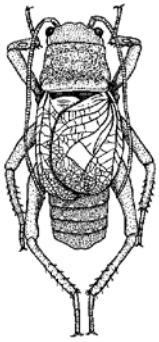

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NEW TAXA OF TETTIGONIIDAE (ORTHOPTERA) FROM VIETNAM

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Four new species of the subfamily Meconematinae (*Xizicus orlovi* **sp. n.**; *X. ryabovi* **sp. n.**; *X. hue* **sp. n.**; *Alloteratura bachma* **sp. n.**) as well as a new genus and three new species of the subfamily Phaneropterinae (*Tamdaopteron* **gen. n.**; type species – *T. major* **sp. n.**; *T. minor* **sp. n.**; *Mirollia elegantia* **sp. n.**) are described from Vietnam. The systematic position of *Tamdaopteron* **gen. n.** is briefly discussed.

KEY WORDS: Orthoptera, Tettigoniidae, taxonomy.

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Описываются 4 новых вида подсемейства Meconematinae (*Xizicus orlovi* sp. **n.**; *X. ryabovi* **sp. n.**; *X. hue* **sp. n.**; *Alloteratura bachma* **sp. n.**), а также новый род и 3 новых вида подсемейства Phaneropterinae (*Tamdaopteron* **gen. n.**; *T. major* **sp. n.** – типовой вид; *T. minor* **sp. n.**; *Mirollia elegantia* **sp. n.**) из Вьетнама. Кратко обсуждается систематическое положение нового рода.

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INTRODUCTION

The genera *Xizicus* Gorochov, 1993 and *Alloteratura* Hebard, 1923 are usually included in the tribe Meconematini. The genus *Mirollia* Stål, 1873 belongs to Mirolliini.

The tribal position of *Tamdaopteron* gen. n. is unclear. The type material of all species described here are deposited in the Zoological Institute of Russian Academy of Sciences (St. Petersburg).

***Xizicus (Eoxizicus) orlovi* Gorochov, sp. n.**
Figs 1-5

MATERIAL. Holotype – ♂, Vietnam, prov. Kon Tum, distr. Kon Plong, vill. Mang Canh, 1200 m, forest, III-IV 2005 (N. Orlov and S. Ryabov). Paratypes: 1♂, 4♀, the same data as for holotype.

DESCRIPTION. MALE (holotype). Coloration greenish with dark brown eyes and parallel narrow stripes along lateral edges of pronotal disc, more or less brownish spines on legs and line along anal edge of both tegmina. Wings long; tegmina slightly shorter than hind wings. Abdomen with a pair of small tubercles on hind edge of 10th tergite (distance between these tubercles rather large) and characteristic shape of cerci: proximal part of cerci rather thick and with two medial ridges (lower ridge comparatively long and sinuate, upper one short and more rounded); distal part of cerci distinctly narrower, almost straight, directed somewhat medially and upwards, with rounded apex (Figs 1-3).

Variations. Second male with slightly lighter eyes and darker spines of hind tibiae.

FEMALE. Similar to male, but sometimes with dark dots on both sides of apex of hind femora. Genital plate wide, arched in profile, and with shallow rounded notch at apex (Figs 4, 5); ovipositor long, straight, with acute apex of upper valves and very small hook at apex of lower valves.

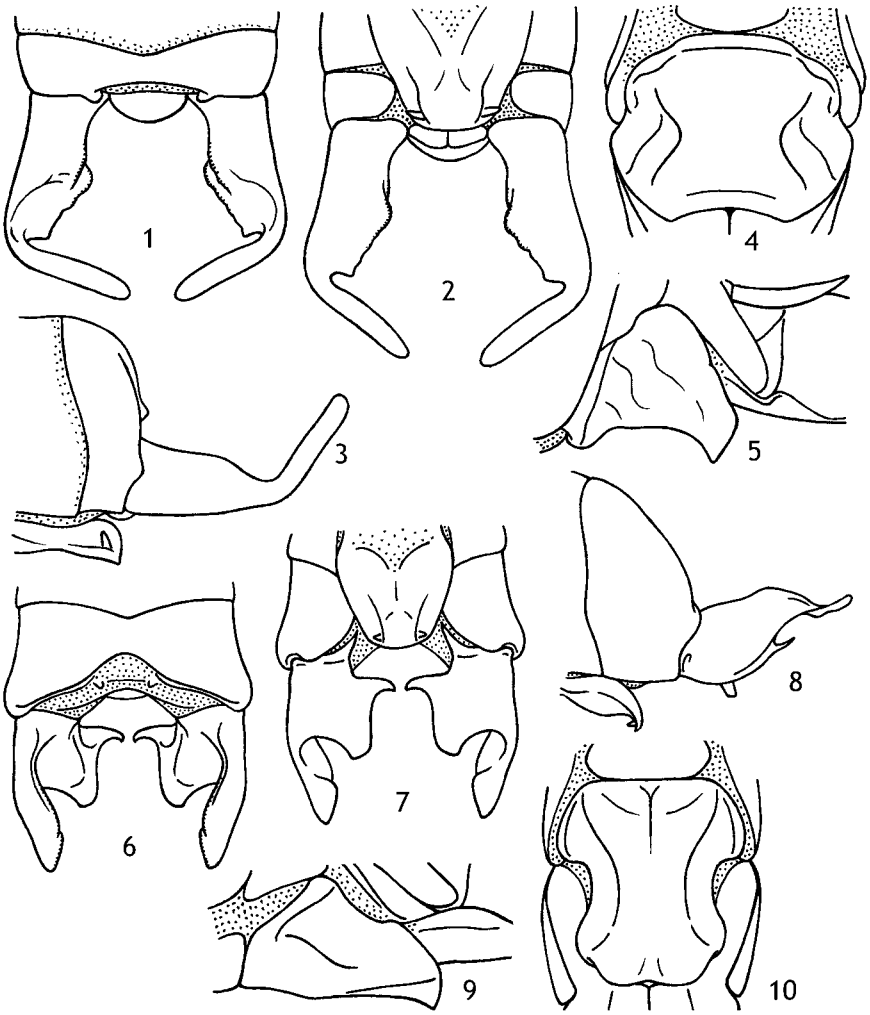
LENGTH (mm). Body: ♂ 12-13, ♀ 11-14; body with wings: ♂ 27-28, ♀ 28-29; pronotum: ♂ 4.8-5, ♀ 4.5-4.7; tegmina: ♂ 22-23, ♀ 23-24; hind femora: ♂ 11.5-12, ♀ 12.2-13; ovipositor 13-13.5.

COMPARISON. The new species is similar to Chinese *X. (E.) meridianus* (Xia et Liu, 1988) as well as Vietnamese *X. (E.) dao* Gorochov, 1998 and *X. (E.) duplum* Gorochov, 1998 in the shape of male cerci. It differs from all these species in the smaller processes of 10th abdominal tergite of male, from *X. dao* and *X. duplum* only, in the shorter medial ridges of male cerci and different shape of the female genital plate. From all other species of the subgenus *Eoxizicus* Gorochov, 1993, *X. orlovi* sp. n. is well distinguished by the characteristic structure of abdominal apex in both sexes.

ETYMOLOGY. The new species is named in honour of one of its collector, herpetologist N.L. Orlov.

***Xizicus (Eoxizicus) ryabovi* Gorochov, sp. n.**
Figs 6-8

MATERIAL. Holotype – ♂, Vietnam, prov. Kon Tum, distr. Kon Plong, vill. Mang Canh, 1200 m, forest, III-IV 2005 (N. Orlov and S. Ryabov).



Figs 1-10. *Xizicus* Gor.: 1-5) *X. orlovi* sp. n.; 6-8) *X. ryabovi* sp. n.; 9, 10) *X. hue* sp. n. Apex of male abdomen from above (1, 6), from below (2, 7), and from side (3, 8); female genital plate from below (4, 10) and from side (5, 9).

DESCRIPTION. MALE (holotype). Similar to holotype of previous species in coloration and structure of body parts, but distinguished by characteristic abdominal apex: tubercles of 10th tergite smaller and separated from its sclerotized part by membranous areas; distance between these tubercles somewhat smaller; cerci shorter, with large and lamellar medial ridge provided with hooked anterior process (directed medially and downwards) and lobe-like posterior projection; distal part of cerci also lamellar, twisted, and with two sloping lobe-like ridges near rounded apex (Figs 6-8).

FEMALE unknown.

LENGTH (mm). Body 11.5; body with wings 27; pronotum 4.4; tegmina 22; hind femora 11.

COMPARISON. In the structure of male cerci, *X. ryabovi* sp. n. is similar to *X. (E.) kulingensis* (Tinkham, 1943), but it differs from this Chinese species as well as from all other species of this subgenus (with known male) in the very small processes of 10th abdominal tergite of male separated from this tergite by membranous areas and in the characteristic shape of distal part of male cerci.

ETYMOLOGY. The new species is named in honour of one of its collector, herpetologist S.A. Ryabov.

***Xizicus (Eoxizicus) hue* Gorochov, sp. n.**
Figs 9, 10

MATERIAL. Holotype – ♀, Vietnam, prov. Thua Thien Hue, 40 km SE of city Hue, National park Bach Ma, 1300 m, forest, X 2003 (N. Orlov).

DESCRIPTION. FEMALE (holotype). Similar to both previous species, but coloration slightly lighter (greenish yellow with dark brown eyes, moderately brown narrow stripes along lateral edges of pronotal disc and spines of hind tibiae, light brownish spines of fore and middle tibiae, line along anal edge of tegmina, and dots on both sides of apex of hind femora). Structure of wings and ovipositor as in *X. orlovi* sp. n. Genital plate elongate, with almost straight lower edge in profile, a pair of rounded lateral nothes, strongly widened proximal part, and less widened distal part; latter part with sinuate lateral edges; apex of this part without distinct notch, but with very short longitudinal keel on ventral surface (Figs 9, 10).

MALE unknown.

LENGTH (mm). Body 12; body with wings 26; pronotum 4.1; tegmina 22; hind femora 11; ovipositor 10.2.

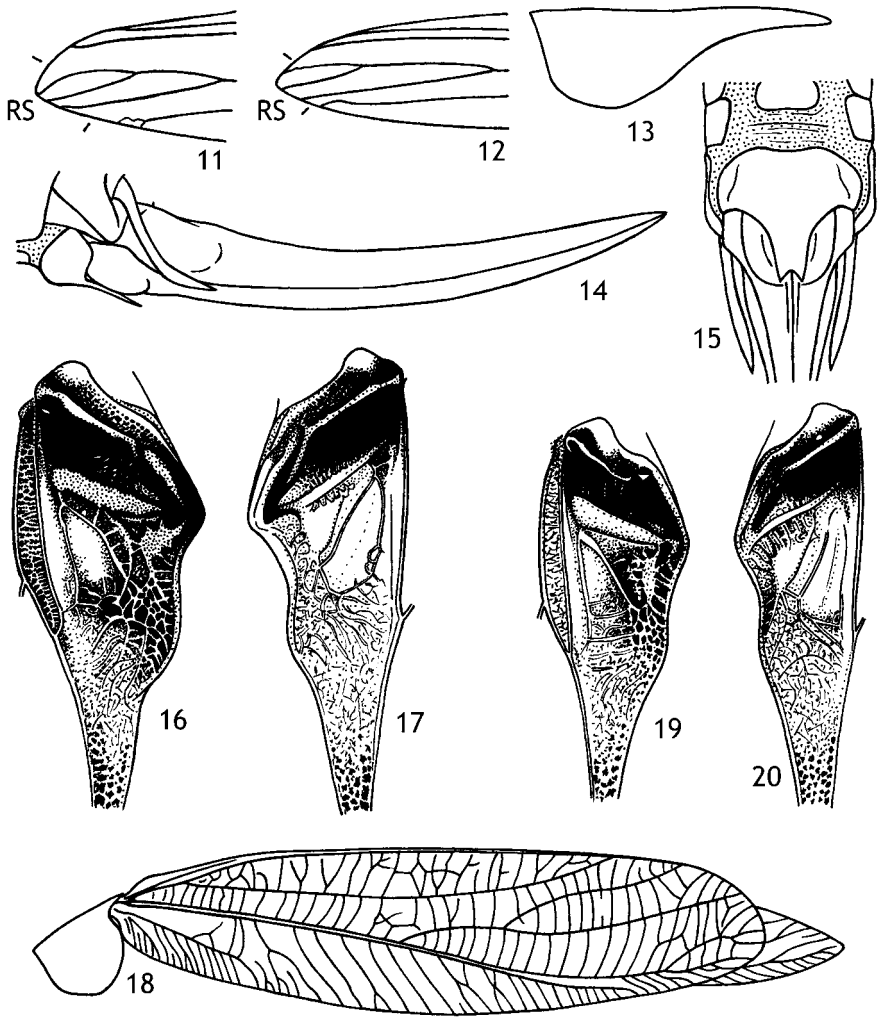
COMPARISON. The new species is most similar to *X. (E.) danangi* Gorochov, 1998 (Vietnam) in the general appearance and structure of female genital plate, but this plate in *X. hue* is shorter and lower, with the distal part more widened and the apex having longitudinal (not transverse) keel on ventral surface. From all other species of this subgenus (with known female), the new species is well distinguished by the characteristic shape of female genital plate.

***Alloteratura bachma* Gorochov, sp. n.**
Figs 12-15

MATERIAL. Holotype - ♀, Vietnam, prov. Thua Thien Hue, 40 km SE of city Hue, National park Bach Ma, 1300 m, forest, X 2003 (N. Orlov).

DESCRIPTION. FEMALE (holotype). Coloration uniformly greenish yellow, but with brown eyes, slight small darkenings on apical part of some segments of antennal flagellum, narrow light brownish stripe along anal edge of tegmina, and darkish apici of 3rd tarsal segments. Rostrum of head dorsoventrally depressed, with

rounded (from above) apex and longitudinal shallow concavity along median line on dorsal surface of rostrum; distance between antennal cavities very small; scape large; eyes globular, almost as long as scape; maxillar palpi typical of *Alloteratura*



Figs 11-20. *Alloteratura* Heb. and *Tamdaopteron* gen. n.: 11) *A. cervus* Gor.; 12-15) *A. bachma* sp. n.; 16-18) *T. major* sp. n.; 19, 20) *T. minor* sp. n. Tegminal distal part of male (11) and female (12); pronotum of female from side (13); female abdominal apex with ovipositor from side (14) and this apex with only base of ovipositor from below (15); stridulatory part of upper (16, 19) and lower (17, 20) male tegmina; pronotum and wings of female from side (18).

(with extremely short 5th segment and most long 4th one). Pronotum rather low, with long hind lobe and shallow humeral notch (Fig. 13). Tegmina extending to apex of hind femora and with narrow distal part; RS with base in proximal part of tegmen and 3 branches in distal one; first branch of RS almost straight and with apex situated before tegminal apex (Fig. 12). Hind wings not reaching tegminal apex for 0.5 mm. Tibiae distinctly longer than femora; fore and middle tibiae with 3 inner and 4 outer lower spines; these spines rather short in fore tibiae and very small in middle ones; hind legs without any spines on femur and with numerous denticle-like spines on both lower keels of tibia. Abdominal apex with rather long and narrow cerci, characteristic genital plate, and rounded lobes on ventral surface of base of ovipositor lower valves (Figs 14, 15); ovipositor long, not narrow, gradually narrowing to acute apex, and slightly curved upwards (Fig. 14).

MALE unknown.

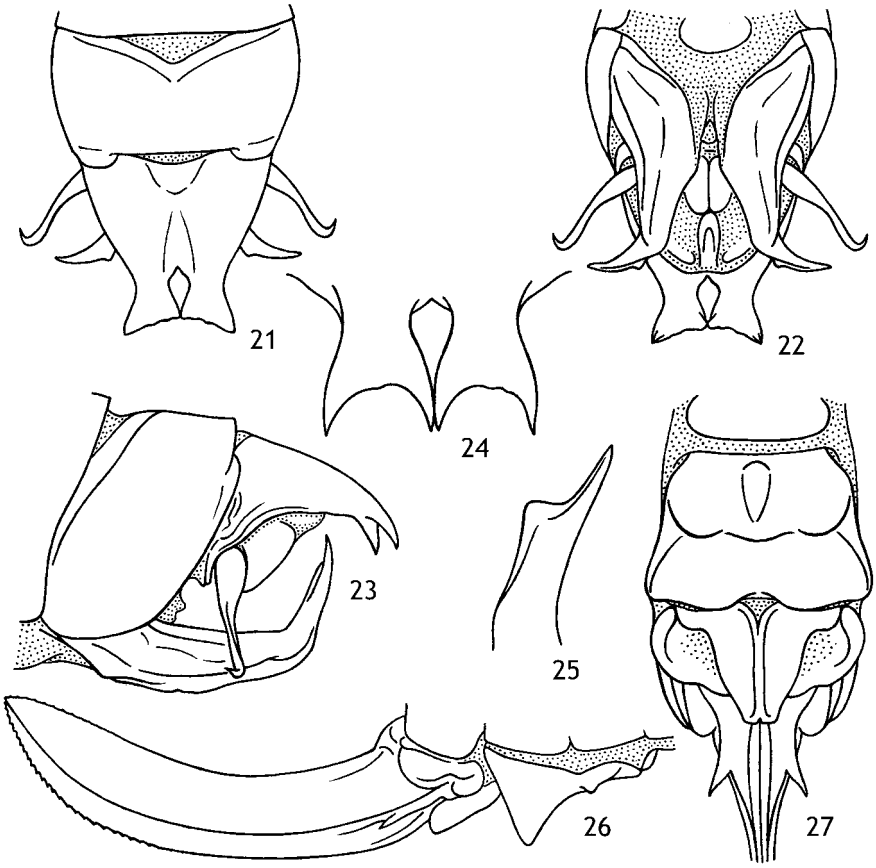
LENGTH (mm). Body 10; body with wings 14.5; pronotum 4.8; tegmina 11; hind femora 9.8; ovipositor 8.

COMPARISON. This new species is most similar to *A. cervus* Gorochov, 1998 from Vietnam, but it differs in the narrower distal part of tegmina, almost straight first branch of RS, situation of apex of this branch before tegminal apex (for comparison see Figs 11 and 12), and distinctly longer hind wings (in *A. cervus*, these wings are not reaching tegminal apex for 1.2-1.3 mm). From all other congeners, *A. bachma* sp. n. is distinguished by the almost uniform coloration in combination with characteristic shape of rostrum, pronotum, tegmina, female genital plate, and ovipositor.

Genus *Tamdaopteron* Gorochov, gen. n.

Type species - *Tamdaopteron major* sp. n.

DESCRIPTION. Size rather large; coloration green with dark spots on dorsal part of tegmina. Head rather high, with globular and not very large eyes; rostrum between antennal cavities very narrow, with rounded (from above) apex, sinuate upper edge (in profile), and distinct concavity on dorsal part of rostrum along its median line. Pronotum typical of Phaneropterinae with well developed humeral notches (Fig. 18); sternites of thorax without spines. Legs long and narrow, with spine on fore coxae and both tympana opened; lower inner keel of fore femora, lower outer keel of middle femora, and both lower keels of hind femora with small denticles; fore and middle tibiae with rather numerous small spines on all keels; hind tibiae with numerous denticles on all keels also. Tegmina long, not wide, with slightly rounded costal and almost straight anal edges, round apex, and very narrow dorsal part; base of RS in proximal half of tegmen; RA and RS with 2 and 2-3 branches respectively (Fig. 18); male stridulatory apparatus well developed (but not large), elongate, with sinuate medial edges, rather small and narrow mirror, heavily sclerotized area between mirror and stridulatory vein (this area larger in lower tegmen), and rather dense and irregular venation in other parts of this apparatus (Figs 16, 17, 19, 20). Hind wings 1.1 times as long as tegmina; their exposed distal



Figs 21-27. *Tamdaopteron major* sp. n.: 21-25) male; 26, 27) female. Abdominal apex from above (21), from below (22), and from side (23); hind processes of 10th abdominal tergite from above and slightly behind (24); distal part of right sclerite of genital plate from behind and slightly below (25); lower part of abdominal apex with ovipositor from side (26) and this apex with only base of ovipositor from below (27).

part (Fig. 18) not membranous. Male abdominal apex (Figs 21-25, 28-32) with characteristic 10th tergite having a pair of hind processes directed backwards and slightly downwards; epiproct small, oval, and elongate; its apex directed more or less downwards; cerci rather small, with thin distal half and small apical hook; genital plate consisting of a pair of movable longitudinal sclerites (each of them with distal part curved upwards) and soft area between proximal parts of these sclerites (in rest position, one of these sclerites usually lied on the other); genitalia membranous. Female abdominal apex with 7th sternite heavily sclerotized, large, having median concavity in proximal part and a pair of lobes in distal part; genital plate narrower, with elongate median lobe and longitudinal keel on its ventral surface; base of ovi-

positor with a pair of rounded lateral lobes and a pair of spine-like processes behind them; ovipositor elongate, not strongly curved upwards, with small and very small denticles along lower and upper edges of ovipositor distal part respectively (Figs 26, 27).

SPECIES INCLUDED. Type species and *T. minor* sp. n.

COMPARISON. The new genus is somewhat similar to the genus *Holochlora* Stål, 1873 in the structure of male abdominal apex, but it differs from *Holochlora*, Holochlorini and numerous other genera of Phaneropterinae in the both tympana not slit-like. From the genera of this subfamily with all tympana opened, *Tamdaopteron* gen. n. is distinguished by the following combination of characters: the rostrum is not very long; keels on pronotum and spines on fore coxae are absent; the legs are with not lamellar spines; structure of wings is typical of majority of Phaneropterinae, but with very narrow dorsal part of tegmina; the stridulatory apparatus and male abdominal apex are characteristic, the ovipositor is well developed and comparatively long.

DISCUSSION. The structure and coloration of stridulatory apparatus (and analogous areas of female) in *Tamdaopteron* gen. n. shows remarkable similarity to that of *Stictophaula* Hebard, 1923 and *Arnobia* Stål, 1876 (for comparison see Gorochov, 1998: Figs 1, 3, 5-10, 82-84). However, majority of other characters of these genera are very different. Nevertheless, this partial similarity may be a certain indication of relationship between these genera as well as parallel appearance of slit-like tympana or independent resurrection of primitive condition (tympana opened) in different branches of the subfamily. The possibility of such modifications in tribes Elimaeini or Ducetiini respectively was discussed in some previous papers (Gorochov & Kang, 2002; Gorochov, 2004).

Tamdaopteron major **Gorochov, sp. n.**
Figs 16-18, 21-27

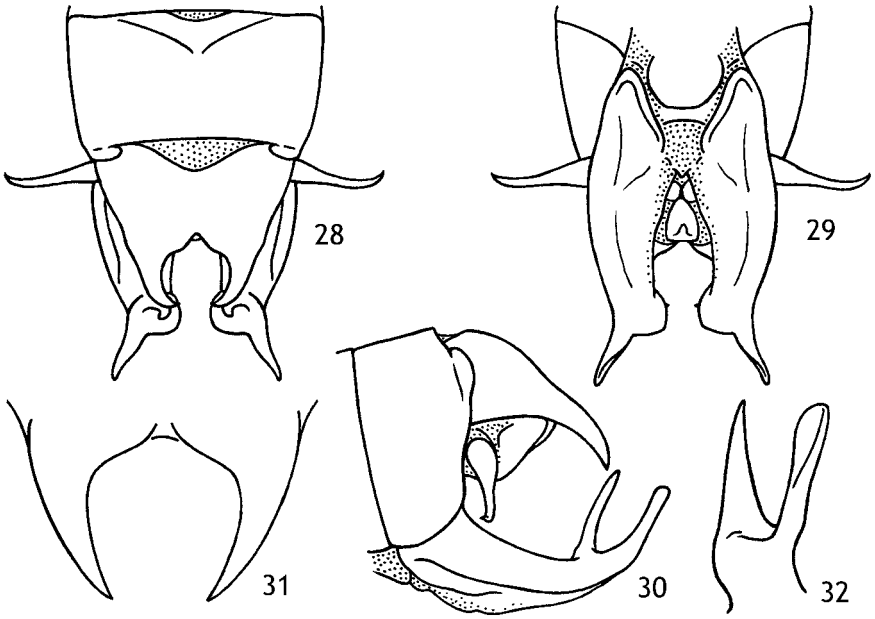
MATERIAL. Holotype – ♂, Vietnam, prov. Vinh Phu, environs of town Tam Dao, 800-900 m, primary forest, at light, 1-11.VI 1995 (A. Gorochov). Paratypes: 6♂, 1♀, the same locality as for holotype, 17.V-11.VI 1995 (A. Gorochov).

DESCRIPTION. MALE (holotype). Pronotum with roundly convex (from above) hind lobe; humeral notch of pronotum in profile as in Fig. 18. Tegminal RS with 3 branches; base of RS situated as in Fig. 18; stridulatory part of both tegmina rather wide, with strongly sinuate medial edge and blackish proximal area; in upper tegmen areas behind stridulatory vein and near mirror also darkened, greyish brown (Figs 16, 17). Hind processes of 10th abdominal tergite wide and bifurcated at apex; distance between these processes very small (Figs 21, 24); cerci and general shape of genital plate as in Figs 21-23; distal part of sclerites of this plate curved upwards and laterally, with long spine-like outer apical process and short lobe-like inner apical projection (Figs 22, 23, 25).

VARIATIONS. In majority of paratypes tegminal RS with 2 branches only.

FEMALE. Similar to male, but coloration of dorsal part of tegmina more uniform, greenish with small blackish spot near base of lateral edge of this part (almost as in female of *Stictophaula*). Tegminal RS as in latter males (Fig. 18); abdominal apex and ovipositor as in Figs 26, 27.

LENGTH (mm). Body: ♂ 36-42, ♀ 32; body with wings: ♂ 57-59, ♀ 56; pronotum: ♂ 7.2-7.5, ♀ 7.3; tegmina: ♂ 43-45, ♀ 43; hind femora: ♂ 26-29, ♀ 28; ovipositor 12.5.



Figs 28-32. *Tamdaopteron minor* sp. n., male: 28) abdominal apex from above; 29) same from below; 30) same from side; 31) hind processes of 10th abdominal tergite from above and slightly behind; 32) distal part of right sclerite of genital plate from behind and slightly below.

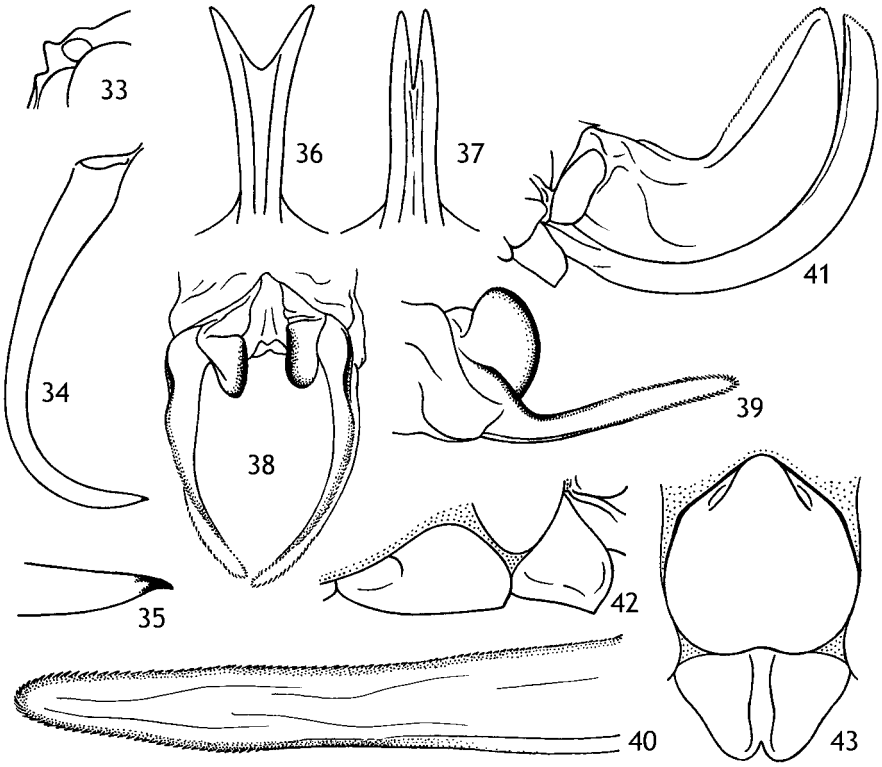
Tamdaopteron minor **Gorochov, sp. n.**
Figs 19, 20, 28-32

MATERIAL. Holotype – ♂, Vietnam, prov. Vinh Phu, environs of town Tam Dao, 800-900 m, primary forest, at light, 17-31.V 1995 (A. Gorochov).

DESCRIPTION. MALE (holotype). Very similar to previous species in coloration and shape of body parts, but distinguished by following characters: tegminal RS with 2 branches; base of tegminal RS situated somewhat nearer middle part of tegmen; stridulatory part of both tegmina slightly narrower and with less sinuate medial edge (Figs 19, 20); hind processes of 10th abdominal tergite narrow and with acute apex; distance between these processes rather large (Figs 28, 31); cerci with less hooked apex; genital plate with deeply bifurcated distal part (Figs 29, 30, 32).

FEMALE unknown.

LENGTH (mm). Body 32; body with wings 53; pronotum 6.5; tegmina 39; hind femora 22.



Figs 33-43. *Mirollia elegantia* sp. n.: 33) rostrum of head from side; 34) left male cercus from above; 35) its apex from above; 36, 37) distal half of male genital plate from behind and slightly below; 38) male genitalia from above; 39) same from side; 40) their lateral process from side; 41) ovipositor from side; 42) 7th abdominal sternite and genital plate of female from side; 43) same from below.

***Mirollia elegantia* Gorochov, sp. n.**
Figs 33-43

MATERIAL. Holotype – ♂, Vietnam, prov. Kon Tum, distr. Kon Plong, vill. Mang Canh, 1200 m, forest, III-IV 2005 (N. Orlov and S. Ryabov). Paratypes: 2 ♂, same data as for holotype; 1 ♂, 1 ♀, Vietnam, prov. Quong Tri, distr. Huong Hoa, vill. Huong Lap, commune Ban Kup, 16°55’863” N, 106°35’361” E, 400 m, forest, V 2005 (N. Orlov).

DESCRIPTION. MALE (holotype). Size rather large. Coloration yellowish with characteristic pattern: very small stripe behind each of eyes, sparse small spots on almost all areas of tegminal lateral part, numerous dots on medial (anal) half of this part, and stridulatory part of upper tegmen dark brown (but latter part with light brown stridulatory vein and following yellowish marks: small proximal and distal spots, some veinlets behind stridulatory vein, and very narrow lateral stripe); outer parts of 2nd and 3rd antennal segments, rather numerous and not narrow rings on other parts of flagellum, 2 pairs of small spots on pronotal disc (before middle part and on lateral edges in hind part), small marks on femoral apici and larger ones near tympana, 3rd tarsal segments of all legs, outer and inner parts of 1st and 2nd segments of hind tarsi blackish; sparse dots on head (a pair under eyes and a pair near hind edge of genae) and on middle and hind legs reddish. Rostrum of head with well sinuate upper edge in profile (Fig. 33). Structure of thorax, wings, and legs rather typical of this genus. Cerci long, thin, not strongly hooked (Fig. 34), with apex as in Fig. 35; genital plate with long and narrow distal half; its apex with a pair of long and narrow lobes (Fig. 37); genitalia with characteristic (almost disc-like) medial lobes and long, narrow, denticulate lateral processes; upper and lower edges of these processes almost straight and more or less parallel (Figs 38-40).

Variations. Pronotum sometimes with an additional pair of small blackish spots near median part of hind edge of disc. In male from prov. Quong Tri reddish dots indistinct and genitalia with distal part of lateral processes slightly wider. Some differences in shape of genital plate in dry specimens (Figs 36, 37) may be result of softness of its apical lobes in fresh insects.

FEMALE. Similar to male from prov. Quong Tri, but spots and dots on lateral tegminal part less distinct, dorsal tegminal part yellowish, and 3rd tarsal segments lighter (light brown with dark brown proximal stripe and distal part). Genital plate short, with small apical notch only (Figs 42, 43); ovipositor as in Fig. 41.

LENGTH (mm). Body: ♂ 13-16, ♀ 17.5; body with wings: ♂ 31-33, ♀ 36; pronotum: ♂ 5.2-5.5, ♀ 5; tegmina: ♂ 23-25, ♀ 26; hind femora: ♂ 12.5-14, ♀ 14; ovipositor 5.8.

COMPARISON. This species is similar to *M. longipinna* Ingrisch et Shishodia, 1998 (India) and *M. angusticerca* Gorochov et Kang, 2004 (China) in the shape of male cerci, male genital plate, and male genitalia, but the new species is distinguished from them by the lateral processes of male genitalia distinctly longer, somewhat narrower, and with almost straight upper and lower edges.

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