

Taxonomic study of Mexican Phalangopsinae (Orthoptera: Gryllidae)

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Two new genera, 20 new species, and 4 new subspecies of spider-like crickets (tribes Luzarini and Paragryllini) are described from the following Mexican states: Veracruz, Chiapas, Oaxaca, and Tabasco. Keys to Mexican species of the genera studied are given.

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This paper contains descriptions of new taxa of Phalangopsinae from tropical forests of Mexico with keys to Mexican species for all genera considered. It is based on the material from Zoological Institute, Russian Academy of Sciences, St. Petersburg (ZIAS) and the Natural History Museum, London (BMNH). The terminology of the male genital structures is given after Gorochov (1995, 2002). It is presented here in Figs 1, 2, 39, 40, 48, 49, 55, 59, 73-75, 84-89. This terminology is a somewhat modified variant of that by Randell (1964) with additions from some other authors (Alexander & Otte, 1967). The genital structure of most crickets is described with help of this terminology.

As noted previously (Gorochov, 2002), "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". So, the same term can be used for structures of convergent origin as well as for homologous structures. This is especially important when origin and homology of structures are more or less unclear (usual situation in Grylloidea). Another approach would force us to give numerous different terms for numerous similar structures in different groups of crickets.

Desutter-Grandcolas (2003) wrote that as different dorsal genital sclerotizations in different superfamilies of Ensifera were called the epiphallus by Gorochov, "this author thus considered that the dorsal sclerites present in Gryllidae, Tettigoniidae and Rhaphidophoridae are homologous". But the book by Gorochov (1995) cited by Desutter-Grandcolas contains a special chapter about the evolution of genitalia and a scheme (Fig. 1155)

with clear statements that many of sclerotizations on the dorsal (epiphallic) fold of the male genitalia in many branches of Ensifera have independent origin from the same membranous fold, and it is very difficult to understand their homology to a particular membranous area of this fold.

Tribe **Luzarini** Hebard, 1928

In the catalogue by Chopard (1968), the genera *Amphiacusta* Sauss. and *Phalangopsis* A.-Serv. were included in the same tribe Heterogryllini Hubbell, 1938, but not in Luzarini. My study of the male genitalia in *Amphiacusta* and *Luzara* Walk. showed that they are rather similar in these genera, but Chopard's opinion led me to provisional consolidation of the group Amphiacustae Hubbell, 1938 with the tribe Phalangopsini Blanchard, 1845, as I had no opportunity to study the male genitalia of *Phalangopsis* (Gorochov, 1986). Later, the genus *Amphiacusta* was included in Luzarini (Desutter, 1987), but Otte (1994) returned it in Heterogryllini (and illogically transferred *Heterogryllus* Sauss. to Phalangopsini), and Gorochov (1995), lacking material on *Phalangopsis* and *Heterogryllus* for checking these views, simply repeated his own previous supposition.

Now (after my study of *Phalangopsis*, but not of *Heterogryllus*), I agree that the Amphiacustae are more related to Luzarini than to Phalangopsini and may be placed in Luzarini because of the similar type of the male genitalia and ovipositor. Their male genitalia (Figs 1, 2, 39, 40, 48, 49, 55, 59) have a characteristic epiphallus consisting of a more or less transverse median bridge and a pair of lateral arms usually directed backwards, and a pair of ectoparameres of unclear origin often

divided into 2 movable, more or less sclerotized structures (sometimes upper projections or processes of lateral epiphallal arms are separated from the main body of these arms and more or less movable; in this case, they are here named "lateral ectoparameres", the previous ectoparameres are here named "medial ectoparameres", and separate parts of the latter ectoparameres, "dorsomedial and ventromedial ectoparameres" and so on) [in Phalangopsini, the epiphallus is rather simple in shape, and in Paragryllini (their epiphallus is partly similar to that of Luzarini), ectoparameres are absent (Figs 73-75, 84-88) or originated from movable hind lateral lobes of median epiphallal bridge (Fig. 89)]. The ovipositor of Luzarini in profile is with the apical part of lower valves almost completely covered by the apical part of upper valves (Fig. 29, 41) or with the lower valves well exposed from base to apex (Figs 50, 58) [the distal part of ovipositor of Luzarini sometimes similar to that of Phalangopsini, but not to that of Paragryllini (for comparison, see Figs 71, 79)].

Genus **Noctivox** Desutter-Grandcolas & Hubbell, 1993

Note. This genus is known only from Mexico. It comprises large spider-like crickets with rather wide (oval or almost round) tegmina in male, which are transformed into a large stridulatory apparatus. Females of these crickets are apterous, and their males are lacking hind wings. At night, these crickets usually sing or walk (with help of their long and rather thin legs) on the bark of tree trunks not far from the ground; at daytime, they sit in the hollows of trees (sometimes in the cavities under died bark or under died wood). The diagnostic characters of this genus were published by Desutter-Grandcolas (1993). She wrote that "outside Chiapas, only a few troglotic species are known in Amphiacustae: they belong to the genus *Noctivox* and are quite strictly localized in Oaxaca and Veracruz". However, all species of *Noctivox* collected by me and my colleagues in all these states are not associated with true caves.

Key to species and subspecies of *Noctivox*

1. Fore tibiae with only inner tympanum (sometimes also with traces of outer tympanum) 2
 - Fore tibiae with both inner and outer tympana ... 10
2. Male genitalia: median epiphallal bridge comparatively long and narrow (Figs 12, 16); lateral ectoparameres distinctly bifurcate in distal part (Figs 13, 14, 17, 18). Female genital plate with moderately deep hind median notch and rounded hind lateral lobes (Figs 15, 19) ... 3
 - Male genitalia: median epiphallal bridge short and wide (Fig. 20); lateral ectoparameres not bifurcate or almost not bifurcate in distal part. Female genital plate with deep (distinctly deeper than in Fig. 15) or very small

- (much smaller than in Fig. 19) hind median notch, or without notch (Fig. 23); hind lateral lobes of this plate undeveloped (Fig. 23) or diverse 4
- 3. Male genitalia: median epiphallal bridge with large hind median notch (Fig. 12); lateral ectoparameres with proximal part wider than distal part (Fig. 13) and inner distal process rounded and directed partly upwards in relation to longest outer distal process (Fig. 14). Female genital plate with comparatively deep hind median notch (Fig. 15); female hind femora almost 1.1 times as long as ovipositor. [Eastern Veracruz] **N. santiagoi** sp. n.
 - Male genitalia: median epiphallal bridge with small hind median notch (Fig. 16); lateral ectoparameres with sclerotized proximal part narrower than distal one (Fig. 17) and inner distal process acute and directed partly downwards in relation to longest outer distal process (Fig. 18). Female genital plate with not deep hind median notch (Fig. 19); female hind femora 1.4-1.5 times as long as ovipositor. [Eastern Veracruz] **N. alejandroi** sp. n.
- 4. Male genitalia with hooked lateral ectoparameres. Female genital plate with deep hind median notch and rounded hind lateral lobes 5
 - Male genitalia with more or less square lateral ectoparameres from above (Fig. 21), and/or female genital plate different 6
- 5. Stridulatory vein of male tegmina with 253-291 teeth. Female probably indistinguishable from that of *N. bolivari*. [Western Veracruz; Northern Oaxaca] **N. chopardi** Des.-Grand.
 - Stridulatory vein of male tegmina with 218-245 teeth. Female probably indistinguishable from that of *N. chopardi* [Western Veracruz] **N. bolivari** (Chop.)
- 6. Male genitalia with median epiphallal bridge almost lacking hind median lobe. Female genital plate with very small hind median notch 7
 - Male genitalia with median epiphallal bridge having distinct median lobe (Fig. 20), and/or female genital plate different 8
- 7. Male genitalia with proximal part of lateral ectoparameres distinctly widened in profile. Female probably indistinguishable from that of *N. dissimilis*. [Western Chiapas] **N. hubbelli** Des.-Grand.
 - Male genitalia with proximal part of lateral ectoparameres not widened in profile. Female probably indistinguishable from that of *N. hubbelli*. [Northern Chiapas] **N. dissimilis** Des.-Grand.
- 8. Head with almost straight upper edge in profile and large lateral ocelli (Fig. 3) 9
 - Head with rather strongly curved upper edge in profile and small lateral ocelli (Fig. 4). Female genital plate without any hind notch, but with small hind median lobe (Fig. 23). [Eastern Chiapas] (male unknown) ... **N. mikhaili** sp. n.
- 9. Fore surface of epicranium with distinct light vertical median stripe. Male genitalia as in Figs 20-22. [North-eastern Chiapas] (female unknown) **N. sergeyi** sp. n.
 - Fore surface of epicranium with brown median area. Female genital plate with moderately deep hind notch and almost acute hind lateral lobes (Fig. 24). [Southern Oaxaca] (male unknown) **N. oaxacae** sp. n.
- 10. Male genitalia with median epiphallal bridge almost lacking hind median notch, and/or female genitalia as follows: genital plate with hind median notch not very deep (less deep than in Figs 28, 33), ovipositor 1.2-1.3 times as long as hind femora 11
 - Male genitalia with median epiphallal bridge having more or less small (but distinct) hind median notch

- (Figs 25, 30, 34), and/or female genitalia as follows: genital plate with hind median notch deeper (as in Figs 28, 33), ovipositor less long (usually not longer than hind femora) 12
11. Light median vertical stripe on fore part of epicranium very narrow. Male genitalia with lateral ectoparameres almost straight in profile. Ovipositor almost 1.2 times as long as hind femora. [Southern Chiapas] **N. minor** Des.-Grand.
 - Light median vertical stripe on fore part of epicranium rather wide. Ovipositor almost 1.3 times as long as hind femora. [Central Chiapas] (male unknown) **N. longixipha** Des.-Grand.
 12. Male genitalia with median epiphallallic bridge comparatively long (Figs 25, 30) and lateral ectoparameres having rather wide distal half (Figs 26, 31); ovipositor subequal to hind femora in length 14
 - Male genitalia with median epiphallallic bridge distinctly shorter (Fig. 34) and lateral ectoparameres having distinctly narrower distal half (Fig. 35); ovipositor subequal to hind femora in length or slightly shorter. If not this combination of characters, hind femora approximately 1.1 times as long as ovipositor 16
 13. Male genitalia: median epiphallallic bridge with not very small hind median notch (Fig. 25); most of dorsolateral edges of lateral ectoparameres keel-like (Figs 26, 27). Hind lobes of female genital plate with weakly distinct (rounded or almost angular) convexities on medial edges (Fig. 28). [Western Chiapas] **N. sanchezi sanchezi** Des.-Grand.
 - Male genitalia: median epiphallallic bridge with smaller hind median notch (as in Fig. 30); most of dorsolateral edges of lateral ectoparameres not keel-like (Figs 31, 32). Hind lobes of female genital plate with more distinct (distinctly angular) convexities on medial edges (Fig. 33). [Central Chiapas] **N. sanchezi ocosingo** ssp. n.
 14. Body small (length of pronotum 2.3 mm in male and 2.6–3 mm in female). Male genitalia with slightly curved distal part of lateral ectoparameres in profile. Ovipositor almost as long as hind femora. [Western Chiapas] **N. tzotzila** Des.-Grand.
 - Body larger (length of pronotum 2.8–2.9 mm in male and 3.3–3.6 mm in female). Male genitalia with straight distal part of lateral ectoparameres in profile (Fig. 36), and/or ovipositor slightly shorter than hind femora 15
 15. Pronotal lateral lobes almost uniformly dark brown. Male genitalia as in Figs 34–36. [Western Chiapas] **N. ocote** Des.-Grand.
 - Each pronotal lateral lobe with yellowish spot in fore part. [Southern Chiapas] (male unknown) **N. clava** Des.-Grand.

Noctivox santiagoi sp. n. (Figs 1, 2, 5–7, 12–15)

Holotype. ♂, **Mexico, Veracruz**, 15–20 km NE of town Catemaco, Los Tuxtlas (biological station of Mexico University), 2 km from Mexican Gulf, primary forest on hills, at night, on bark of died tree not far from ground, 6–17.XI.2006, A. Gorochov & A. Ovtshinnikov (ZIAS).

Paratypes. 8 ♂, 6 ♀, same data as holotype, but some specimens collected on bark of living trees and in hollows of died and living trees (1 ♀ collected as larve, imago reared I.2007) (ZIAS).

Description. **Male** (holotype). Coloration brown with indistinct large dark areas on head and pronotum as well as with light brown areas:

vertical stripe on fore surface of head; spots on clypeus, labrum, scapes, genae, under antennal cavities, and behind eyes; less distinct spots on pronotum and legs; most part of metanotal gland and dorsal part of left tegmen. Head with almost straight upper edge in profile (as in Fig. 3) and not very small, distinct lateral ocelli (their length almost equal to height of median ocellus, about 0.15 mm). Metanotal gland as in Fig. 7; tegmina extending to 6th abdominal tergite, with venation of dorsal part as in Fig. 5; fore tibiae with only inner tympanum, which is rather small and oval. Anal plate almost square, with rather wide and more or less truncate apex; genital plate also somewhat square, but slightly elongate, with roundly notched hind edge and longitudinal fold between this notch and very convex central part of this plate; genitalia (Figs 1, 2, 12–14) with deep median notch at hind part of median epiphallallic bridge (Fig. 12), bifurcate lateral ectoparameres having proximal part much wider than distal one (Fig. 13), and rounded apex of their inner process, which is directed partly upwards in relation to longest outer process (Fig. 14).

Variation. Coloration slightly lighter or hardly darker. Tegmina sometimes extending to 5th abdominal tergite. In one paratype, tegminal venation aberrant (Fig. 6).

Female. Coloration and shape of body similar to those of male, but with slightly spotted mesonotum and metanotum as well as with rounded apex of anal plate. Genital plate rather short, with a pair of widely rounded hind lobes and comparatively deep notch between them (Fig. 15); ovipositor long (hind femur approximately 1.1 times as long as ovipositor).

Length (mm). Body: ♂ 11–16, ♀ 11.5–17; pronotum: ♂ 2.3–3.2, ♀ 3–3.4; tegmina, ♂ 6.2–7; hind femur: ♂ 13–16.5, ♀ 16.5–18.5; ovipositor 15–16.5.

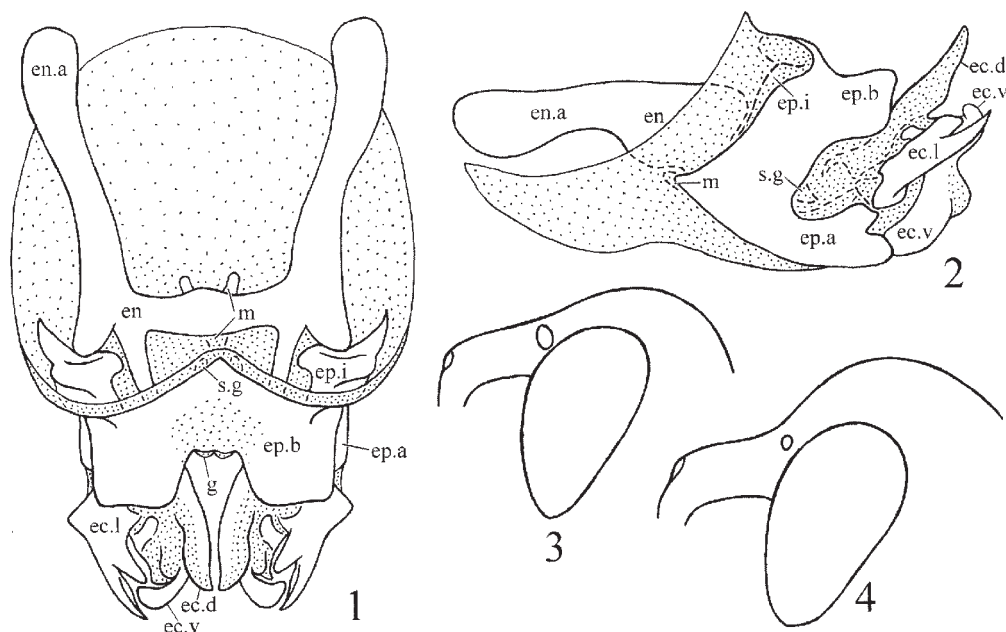
Etymology. This species is named in honour of Dr. Santiago Zaragoza Caballero, one of organizers of our field work in Mexico in 2006.

Noctivox alejandroi sp. n. (Figs 8, 9, 16–19)

Holotype. ♂, **Mexico, Veracruz**, 15–20 km NE of town Catemaco, Los Tuxtlas (biological station of Mexico University), 2 km from Mexican Gulf, primary forest on hills, at night, on bark of living tree not far from ground, 6–17.XI.2006, A. Gorochov & A. Ovtshinnikov (ZIAS).

Paratypes. 1 ♂, 2 ♀, same data as holotype, but one female collected in hollow of died tree (ZIAS).

Description. **Male** (holotype). Coloration similar to that of dark specimens of *N. santiagoi*, but upper part of head (excepting antennae) and pronotum almost completely dark brown, legs less spotted (brown with almost indistinct spots), metanotal gland less light (brown), and abdominal



Figs 1-4. *Noctivox*. 1, 2, *N. santiagoi* sp. n. (holotype); 3, *N. sergeyi* sp. n.; 4, *N. mikhailei* sp. n. Male genitalia from above (1) and from side (2); upper part of head from side (3, 4). Abbreviations: *ec.d*, dorsomedial ectoparamere; *ec.l*, lateral ectoparamere; *ec.v*, ventromedial ectoparamere; *en*, endoparamere; *en.a*, endoparameral apodeme; *ep.a*, lateral epiphallallic arm; *ep.b*, median epiphallallic bridge; *ep.i*, proximal epiphallallic invagination; *g*, guiding rod (membranous apex); *m*, mold of spermatophore attachment plate; *s.g.*, ventral sclerite of guiding rod base.

tergites darker (almost dark brown). Structure of body parts also similar to that of *N. santiagoi*, but distinguished by following characters: metanotal gland with distinctly narrower apical parts of median projection (Fig. 9); tegmina extending to only 4th abdominal tergite and with venation of dorsal part as in Fig. 8; genital plate with somewhat less convex central part; genitalia (Figs 16-18) with not deep median notch at hind part of median epiphallallic bridge (Fig. 16); sclerotized proximal part of lateral ectoparameres distinctly narrower than distal one (Fig. 17); apex of their inner process acute and directed partly downwards in relation to longest outer process (Fig. 18).

Variation. In paratype, fore tibiae with very small, hardly visible, and strongly reduced outer tympanum of left leg, and hind edge of median epiphallallic bridge with a pair of small additional notches (more distinct than in holotype) around median notch.

Female. Coloration and shape of body similar to those of male, but all thoracic tergites almost uniformly dark brown, and anal plate as in female of *N. santiagoi*. Genital plate also similar to that of *N. santiagoi*, but usually with less deep hind notch (Fig. 19); ovipositor short (hind femur 1.4-1.5 times as long as ovipositor).

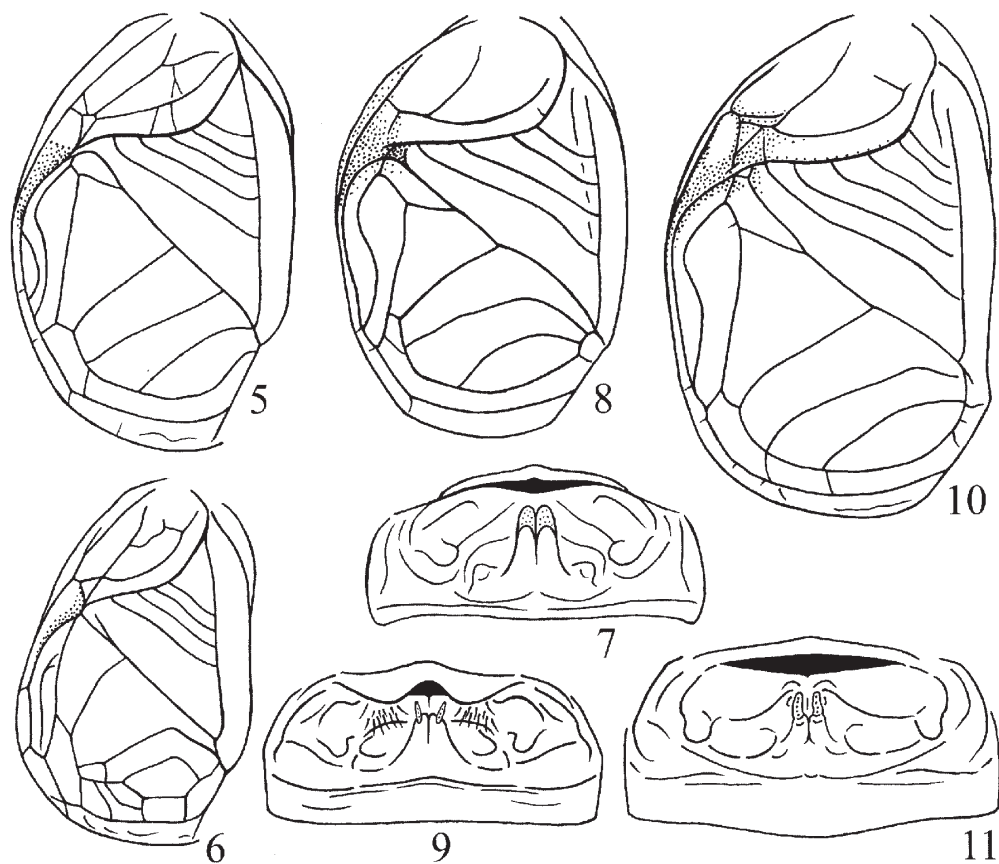
Length (mm). Body: ♂ 14.7-16.5, ♀ 15-17.7; pronotum: ♂ 2.7-2.9, ♀ 3-3.2; tegmina, ♂ 6.2-6.6; hind femur: ♂ 16-16.5, ♀ 16.5-17.5; ovipositor 11.5-11.8.

Etymology. This species is named in honour of Dr. Alejandro Zaldivar-Riverón, one of organizers of our field work in Mexico in 2006.

***Noctivox sergeyi* sp. n.** (Figs 3, 10, 11, 20-22)

Holotype. ♂, **Mexico**, *Chiapas*, environs of town Palenque, near Maya archaeological centre, primary forest, at daytime, in hollow of living tree, 25.V.2006 (collected as larve, imago reared IX.2006), A. Gorochoy & M. Berezin (ZIAS).

Description. **Male** (holotype). Coloration brown with numerous distinct lighter and darker spots on head, pronotum, and legs (including light vertical stripe on head as in *N. santiagoi* and *N. alexandroi*), as well as with more or less light brown mesonotum and metanotum, tegmina, fore abdominal tergites and sternites, basal part of cerci, and almost dark brown rest of abdominal tergites and apex of anal plate. Head with almost straight upper edge in profile (Fig. 3) and not very small, distinct lateral ocelli (their length almost equal to height of median ocellus, about



Figs 5-11. *Noctivox*, male. **5-7**, *N. santiagoi* sp. n. (5, 7, holotype); **8, 9**, *N. alexandroi* sp. n. (holotype); **10, 11**, *N. sergeyi* sp. n. Dorsal part of right tegmen (5, 6, 8, 10); metanotal gland from above (7, 9, 11).

0.2 mm). Metanotal gland with apical parts of median projection intermediate between those of *N. santiagoi* and *N. alexandroi* (Fig. 11); tegmina with venation of dorsal part as in Fig. 10; fore tibiae with only inner tympanum, which is rather small and oval. Anal plate as in *N. santiagoi* and *N. alexandroi*; genital plate intermediate between those of these species; genitalia (Figs 20-22) with median epiphallic bridge distinctly wider and shorter than in *N. santiagoi* and *N. alexandroi*; this bridge with 3 hind lobes (wide median and a pair of narrower lateral) and distinctly angular fore (proximal) edge (Fig. 20); lateral ectoparameres similar to those of *N. dissimilis* and *N. hubbelli*, but with not deep notch between almost acute medial apex and medial sclerotized lobe (this lobe directed upwards in relation to main body of ectoparamere) as well as with rather narrow proximal part in profile (Figs 21, 22).

Female unknown.

Length (mm). Body 18; pronotum 3.6; tegmina 9.7; hind femur 23.

Etymology. This species is named in honour of Dr. Sergey Sedov, one of organizers of our field work in Mexico in 2006.

***Noctivox mikhaili* sp. n.**
(Figs 4, 23)

Holotype. ♀, **Mexico**, *Chiapas*, distr. Ocosingo, Selva Lacandona between biosphere reserve Montes Azules and Bonampak natural monument (near border with Guatemala), environs of vill. Lacanja-Chansayab, primary forest, at night, 20-27.V.2007, M. Berezin & E. Tkatsheva (ZIAS).

Description. Female (holotype). Coloration similar to that of *N. sergeyi*, but somewhat darker, with less distinct lighter spots (from light brown to reddish brown), weakly spotted mesonotum and metanotum, and almost uniformly dark abdomen (including cerci). Head with characteristically curved upper edge in profile (Fig. 4) and very

small, partly reduced lateral ocelli (their length almost half of height of median ocellus, about 0.1 mm). Fore tibiae with only inner tympanum, which is rather small and oval. Anal plate with rounded hind part; genital plate rather short and with very short, roundly angular median lobe on hind edge (Fig. 23); ovipositor moderately short (hind femur approximately 1.3 times as long as ovipositor).

Male unknown.

Length (mm). Body 21; pronotum 4.4; hind femur 25; ovipositor 19.

Etymology. This species is named in honour of one of its collectors, Dr. Mikhail Berezin.

Noctivox oaxacae sp. n.

(Fig. 24)

Holotype. ♀, **Mexico**, *Oaxaca*, 35 km NNE of town Santa Cruz Huatulco (10 km N of vill. Xadani), 900-1000 m, partly primary/partly secondary forest, at night, on bark of living tree, 7-11.V.2006, A. Gorochov & M. Berezin (ZIAS).

Description. *Female* (holotype). Coloration similar to that of *N. sergeyi*, but without light vertical stripe on fore surface of head (median part of this surface brown), with weakly spotted mesonotum, metanotum, and abdominal tergites. Head with almost straight upper edge of head in profile and not very small, distinct lateral ocelli (almost as in *N. sergeyi*). Fore tibiae with only inner tympanum (rather small and oval). Anal plate as in *N. mikhaili*; genital plate with rather deep, angular hind median notch and almost acute hind lobes (Fig. 24); ovipositor long (hind femur almost 1.1 times as long as ovipositor).

Male unknown.

Length (mm). Body 16; pronotum 3.4; hind femur 18.7; ovipositor 17.4.

Noctivox sanchezi ocosingo ssp. n.

(Figs 30-33)

Holotype. ♂, **Mexico**, *Chiapas*, distr. Ocosingo, environs of town Ocosingo, ~1200 m, primary forest, at night, 17.V.2007, M. Berezin & E. Tkatsheva (ZIAS).

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

Description. *Male* (holotype). Coloration and structure of body very similar to those of male of nominotypical subspecies, but small differences in shape of genitalia present: median epiphallic bridge with smaller hind median notch (for comparison see Figs 25 and 30); lateral ectoparameres without keel-like dorso-medial edge on their main body (in *N. s. sanchezi*, this keel-like edge distinct and convex in profile; see Figs 26, 27 and 31, 32).

Variation. Paratype with only insignificant differences in tegminal venation (in limits of variability of nominotypical subspecies).

Female. All characters as in female of nominotypical subspecies, but hind lobes of genital plate with slightly more distinct angular convexities on medial edges (see Figs 28 and 33).

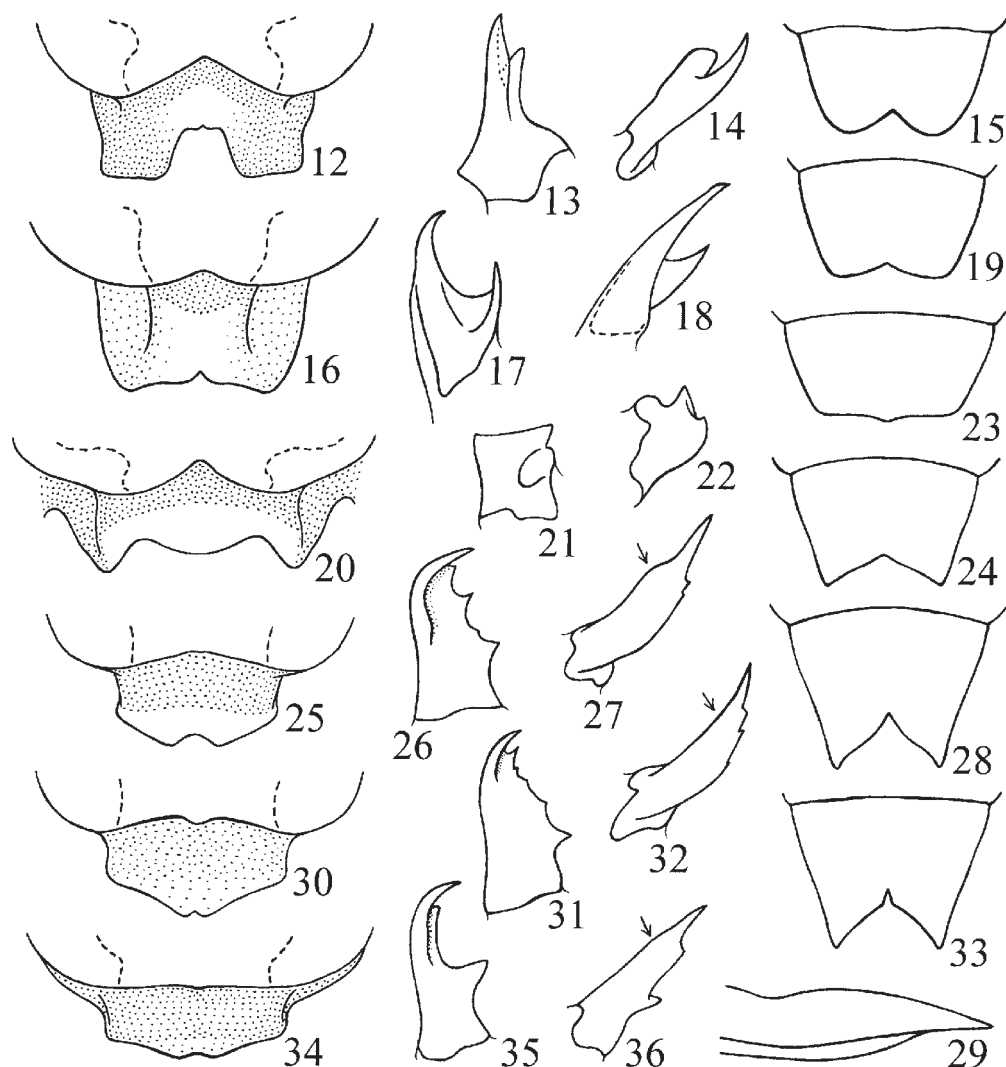
Length (mm). Body: ♂ 17-17.5, ♀ 17; pronotum: ♂ 2.9-3.2, ♀ 3.3; tegmina, ♂ 12.5-13; hind femur ♂ 19-20.3, ♀ 20; ovipositor 20.5.

Genus **Nemoricantor** Desuter-Grandcolas & Hubbell, 1993

Note. This genus is similar to *Noctivox*, but it is clearly distinguished by the partial reduction of lateral ectoparameres and less complex structure of ventromedial ectoparameres in the male genitalia (for comparison see Figs 1, 2 and 39, 40). Another characteristic feature is the presence of a wide whitish yellow band along lower edge of lateral part in the male tegmina. Some other distinctions are listed by Desuter-Grandcolas (1993). The studied representatives of this genus also are not associated with caves, and they are less associated with tree trunks than those of *Noctivox*; most of them were collected on taluses along mountain forest roads and on forest floor.

Key to Mexican species and subspecies of *Nemoricantor*

1. Male genitalia with lateral ectoparameres very small and completely membranous, dorsal part of ventromedial ectoparameres distinctly concave in profile, and epiphallic arms not very wide (not very high) (Fig. 40). Female with hind femora distinctly spotted and apex of genital plate not very deeply notched (Figs 43, 45) 2
- Male genitalia with lateral ectoparameres distinctly larger and partly sclerotized, dorsal part of ventromedial ectoparameres not concave in profile, and epiphallic arms probably much wider (higher). [Tabasco; Chiapas possibly near border with Tabasco (?)] (female insufficiently described) **N. aztecus** (Sauss.)
2. Male tegmina with rather narrow distal part (Fig. 37) and almost completely yellow lateral part situated under dark longitudinal “humeral” veins; male hind femora more or less uniformly brown. Female with rather wide apical notch of genital plate (as in Fig. 43), virtually indistinguishable from *N. maculatus maculatus* ssp. n. [Southern Chiapas] **N. vulgatus** sp. n.
- Male tegmina with distinctly less narrow distal part (Figs 42, 44) and yellow lower half of lateral part (its upper half, situated under dark longitudinal “humeral” veins, also dark); male hind femora distinctly spotted. Female with comparatively diverse apical notch of genital plate (Figs 43, 45) 3
3. Male tegmina with 3 oblique veins and dorsal part not very narrow near apex and not very wide between stridulatory vein and mirror (Fig. 42). Female with rather wide apical notch of genital plate (Fig. 43), virtually indistinguishable from *N. vulgatus* sp. n. [Southern Oaxaca] **N. maculatus** sp. n. (s. str.)
- Male tegmina with 5 oblique veins and dorsal part slightly narrower near apex and slightly wider between stridulatory vein and mirror (Fig. 44). Female



Figs 12-36. *Noctivox*. 12-15, *N. santiagoi* sp. n. (holotype); 16-19, *N. alexandroi* sp. n. (holotype); 20-22, *N. sergeyi* sp. n.; 23, *N. mikhailli* sp. n.; 24, *N. oaxacae* sp. n.; 25-29, *N. sanchezi sanchezi* Des.-Grand.; 30-33, *N. s. ocosingo* ssp. n. (holotype); 34-36, *N. ocote* Des.-Grand. Median epiphallal bridge from above (12, 16, 20, 25, 30, 34); right lateral ectoparamere from below and slightly behind (13, 17) and from side (14, 18, 22, 27, 32, 36); left lateral ectoparamere from above and slightly in front (21, 26, 31, 35); female genital plate from below (15, 19, 23, 24, 28, 33); apex of ovipositor from side (29).

genital plate with rather narrow apical notch (Fig. 45). [Western Chiapas] *N. maculatus tuxtla* ssp. n.

Nemoricantor vulgatus sp. n.
(Figs 37-41)

Holotype. ♂, **Mexico, Chiapas**, 130 km NW of city Tapachula, environs of vill. Ejido Las Golondrinas near reserve El Triunfo, 800-1000 m, on floor of secondary forest, at night, 13-17.V. 2006, A. Gorochoy & M. Berezin (ZIAS).

Paratypes. 4 ♂, 6 ♀, same data as holotype, but some specimens were collected on taluses along mountain road in primary forest (ZIAS).

Description. **Male** (holotype). Coloration spotted, but with almost unicolorous legs: head light brown with slightly darkened dorsal part, as well as darker (brown) small spot behind median ocellus, small, more or less transverse stripes around lateral ocelli, 6 vertical stripes on fore surface of epicranium, and spots behind eyes; antennae

with spotted scape and dark brown flagellum having very sparse and small light spots; palpi darkish with light upper longitudinal line; pronotum brown with yellowish stripe along fore and lower edges and dark spots along edges of brown area; pterothorax light brown with several slight darkenings on pleurites and metanotum; coxae light with darkish spots; femora almost uniformly reddish brown, but hind femora with narrow longitudinal yellowish stripe along median line of outer surface and weakly distinct darkish stripes on upper and lower parts of these femora (upper stripes oblique and numerous, lower stripes longitudinal and consisting of several spots partly fused with each other); tibiae brown with weakly distinct lighter and darker spots; tarsi more spotted; dorsal part in right (upper) tegmen brown and in left (lower) tegmen semitransparent; lateral tegminal part whitish yellow with brown humeral region (this region with only 3 longitudinal veins and very narrow areas between them); abdomen with dark greyish brown tergites and anal plate, light sternites and genital plate, and weakly darkened cerci. All ocelli distinct; lateral ocelli only slightly smaller than median ocellus. Fore tibiae with only inner tympanum, which is rather small, but distinct. Metanotal gland consisting of a pair of large oval convexities (almost flat and weakly distinct) on fore part of metanotum. Tegmina with dorsal part strongly narrowing to apex and having 6 oblique veins (Fig. 37); lateral tegminal part narrow, with almost indistinct branches of Sc. Anal plate as in Fig. 38; genital plate elongate (but not large) and with slight apical notch; genitalia with small and completely membranous rudiments of lateral ectoparameres consisting of narrow folds with very small upper apical lobules; ventromedial ectoparameres in profile with widely rounded apical part and distinctly concave dorsal part (Figs 39, 40).

Variation. Some paratypes slightly lighter or hardly darker. Dorsal tegminal part sometimes with somewhat different venation (in region of chords and mirror) and 4-5 oblique veins.

Female. Coloration and structure of body similar to those of male, but with more spotted coloration of tibiae, hind femora (upper part of hind femora light with 3 distinct very dark wide oblique stripes on outer surface and reticular ornament on inner surface), and abdominal tergites. Genital plate with rather wide and not deep hind median notch as well as rounded hind (lateral) lobes (as in Fig. 43); ovipositor distinctly shorter than hind femora.

Length (mm). Body: ♂ 12-15, ♀ 16-19; pronotum: ♂ 2-2.4, ♀ 2.8-3.2; tegmina, ♂ 4.8-5.6; hind femur ♂ 16-17.5, ♀ 18-22; ovipositor 15-17.5.

Comparison. The differences from Mexican species are given in the key. From all other

congeners, the new species differs in the much smaller and completely membranous lateral ectoparameres in the male genitalia.

Nemoricantor maculatus sp. n.

(Figs 42, 43)

Holotype. ♂, **Mexico, Oaxaca**, 35 km NNE of town Santa Cruz Huatulco (10 km N of vill. Xadani), 900-1000 m, on talus along mountain road in secondary forest, at night, 7-11.V.2006, A. Gorochoy & M. Berezin (ZIAS).

Paratypes. 1 ♂, 2 ♀, same data as holotype, but 1 ♀ collected on died wood in partly primary/partly secondary forest (ZIAS).

Description. **Male** (holotype). Coloration and structure of body similar to those of *N. vulgatus*, but distinguished by following characters: head with almost completely dark dorsal part (excepting very small spots near lateral ocelli and inner edges of eyes), 4 dark vertical stripes on fore surface of epicranium (upper parts of middle stripes almost fused with each other under median ocellus, but interspace between lower parts of these stripes with additional darkish median spot), and paired dark spots on clypeus and behind eyes; pronotum with a few small light spots in fore half of its dark part; femora, fore and middle tibiae, and tarsi with contrasting dark and light spots (ornament of hind femora as in female of *N. vulgatus*); hind tibiae almost completely dark, with only traces of lighter spots; lateral tegminal part with dark upper half (and humeral region) and whitish yellow lower half; distal abdominal tergites and anal plate rather light, but with numerous small dark spots; tegmina with dorsal part weakly narrowing to apex and having 3 oblique veins (Fig. 42).

Variation. Paratype with slightly different venation in region of chords and mirror.

Female. Coloration and structure of body as in male, but head sometimes with rather small lightish spots on dorsal part. Genital plate (Fig. 43) and ovipositor almost as in *N. vulgatus* (females of these species virtually indistinguishable).

Length (mm). Body: ♂ 14-15, ♀ 17-18.5; pronotum: ♂ 2.5-2.6, ♀ 2.9-3.1; tegmina, ♂ 6.8-7; hind femur ♂ 18-18.5, ♀ 20-21; ovipositor 15.5-16.5.

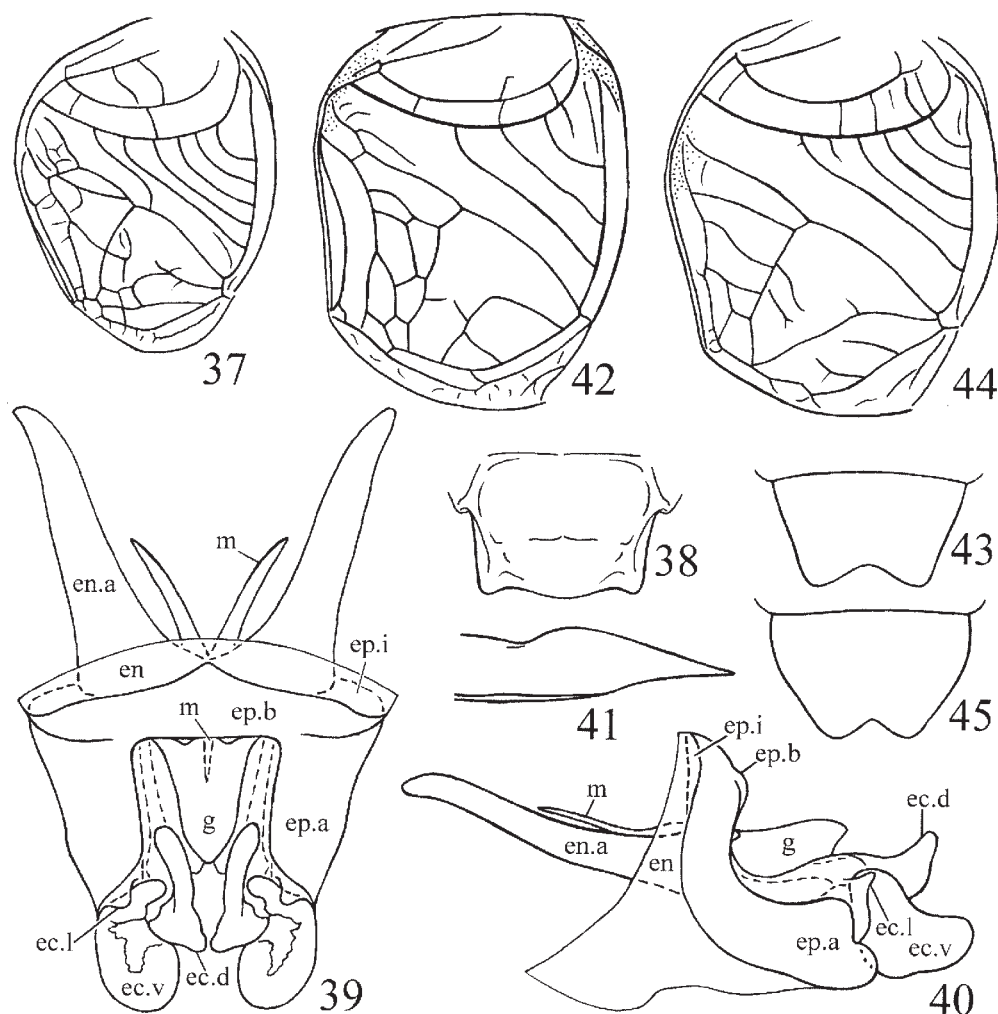
Comparison. The differences from all Mexican species are given in the key. From all other congeners, the new species is distinguished by the structure of the male genitalia as in *N. vulgatus*.

Nemoricantor maculatus tuxtla ssp. n.

(Figs 44, 45)

Holotype. ♂, **Mexico, Chiapas**, city Tuxtla Gutierrez, partly primary/partly secondary forest on hill near Zoo (ZOOMAT), on forest floor, at night, 19.V.2006, A. Gorochoy & M. Berezin (ZIAS).

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



Figs 37-45. *Nemoricantor*. **37-41**, *N. vulgatus* sp. n. (37-40, holotype); **42, 43**, *N. maculatus maculatus* ssp. n. (holotype); **44, 45**, *N. maculatus tuxtla* ssp. n. Dorsal part of male right tegmen (37, 42, 44); male anal plate from above (38); male genitalia from above (39) and from side (40); apex of ovipositor from side (41); female genital plate from below (43, 45). Abbreviations as in Figs 1-4.

Description. Male (holotype). Coloration and structure of body as in nominotypical subspecies, but distal abdominal tergites darker (their dark spots partly fused with each other), and dorsal tegminal part slightly narrower in apical part and slightly wider between stridulatory vein and mirror, with 5 oblique veins and somewhat wider area between stridulatory vein and 1A (Fig. 44).

Female. Coloration and structure of body as in male, but head with light transverse stripe on dorsal surface and without darkish median spot on lower part of fore surface of epicranium. Genital plate with hind median notch distinctly narrower than in nominotypical subspecies (Fig. 45).

Length (mm). Body: ♂ 14.5, ♀ 17.5; pronotum: ♂ 2.5, ♀ 3.2; tegmina, ♂ 6.6; hind femur ♂ 17.5, ♀ 21; ovipositor 16.

Genus **Lerneca** Walker, 1869

Note. This genus is characteristic in having rather long tegmina and shortened or completely developed hind wings. Its body is distinctly smaller than in the both previous genera, legs are shorter, metanotal gland of male consists of a pair of rounded tubercles (Figs 47, 52), stridulatory apparatus is well developed (Figs 46, 51), and apex of ovipositor is as in Fig. 50. Most

characteristic features of the male genitalia are as follows: lateral ectoparameres more or less separated from epiphallal arms and with dorsal edge denticulated; epiphallal arms denticulated or provided with distinct hairs on ventral edge; medial ectoparameres rather large, partly membranous, and undivided or weakly divided (Figs 48, 49). The representatives of *Lerneca* usually live on forest floor among dry leaves.

Key to Mexican species and subspecies of *Lerneca*

1. Most part of antennal flagellum black with sparse, small, distinct light spots. Male tegmina moderately shortened and rather narrow (their length 7.5-7.8 mm; width of mirror 2.7-2.9 mm) (Fig. 46). Male metanotal gland with not large tubercles (Fig. 47). Male genitalia with rather deep median notch on hind edge of epiphallus (Fig. 48) and comparatively long epiphallal arms (Fig. 49). [Southern Oaxaca] *L. occidentalis* sp. n.
- Most part of antennal flagellum uniformly brownish (not very dark). Male tegmina slightly longer and wider (their length 8.4-8.6 mm; width of mirror 3.3-3.5 mm) (Fig. 51). Male metanotal gland with somewhat larger tubercles (Fig. 52). Male genitalia with distinctly less deep median notch on hind edge of epiphallus (Fig. 53) and somewhat shorter epiphallal arms (Fig. 54) 2
2. Head with dark brown dorsal part provided with a pair of narrow light stripes along inner edges of eyes and a few short lightish longitudinal lines on hind part of vertex; fore femora and tibiae as well as male middle femora black. [Southern Chiapas] *L. inalata mexicana* ssp. n.
- Head with lighter dorsal part: light brown with numerous rather small brown spots; fore femora and tibiae as well as middle femora distinctly spotted. [Surinam; French Guiana; Panama] *L. inalata inalata* (Sauss.)

Lerneca occidentalis sp. n. (Figs 46-50)

Holotype. ♂, **Mexico**, *Oaxaca*, 35 km NNE of town Santa Cruz Huatulco (10 km N of vill. Xadani), 900-1000 m, partly secondary/partly primary forest, at night, 7-11.V.2006, A. Gorochov & M. Berezin (ZIAS).

Paratypes. 3 ♂, 6 ♀, same data as holotype (ZIAS).

Description. *Male* (holotype). Coloration black with following lighter marks: upper part of head with narrow yellowish lines along ventral edge of median ocellus, along dorsal edges of antennal cavities and eyes, as well as with 6 short longitudinal light stripes on hind part of vertex; dorsomedial part of scape and short proximal part of antennal flagellum yellow, and rest of flagellum with sparse whitish spots; maxillary palpi with two apical segments (excepting very small proximal part of 4th segment) and ventral surface of distal part of 3rd segment white; pronotum with light brown longitudinal stripes along lateral edges of disc; middle tibiae and tarsi with a few lightish spots; proximal half of hind femora with numerous

lightish oblique lines on outer surface and light spots on inner surface; hind tibiae with spurs and apical part of spines light brownish; metanotum with lightish lateral and hind parts as well as a pair of small spots on tubercles of central part (as in Fig. 47); tegmina yellow (excepting transparent dorsal part of lower tegmen) with brown branches of *Sc* and numerous small brownish spots on all membranes of dorsal part of upper tegmen; rudiments of hind wings whitish; abdominal sternites (excepting genital plate) greyish. Apical segments of maxillary palpi long, distinctly longer than maximum diameter of eyes. Metanotal gland as in Fig. 47. Fore tibiae with small, rounded inner tympanum and slightly larger, oval outer one. Tegmina with comparatively narrow dorsal part (width of mirror 2.9 mm), weakly curved chords, and short apical area (Fig. 46); hind wings almost 1.5 times as long as metanotum. Anal plate with rounded apex; distal part of genital plate with slight hind median notch and longitudinal median fold; genitalia with rather deep median notch on hind edge of epiphallus, comparatively long epiphallal arms (having rounded apex and teeth on middle part of ventral edge), and narrow and characteristically curved lateral ectoparameres (Figs 48, 49).

Variation. Sometimes fore tarsi and pronotal disc with brownish spots. Small variations in tegminal venation present (width of mirror 2.7-2.9 mm).

Female. Coloration and structure of body as in male, but dorsal tegminal part with 5 almost parallel longitudinal veins (sublateral of these veins bifurcate in middle part), genital plate with almost truncate apex, and coloration sometimes with almost completely dark scapes, lighter dorsal surface of hind tibiae, and distinct dark spots on lateral part of tegmina.

Length (mm). Body: ♂ 10-11, ♀ 10-12; pronotum: ♂ 1.9-2, ♀ 2.2-2.4; tegmina: ♂ 7.5-7.8, ♀ 7.3-7.8; hind femur ♂ 8.4-8.8, ♀ 8.2-8.6; ovipositor 7.8-8.2.

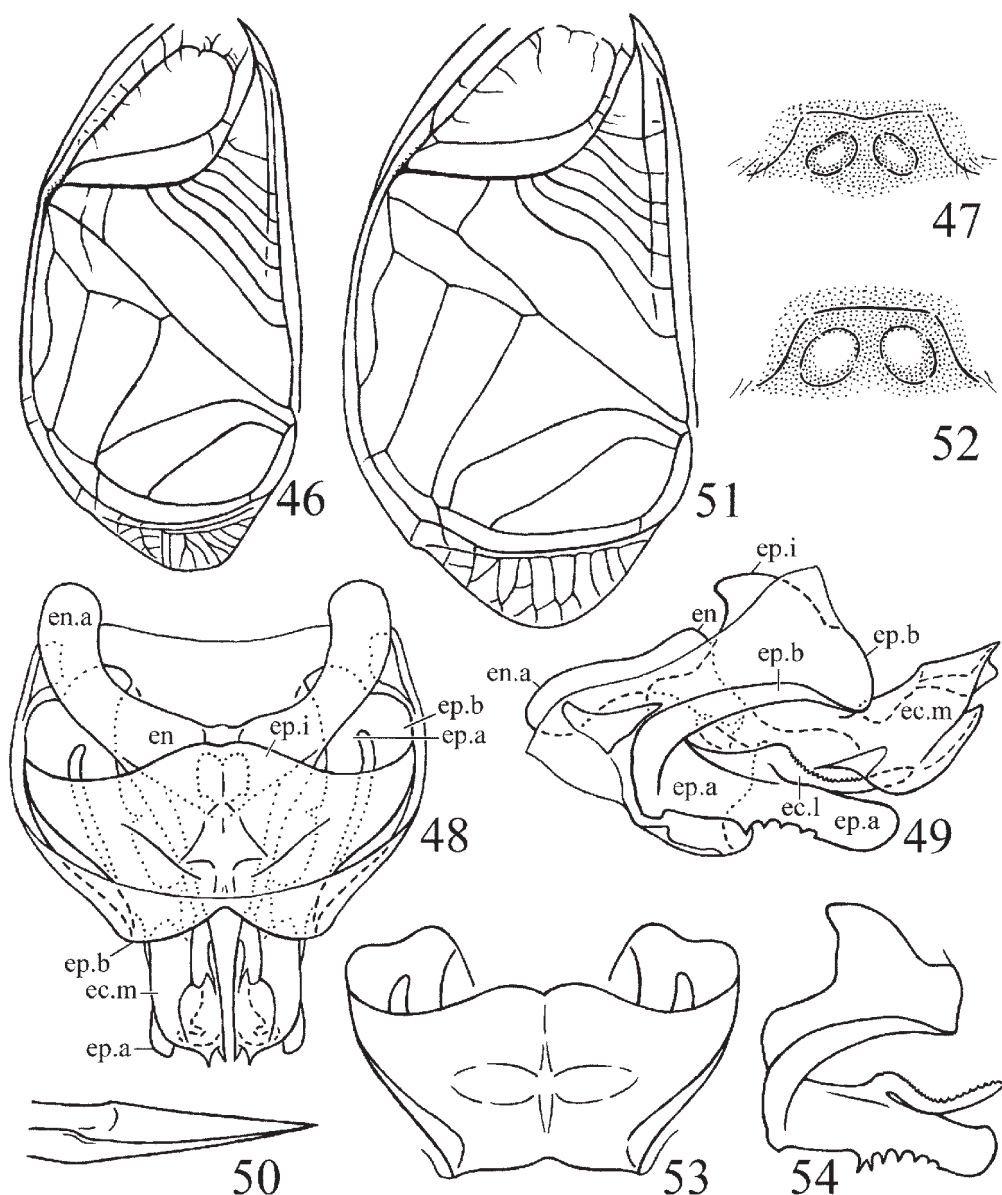
Comparison. This species is most similar to *L. inalata* (Sauss.), but it differs in the characters listed in the key. From all other congeners, the new species is distinguished by the characteristic shape of epiphallal arms and lateral ectoparameres in the male genitalia.

Lerneca inalata mexicana ssp. n. (Figs 51-54)

Holotype. ♂, **Mexico**, *Chiapas*, 130 km NW of city Tapachula, environs of vill. Ejido Las Golondrinas near reserve El Triunfo, 800-1000 m, primary forest, at night, 13-17.V.2006, A. Gorochov & M. Berezin (ZIAS).

Paratypes. 3 ♂, 2 ♀, same data as holotype (ZIAS).

Description. *Male* (holotype). Coloration and structure of body similar to those of *L. occidentalis*,



Figs 46-54. *Lerneca*. **46-50**, *L. occidentalis* sp. n. (46, 48, 49, holotype); **51-54**, *L. inalata mexicana* ssp. n. (52, holotype). Dorsal part of male right tegmen (46, 51); male metanotal gland from above (47, 52); male genitalia from above (48) and from side (49); apex of ovipositor from side (50); epiphallus with lateral ectoparameres from above (53) and from side (54). Abbreviations: *ec.m*, medial ectoparamere; others as in Figs 1-4.

but distinguished by following characters: antennal flagellum without whitish spots (almost uniformly brownish, but with dark yellow short proximal part); pronotal disc, metanotal gland (Fig. 52), fore tarsi, and hind legs with slightly larger lightish areas; tegmina greyish with marks as in *L. occidentalis* and whitish crossveins between *R* and *M*;

abdominal sternites, cerci, anal and genital plates brownish grey; tegminal dorsal part distinctly wider (width of mirror 3.4 mm) and with somewhat longer apical part (as in Fig. 51); genitalia with distinctly less deep hind median notch of epiphallus and somewhat shorter epiphallic arms having longer teeth on ventral edge (as in Figs 53, 54).

Variation. Paratypes slightly darker or hardly lighter.

Female. Coloration and structure of body as in male, but with lighter spots on middle femora, somewhat darker dorsal tegminal part, genital plate as in female of *L. occidentalis*, and dorsal tegminal part distinguished from that of this female by more distal bifurcation of subparalel longitudinal vein only.

Length (mm). Body: ♂ 9.5-10, ♀ 10-11; pronotum: ♂ 1.7-1.9, ♀ 2.1-2.3; tegmina: ♂ 8-8.5, ♀ 7.2-7.5; hind femur ♂ 8.4-8.6, ♀ 9-9.5; ovipositor 7-7.3.

Comparison. The differences from the nominotypical subspecies are given in the key.

Genus *Niquirana* Hebard, 1928

Note. This genus was described for a single male from Nicaragua similar to that of the genus *Luzara* in general appearance, but much smaller (Hebard, 1928). In the same paper, Hebard supposed that *Amusus mexicanus* Saussure, 1897, described from Mexico (Tabasco: Teapa) from female only, may belong to *Niquirana* or to the genus *Amusina* Hebard, 1928, which was described by him for a single species from Ecuador. Chopard (1968) and his followers (Otte, 1994; Eades et al., 2007) put Saussure's species in *Amusina*, but I am inclined to its inclusion in *Niquirana*, as my material agrees with Saussure's description and is similar to the type species of *Niquirana* in the hairless dorsal surface of head, pronotum, and upper tegmen, as well as large pronotum, presence of only inner tympanum, not very strongly shortened tegmina with truncate distal edge and rather wide (high) lateral part, absence of distinct venation on dorsal surface of male upper tegmen, and characteristic coloration: very dark with distinctly lighter dorsal part of upper tegmen and much lighter stripe along its distal edge. Male genitalia in type species of both *Niquirana* and *Amusina* are insufficiently described or not described, respectively, therefore attribution of Saussure's species and my material to *Niquirana* is questionable.

Moreover, both new species described below are distinguished from each other by the male genitalia only. Their females are indistinguishable from each other and from that of Saussure's species, judging by its description (Saussure, 1897). So, one of these new species may turn out to be a synonym or a subspecies of *N.? mexicana*, but it is very possible also that they are 3 different species.

Key to Mexican species possibly belonging to *Niquirana* (only for males)

1. Male genitalia with wide both semimembranous lateroproximal parts of epiphallus and desclerotized

area between proximal parts of lateral epiphallic arms, short both these arms and hind endoparameral arms (Figs 55, 56), and desclerotized middle part of ectoparameres (Fig. 57). [Eastern Veracruz]

- *N.? veracruz* sp. n.
Male genitalia with distinctly narrower both semimembranous lateroproximal parts of epiphallus and desclerotized area between proximal parts of lateral epiphallic arms, somewhat longer both these arms and hind endoparameral arms (Figs 59, 60), and completely sclerotized ectoparameres (Fig. 61). [Western Chiapas] *N.? chiapas* sp. n.

Niquirana? veracruz sp. n. (Figs 55-58)

Holotype. ♂, **Mexico**, Veracruz, 15-20 km NE of town Catemaco, Los Tuxtlas (biological station of Mexico University), 2 km from Mexican Gulf, primary forest on hills, at night, on forest floor among dry leaves, 6-17.XI.2006, A. Gorochov & A. Ovtshinnikov (ZIAS).

Paratypes. 1 ♂, 2 ♀, same data as holotype (ZIAS).

Description. *Male* (holotype). Coloration blackish with following marks: yellowish ocelli, membranes of antennal cavities, spots between lateral ocelli and eyes, proximal part of antennal flagellum, a pair of small spots along fore edge of pronotal disc, narrow stripe along its hind edge, areas on pterothorax and hind coxae, large spot on inner surface of proximal part of hind femora, most part of hind abdominal tergites, and cercal base; light brown spots on clypeus, labrum, and anal plate; whitish lines on dorsal edge of apical and subapical segments of maxillary palpi, sparse spots on antennal flagellum, and narrow stripe along distal edge of upper tegmen; reddish brown (rather light) rest of dorsal part of this tegmen; brown (somewhat darker) lateral part of tegmina, fore abdominal tergites, abdominal sternites, and spots on genital plate; transparent dorsal part of lower tegmen; brownish grey rest of cerci. Tegmina extending to apex of 4th abdominal tergite, with 4 parallel longitudinal veins in lateral part (vein near costal edge with a few short branches), hardly visible trace of arched stridulatory vein on dorsal surface of upper tegmen, and partly reduced venation in dorsal part of lower tegmen (this part almost completely membranous, modified for sound radiation). Anal plate narrowing to truncate apex and with distinct small median impression near fore edge; genital plate elongate and with rather wide, roundly truncate apex; genitalia as in Figs 55-57.

Variation. Paratype slightly darker: maxillary palpi almost without lighter areas; light spots on pronotum intensely yellow (almost light brown); abdominal sternites dark brown.

Female. Coloration and structure of body as in male, but tegmina shorter (extending to base of 3rd abdominal tergite), covering each other by only narrow medial part, without any trace of venation in dorsal part of both tegmina, and with slightly

darker coloration of this part. Genital plate with very slight hind median notch; ovipositor with narrow and acute apex (Fig. 58).

Length (mm). Body: ♂ 12.5-13, ♀ 12.5-13.5; pronotum: ♂ 2.8-2.9, ♀ 3.3-3.5; tegmina: ♂ 5.2-5.6, ♀ 4.3-4.7; hind femur ♂ 10-10.3, ♀ 10-11.5; ovipositor 9.5-9.8.

Comparison. From *N. polita* Heb., the new species differs in the dark palpi and hind femora as well as truncate apex of male anal plate. Differences from *N. ? mexicana*, known only from female, are unclear.

Niquirana? chiapasi sp. n.

(Figs 59-61)

Holotype. ♂, **Mexico**, *Chiapas*, city Tuxtla Gutierrez, partly primary/partly secondary forest on hill near Zoo (ZOOMAT), at night, on forest floor among dry leaves, 19.V.2006, A. Gorochoy & M. Berezin (ZIAS).

Paratypes. **Mexico**, *Chiapas*: 8 ♂, 12 ♀, same data as holotype (ZIAS); 3 ♂, 2 ♀, distr. Ocozocoautla, educational reserve Laguna Belgica near biosphere reserve El Ocote, 600-1000 m, primary forest, at night, on forest floor, 22-24.V.2006, A. Gorochoy & M. Berezin (ZIAS).

Description. *Male* (holotype). Coloration and structure of body as in dark male of *N. ? veracruz*, but with following differences: pronotum without yellow spots along fore edge and with lightish spot on lower part of lateral lobes; hind abdominal tergites almost completely dark; abdominal sternites and outer surface of lower part of hind

femora slightly lighter; genitalia with distinctly narrower both semimembranous lateroproximal parts of epiphallus and desclerotized area between proximal parts of lateral epiphallic arms, somewhat longer both these arms and hind endoparameral arms (Figs 59, 60), and completely sclerotized ectoparameres (Fig. 61).

Variation. Pronotum sometimes with yellow stripe along hind edge only or with a pair of additional very small lightish spots along fore edge; hind abdominal tergites sometimes rather light.

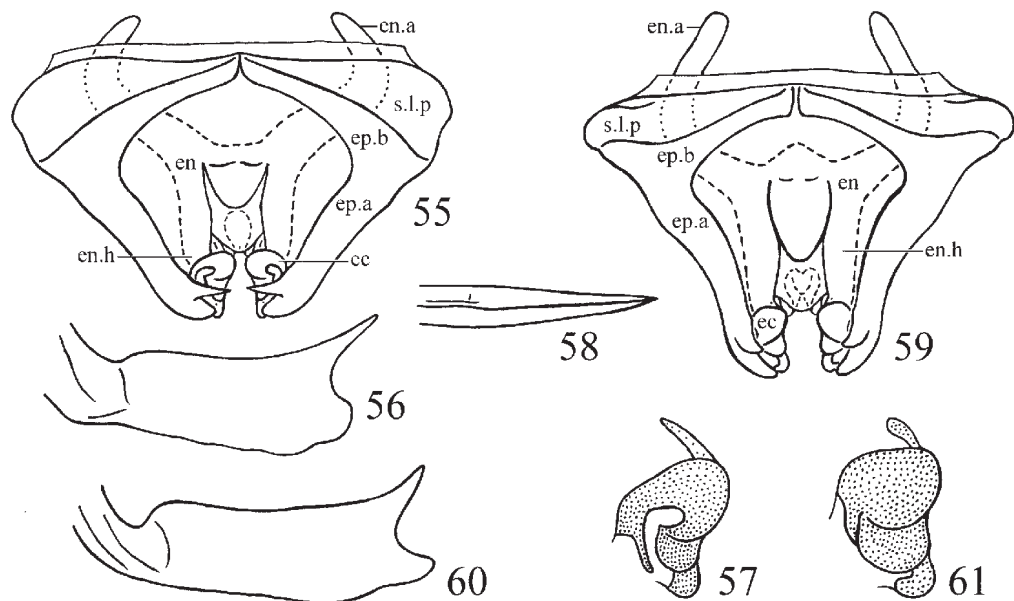
Female. Coloration and body as in male of this species, but tegmina, genital plate, and ovipositor as in female of *N. ? veracruz* (part of females indistinguishable from those of this species).

Length (mm). Body: ♂ 11-13.5, ♀ 13.5-15; pronotum: ♂ 2.6-3, ♀ 3.3-3.5; tegmina: ♂ 4.7-5.3, ♀ 4.3-4.5; hind femur ♂ 8.2-9.7, ♀ 10-10.7; ovipositor 9-9.5.

Comparison. The differences from *N. ? veracruz* are given in the key, and those from *N. polita* are as in *N. ? veracruz*. Differences from *N. ? mexicana* are unclear.

Genus *Arachnopsita* Desutter-Grandcolas & Hubbel, 1993

Note. This genus includes a few species from Guatemala (Desutter-Grandcolas, 1993). It and



Figs 55-61. Possible representatives of *Niquirana*. **55-58.** *N. ? veracruz* sp. n. (55-57, holotype); **59-61.** *N. ? chiapasi* sp. n. (holotype). Male genitalia from above (55, 59); left epiphallic arm from side and slightly behind (56, 60); left ectoparamere from above (57, 61); apex of ovipositor from side (58). Abbreviations: *ec*, ectoparamere; *en.h*, hind endoparameral arm; *s.l.p*, semimembranous lateroproximal part of epiphallus; others as in Figs 1-4.

the genera *Mayagrillus* Des.-Grand. & Hubb. and *Leptopedetes* Des.-Grand. are characterized by the apterous or very short-winged body, very thin and long legs, and absence of tympana. Main differences between them are in the structure of the male genitalia. The specimens considered here are more or less similar to these genera in the general appearance, but the absence of adult male allows me to include them in one of these genera only tentatively.

Arachnopsita? lithophila sp. n.

Holotype. ♀, **Mexico**, *Chiapas*, 130 km NW of city Tapachula, environs of vill. Ejido Las Golondrinas near reserve El Triunfo, 800-1000 m, primary forest, at night, among large stones near brook, 13-17.V.2006, A. Gorochoy & M. Berezin (ZIAS).

Paratypes. 3 ♂ (nymphs), same data as holotype (ZIAS).

Description. *Female* (holotype). Coloration light reddish brown with greyish brown tergites of metathorax and abdomen, reddish brown spot under each eye, brown most part of cerci and small area on dorsal part of rostral apex, and yellowish mouthparts, mesonotum (having greyish brown stripe along hind edge), coxae, tarsi, hind abdominal sternites, and genital plate. Head with not long rostrum and rather narrow, vertical eyes; scape almost 1.5 times as wide as rostrum between antennal cavities; median ocellus distinct, but lateral ocelli much smaller (partly reduced); dorsal edge of epicranium in profile with rather deep concavity between rostrum and rest of vertex (this concavity more or less similar to that in Fig. 4). Legs very thin and long, but hind femora jumping; tympana absent; fore and middle tibiae with 2 lower spurs; hind tibiae with 4 outer and 3 inner spines on dorsal surface (excepting 3 pairs of apical spurs). Mesonotum with very small lateral lobules (tegmina) almost not separated from its main body. Genital plate almost triangular, but with weak hind median notch; ovipositor not long (hind femur 1.6 times as long as ovipositor) and with rather narrow, acute apex (distal part of ovipositor approximately intermediate between those in Figs 29 and 58).

Male (nymph). Coloration and structure of body similar to female, but somewhat smaller and with slightly larger tegminal lobules (adult male probably with strongly shortened tegmina lacking stridulatory apparatus).

Length (mm), ♀. Body 13.7; pronotum 2.8; tegminal lobules 0.6; hind femora 18; ovipositor 11.

Comparison. The new species is distinguished from all other species of *Arachnopsita* by two general characters (the distinctly concave dorsal edge of epicranium between rostrum and rest of vertex in profile, presence of only 7 spines on hind tibiae

and from *Mayagrillus* and *Leptopedetes*, by 3 general characters (the both previous characters and partly reduced lateral ocelli). *A. ? lithophila* differs also from *Longuripes* Des.-Grand. & Hubb. and *Prolonguripes* Des.-Grand. (possible synonyms or subgenera of a single genus, which are characterized by the dorsal edge of epicranium similar to that of this species) in the absence of tympana, less numerous spines of hind tibiae, and probably strongly shortened male tegmina lacking stridulatory apparatus.

Tribe Paragrillini Desutter, 1988

This tribe was described as a separate family of Grylloidea divided into Paragrillinae (with Paragrillini and Benoistellini) and Rumeinae (Desutter, 1988). In the same paper, the family Neoacridae (with Neoacridini and Strogulomorphini) was also described. Later this author (Desutter-Grandcolas, 1992) included Paragrillini, Benoistellini, Rumeinae, Neoacridini, and Strogulomorphini in Phalangopsidae as 5 tribes without indication of subfamilies, and Gorochoy (1995) put the first three tribes in Paragrillini (Cacoplistinae) and the two others, in Neoacridini (Phalangopsinae). Now I think that the representatives of all these "tribes", excepting Strogulomorphini, belong to a single tribe of Phalangopsinae, and I select for it the name Paragrillini, as all suitable names were established in the same paper by Desutter.

Paragrillini include several genera with diverse general appearance and structure of the male genitalia (Figs 73-75, 84-89). The most characteristic feature of Paragrillini is the shape of the distal part of ovipositor, which is slightly thickened, acute at the apex, with distinctly widened (high) subapical part of upper valves and well exposed apical part of lower valves in profile (Figs 71, 79); such an ovipositor is present in the following Neotropical genera: *Paragrillus* Sauss., *Ectecous* Sauss., *Laranda* Sauss., *Benoistella* Uv., *Neoacra* Des., *Rumea* Des.-Grand., *Silvastella* Des.-Grand., *Mexiacra* gen. n., *Oaxacra* gen. n., and possibly some others. Two related New Guinean genera (*Mikluchomaklaia* Gor. and *Brevizacra* Gor.) also have a similar structure of the ovipositor (Gorochoy, 2003, 2006) and may be included in this tribe.

Genus Paragrillus Guérin-Ménéville, 1844

Note. This genus includes large or medium-sized species with rather strong fore and middle legs, usually well developed wings, large stridulatory apparatus of the male tegmina having a large round or somewhat transverse mirror crossed by numerous arched dividing veins (Figs 62, 65, 68, 72, 90), well developed inner and outer tympana,

distinctly inflated upper inner spur of hind tibiae, a pair of thin and long processes on male anal plate (Figs 69, 76), characteristic male genitalia with the epiphallus somewhat similar to that of Luzarini (convergence) and without ectoparameres (Figs 73-75), and denticulated dorsal edge of distal part of ovipositor (Fig. 71). The representatives of *Paragryllus* are specialized inhabitants of tree trunks in rain forests. At night, they walk or sing on the bark of living trees usually in the upper part of trunk.

Key to Mexican species and subspecies of *Paragryllus* (only for males)

1. Tegmina with distinctly transverse mirror (mirror about 1.4 times as wide as long) and more or less shortened apical area (mirror 1.9-2.4 times as wide as length of apical area) (Figs 62, 65) 2
- Tegmina with almost round mirror (mirror about 1.2 times as wide as long) and rather long apical area (mirror 1.5-1.7 times as wide as length of apical area) (Figs 68, 72) 3
2. Pronotal lateral lobes dark brown with yellowish stripe along ventral edge; fore and middle femora distinctly spotted (Fig. 90). Tegminal mirror about 2.4 times as wide as length of tegminal apical area (Fig. 62). Hind basitarsus about 2.3 times as long as upper inner spur of hind tibiae. Hind lateral lobes of median epiphallallic bridge in genitalia with high longitudinal keel along ventrolateral edge (Fig. 64). [North-eastern Chiapas] ***P. ovalis* sp. n.**
- Pronotal lateral lobes uniformly dark brown; fore and middle femora almost uniformly dark brown. Tegminal mirror about 1.9 times as wide as length of tegminal apical area (Fig. 65). Hind basitarsus about 2.1 times as long as upper inner spur of hind tibiae. Hind lateral lobes of median epiphallallic bridge in genitalia with low longitudinal keel along ventrolateral edge (Fig. 67). [Eastern Chiapas] ***P. concolor* sp. n.**
3. Tegmina with stridulatory vein about 1.6 times as long as distance between this vein and mirror (Fig. 68); mirror with 4-5 dividing veins. [Eastern Veracruz] ***P. circularis* sp. n. (s. str.)**
- Tegmina with stridulatory vein about 1.3 times as long as distance between this vein and mirror (Fig. 72); mirror with 7-8 dividing veins. [Tabasco] ***P. circularis multinervis* ssp. n.**

***Paragryllus ovalis* sp. n.**
(Figs 62-64, 90)

Holotype. ♂, **Mexico, Chiapas**, environs of town Palenque, near Maya archaeological centre, ~200 m, primary forest, at night, on bark of living tree trunk in about 2 m above ground, 18-20.XI.2006 (collected as larve, imago reared III.2007), A. Gorochov & A. Ovtshinnikov (ZIAS).

Description. *Male* (holotype). Body medium-sized. Coloration rather spotted (Fig. 90): head brown with almost light brown (more or less spotted) dorsal surface, rather numerous small light spots on fore part of epicranium and mouthparts, partly light antennal scape, and dark brown antennal flagellum having sparse, small, almost

indistinct lightish spots; pronotum with light brown (somewhat spotted) disc and dark brown lateral lobes having yellowish stripes along ventral edges; fore and middle femora distinctly spotted; hind femora light brown with brown numerous oblique lines on outer surface and several spots on inner surface; tibiae and tarsi weakly (almost indistinctly) spotted; lateral part of tegmina and dorsal part of upper (right) tegmen brownish grey, not dark; hind wings greyish; abdomen (including cerci) light brown. Pronotum rather short (head about 1.25 times as wide as length of pronotum). Hind basitarsus 2.3 times as long as upper inner (thickened) spur of hind tibiae. Tegmina with oval, transverse mirror, which is 1.4 times as wide as long and 2.4 times as wide as length of apical area; stridulatory vein 1.5 times as long as distance between this vein and mirror; mirror with 7 dividing veins (Fig. 62). Anal plate with long paired processes (as in Fig. 69); genitalia with narrow notch between ventromedial projections of median epiphallallic bridge (Fig. 63); hind lateral lobes of this bridge with high longitudinal keel along ventrolateral edge (Fig. 64).

Female unknown.

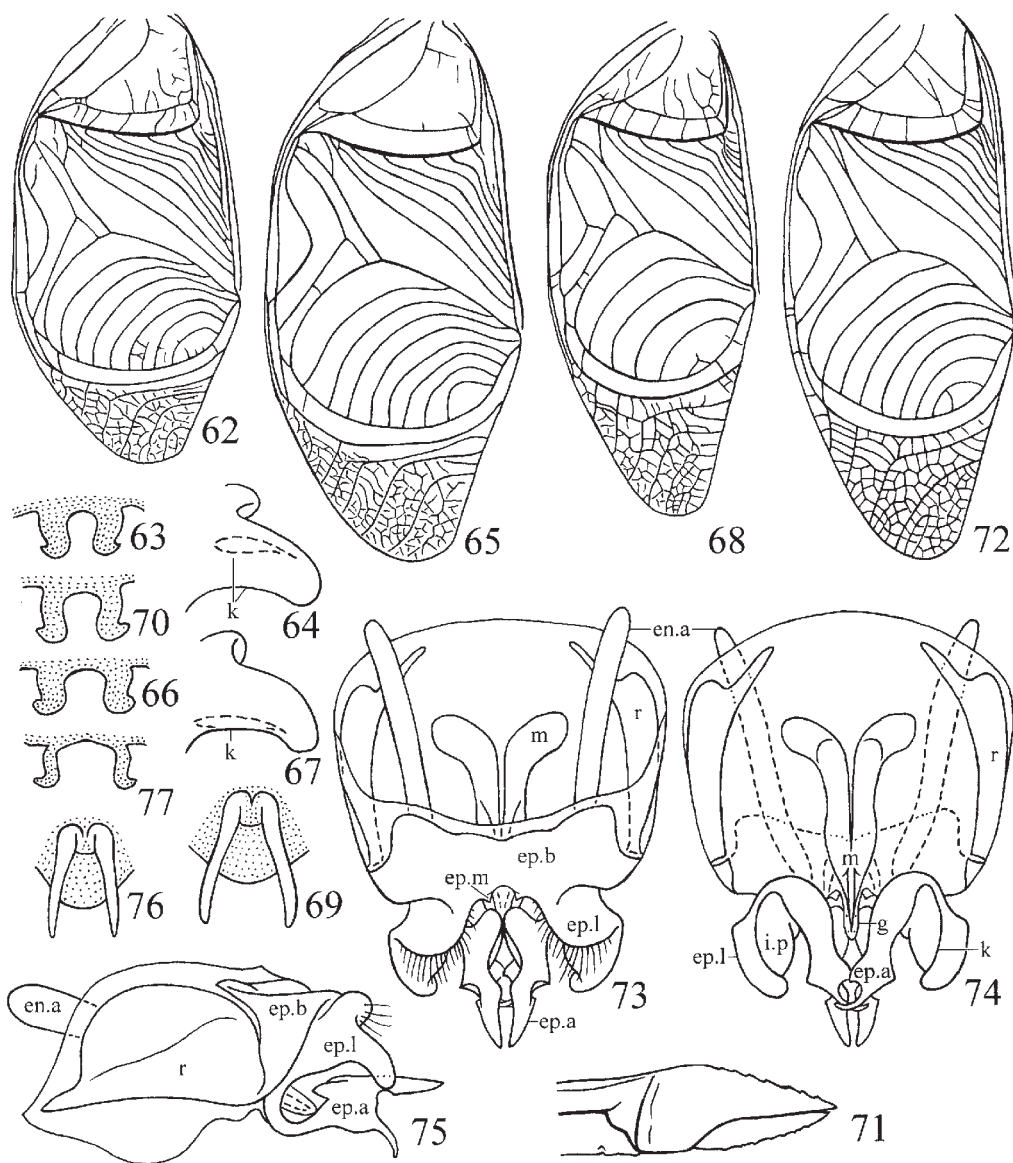
Length (mm). Body 16; body with wings 19.3; pronotum 2.9; tegmina 14.5; hind femur 12.5.

Comparison. This species is most similar to *P. elapsus* Des.-Grand., but it is distinguished by the slightly shorter stridulatory vein, more numerous dividing veins in mirror, somewhat longer processes of the male anal plate, much narrower notch between ventromedial projections of median epiphallallic bridge (for comparison see Figs 63 and 77), and much higher keel along ventrolateral edge of hind lateral lobes of this bridge (in *P. elapsus*, this keel is as in Fig. 67). From all other known congeners, the new species differs in the characteristic tegminal venation, size of upper inner spur of hind tibiae, shape of lateral lobes of median epiphallallic bridge, and length of lateral epiphallallic arms.

***Paragryllus concolor* sp. n.**
(Figs 65-67)

Holotype. ♂, **Mexico, Chiapas**, distr. Ocosingo, Selva Lacandona within biosphere reserve Montes Azules and Bonampak natural monument (near border with Guatemala), environs of vill. Lacanja-Chansayab, primary forest, at night, 20-27.V.2007, M. Berezin & E. Tkatsheva (ZIAS).

Description. *Male* (holotype). Body large. Coloration similar to that of *P. ovalis*, but distinctly less spotted: pronotum dark brown with only a pair of slightly lighter (brown) spots on disc; fore and middle femora almost uniformly dark brown; hind femora brown with weakly distinct darker oblique lines on outer surface and spots on inner surface; all tibiae and tarsi uniformly brown; lateral part of tegmina dark brown; dorsal part of



Figs 62-77. *Paragryllus*. **62-64.** *P. ovalis* sp. n.; **65-67.** *P. concolor* sp. n.; **68-71.** *P. circularis* sp. n. (s. str.); **72-75.** *P. c. multinervis* ssp. n.; **76, 77.** *P. elapsus* Des.-Grand. Dorsal part of male right tegmen (62, 65, 68, 72); ventromedial projections of median epiphallallic bridge from behind and slightly above (63, 66, 70, 77); left hind lateral lobe of median epiphallallic bridge from side (inner plate of this lobe is outlined by interrupted line) (64, 67); processes of male anal plate from above (69, 76); distal part of ovipositor from side (71); male genitalia from above (73), from below (74), and from side (75). Abbreviations: *ep.l*, hind lateral lobe of median epiphallallic bridge; *ep.m*, ventromedial projection of this bridge; *i.p.*, inner plate of hind lateral lobe of this bridge; *k*, keel along ventrolateral edge of hind lateral lobe of this bridge; *r*, ramus; others as in Figs 1-4.

upper (right) tegmen brown with some veins light brown; abdomen brown, but with hardly lighter cerci and almost dark brown distal tergites. Pronotum rather long (head about 1.05 times as wide as length of pronotum). Hind basitarsus 2.1 times

as long as upper inner (thickened) spur of hind tibiae. Tegmina similar to those of *P. ovalis*, but their apical area longer (mirror 1.9 times as wide as length of apical area), mirror with 8 dividing veins, stridulatory vein about 1.7 times as long

as distance between this vein and mirror, and cell between medial chords wider (Fig. 65). Anal plate and genitalia also similar to those of *P. ovalis*, but notch between ventromedial projections of median epiphallic bridge slightly wider (Fig. 66), and hind lateral lobes of this bridge with low longitudinal keel along ventrolateral edge (Fig. 67).

Female unknown.

Length (mm). Body 22; body with wings 25.5; pronotum 4.2; tegmina 17.5; hind femur 18.

Comparison. The differences from *P. ovalis* are given in the key. From *P. elapsus*, the new species differs in the more uniform coloration, wider cell between medial chords of male tegmina, more numerous dividing veins in mirror, distinctly longer tegminal apical area, and narrower notch between ventromedial projections of median epiphallic bridge (for comparison see Figs 66 and 77); from all other known congeners, the new species is distinguished by the same characters as *P. ovalis*.

Paragryllus circularis sp. n.
(Figs 68-71)

Holotype. ♂, **Mexico**, *Veracruz*, 15-20 km NE of town Catemaco, Los Tuxtlas (biological station of Mexico University), 2 km from Mexican Gulf, primary forest on hills, at night, on bark of living tree trunk in about 5 m above ground, 6-17.XI.2006, A. Gorochov & A. Ovtshinnikov (ZIAS).

Paratypes. 4 ♀, same data as holotype, but in 3-4 m above ground (ZIAS).

Description. Male (holotype). Body medium-sized. Coloration more or less intermediate between those of *P. ovalis* and *P. concolor*; pronotum with disc coloured as in *P. ovalis* and pronotal lateral lobes, as in *P. concolor*; fore and middle femora light brown with weakly distinct darker spots; coloration of hind femora as in *P. ovalis*; tibiae and tarsi hardly spotted (almost uniformly brownish); upper (right) tegmen insignificantly darker than in *P. ovalis*; coloration of abdomen almost as in *P. concolor*. Pronotum rather long (head about 1.05 times as wide as length of pronotum). Hind basitarsus 2.0 times as long as upper inner (thickened) spur of hind tibiae. Tegmina with almost round mirror, which is 1.2 times as wide as long and 1.5 times as wide as length of apical area; stridulatory vein 1.6 times as long as distance between this vein and mirror; mirror with 4-5 dividing veins; cell between medial chords intermediate between those of *P. ovalis* and *P. concolor* (Fig. 68). Anal plate with long paired processes (Fig. 69); genitalia similar to those of *P. concolor*, but with notch between ventromedial projections of median epiphallic bridge almost intermediate between those of *P. concolor* and *P. ovalis* (Fig. 70).

Female. Size and coloration similar to male, but slightly darker: sometimes head almost completely dark and other parts of body almost as in *P. concolor* (excepting always weakly spotted middle femora and uniformly dark brown tegmina). Tegminal dorsal part with 10-12 slightly oblique, not very regular longitudinal veins (including their branches) and rather numerous, somewhat irregular crossveins; tegminal dorsal part with 11-13 regular branches of *Sc*. Genital plate with rather deep hind median notch; ovipositor slightly shorter than hind femur and with distal part as in Fig. 71.

Length (mm). Body: ♂ 16.5, ♀ 19-20.5; body with wings: ♂ 21, ♀ 21-24; pronotum: ♂ 3.8, ♀ 4-4.3; tegmina: ♂ 15.5, ♀ 14.5-15.5; hind femur ♂ 15, ♀ 14.5-15.5; ovipositor 13.5-14.5.

Comparison. The differences from Mexican species are given in the key. From *P. elapsus*, the new species is distinguished by the almost round mirror and much longer apical area in the male tegmina as well as distinctly narrower notch between ventromedial projections of median epiphallic bridge (for comparison see Figs 70 and 77). From all other known congeners, the new species differs in the same characters as *P. ovalis*.

Paragryllus circularis multinervis ssp. n.
(Figs 72-75)

Holotype. ♂, **Mexico**, *Tabasco*, "Teapa, Tabasco, April, H. H. S.", "Brit. Mus. 1899-235", "*Paragryllus temulentus* Sss." (BMNH).

Paratype. ♀, same data as holotype (BMNH).

Description. Male (holotype). Coloration and shape of body parts as in nominotypical subspecies, but body slightly larger, pronotum and legs as in light specimens of *P. c. circularis*, tegmina with stridulatory vein 1.3 times as long as distance between this vein and mirror, and mirror 1.7 times as wide as length of tegminal apical area and with 7-8 dividing veins (Fig. 72).

Female. Size and coloration similar to male. In other characters, similar to female of *P. c. circularis*, but distinguished by somewhat longer ovipositor.

Length (mm). Body: ♂ 25, ♀ 22; body with wings: ♂ 28, ♀ 26.5; pronotum: ♂ 4.7, ♀ 4.5; tegmina: ♂ 20, ♀ 19.5; hind femur ♂ 19, ♀ 17; ovipositor 19.

Genus Mexiacla gen. n.

Type species: *Mexiacla ecosuri* sp. n.

Diagnosis. Head with long and narrow rostrum, large scapes and antennal cavities (Fig. 78). Pronotum rather long (Fig. 78). Legs more or less long and thin, but hind femora thickened, jumping; fore tibiae with elongate outer tympanum only or without tympana. Tegmina significantly shortened

and with more or less developed stridulatory apparatus in males (Figs 78, 80, 81), very small, lateral, almost completely covered by pronotum in females; sometimes tegmina absent in both sexes; hind wings absent in both sexes. Male abdomen with abdominal gland consisting of 3-5 pairs of rounded tubercles connected with each other by more or less developed transverse keels; anal plate with roundly truncate apex (Figs 78, 81, 82); genital plate gradually narrowing to apex in males and with slight hind median notch in females. Male genitalia (Figs 84-88) with long, narrow in distal part, and heavily sclerotized median epiphallallic bridge having a pair of spine-like hind lateral lobes; lateral epiphallallic arms large (long and wide), less sclerotized, lobe-like, and with narrow apical part; ectoparameres undeveloped; mold of spermatophore attachment plate usually surrounded by a pair of lateral semimembranous plates connected with lateral epiphallallic arms (Figs 84, 85, 87, 88). Ovipositor with distal part lacking denticles (Fig. 79).

Included species. Type species; *M. zoomati* sp. n.; *M. ibunami* sp. n.; *M. apteromorpha* sp. n.

Comparison. This genus is clearly distinguished from all other genera of Paragryllini by the strongly shortened (and lacking any gland) or absent tegmina, presence of characteristic male abdominal gland, above-mentioned characters of the male genitalia (see Diagnosis), and nondenticulate apex of ovipositor.

Note. Representatives of this genus live among large stones near forest mountain brooks or walk on forest floor, died wood, and lower part of tree trunks. All species described here are collected out of caves.

Key to species of *Mexiacla*

1. Fore tibiae with distinct outer tympanum 2
- Fore tibiae without tympana 3
2. Coloration more or less light brown with brown spots. Male genitalia with long spine-like hind lateral lobes of median epiphallallic bridge (Fig. 84). Ovipositor rather short (hind femora 1.5-1.6 times as long as ovipositor). [Southern Chiapas] ***M. ecosuri*** sp. n.
- Coloration more or less brown with dark brown spots. Male genitalia with somewhat shorter spine-like hind lateral lobes of median epiphallallic bridge (Fig. 87). Ovipositor distinctly longer (hind femora 1.1-1.2 times as long as ovipositor). [Western Chiapas] ***M. zoomati*** sp. n.
3. Coloration dark, usually weakly spotted. Tegmina in male present. Male genitalia with long epiphallus (Fig. 86). Ovipositor not very long (hind femora 1.2-1.3 times as long as ovipositor). [Eastern Veracruz] ***M. ibunami*** sp. n.
- Coloration light, distinctly spotted. Tegmina in male absent. Male genitalia with distinctly shorter epiphallus (Fig. 88). Ovipositor very long, 1.4 times as long as hind femora. [Western Chiapas] ***M. apteromorpha*** sp. n.

***Mexiacla ecosuri* sp. n.**

(Figs 78, 79, 84, 85)

Holotype. ♂, **Mexico**, *Chiapas*, 130 km NW of city Tapachula, environs of vill. Ejido Las Golondrinas near reserve El Triunfo, 800-1000 m, primary forest, at night, among large stones near brook, 13-17.V.2006, A. Gorochoy & M. Berezin (ZIAS).

Paratypes. 16 ♂, 9 ♀, same data as holotype (ZIAS).

Description. *Male* (holotype). Coloration light brown with following marks brown: small spots near ocelli, lines along lateral edges of rostrum and between antennal cavities, stripes from these cavities to mandibular bases, vertical spots on genae, and lateral lobes of pronotum and spots on its disc, as well as not very distinct spots on legs, proximal and distal areas of dorsal tegminal part, lateral part of tegmina, abdominal tergites, and anal plate. Legs very long; hind femora weakly thickened; fore tibiae with only outer tympanum. Tegmina with narrow (low) lateral part having 6-8 oblique and more or less irregular branches of *Sc*; dorsal tegminal part as in Fig. 78. Abdominal gland with 5 pairs of tubercles and slightly arched transverse keels between tubercles of 3 fore pairs (Fig. 78); genitalia as in Figs 84, 85.

Variation. Coloration slightly darker or hardly lighter; dark spots sometimes larger and more distinct; abdominal tergites sometimes almost light brown or with light tubercles of abdominal gland. Median epiphallallic bridge insignificantly varied in shape.

Female. Coloration and structure of body similar to those of males, but tegmina almost completely covered by pronotum and legs somewhat shorter. Hind femur 1.5-1.6 times as long as ovipositor.

Length (mm). Body: ♂ 13-17, ♀ 13-15.5; pronotum: ♂ 2.7-3.5, ♀ 2.9-3.3; tegmina: ♂ 3.8-4.5, ♀ (visible part) 0.2-0.6; hind femur ♂ 13-15, ♀ 12-13.5; ovipositor 8-8.5.

Etymology. The species is named after the “El Colegio de la Frontera Sur” (ECOSUR) in city Tapachula (Chiapas), institution which organized our field work in Southern Chiapas in 2006.

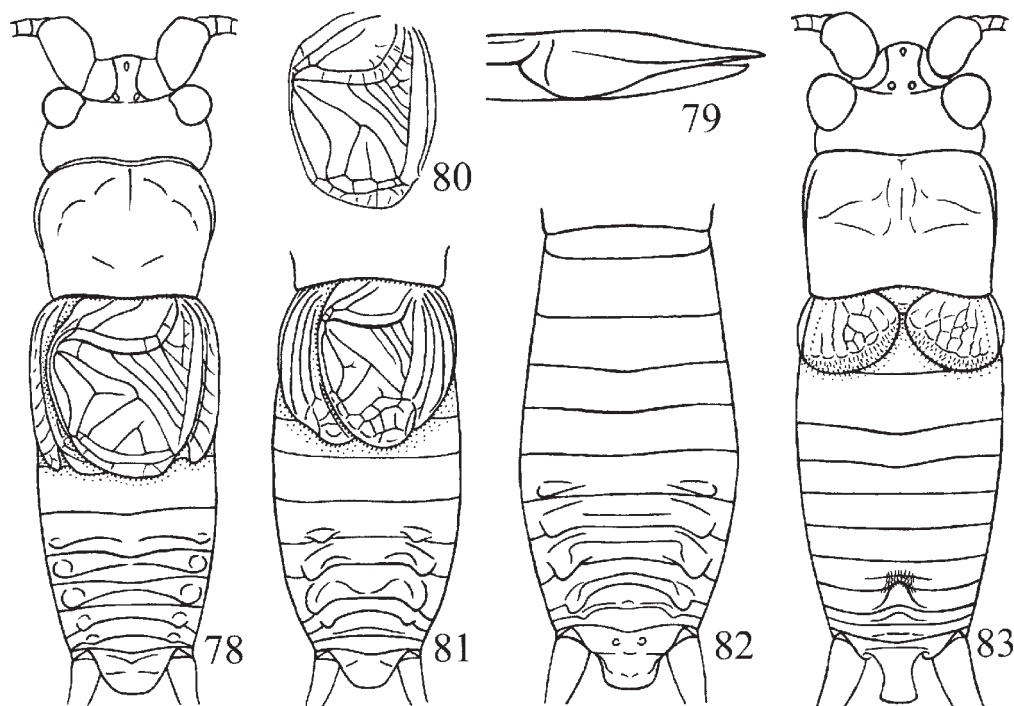
***Mexiacla zoomati* sp. n.**

(Figs 80, 87)

Holotype. ♂, **Mexico**, *Chiapas*, distr. Ocozacoautla, educational reserve Laguna Belgica near biosphere reserve El Ocote, 600-1000 m, primary forest, at night, on died wood, 22-24.V.2006, A. Gorochoy & M. Berezin (ZIAS).

Paratypes. 2 ♂, 2 ♀, same data, but females collected 30-31.V.2007 by M. Berezin & E. Tkatsheva (ZIAS).

Description. *Male* (holotype). Coloration darker than in *M. ecosuri*: brown with dark brown dorsal part of head (provided with a pair of lighter longitudinal lines between eyes), smaller light brown areas on other parts of head, dark antennal flagellum, pronotum, spots on legs, abdominal tergites, and anal plate, brownish grey cerci (having light-



Figs 78-83. *Mexiacla* and *Oaxacla*. **78, 79**, *M. ecosuri* sp. n. (78, holotype); **80**, *M. zoomati* sp. n. (holotype); **81**, *M. ibunani* sp. n. (holotype); **82**, *M. apteromorpha* sp. n. (holotype); **83**, *O. squamiptera* sp. n. (holotype). Body of male from above, but without most part of antennae, legs and genital plate (78, 83), and additionally without head and most part of pronotum (81, 82); distal part of ovipositor from side (79); dorsal part of male right tegmen (80).

ish small proximal part), and darkish apex of genital plate. Legs, tegmina, and abdomen similar to those of *M. ecosuri*, but legs slightly shorter, hind femora somewhat thicker, tegmina with distinctly narrower mirror (Fig. 80) and almost without branches of *Sc*, abdominal gland with hardly less developed transverse keels, and genitalia with somewhat shorter spine-like hind lateral lobes of median epiphallic bridge (Fig. 87).

Variation. Paratype with slightly lighter dorsal part of head and lightish spots under tegmina.

Female. Coloration similar to that of males, but without lightish spots on pterothorax. Structure of body similar to that of female of *M. ecosuri*, but ovipositor distinctly longer (hind femur 1.1-1.2 times as long as ovipositor).

Length (mm). Body: ♂ 12-15, ♀ 11.5-12.5; pronotum: ♂ 2.7-3.2, ♀ 2.6-2.8; tegmina: ♂ 3.7-4.2, ♀ (visible part) 0.2-0.5; hind femur ♂ 11-13.7, ♀ 10-10.6; ovipositor 8.4-9.2.

Etymology. The species is named after the "Zoológico Regional Miguel Álvarez del Toro" (ZOOMAT) of "Instituto de Historia Natural y Ecología" in city Tuxtla Gutierrez (Chiapas), insti-

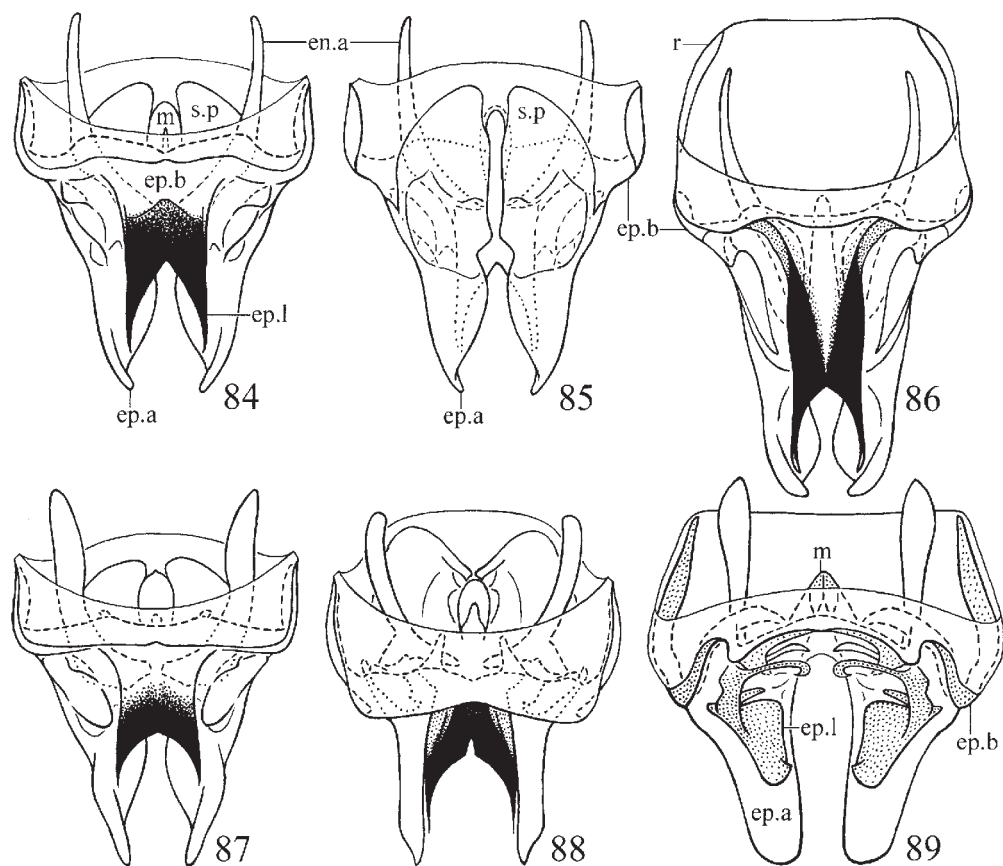
tution which organized our field work in Western Chiapas in 2006.

***Mexiacla ibunani* sp. n.** (Figs 81, 86)

Holotype. ♂, **Mexico**, Veracruz, 15-20 km NE of town Catemaco, Los Tuxtlas (biological station of Mexico University) in 2 km from Mexican Gulf, primary forest on hills, at night, on lower part of living tree trunk near hollow, 6-17.XI.2006, A. Gorochov & A. Ovtshinnikov (ZIAS).

Paratypes. 9 ♂, 7 ♀, same data as holotype, but some specimens collected on died wood or forest floor (ZIAS).

Description. **Male** (holotype). Coloration and external structure similar to those of *M. zoomati*, but dorsal part of head almost as in holotype of this species, rest of epicranium uniformly dark brown (almost black), legs shorter, fore tibiae without tympana, tegmina with somewhat reduced dorsal part (Fig. 81), abdominal gland with 4 pairs of tubercles and sinuated transverse keels between 2 middle pairs of these tubercles (Figs 81). Genitalia with very long epiphallus and its parts (distinctly longer than in *M. ecosuri* and *M. zoomati*); lateral



Figs 84-89. *Mexiacla* and *Oaxacla*, male. **84, 85.** *M. ecosuri* sp. n. (holotype); **86.** *M. ibunami* sp. n. (holotype); **87.** *M. zoomati* sp. n. (holotype); **88.** *M. apteromorpha* sp. n. (holotype); **89.** *O. squamiptera* sp. n. (holotype). Genitalia from above (84, 86-89) and from below (85). Abbreviations: *s.p.*, semimembranous plate near mold of spermatophore attachment plate; others as in Figs 1-4 and 62-77.

semimembranous plates around mold of spermatophore attachment plate indistinct (Fig. 86).

Variation. Sometimes coloration somewhat lighter and more spotted. Abdominal gland sometimes with partly reduced fore pair of tubercles or without these tubercles.

Female. General appearance similar to that of males, but epicranium sometimes with comparatively light (brownish) spots under rostral apex and/or on genae. Hind femur 1.2-1.3 times as long as ovipositor (females sometimes distinguished from those of *M. zoomati* by absence of tympana only).

Length (mm). Body: ♂ 10-15, ♀ 11-14; pronotum: ♂ 2.5-3, ♀ 2.5-3.3; tegmina: ♂ 3.3-3.7, ♀ (visible part) 0.1-0.3; hind femur ♂ 10-11.7, ♀ 9.5-12; ovipositor 8-9.

Etymology. The species is named after the "Instituto de Biología, Universidad Nacional Autónoma de México" (IBUNAM) in city Mexico,

institution which organized our field work in Eastern Veracruz in 2006.

***Mexiacla apteromorpha* sp. n.** (Figs 82, 88)

Holotype. ♂, **Mexico**, Chiapas, city Tuxtla Gutierrez, secondary forest on hill near Zoo (ZOOMAT), at night, on artificial stone wall, 19.V.2006, A. Gorochoy & M. Berezin (ZIAS).

Paratypes. 4 ♂, 1 ♀, same data as holotype (ZIAS).

Description. **Male** (holotype). Coloration yellowish with not large darker spots: head with a pair of brown parallel vertical lines between antennal cavities, brownish spots on hind part of epicranium, scapes, and apex of maxillary palpi, and brownish grey antennal flagellum; pronotum, legs, and tergites of both pterothorax and abdomen distinctly spotted. Legs moderately long; hind femora well thickened; fore tibiae without



Fig. 90. *Paragryllus ovalis* sp. n., male, dorsal view.

tympana. Tegmina absent. Abdominal gland with 5 pairs of tubercles (distal one very small), almost straight transverse keels between tubercles of 2nd and 3rd pairs, and slightly arched transverse keel between tubercles of 4th pair (Fig. 82); genitalia with deep transverse fold of proximal half of epiphallus, rather deep and narrow median notch between hind lateral lobes of median epiphallal bridge, and distinct lateral semimembranous plates around mold of spermatophore attachment plate (Fig. 88).

Variation. Sometimes darkenings along fore edge of pronotal disc larger and rather dark. Shape of median epiphallal bridge insignificantly varied.

Female. General appearance as in holotype. Ovipositor very long, 1.4 times as long as hind femur.

Length (mm). Body: ♂ 17-19, ♀ 18; pronotum: ♂ 3.3-3.5, ♀ 3.6; hind femur ♂ 14-15, ♀ 15.5; ovipositor 22.

Genus *Oaxacla* gen. n.

Type species: *Oaxacla squamiptera* sp. n.

Diagnosis. Head with rostrum somewhat wider, eyes distinctly larger, and scapes and antennal cavities smaller than in *Mexiaclea* (Fig. 83). Pronotum almost square. Legs slightly shorter and thicker than in *Mexiaclea*; fore tibiae without tympana. Tegmina in males strongly shortened, almost lateral, without stridulatory apparatus, but with traces of rather irregular venation and thickened hind edge of dorsal part (this edge, provided with numerous short hairs, probably is tegminal gland for attraction of female during copulation) (Fig. 83); tegmina in females very small, lateral, almost completely covered by pronotum; hind wings in both sexes absent. Male abdomen with abdominal gland consisting of two median tubercles (large one on 7th tergite and small one on 8th tergite) and numerous rather long hairs on middle part of 6th tergite (these hairs directed backward) and on apex of large tubercle (these hairs directed forward); anal plate rather long, with truncate apex and distinctly narrowed middle and distal parts (Fig. 83); genital plate of both sexes similar to that of *Mexiaclea*. Male genitalia (Fig. 89) with not narrow median epiphallal bridge divided into 3 parts: proximal transverse sclerite and a pair of heavily sclerotized hind lateral lobes; these parts movably separated from each other and more or less analogous to epiphallus and ectoparameres in other tribes of Phalangopsinae; lateral epiphallal arms similar to those of *Mexiaclea*; semimembranous plates around mold of spermatophore attachment plate and ectoparameres undeveloped. Distal part of ovipositor intermediate between those of *Paragrillus* and *Mexiaclea*, but without denticles.

Included species. Type species; *O. ? elenae* sp. n.

Comparison. This genus is possibly most related to *Mexiaclea*, but distinguished from it and all other genera of Paragrillini by the almost lateral male tegmina with probable gland along distal edge of dorsal part and without stridulatory apparatus, as well as different structure of abdominal gland, anal plate, and genitalia in male (see Diagnosis).

Note. Representatives of *Oaxacla* usually walk on died wood and lower part of tree trunks.

Key to species of *Oaxacla*

1. Head with light vertical stripe under rostral apex rather narrow (upper part of this stripe approximately as wide as median ocellus); pronotum with distinct, more or less large light spots along lateral edges of disc. Tegmina, abdominal gland, anal plate, and genitalia of male as in Figs 83, 89. Ovipositor very long, 1.4-1.5 times as long as hind femora. [Southern Oaxaca] *O. squamiptera* sp. n.
- Head with light vertical stripe under rostral apex distinctly wider (upper part of this stripe almost twice as wide as median ocellus); pronotum with only small and almost indistinct lightish spots. Ovipositor much shorter, approximately 1.1 times as long as hind femora. [Central Chiapas] (male unknown) *O. ? elenae* sp. n.

Oaxacla squamiptera sp. n. (Figs 83, 89)

Holotype. ♀, **Mexico**, *Oaxaca*, 35 km NNE of town Santa Cruz Huatulco (10 km N of vill. Xadani), 900-1000 m, partly primary/partly secondary forest, at night, on lower part of trunk of living tree, 7-11.V.2006, A. Gorochoy & M. Berezin (ZIAS).

Paratypes. 16 ♂, 10 ♀, same data as holotype, but some specimens collected on died wood (ZIAS).

Description. *Male* (holotype). Coloration brown, spotted: head dark brown with yellowish 4 longitudinal lines on hind part of vertex, small median spot on dorsal part of rostral base, narrow vertical stripe under rostral apex, a few spots under eyes and on genae, line along hind edge of eyes, median and lower parts of clypeus, labrum, and most part of mandibles (spots under antennal cavities and on lateral parts of clypeus less distinct, more or less light brown); scape light brown with darkened spot near base and stripe along distal edge; antennal flagellum dark brown with small sparse lightish spots; palpi light with darkish longitudinal stripes on lateral surfaces of 3rd, 4th, and 5th segments of maxillary palpi; pronotum dark brown with rather large light brown spots along lateral edges of disc; pterothorax greyish brown with lightish sternites, spots on pleurites and tergites (latter spots situated under tegmina and along hind edges of meso- and metanotum, as well as on lateral part of metanotum); legs light brown with distinct dark spots (excepting hind femora with less distinct darkish spots) and very dark dorsal

surface of hind tibiae; tegmina almost black, but with narrow whitish stripe along sublateral vein; abdomen with dark brown tergites (having sparse and weakly distinct lightish spots) and both anal and genital plates, almost light brown sternites, and brownish grey cerci. Structure of tegmina, abdominal gland, and anal plate as in Fig. 83; genitalia (Fig. 89) with slightly hooked apical part of hind lateral lobes of median epiphallallic bridge and characteristic transverse sclerotized ribbon at proximal part of each of these lobes (medial part of this ribbon almost hook-like).

Variation. Some of paratypes with slightly less thickened distal edge of tegmina and small additional group of long hairs (directed backward) on middle part of 5th abdominal tergite. Hind lateral lobes of epiphallallic median bridge sometimes with slightly narrower apical part.

Female. Coloration and body structure similar to those of males, but hind tibiae with spotted dorsal surface, abdominal tergites somewhat lighter and more spotted, tegmina much shorter and distinctly lateral (almost completely covered by pronotum). Ovipositor very long, 1.4-1.5 times as long as hind femur.

Length (mm). Body: ♂ 12-14, ♀ 14-16; pronotum: ♂ 3.3-3.5, ♀ 3.5-3.8; tegmina: ♂ 1.7-1.9, ♀ (visible part) 0.3-0.6; hind femur ♂ 11-12.5, ♀ 11.5-13; ovipositor 16-19.5.

Oaxacla? elenae sp. n.

Holotype. ♀, **Mexico**, *Chiapas*, distr. Ocosingo, environs of town Ocosingo, ~1200 m, primary forest, at night, 17.V.2007, M. Berezin & E. Tkatsheva (ZIAS).

Description. **Female** (holotype). Coloration and structure of body parts very similar to those of female of *O. iguami* sp. n., but upper part of head almost without light lines, light vertical stripe under rostral apex almost twice wider, labrum partly darkened, proximal part of antennal flagellum somewhat lighter (brown), pronotum with only small and almost indistinct lightish spots, hind femora with darker apex, cerci almost dark brown with lighter short proximal part, and ovipositor much shorter, approximately 1.1 times as long as hind femur.

Male unknown.

Length (mm). Body 15.8; pronotum 3; tegmina (visible part) 0.4-0.5; hind femur 12.2; ovipositor 13.5.

Etymology. The species is named in honour of one of its collectors, Elena Tkatsheva.

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References

- Alexander, R.D. & Otte, D.** 1967. The evolution of genitalia and mating behavior in crickets (Gryllidae) and other Orthoptera. *Misc. Publ. Mus. Zool. Univ. Michigan*, **133**: 1-62.
- Chopard, L.** 1968. Gryllides. *Orthopterorum Catalogus*, **12**: 213-500. s' Gravenhage.
- Desutter, L.** 1987. Structure et évolution du complexe phallique des Gryllidae (Orthoptères) et classification des genres Néotropicals de Grylloidea. Première partie. *Ann. Soc. Entomol. Fr. (N. S.)*, **23**(3): 213-239.
- Desutter, L.** 1988. Structure et évolution du complexe phallique des Gryllidae (Orthoptères) et classification des genres Néotropicals de Grylloidea. Deuxième partie. *Ann. Soc. Entomol. Fr. (N. S.)*, **24**(3): 343-373.
- Desutter-Grandcolas, L.** 1992. Les Phalangopsidae de Guyane française (Orthoptères, Grylloidea): systématique, éléments de phylogénie et de biologie. *Bull. Mus. Nat. Hist. Natur., Paris*, 4e ser., sect. A, **14**(1): 93-177.
- Desutter-Grandcolas, L.** 1993. The cricket fauna of Chiapanecan caves (Mexico): systematics, phylogeny and the evolution of troglotic life (Orthoptera, Grylloidea, Phalangopsidae, Luzarinae). *Int. J. Speleol.*, **22**(1-4): 1-82.
- Desutter-Grandcolas, L.** 2003. Phylogeny and the evolution of acoustic communication in extant Ensifera (Insecta, Orthoptera). *Zoologica Scripta*, **32**: 525-561.
- Eades, D.C., Otte, D. & Naskrecki, P.** 2007. Orthoptera Species File Online. <http://osf2x.orthoptera.org>
- Gorochov, A.V.** 1986. System and morphological evolution of crickets from the family Gryllidae (Orthoptera) with description of new taxa. Communication 1. *Zool. Zh.*, **65**(4): 516-527. (In Russian).
- Gorochov, A.V.** 1995. System and evolution of the suborder Ensifera (Orthoptera). Parts 1 and 2. *Trudy Zool. Inst. Ross. Akad. Nauk.*, **260**. 224 and 213 pp. (In Russian).

- Gorochov, A.V.** 2002. Taxonomy of Podoscirtinae (Orthoptera: Gryllidae). Part 1: the male genitalia and Indo-Malayan Podoscirtini. *Zoosyst. Ross.*, **10**(2), 2001: 303-350.
- Gorochov, A.V.** 2003. New and little known crickets of the subfamily Phalangopsinae (Orthoptera, Gryllidae). 2. Oceania, Sri Lanka, and Australia. *Zool. Zh.*, **82**(9): 1064-1074. (In Russian).
- Gorochov, A.V.** 2006. New and little known crickets of the subfamily Phalangopsinae (Orthoptera, Gryllidae). 3. Indonesia, Philippines, and the Seyshelles. *Zool. Zh.*, **85**(6): 691-701. (In Russian).
- Hebard, M.** 1928. The group Luzarae of the subfamily Phalangopsinae (Orthoptera: Gryllidae). *Trans. Amer. Entomol. Soc.*, **54**(913): 1-56, pls. 1-13.
- Otte, D.** 1994. Crickets (Grylloidea). *Orthoptera species file 1. A systematic catalog*. 120 pp. Philadelphia.
- Randell, R.L.** 1964. The male genitalia in Gryllinae (Orthoptera: Gryllidae) and a tribal revision. *Can. Entomol.*, **96**(12): 1565-1607.
- Saussure, H.** 1897. Fam. Gryllidae. *Biologia Centrali-Americana. Insecta. Orthoptera*, **1**: 198-284, tab. 11-13. London.

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