminal bend; Fig. XXIII: 1), male metanotal gland without any projections or keels in central part and usually with distinctly larger main (pubescent) concavity (Figs XXIII: 2, 6), male anal plate with membranous hind median part (this part slightly sclerotized in *Zvenella*; Figs XX: 2, 11, 15, 18, 20, 24; XXIII: 3, 7) and numerous very short setae on partly sclerotized lateral parts (these parts smooth in *Zvenella*), male genitalia with undeveloped ectoparameres (probable main distinction between these genera) and denticulate guiding rod consisting of several sclerites and trifurcated at apex (Figs XXIII: 5; XXIV).

Male genital plate very similar to that of *Zvenella*, but genital plate of the single available female [determined by me only as *Prozvenella* sp. (Sri Lanka)] shorter and with larger apical notch, and ovipositor rather similar to that of *Zvenella*, but with more numerous teeth at apex (for comparison see Figs XX: 3, 5, 6, 13, 16; XXIII: 4, 8, 9).

Included species: type species, *Madasumma similis* Chopard, 1969, *M. soror* Chopard, 1969, *M. saussureana* Chopard, 1969, and possibly, *Platydictylus marginipennis* Guérin-Méneville, 1844 (Fig. XXIV: 20).

***Prozvenella ordinaria* sp. n.**
(Figs XXIII: 1-5; XXIV: 13-16)

Holotype. ♂, Sri Lanka, "Ceylon, 1907, O. John" (ZIAS).

Description. Male (holotype). Appearance typical of *Prozvenella*. Head light brown with dark brown area between rostral apex and eyes and a pair of longitudinal stripes on vertex behind medial parts of eyes, a pair of short and narrow vertical stripes under rostral apex, and numerous darkish dots. Pronotum light brown with darkenings along lateral edges of disc, hardly darkened remaining part of this disc, and numerous darkish dots on lateral lobes. Tegmina with venation as in Fig. XXIII: 1, light greyish (almost transparent) with dark brown spot in region of chords, stripes along upper edge of lateral part (this stripe interrupted by lighter branches of *Sc*) and along lateral edge of dorsal part (this stripe interrupted by yellowish transverse veinlets), yellowish stripe between these dark stripes (between *R* and *M*) interrupted by dark spots in middle part, yellowish white line along lower edge of lateral part, whitish spots at base of basal area, near stridulatory vein, and near lateral and distal edges of

mirror, small slight brownish darkenings on numerous areas of dorsal part (Fig. XXIII: 1). Legs light brown with darkish dots on fore and middle legs, along lower edge of hind femora, and near bases of hind tibial spines; hind femora with darkened apical part and slight darkening near middle of upper surface; outer tympanum oval and rather large, inner one slit-like and small (outer tympanum almost twice as long as inner one).

Metanotal gland, anal and genital plates as in Figs XXIII: 2-4. Genitalia (Figs XXIV: 13-15) very similar to those of *P. similis* (Figs XXIV: 1-12), but distinguished by the shallower notch between left and right upper apical processes of epiphallus (Figs XXIV: 10, 16), longer and narrower hind lower (denticulate) epiphallal lobes (Figs XXIV: 14) as well as much wider guiding rod (Figs XXIII: 5; XXIV: 14, 16).

Female unknown.

Length (mm). Body 21; body with wings 29; pronotum 3; tegmina 18; hind femora 12.5.

Comparison. *P. ordinaria* is similar to *P. similis* and *P. soror* in the structure of the male genitalia, but differs from the first species in the genital characters listed above and from the second species, in the differently shaped apical part of the epiphallus and hind lower (denticulate) epiphallal lobes, as well as much wider guiding rod.

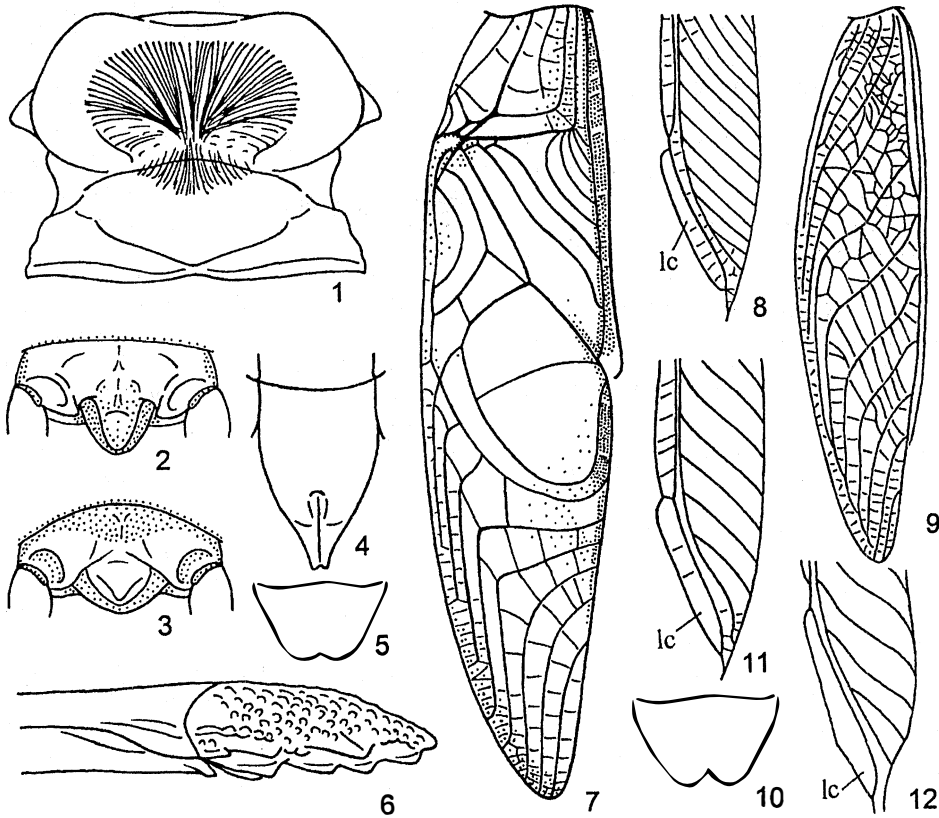
***Prozvenella similis orientalis* subsp. n.**
(Figs XXIV: 7-10)

Holotype. ♂, India, "Ind. Or. [Northern part of Eastern Hindustan (?)] P. Castets" [identified as *Calyptotr. marginip.* Guér.] (MNCN).

Description. Male (holotype). Similar to the previous species in general appearance, but coloration somewhat more uniform (light greyish brown with darkish spots near ocelli and between bases of branches of tegminal *Sc*; light parts of tegmina similar to those of *P. ordinaria*) and inner tympanum slightly larger (outer tympanum almost 1.5 times as long as inner one). Tegminal venation, metanotal gland, and anal plate almost identical to those of *P. ordinaria*.

Male genitalia as in *P. similis similis* described by Chopard from the southern part of Eastern Hindustan (Madras), but upper epiphallal processes distinctly longer (much longer than remaining proximal part of upper epiphallal edge in profile; in nominotypical subspecies, this remaining part not shorter than mentioned processes; see Figs XXIV: 9, 12) and guiding rod slightly wider (Figs XXIV: 8, 11).

Female unknown.



Figs XXV (1-12). *Idiotrella*, *Madasumma* and *Tamborina*. 1, 2, *I. malacca* sp. n.; 3-9, *I. javae* sp. n.; 10, *I. coomani* (Chop.); 11, *M. plana* (Walk.); 12, *T. australis* (Walk.) (from Otte & Alexander, 1983: Fig. 253L). Male metanotal gland (1); male anal plate from above (2, 3); genital plate of male (4) and female (5, 10) from below; apex of ovipositor from side (6); dorsal part of tegmen of male (7) and female (9); distal half of lateral part of male tegmen (8, 11, 12).

Abbreviation: *lc*, lancet-like area.

Length (mm). Body 22.5; body with wings 31; pronotum 3.5; tegmina 19.5; hind femora 14.

***Prozvenella similis occidentalis* subsp. n.**
(Figs XXIV: 4-6)

Holotype. ♂, **India**, "Anoheri Salsette [Salsette Islands near Bombay (Northern part of Western Hindustan)]", [identified by Chopard as *Madasumma similis* Chop.] (BMNH).

Description. Male (holotype). Very similar to *P. similis orientalis* in general appearance, but male genitalia with low and somewhat longer epiphallus, as well as with smaller lower epiphallic lobes and slightly narrower guiding rod (Figs XXIV: 5, 6, 8, 9). The new subspecies differing from nominotypical subspecies in low epiphallus, longer upper epiphallic processes (their length almost equal to height of middle part of epiphallus; in *P. similis*

similis, this ratio different), and smaller lower epiphallic lobes (Figs XXIV: 5, 6, 11, 12).

Female unknown.

Length (mm). Body 20; body with wings 28; pronotum 2.9; tegmina 17; hind femora 12.

***Prozvenella similis meridionalis* subsp. n.**
(Figs XXIV: 1-3)

Holotype. ♂, **India**, "Coimbatore [Southern part of Western Hindustan], 25.VIII.1915, Fletcher - coll." [identified as *Madasumma irrorata* Ss.] (BMNH).

Description. Male (holotype). Very similar to both above-described new subspecies in general appearance, but clearly distinguished from them and nominotypical subspecies by distinctly larger lower epiphallic lobes (for comparison see Figs XXIV: 2, 5, 8, 11).

Female unknown.

Length (mm). Body 20.5; body with wings 30; pronotum 3.2; tegmina 19; hind femora 13.

Prozvenella saussureana (Chopard, 1969)
(Figs XXIII: 6, 7; XXIV: 17-19)

Madasumma saussureana Chopard, 1969: 343-345.

Material. Sri Lanka: 1 ♂, "Ceylon, Peradeniya, VII.1909, E.E. Green" (BMNH); 1 ♂, "Kandy, Ceylon, 27.X.99" (BMNH); 2 ♂, "Green. Ceylon. 90-115" (BMNH, ZIAS); 1 ♂, "Ceylon, 1907, O. John" (ZIAS).

Note. This species is similar to *P. ordinaria* and *P. similis* in the general appearance, but its coloration is rather variable (from resembling that of *P. similis* to resembling that of *P. ordinaria*, but in the latter case the pronotum and upper half of head are almost entirely dark brown, and the entirely yellowish area between tegminal *R* and *M* is always present), the male metanotal gland is shorter (Figs XXIII: 2, 6), the male anal plate is also shorter and with the partly sclerotized lateral parts distinctly separated from each other (Figs XXIII: 3, 7), the male genitalia are with the shorter upper apical epiphallal processes widely spaced, large lower epiphallal lobes provided with larger denticles (teeth), proximal lower epiphallal lobes directed downwards (not upwards, as in *P. ordinaria* and *P. similis*), and distinctly narrower guiding rod (Figs XXIV: 17-19). *P. saussureana* differs from *P. soror* in some of the above-mentioned details of the male genitalia and from *P. marginipennis*, in the general shape of epiphallus (Figs XXIV: 19, 20).

Genus *Idiotrella* gen. n.

Type species: *Idiotrella javae* sp. n.

Diagnosis. Body rather large, elongated, distinctly pubescent. Coloration more or less greyish. Head rather narrow and low (not high); rostrum between antennal cavities slightly narrower than scape. Pronotum narrowed in front, with rounded bend between disc and lateral lobe. Tegmina of male long, with large longitudinal mirror, two groups of oblique veins (Fig. XXV: 7), and with *R* fused with *M* before lancet-like area (Fig. XXV: 8); tegmina of female with characteristically curved longitudinal veins of dorsal part and wide areas between proximal halves of these veins (these areas divided into numerous long and narrow longitudinal cells and/or with irregular transverse venation) (Fig. XXV: 9). Hind wings much longer than tegmina. Fore tibiae with oval outer tympanum and partly slit-like (almost open) inner one.

Structure of male metanotal gland, male anal

plate, and genital plates rather simple (Figs XXV: 1-5, 10). Male genitalia with very short epiphallus (provided with a pair of wide upper processes), two pairs of ectoparameres (second pair partly fused with guiding rod), trifurcated guiding rod (upper unpaired lobe semimembranous and lower paired processes or lobes sclerotized and acute), and long apodemes of endoparameres and mold of spermatophore attachment plate (Figs XXVI) (epiphallus, ectoparameres, and guiding rod rather restrictedly movable with respect to each others). Ovipositor with distinctly drilling apex (Fig. XXV: 6).

Included species. Type species, *Madasumma karnyi* Chopard, 1929, *I. malaccae* sp. n., possibly, also *M. pachyonyx* Chopard, 1930 and *M. coomani* Chopard, 1939.

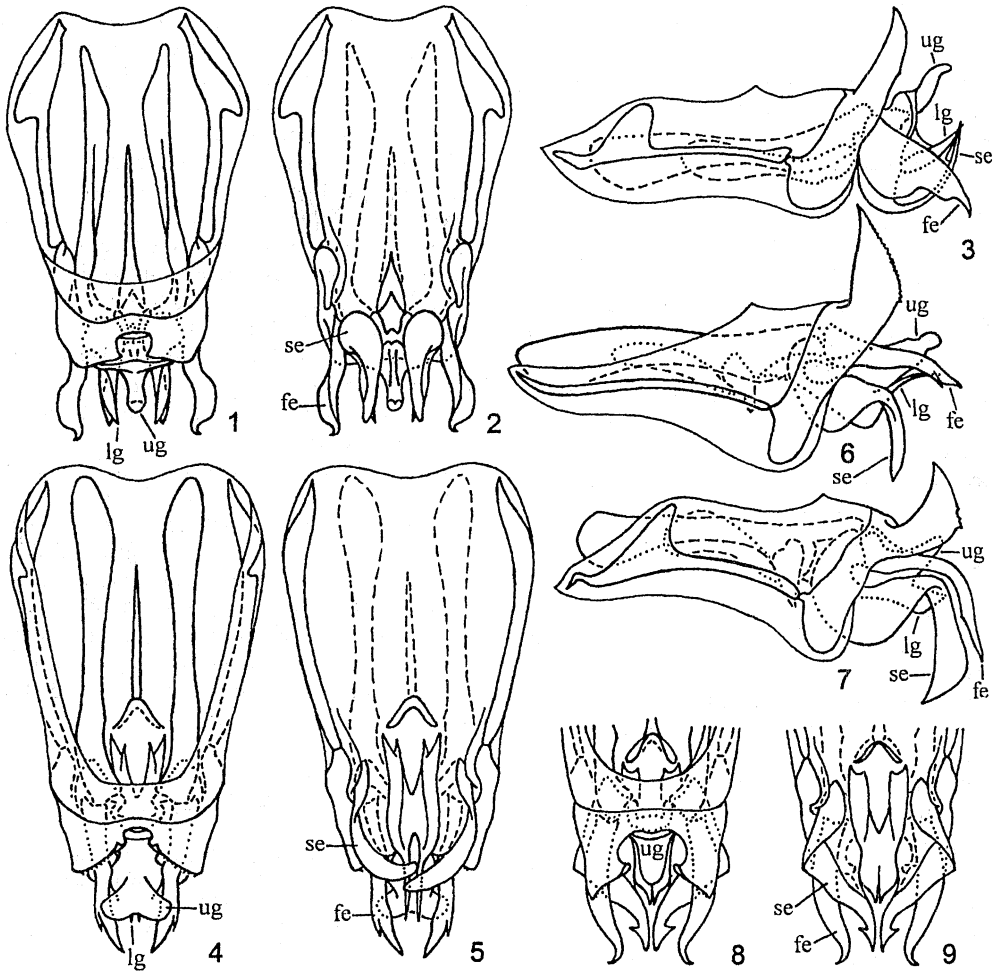
Comparison. This genus is possibly related to the Australian *Tamborina* Otte & Alex., as in the both genera *R* is fused with *M* before the lancet-like area on the male tegmina (Figs XXV: 8, 12), whereas in all previous genera this fusion is absent (Fig. XXV: 11). In addition, both genera are very similar in the general outlines of the male genitalia, but the epiphallus of *Idiotrella* is distinctly shorter and with much wider notch between the upper processes.

Idiotrella javae sp. n. (Figs XXV: 3-9; XXVI: 1-3)

Holotype. ♂, Java, 20-25 km SE of Bogor, env. of Cemande, Pangrango Mountains, 1000 m, forest, 27.XI-7.XII.1999, A. Gorochov (ZIAS).

Paratypes. 11 ♂, 10 ♀, same data as in holotype, but 9.XI-7.XII.1999 (ZIAS).

Description. *Male* (holotype). Head and pronotum more or less uniformly greyish, but with hardly visible darkening on hind part of vertex and along hind part of pronotal disc, small darkish spots under eyes, near lateral parts of anteclypeus, and along fore edge of pronotal disc; maxillary palpi with darkened apex and articulation of 3rd and 4th segments, antennal flagellum with numerous wide darkish bands, and lateral lobes of pronotum with dark dots. Venation of tegmina as in Fig. XXV: 7; coloration of tegmina greyish with darkened stripes along lateral edge of dorsal part and along medial edge of apical area, darkish spots on region of chords near proximal part of diagonal vein, and between some veins on upper part of lateral area, very light (whitish) spots near lateral and distal edges of mirror, veins and numerous cell on lateral part, and transverse veinlets between *M* and *CuA*. Hind wings greyish. Legs greyish with numerous dark dots and small darkish spots. Metanotal gland



Figs XXVI (1-9). *Idiotrella*, male. 1-3, *I. javae* sp. n. (holotype); 4-6, *I. karnyi* (Chop.); 7-9, *I. malaccaae* sp. n. (holotype). Genitalia from above (1, 4), from below (2, 5), and from side (3, 6, 7); their distal half from above (8) and from below (9).

Abbreviations: *fe*, first ectoparamere; *lg*, lower process (lobe) of guiding rod; *se*, second ectoparamere; *ug*, upper lobe of guiding rod.

similar to that in Fig. XXV: 1, but pubescent area of fore lobe distinctly smaller and almost quadrangular, and pubescent part of hind lobe also somewhat smaller.

Anal plate with a pair of characteristic lateral concavities and short hind median part directed downwards (Fig. XXV: 3); genital plate as in Fig. XXV: 4. Genitalia with not very wide notch between upper epiphallic processes; first ectoparameres wide, almost not curved, with short apical hook; second ectoparameres narrow, arched, directed upwards; guiding rod with short proximal part, rather narrow upper lobe directed almost upwards, and long lower processes connected

with second ectoparameres by membrane (Figs XXVI: 1-3).

Variation. Coloration sometimes lighter, light greyish or almost yellowish with less distinct darkenings.

Female. Similar to male, but dorsal part of tegmina slightly darker (brownish grey or brown) with dark and light (almost whitish) spots along bend of tegmen (dark spots much longer than light ones). Venation of tegminal dorsal part as in Fig. XXV: 9.

Genital plate with small apical notch (Fig. XXV: 5); apex of ovipositor as in Fig. XXV: 6.

Length (mm). Body: ♂ 21-24, ♀ 19-22; body

with wings: ♂ 30-32, ♀ 31-34; pronotum: ♂ 3.2-3.5, ♀ 3.3-3.6; tegmina: ♂ 19-21, ♀ 20-22; hind femora: ♂ 13.5-14.5, ♀ 14-15; ovipositor 13.5-15.

Comparison. *I. javae* is similar to *I. karnyi*, but these species clearly differ in the details of the male genitalia (for comparison see Figs XXVI: 1-6). The new species is distinguished from *I. pachonyx* and *I. coomani* by the differently shaped epiphallus in profile.

Idiotrella malaccae sp. n.
(Figs XXV: 1, 2; XXVI: 7-9)

Holotype. ♂, Thailand, prov. Surat Thani (Central Malacca), 40 km WSW of Phanom, env. of National Park Khao Sok, primary forest, 20-29.VII.1996, A. Gorochov (ZIAS).

Paratypes. Thailand: 2 ♂, same data as in holotype (ZIAS). Malaysia (Southern Malacca): 1 ♂, "Bukit Kutu, F. M. S., 3457 ft, 19.IX.30, N.C.E. Miller" [identified by Chopard as *Madasumma karnyi* Chp.] (BMNH).

Description. Male (holotype). Similar to *I. javae* in general appearance, but coloration brownish, without darkenings on head, along hind part of pronotal disc, on tegminal lateral part, and along medial edge of tegminal apical area. Metanotal gland differing from that of *I. javae* in distinctly larger and round pubescent area of fore lobe and somewhat larger pubescent part of hind lobe (Fig. XXV: 1). Anal and genital plates also similar to those of *I. javae*, but with slightly longer hind median part of anal plate (Fig. XXV: 2). Genitalia with very wide notch between upper epiphallic processes; first ectoparameres narrow, distinctly curved, with long apical hook; second ectoparameres with wide proximal part and narrower distal part directed downwards; guiding rod with slightly wider (than in *I. javae*) upper lobe directed backwards and partly upwards, short lower processes without distinct connection with second ectoparameres, and longer (than in *I. javae*) proximal part (Figs XXVI: 7-9).

Variation. Lateral part of tegmina sometimes with slight darkenings between basal parts of branches of *Sc*.

Female unknown.

Length (mm). Body 20-22; body with wings 31-35; pronotum 3.2-3.5; tegmina 20-23; hind femora 14.5-16.

Comparison. *I. malaccae* clearly differs from all other congeners in details of the male genitalia.

Idiotrella karnyi (Chopard, 1929)
(Figs XXVI: 4-6)

Madasumma karnyi Chopard, 1929: 115-116.

Material. Malaysia: 1 ♂, "Perak, Hulu, Belum Exp., B. Camp, 5°30'07"N, 101°26'21"E, 13-14.IV.1994 (ZIAS); 1 ♂, "Johor. Tebran River, H.N. Ridley, 1907-184" [identified by Chopard as *Madasumma karnyi* Chop.] (BMNH).

Note. This species was described from Mentawai Islands near the western coast of Sumatra (Chopard, 1929). It is very similar to *I. malaccae*, but the male metanotal gland of *I. karnyi* is characterized by the distinctly larger pubescent area of hind lobe, and its male genitalia, by the longer upper epiphallic processes, narrower notch between them, shorter and almost straight first ectoparameres (provided with two short apical hooks), narrower distal part of second ectoparameres, and guiding rod with strongly widened apical part of upper lobe and much longer and narrower lower processes (Figs XXVI: 4-6).

Idiotrella? coomani (Chopard, 1939)
(Fig. XXV: 10)

Madasumma coomani Chopard, 1939: 79-80.

Material. Vietnam: 1 ♀, prov. Hoa Binh, distr. Da Bac, Tu Ly, secondary forest, 22.X.1990, A. Gorochov (ZIAS); 1 ♀, prov. Hoa Binh, distr. Mai Chau, env. of Mai Chau, 250 m, forest, 30.X-4.XI.1990, A. Gorochov (ZIAS); 1 ♀, prov. Ha Tay, mountain Ba Vi, 400 m, primary forest, 21-24.XI.1990, A. Gorochov (ZIAS).

Note. This species was described from a single male collected at "Hoa Binh" (Chopard, 1939). The above-mentioned females were collected near the type locality; these specimens are in good correspondence to the original description and probably belong to this species.

Description of female (nov.). Similar to female of *I. javae* in general appearance and tegminal venation, but coloration slightly more uniform (brown with slightly darkened upper part of head and pronotal disc, light brown legs and lateral part of tegmina, dark dots on pronotal lateral lobes and legs, dark base of tibiae and apical part of fore and middle femora, small sparse light spots on antennal flagellum and along lateral edge of tegminal dorsal part), and genital plate with deeper apical notch (Fig. XXV: 10).

Length of female (mm). Body 21-23; body with wings 28-32; pronotum 3.5-4; tegmina 18-21; hind femora 14.5-17; ovipositor 13-15.5.

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