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Taxonomic studies on the *Neotropical* Landrevinae with description of new taxa (Orthoptera, Grylloidea, Gryllidae)

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Abstract

The understanding of the subfamily Landrevinae has been modified by different authors since its creation. In the neotropics three genera are known to the present: *Odontogryllus* Saussure, 1877 (one from México, the others amazonian), *Brasilodontus* de Mello, 1992 with two species (from Brazilian Atlantic Forest), e *Valchica* de Mello, 1992 with one species (from Costa Rica). De Mello (1992) erroneously created the tribe Odontogryllini for this cluster of neotropical genera, here suppressed. In the present paper we revise and add new species to *Brasilodontus* and describe two monotypic genera, *Xulavuna* n. gen. and *Yarrubura*, n. gen. An identification key to the genera of neotropical Landrevinae is presented as well as one for the species of *Brasilodontus*. The male fore wings of *Xulavuna adenoptera* n. sp. is remarkable regarding its shape and its glandular condition.

Key words: Landrevinae, Orthoptera, glandular wing, description, new taxa, *Neotropica*.

Resumo

O entendimento da subfamília Landrevinae tem sido alterada por diferentes autores desde sua criação. Até o momento, três gêneros são conhecidos da Neotropica: *Odontogryllus* Saussure, 1877 com 11 espécies (uma das quais do México, as demais amazônicas), *Brasilodontus* de Mello, 1992 com duas espécies (da Floresta Atlântica brasileira), e *Valchica* de Mello, 1992 monotípico (da Costa Rica). De Mello (1992) erroneamente erigiu a tribo Odontogryllini para esse grupo de gêneros neotropicais, aqui suprimida. No presente trabalho revisamos e adicionamos novas espécies ao gênero *Brasilodontus* e descrevemos novos gêneros monotípicos, *Xulavuna* gen. n. e *Yarrubura*, gen. n. Uma chave de identificação para os gêneros de Landrevinae neotropicais é apresentada, assim como uma para as espécies de *Brasilodontus*. As asas mesonotais do macho de *Xulavuna adenoptera* sp. n. são notáveis quanto à forma e sua condição glandular.

Palavras-chave: Landrevinae, Orthoptera, asa glandular, descrição, novos táxons, *Neotropica*.

Introduction

Landrevinae Gorochov, 1982 was initially described as the legion Landrevites Saussure, 1878, comprising *Odontogryllus* Sauss., 1877 and *Landreva* Walker, 1869. Chopard (1967) transferred the genera from Landrevites to the Gryllomorphini (Gryllinae). Gorochov (1982) reallocated these genera to his Landrevinae, tribe Landrevini.

Otte (1988) described 13 genera and 31 species of Landrevinae from the western pacific region but improperly regarded them as Pteroplistinae Chopard, 1936. De Mello (1992) followed that author and created the tribe Odontogryllini for the neotropical members of Pteroplistinae, *i.e.*, the genera *Odontogryllus* Sauss., 1877, *Brasilodontus* de Mello, 1992 and *Valchica* de Mello, 1992.

Gorochov et al. (2004) mentioned that the Landrevinae are more related to the Eneopterinae and Hemigryllinae while the Pteroplistinae has affinities to Phalangopsinae. Gorochov (2005) erected the tribe Prolandrevini, now comprising three genera from southern South Africa. Posteriorly, Odontogryllini de Mello, 1992 was removed from Pteroplistinae to Landrevinae (Gorochov, 2013).

The aims of the present paper are: 1- review the genus *Brasilodontus*; 2- describe two new monotypic genera: *Xulavuna* n. gen. and *Yarrubura* n. gen.; 3- provide an identification key for the neotropical genera of Landrevinae and one for the species of *Brasilodontus*; 4- check the validity of the tribe Odontogryllini as a taxon to comprise all the neotropical genera of Landrevinae.

Methods

The specimens were collected manually or by means of the employment of pitfall traps along trails in several Atlantic Forest localities and one Amazonian area (near Manaus), Brazil.

Drawings, comparisons and descriptions and photographic shots were done under two stereomicroscopes (Zeiss, models Discovery V.20 and V.8); a graduated eyepiece was employed for measurements, the values subsequently converted to millimeters. The male genitalia, after dissection, were treated with at 10% potassium hydroxide solution for 24 hours at room temperature to remove muscular tissues, and then analyzed. The images were edited on Photoshop CS5. We employ the phallic complex terminology of Desutter (1987, 1988, 1990) with the corrections made by that author in a subsequent contribution (Desutter-Grandcolas,

2003). The classification employed in the Orthoptera Species File Online (Eades et al. 2013) is adopted.

Results

A comparison of specimens of the genera *Odontogryllus*, *Brasilodontus*, *Valchica* and of the new ones, *Xulavuna* n. gen. and *Yarrubura* n. gen., as well as of others known from the literature showed that the tribe Odontogryllini de Mello, 1992 comprising the three former ones is not a natural assemblage and thus must be suppressed. So, now we place all the neotropical genera, including the new ones erected here, in the tribe Landrevini Gorochoy, 1982.

The species belonging to the neotropical genera in which the male fore wings are functional for acoustic communication, *i.e.*, *Brasilodontus*, *Valchica* and *Yarrubura*, n. gen. are ambidextrous, the stridulatory file been present on the ventral face of each wing. This condition has never been mentioned for taxa from other parts of the world.

Descriptions and redescriptions

Brasilodontus de Mello, 1992

Type species: *B. mucuriensis* de Mello, 1992. By original designation.

Recognition: head wider than long; eyes dark, large, somewhat prominent, without unpigmented area on supero-frontal area; maxillary palpi with the fifth joint truncated; pronotum with anterior and posterior margins nearly straight, covered of bristles; male fore wings functional for singing, with stridulum and specialized venation, extending beyond the hind margin of the first abdominal tergite (except in *B. riocensis*, in which the wing is shorter, and in *B. apterus*, n. sp.); male hind wings absent; metanotal gland absent; auditory tympana never present on the outer face of fore tibia; tibia I with three apical spurs; tibia II with three apical spurs; tibia III with 4/4 dorsal spurs and 3/3 apical ones, the median the longest on both faces; supra-anal plate short; subgenital plate pilose, slightly wider than long; phallic complex very long, not tubular, main lobes of pseudepiphallus deeply invaginated, becoming bifid, each side bearing a fringe of bristles towards the apex, endophallic sclerite elongate but small; female fore wings absent; copulatory papilla long and thin (broader and flattened in *B. itamarajuensis*, n. sp. and *B. portosegurensis*, n. sp.); ovipositor depressed.

***Brasilodontus mucuriensis* de Mello, 1992**

Figs. 1, 3, 15, 16

Diagnosis: labrum medium brown with inferior and lateral portions yellowish (fig.1D); male fore wings extending beyond hind margin of second abdominal segment (fig. 1F), stridulatory vein with *ca.* 67 teeth; supra-anal with posterior margin nearly straight on mid-portion (fig. 1H); apex of pseudepiphallus dilated as seen from the sides; fringe of bristles on main lobes of pseudepiphallus located dorsally, before the apex (figs. 3A, B, C), rows of denticles on distal portion of main lobe of pseudepiphallus small, dorsally located; pseudepiphallus parameres short; copulatory papilla wider at first fourth, somewhat transparent (fig. 15F).

Redescription. Male. Head: black (fig. 1A); top of head and occiput black; three same-sized ocelli present (fig. 1D); maxillary palpi light to medium brown (fig. 1G); frons, gena and clypeus medium to dark brown, labrum medium brown with inferior and lateral portions yellowish (fig.1D). **Thorax:** pronotum dark brown (fig. 1C); thoracic sternites as in fig. 1K. Fore wings reaching posterior margin of second abdominal tergite (fig. 1F); dorsal field with three harp veins; stridulatory vein with *ca.* 67 teeth (Fig. 16D); lateral field with two parallel veins below angulation. **Legs:** medium brown, except the hind tibia, which is dark brown (fig.1L); tibia I with only the internal tympanum (fig. 1J). **Abdomen:** general color medium to dark brown on dorsum, lighter ventrally; supra-anal plate medium brown with two whitish lines on distal pigmented area, posterior margin nearly straight on mid-portion (fig. 1H); subgenital plate medium brown, darker laterally, posterior margin concave (Fig. 1I). **Phallic Complex** (figs. 3A, B, C): pseudepiphallus moderately up-curved, its main lobe wider at first third, the apex flattened laterally, fringe of bristles located dorsally, clearly anterior to the apex, row of small denticles present posteriorly to the fringe, dorsal; pseudepiphallic parameres short; tip of ectophallic fold located at the level of distal margin of pseudepiphallic parameres, ectophallic apodemes slightly curved. **Female:** general coloration similar to male (fig. 1B); copulatory papilla wider at first fourth, light yellow, somewhat transparent (fig. 15F).

Material examined: 11 male, 7 female and 2 nymphs. Brazil, Mucuri, Bahia, Assentamento Paulo Freire (18° 3'S 39°41'W), 25.vii.2012, F. A. G de Mello & C. F. Sperber *leg.* All specimens preserved in 80% alcohol (all newly collected material). Type specimens kept at MZSP.

***Brasilodontus riocensis* de Mello, 1992**

Figs. 2, 3, 15, 16

Diagnosis: frons with a sagital straight light brown line; fore wings short, not surpassing first abdominal tergite, the stridulatory vein with *ca.* 54 teeth; tibia I without tympana; supra-anal plate with posterior margin evenly round (fig. 2H); subgenital plate medium brown laterally, light brown centrally; pseudepiphallus distinctly up-curved; apex of pseudepiphallus thin, with denticles both, on inner and outer side of the invagination, fringe of bristles located distally; pseudepiphallic parameres acute at apex; copulatory papilla finger shaped but acute distally, the proximal margin ventrally triangular (fig. 15C2).

Redescription. Male. Head: black (fig.2A); top of head and occiput blackish; three same-sized ocelli present (fig.2D); maxillary palpi light to medium brown (fig. 2G); frons with a sagital straight light brown line; gena and clypeus medium brown, labrum light brown (fig.2D). **Thorax:** pronotum medium brown (fig. 2C); thoracic sternites as in fig. 2K. Fore wings short, not surpassing hind margin first abdominal tergite (fig. 2F); apical field vestigial; dorsal field with three harp veins; stridulatory vein with *ca.* 54 teeth (fig. 16F); lateral field with two parallel veins below angulation. **Legs:** medium brown; tibia I without auditory tympana (fig. 2J). **Abdomen:** general color medium brown, darker in the distal tergites, lighter ventrally; supra-anal light brown with two whitish lines on distal pigmented area, posterior margin evenly round (fig. 2H); subgenital plate medium brown laterally, light brown centrally, posterior margin nearly straight (fig. 2I). **Phallic Complex** (figs. 3D, E, F): pseudepiphallus distinctly up-curved, especially on its posterial third, its main lobe wider at the first third, the apex thin with denticles both, on inner and outer side of the invagination, fringe of bristles apical, dorsally located; pseudepiphallic parameres acute at apex, close to each other; tip of ectophallic fold located posteriorly to the distal margin of the pseudepiphallic parameres; ectophallic apodemes curved. **Female:** general coloration similar to that of male, pronotum reddish brown (fig. 2B); copulatory papilla pale yellow, finger shaped but acute distally, the proximal margin ventrally triangular (fig. 15C2).

Material examined: 14 male, 8 female and 12 nymphs. Brazil, Espirito Santo, Linhares, Reserva Florestal Companhia Vale do Rio Doce (19° 9'S 40° 4'W), 23-29.vii.2012, de Mello *et al leg.* All specimens preserved in 80% alcohol (all newly collected material). Type specimens kept at MZSP.

***Brasilodontus itabunensis* de Mello & Denadai, n. sp.**

Figs. 4, 6, 15, 16

Type specimens: Holotype male, 2 male, 2 female paratypes [MZSP]; 3 male, 1 female paratypes kept at Departamento de Zoologia, Instituto de Biociências, UNESP - São Paulo State University, Botucatu campus.

Etymology: Toponymic, referring to the city of Itabuna, Bahia, Brazil.

Diagnosis: the median ocellus smaller (fig. 4D); male fore wings reaching hind margin of second abdominal segment (fig. 4A, F), stridulatory vein with *ca.* 100 teeth; subgenital plate dark yellow to light brown, posterior margin distinctly round (fig. 4I); apex of pseudepiphallus clavate (Fig. 6A, B, C); fringe of bristles on main lobes of pseudepiphallus located distally (figs. 6A, B, C), rows of denticles on distal portion of main lobe of pseudepiphallus small, dorsally located; pseudepiphallus parameres short; copulatory papilla elongate, the lateral lines as seen from dorsum somewhat concave, the apex white (fig. 15A1), the proximal margin ventrally blunt (fig 15A2).

Description. Male. Head: dark brown (fig. 4A); top of the head and occiput dark brown; three ocelli present, the median smaller (fig. 4D); maxillary palpi light brown (fig. 4G); frons, gena and clypeus medium brown on a yellowish background, labrum whitish (fig. 4D). **Thorax:** pronotum medium brown (fig. 4A); thoracic sternites as in fig. 4K. Fore wings reaching posterior margin of second abdominal tergite (fig. 4A, F); dorsal field with three harp veins; stridulatory vein with *ca.* 100 teeth (fig. 16A); lateral field with two parallel veins. **Legs:** light brown except for the dark brown hind femur; tibia I with only the internal tympanum present (fig. 4J). **Abdomen:** general color light brown on dorsum, lighter ventrally; supra-anal plate yellowish, without whitish lines on distal pigmented area, posterior margin rounded (fig. 4H); subgenital plate dark yellow to light brown, posterior margin distinctly round (fig. 4I). **Phallic Complex** (figs. 6A, B, C): pseudepiphallus slightly up-curved (fig. 6C), its main lobe wider at the second third (fig. 6A, B), the apex clavate, fringe of bristles apical, dorsally located, row of small denticles present anteriorly to the fringe; pseudepiphallic parameres short, rounded, apart from one another; tip of ectophallic fold located at the level of the distal margin of pseudepiphallic parameres; ectophallic apodeme very long, curved. **Female:** general coloration darker as the male (fig. 4B); copulatory papilla yellowish, elongate, the lateral lines as seen from dorsum somewhat concave, the apex white (fig. 15A1), the proximal margin ventrally blunt (fig 15A2).

Material examined: 6 male and 3 female. Brazil, Bahia, Itabuna, Mata do CEPLAC (14°47'S; 39°13'W), i.2001, F. A. G de Mello & S. S. Nihei *leg.* All specimens preserved in 80% alcohol.

***Brasilodontus itamarajuensis* de Mello & Denadai, n. sp.**

Figs. 5, 6, 15, 16

Type specimens: Holotype male, 10 male, 10 female paratypes [MZSP]; 43 male, 24 female paratypes kept at Departamento de Zoologia, Instituto de Biociências, UNESP - São Paulo State University, Botucatu campus.

Etymology: Toponymic, allusive to the city of Itamaraju, Bahia, Brazil.

Diagnosis: frons and gena dark brown with a light brown sagital band from median ocellus to inferior margin of clypeus; labrum medium brown fading to yellow in the lower extremity (fig. 5D); fore wings stridulatory vein with *ca.* 77 teeth; subgenital with the posterior margin slightly sinuose (fig. 5I); the apex of pseudepiphallus twisted and truncate, fringe of bristles apical, rows of small denticles absent; copulatory papilla drop-shaped, distinctly depressed, the proximal margin of ventral face broadly invaginated (fig. 15B2).

Description. Male. Head: dark brown (fig. 5A); top of head and occiput dark brown; three ocelli present, the median slightly smaller than lateral ones (fig. 5D); maxillary palpi light brown (fig. 5G); frons and gena dark brown with a light brown sagital band from median ocellus to inferior margin of clypeus, labrum medium brown fading to yellow in the lower extremity (fig. 5D). **Thorax:** pronotum dark brown (fig. 5C); thoracic sternites as in fig. 5K. Fore wings reaching posterior margin of second abdominal tergite (fig. 5A, F); dorsal field with three harp veins; stridulatory vein with *ca.* 77 teeth (fig. 16B); lateral field with two parallel veins below angulation. **Legs:** medium brown except the lighter hind femora (fig. 5L), and dark brown hind tibia; tibia I with only the internal tympanum present (fig. 5J). **Abdomen:** general color dark brown on dorsum, lighter ventrally; supra-anal plate pale brown, garnished with two whitish lines on distal pigmented area, posterior margin broadly convex (fig. 5H); subgenital plate dark yellow, the posterior margin slightly sinuose (fig. 5I). **Phallic Complex** (figs. 6D, E, F): pseudepiphallus up-curved (fig. 6F), its main lobe wider at the base (fig. 6D), the apex twisted and truncate, fringe of bristles apical, rows of small denticles absent; pseudepiphallic parameres short, round distally, touching each other; tip of ectophallic fold located anteriorly to the distal margin of pseudepiphallic parameres; ectophallic apodemes rather short and slender.

Female: general coloration lighter than the male (fig.5B); copulatory papilla yellowish, drop-shaped, distinctly depressed, the proximal margin of ventral face broadly invaginated (fig. 15B2).

Material examined: 54 male, 34 female and 11 nymphs. Brazil, Bahia, Itamaraju, Parque Nacional Histórico Monte Pascoal (16°45'S 39°32'W), 9-14.vii.2012, F. A. G de Mello & team *leg.* All specimens preserved in 80% alcohol.

***Brasilodontus portosegurensis* de Mello & Denadai, n. sp.**

Figs. 7, 9, 15, 16

Type specimens: Holotype male, 7 male, 7 female paratypes [MZSP]; 12 male, 6 female paratypes kept at Departamento de Zoologia, Instituto de Biociências, UNESP - São Paulo State University, Botucatu campus.

Etymology: Toponymic, referring to the city of Porto Seguro, Bahia, Brazil.

Diagnosis: frons with oval yellowish maculae just below median ocellus; labrum light brown fading to yellow inferiorly (fig. 7D); fore wings reaching posterior margin of second abdominal tergite (fig. 7F), stridulatory vein with *ca.* 75 teeth; subgenital plate with the posterior margin concave (fig. 7I); pseudepiphallus slightly up-curved (fig. 9C), rows of denticles missing; ectophallic apodeme long (fig. 9A, B); copulatory papilla drop-shaped, distinctly depressed, the proximal margin of ventral face deeply invaginated.

Description. Male. Head: dark brown (fig. 7A); head in frontal view medium to light brown; three same-sized ocelli present (fig. 7D); maxillary palpi light to medium brown (fig. 7G); frons with oval yellowish maculae just below median ocellus; gena and clypeus medium brown, labrum light brown fading to yellow inferiorly (fig. 7D). **Thorax:** pronotum dark brown (fig. 7C); thoracic sternites as in fig. 7K. Fore wings reaching posterior margin of second abdominal tergite (fig. 7F); dorsal field with three harp veins; stridulatory vein with *ca.* 75 teeth; lateral field with parallel two parallel veins below angulation (fig. 16C). **Legs:** medium brown, excepting the lighter hind femora; tibia I with only internal tympanum present (fig. 7J). **Abdomen:** general color dark brown; supranal plate brownish under a yellow background, posterior margin broadly convex (fig. 7H), distal pigmented area with two whitish lines; subgenital plate light brown, darker laterally, the posterior margin concave (fig. 7I). **Phallic Complex** (figs. 9A, B, C): pseudepiphallus slightly up-curved (fig. 9C), its main lobe wider at

base (fig. 9A, B), the apex truncate as seen by the sides, fringe of bristles located apically, rows of denticles missing; pseudepiphallic parameres round-tipped, touching each other; tip of ectophallic fold located at the level of distal margin of pseudepiphallus parameres; ectophallic apodeme long (fig. 9A, B). **Female:** general coloration similar to that of male (fig. 7B); copulatory papilla resembling that of the preceding species, drop-shaped, distinctly depressed, the proximal margin of ventral face deeply invaginated (fig. 15D2).

Material examined: 20 male, 13 female and 3 nymphs. Brazil, Bahia, Porto Seguro, Estação Ecológica Vera Cruz (16°21'S 39° 9'W), 23.x.2001, Costa *et. al leg.* All specimens preserved in 80% alcohol.

Brasilodontus apterus de Mello & Denadai, n. sp.

Figs. 8, 9, 15

Type specimens: Holotype male, 7 male, 3 female paratypes [MZSP]; 8 male, 3 female paratypes kept at Departamento de Zoologia, Instituto de Biociências, UNESP - São Paulo State University, Botucatu campus.

Etymology: Allusive to its wingless condition.

Diagnosis: frons with oval dark yellow maculae just below median ocellus (fig. 8D); apterous; tibia I polymorphic for a vestigial/absent internal tympanum; supra-anal plate with posterior margin broadly round (fig. 8H); subgenital plate yellowish at mid-portion, medium brown laterally; pseudepiphallus with apex rounded, fringe of bristles apical, pointing posteriorly (fig. 9F); ectophallic apodeme moderately long; copulatory papilla thin (fig. 15E), anterior margin acute on ventral face (fig. 15E2).

Description. Male. Head: dark brown (fig. 8A); top of the head and occiput dark brown; three same-sized ocelli present (fig. 8D); maxillary palpi light to medium brown (fig. 8G); frons with oval dark yellow maculae, just below median ocellus, gena and clypeus medium brown, labrum yellowish (fig.8D). **Thorax:** pronotum medium brown (fig. 8A); thoracic sternites as in fig. 8K; apterous. **Legs:** medium brown; tibia I polymorphic for a vestigial/absent internal tympanum. **Abdomen:** general color medium brown on dorsum, lighter ventrally; supra-anal plate light to medium brown, with two whitish lines on distal pigmented area, posterior margin broadly round (fig. 8H); subgenital plate yellowish at mid-portion, medium brown laterally, posterior margin concave (fig. 8I). **Phallic Complex** (figs. 9D, E, F): pseudepiphallus up-

curved (fig. 9F), its main lobe wider at base, the apex rounded, fringe of bristles apical, pointing posteriorly (fig. 9F), rows of small denticles located on the outside; pseudepiphallallic parameres rounded distally, separated from one another; tip of ectophallic fold located anteriorly to the distal margin of pseudepiphallallic parameres; ectophallic apodeme moderately long. **Female:** general coloration darker than the male (fig. 8B); copulatory papilla yellowish, thin (fig. 15E), anterior margin acute on ventral face (fig. 15E2).

Material examined: 16 male, 6 female and 1 nymph. Brazil, Bahia, Porto Seguro, Estação Ecológica Vera Cruz (16°21'S 39° 9'W), 06.iii.2002, Costa *et. al leg.* All specimens preserved in 80% alcohol.

Xulavuna de Mello & Denadai n. gen.

Type species: *Xulavuna adenoptera* n. sp.

Etymology: Name is a free combination of letters proposed by a seven year-old boy (João Francisco Tavares de Mello), son of the second author.

Diagnosis: Fore wing short, slightly longer than pronotum, strongly modified: most of the dorsal field occupied by an antero-internal glandular area, the gland itself conspicuous, visible from the top; lateral field very large, occupying a dorsal position (figs. 10A, F; 14A-D); pseudepiphallus compact distally, sub-tubular, strongly bilobate distally; ectophallic apodeme long.

Description. Male. Head: Dorsum of head flattened, almost leveling the dorsal margin of the eyes, which are large and somewhat projected; inter antennal space broader than antennal scape; three small ocelli present; fifth joint of maxillary palpi with apical truncation occupying about half of the joint length. **Thorax:** fore wings short, strongly modified, most of the dorsal field occupied by antero-internal glandular area, the gland itself conspicuous, visible from the top; lateral field extended to the dorsum, occupying most of the wing. Metanotal glands absent. **Legs:** tibia I without tympana, three apical spurs present; tibia II with four apical spurs; femur III robust, tibia III bearing 2-3 teeth on dorso-internal line proximad, then four dorsal spurs, than three apical ones, the median the longest, the same spur configuration on the outer face but with ca. seven teeth; hind basitarsus with ca. six teeth on inner face and five in the outer. **Phallic complex** (fig. 11A, B, C): elongate, semi-tubular, enlarged at apex; pseudepiphallus strongly bilobate distally, pseudepiphallallic paramere 1 (Ps.P1) located ventrally in relation to

Ps.P2, acuminate (shaped as a curved needle), Ps.P2 projected, bifurcate at apex and bearing small bristles; rami large; ectophallic sclerite with a pair of very long apodemes, the arc located distally, ectophallic fold with its tip visible from dorsum; endophallic sclerite not discernible (transparent). Spermatophore whitish. **Female:** apterous, ovipositor well-developed; copulatory papilla compact, with a lobe-shaped projection distad (fig. 15H).

***Xulavuna adenoptera* de Mello & Denadai, n. sp.**

Figs. 10, 11, 14, 15, 16

Type specimens: Holotype male, 5 male, 5 female paratypes [MZSP]; 5 male, 5 female paratypes [Coleção de Invertebrados do Instituto Nacional de Pesquisas da Amazônia (INPA)]; 38 male, 56 female paratypes kept at Departamento de Zoologia, Instituto de Biociências, UNESP - São Paulo State University, Botucatu campus.

Etymology: Alluding to the glandular condition of the male fore wings.

Description. Male: overall coloration medium brown (fig 10A), dark brown on head and pronotum, medium to light brown on abdomen and limbs. **Head:** eyes blackish, surrounded by a yellowish band (fig. 10E); occiput and gena medium brown; base of mandibles, frons, and clypeus yellowish; median ocellus very tiny and elliptical (fig. 10D). **Thorax:** Anterior and posterior margins of pronotum very slightly concave, inferior margin of lateral lobes straight ascending on posterior angle (fig. 10C); fore wings (figs. 10F; 14A-D; 16G) strongly modified, slightly longer than pronotum (figs. 10A), dorsal field much reduced and bearing a conspicuous whitish gland, lateral field larger than dorsal field, occupying a dorsal position and bearing ca. 8-9 in-curved, thick, veins; inferior face of the wing showing four very pronounced, wall shaped, parallel veins in the dorsal field area just before the gland (fig. 14C, D). **Abdomen:** elliptical as seen from dorsum, strongly depressed, the tergites yellowish brown with a darker band along their distal margins, rendering the specimens a banded abdominal coloration (fig. 10A, B). Supra-anal plate with evenly round disto-lateral corners and colored as in fig. 10H. Thoracic sternites light yellow (fig. 10K). Abdominal sternites light brown; subgenital plate long, its posterior margin concave (fig. 10I). **Legs:** fore and middle femora whitish to light brown, covered by dark brown pubescence; fore and middle tibia and tarsi darker than respective femora; hind femora caramel-yellow externally, hind tibia and basitarsus darker (fig. 10L). **Phallic complex:** as described for the genus (fig. 11). **Female:** supra-anal plate with distal margin evenly round, subgenital plate with straight distal margin, ovipositor valves as in figs. 10M, N, O.

Material examined: 49 male, 66 female and 66 nymphs. Brazil, Amazonas, Manaus, Reserva Adolpho Ducke (2°57'S 59°57'W), 1-15.vii.2011, F. A. G de Mello & C. F. Sperber leg. All specimens preserved in 80% alcohol.

***Yarrubura* de Mello & Denadai n. gen.**

Type species: *Yarrubura nigricephala* n. sp.

Etymology: Name is a free combination of letters proposed by a seven year-old boy (João Francisco Tavares de Mello), son of the second author.

Diagnosis: fore wings surpassing the fifth abdominal tergite, stridulatory vein with *ca.* 75 teeth; abdominal sclerite I strongly modified, almost completely fused and concealing sclerite II, also bearing a complex glandular structure; subgenital plate U-shaped; pseudepiphallus apex truncate, near each other; ectophallic apodeme long, straight, shaped as broken rod united, each peace linked to its other half by a small unpigmented connection point, the distal portion narrower than the preceding one; copulatory papilla depressed, longer than wide, dorso-ventrally angle-curved.

Description. Male: Head: Dorsum of head rounded, vertex of head flattened, largest width of the head in the region of the eyes, infero and external margin of eyes sub straight; inter antennal space narrower than antennal scape; three same-sized ocelli, the median elliptical; maxillary palpi with the fifth joint thumb-shaped. **Thorax:** pronotum wider than long, covered of bristles, anterior margin slightly concave, posterior slightly convex, lateral lobes short with inferior margin straight, broadly curved on hind angle; thoracic sternites as in fig. 12K. Fore wings trapezoid, hind margin round, surpassing the fifth abdominal tergite, mirror absent; lateral field with two parallel veins below angulation, stridulatory file with *ca.* 75 teeth. **Legs:** tibia I bearing three apical spurs, only the internal tympanum present; tibia II with three apical spurs; femur III robust, tibia III with 3/3 very small denticles, 3/3 dorsal spurs and 3/3 apical ones. **Abdomen:** abdominal sclerite I strongly modified, almost completely fused and concealing sclerite II, also bearing a complex glandular structure (fig. 14E, F, G); supra-anal plate short, rounded distally; subgenital plate U-shaped, with bristles. **Phallic complex** (figs. 13A, B, C): rather short; pseudepiphallus bilobate distally, the lobes short, juxtaposed, truncate at apex; pseudepiphallic paramere rounded, located internally, the tip of each one visible from dorsum; ectophallic apodeme long, straight, shaped as broken rod united, each peace linked to its other

half by a small unpigmented connection point, the distal portion narrower than the preceding one; endophallic sclerite elongate, straight, the proximal extremity located at the level of the interface between the main lobe of pseudepiphallus and the rami. **Female:** apterous, ovipositor well-developed; copulatory papilla depressed, longer than wide, dorso-ventrally angle-curved.

***Yarrubura nigricephala* de Mello & Denadai, n. sp.**

Figs. 12, 13, 14, 15, 16

Type specimens: Holotype male, 5 male, 5 female paratypes [MZSP]; 5 male, 5 female paratypes [Coleção de Invertebrados do Instituto Nacional de Pesquisas da Amazônia (INPA)]; 38 male, 56 female kept at Departamento de Zoologia, Instituto de Biociências, UNESP - São Paulo State University, Botucatu campus.

Etymology: Referring the black color of the head.

Description. Male. Head: mostly black, contrasting with the anterior portion of pronotum, which is reddish (fig. 12A-D); eyes blackish, large, somewhat prominent, circundated by a reddish-brown ring (fig. 12E); top of the head and occiput black (fig. 12C, D); maxillary palpi yellowish brown (fig. 12G); frons dark brown to black; gena medium brown; clypeus as in fig. 12D; labrum yellowish (fig. 12D). **Thorax:** pronotum covered by bristles, reddish-brown with a thick dark brown band along distal margin (Fig. 12A, C); thoracic sternites as in fig. 12K. Fore wings as described for the genus (fig. 12F; 16E). **Legs:** yellowish to reddish brown (fig. 12A, L), remaining details as for the genus; (Fig. 12J). **Abdomen:** general color dark brown, lighter ventrally; supra-anal plate medium brown, posterior pigmented area with two whitish lines, hind margin broadly round (fig. 12H); subgenital plate light to medium brown, pilose (fig. 12I). **Phallic Complex** (fig.13A, B, C): as described for the genus. **Female:** general coloration lighter than the male, except by the head which is similarly blackish; pronotum reddish, without a darker band along hind margin (fig. 12B); ovipositor light yellowish brown, depressed (Fig. 12M, N, O); copulatory papilla yellowish, tip of the structure unpigmented, nipple-shaped (fig. 15G).

Material examined: 21 male, 15 female and 15 nymphs. Brazil, Amazonas, Manaus, Reserva Adolpho Ducke (2°57'S 59°57'W), 1-15.vii.2011, F. A. G de Mello & C. F. Sperber *leg.* All specimens preserved in 80% alcohol.

Key for the species of *Brasilodontus*

- 1a. fore wings absent *B. apterus*, n. sp.
- 1b. fore wings present 2
- 2a. fore wings not surpassing first abdominal tergite *B. riocensis*, de Mello, 1992
- 2b. fore wings surpassing first abdominal tergite 3
- 3a. apex of pseudepiphallus with a row of denticles; tip of ectophallic fold located posteriorly to the apex of pseudepiphallus parameres; copulatory papilla elongate 4
- 3b. apex of pseudepiphallus without a row of denticles; tip of ectophallic fold located at the level of the apex of pseudepiphallus parameres; copulatory papilla drop-shape 5
- 4a. median ocellus smaller than lateral ones (fig. 4D); male fore wings reaching hind margin of second abdominal segment (fig. 4A, F), stridulatory file with ca. 100 teeth; apex of pseudepiphallus clavate (fig. 6A, B, C); fringe of bristles on main lobes of pseudepiphallus located distally; copulatory papilla: the lateral lines, as seen from dorsum, somewhat concave, wider at first fourth, the apex white (fig. 15A1), proximal margin ventrally blunt (fig. 15A2) *B. itabunensis*, n. sp.
- 4b. all ocelli similar in size; male fore wings extending beyond hind margin of second abdominal segment (fig. 1F), stridulatory file with ca. 67 teeth; apex of pseudepiphallus dilated as seen from the sides (fig. 3C); fringe of bristles on main lobes of pseudepiphallus located dorsally, before the apex (figs. 3A, B, C); copulatory papilla: the lateral lines, as seen from dorsum, not concave, wider at first third, the apex same color as the rest of the structure (fig. 15F) *B. mucuriensis* de Mello, 1992
- 5a. frons and gena with a light brown sagittal band from median ocellus to inferior margin of clypeus; stridulatory file with ca. 77 teeth; posterior margin of subgenital plate slightly sinuose (fig. 5I); apex of pseudepiphallus twisted and truncate; ectophallic apodemes rather short and slender; proximal margin of copulatory papilla with a shallow invagination (fig. 15B2) *B. itamarajuensis*, n. sp.
- 5b. frons with oval yellowish maculae just below median ocellus; fore wings stridulatory vein with ca. 75 teeth; posterior margin of subgenital plate concave (fig. 7I); apex of pseudepiphallus truncate as seen by the sides (fig. 9C), ectophallic apodemes long (fig. 9A, B); proximal margin of copulatory papilla with a deep invagination (fig. 15D2) *B. portosegurensis*, n. sp.

Key for the genera of neotropical Landrevinae

- 1a.** male fore wings without stridulatory file; subgenital plate elongate 2
- 1b.** male fore wings with stridulatory file; subgenital plate short (does not apply to *Brasilodontus apterus*) 3
- 2a.** median ocellus large; fore wings without a gland; female fore wings very small, scale-shaped *Odontogryllus* **Sassure, 1877**
- 2b.** median ocellus small; fore wings with a gland, strongly modified; female fore wings absent *Xulavuna* **n. gen.**
- 3a.** fore wings without harp veins; pseudepiphallus short, main lobes of pseudepiphallus slightly invaginated posteriorly 4
- 3b.** fore wings with harp veins; pseudepiphallus long, main lobes of pseudepiphallus deeply invaginated *Brasilodontus* **de Mello, 1992**
- 4a.** hind wings present; metanotal gland present; dorsum abdominal sclerite I not modified, without a complex glandular structure; posterior margin of pseudepiphallus concave; ectophallic apodeme very small *Valchica* **de Mello, 1992**
- 4b.** hind wings absent; metanotal gland absent; dorsum abdominal sclerite I strongly modified, almost completely fused and concealing sclerite II, also bearing a complex glandular structure (fig. 14E-G); pseudepiphallus bilobate at the apex; ectophallic apodeme long *Yarrubura* **n. gen.**

Acknowledgements

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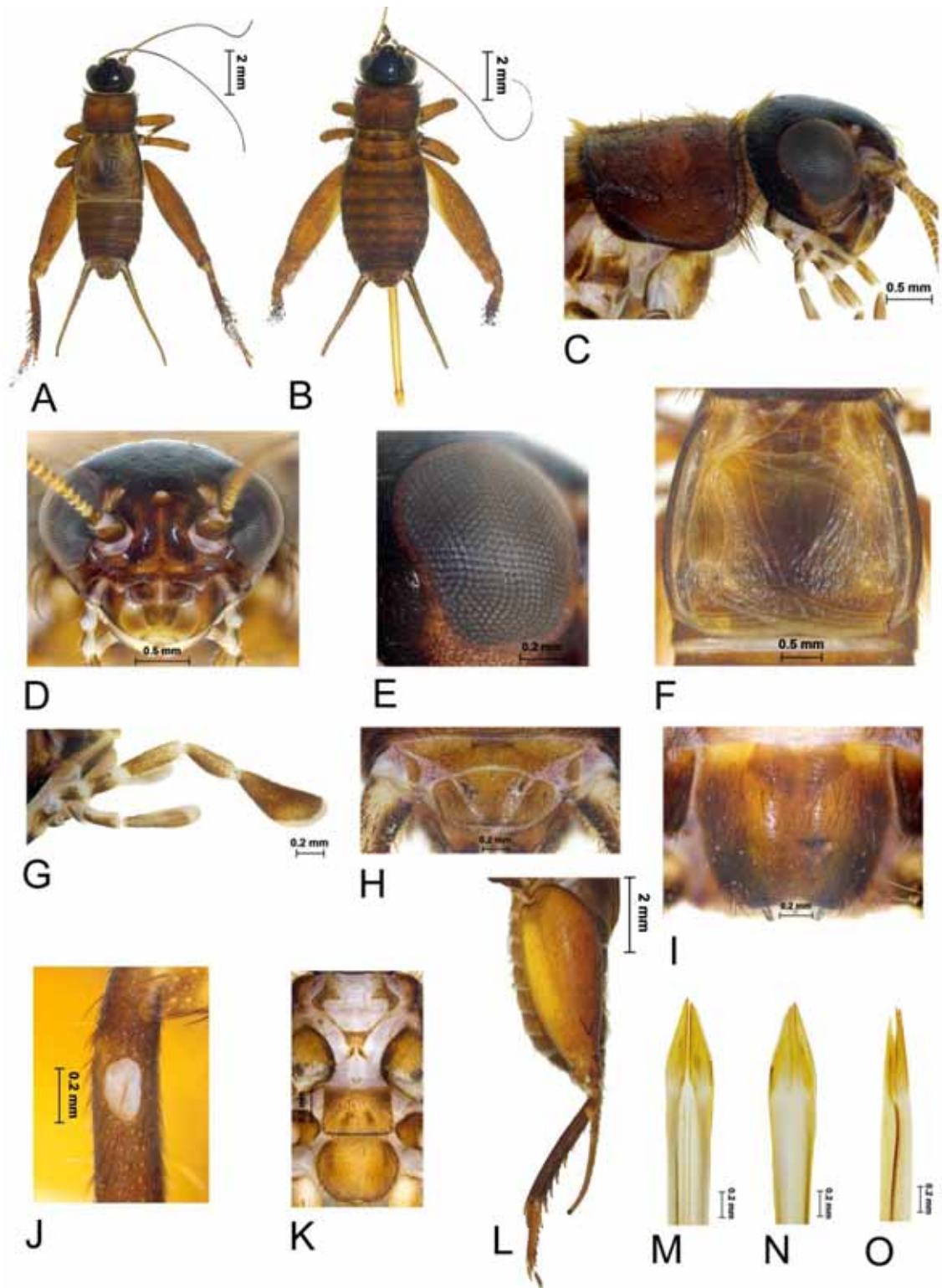


FIGURE 1. *Brasilodontus mucuriensis* de Mello, 1992. A- male, dorsal; B- female, dorsal ; C- male, lateral head and pronotum; D- male, frontal view of head; E- male eye, perpendicular view; F- male, dorsal field of fore wings; G- male maxillary palpi; H- male supra-anal plate; I- male subgenital plate; J- male, inner face of fore tibia showing tympanum; K- male, thoracic sternites; L- hind leg; M, N, O- ovipositor dorsal, ventral and lateral, respectively.

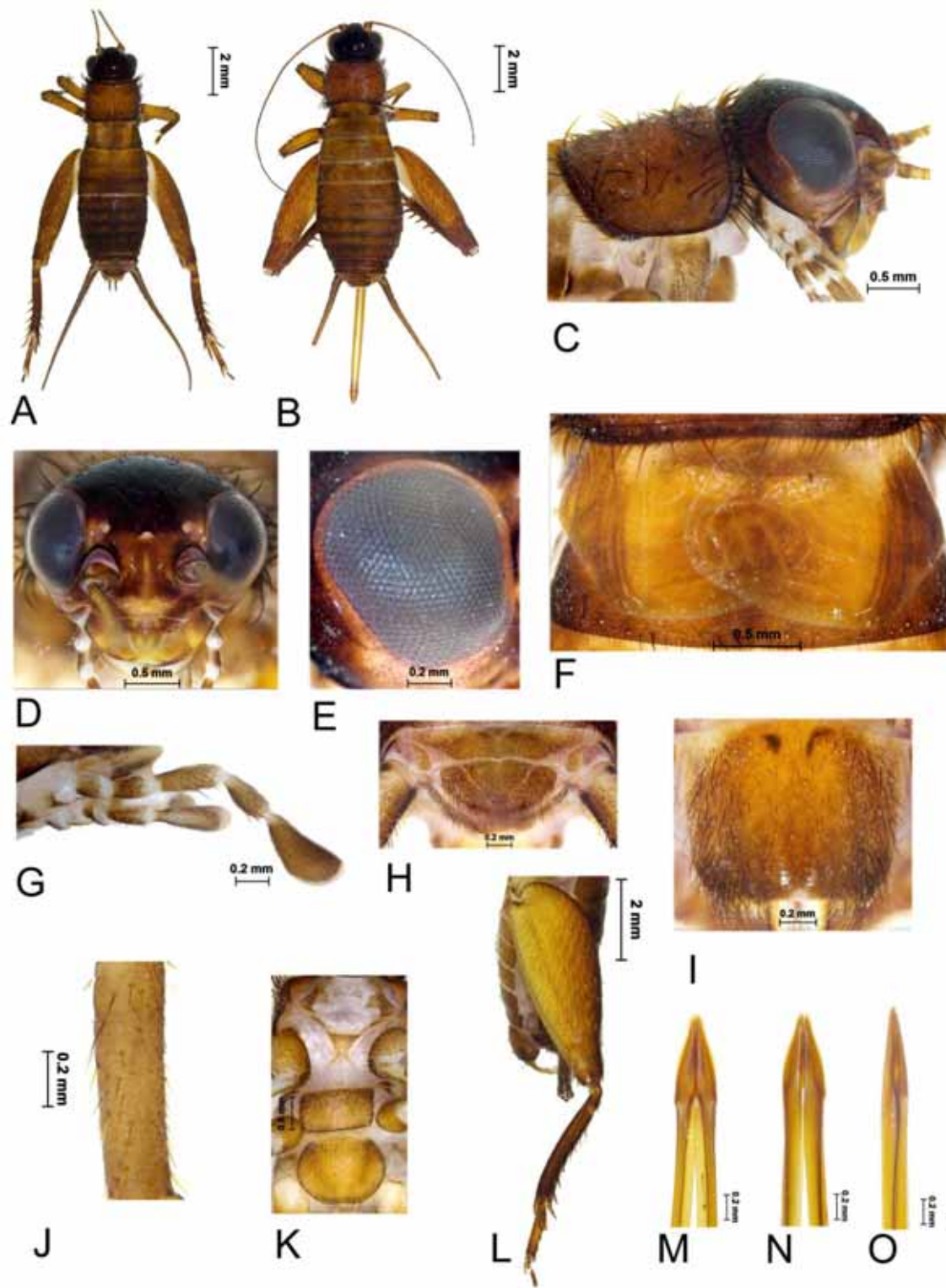


FIGURE 2. *Brasilodontus riocercensis* de Mello, 1992. **A-** male, dorsal; **B-** female, dorsal ; **C-** male, lateral head and pronotum; **D-** male, frontal view of head; **E-** male eye, perpendicular view; **F-** male, dorsal field of fore wings; **G-** male maxillary palpi; **H-** male supra-anal plate; **I-** male subgenital plate; **J-** male, inner face of fore tibia without tympanum; **K-** male, thoracic sternites; **L-** hind leg; **M, N, O-** ovipositor dorsal, ventral and lateral, respectively.

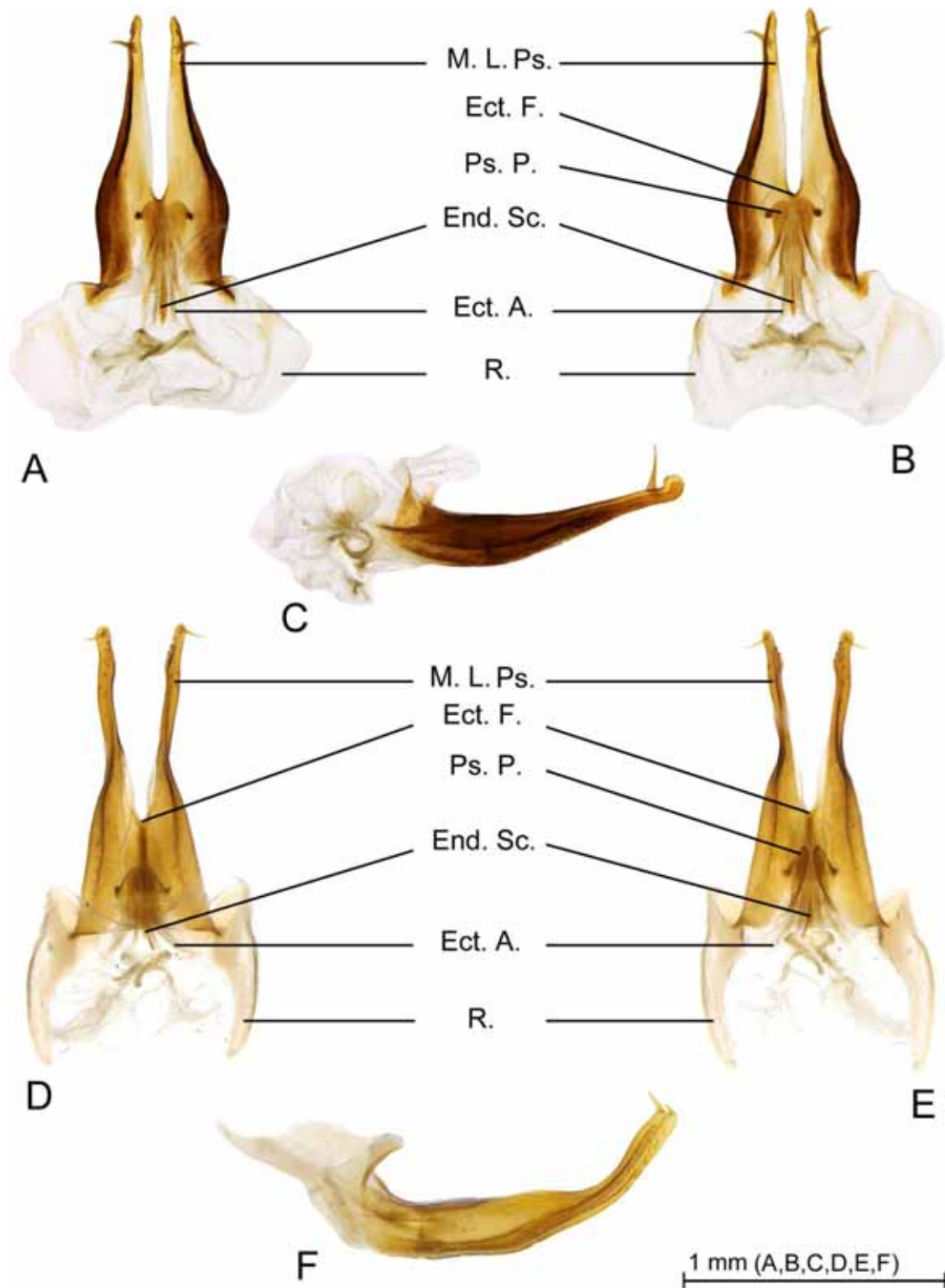


FIGURE 3. *Brasilodontus mucuriensis* de Mello, 1992 male phallic complex. **A**—dorsal view, **B**—ventral view, **C**—lateral view. *Brasilodontus riocencensis* de Mello, 1992 male phallic complex. **D**—dorsal view, **E**—ventral view, **F**—lateral view. Conventions: **M. L. Ps.** - main lobe of pseudepiphallus; **Ps. P.**—pseudepiphallic paramere **Ect. F.**—ectophallic fold; **End. Sc.**—endophallic sclerite; **Ect. Ap.**—ectophallic apodeme; **R.**—rami.

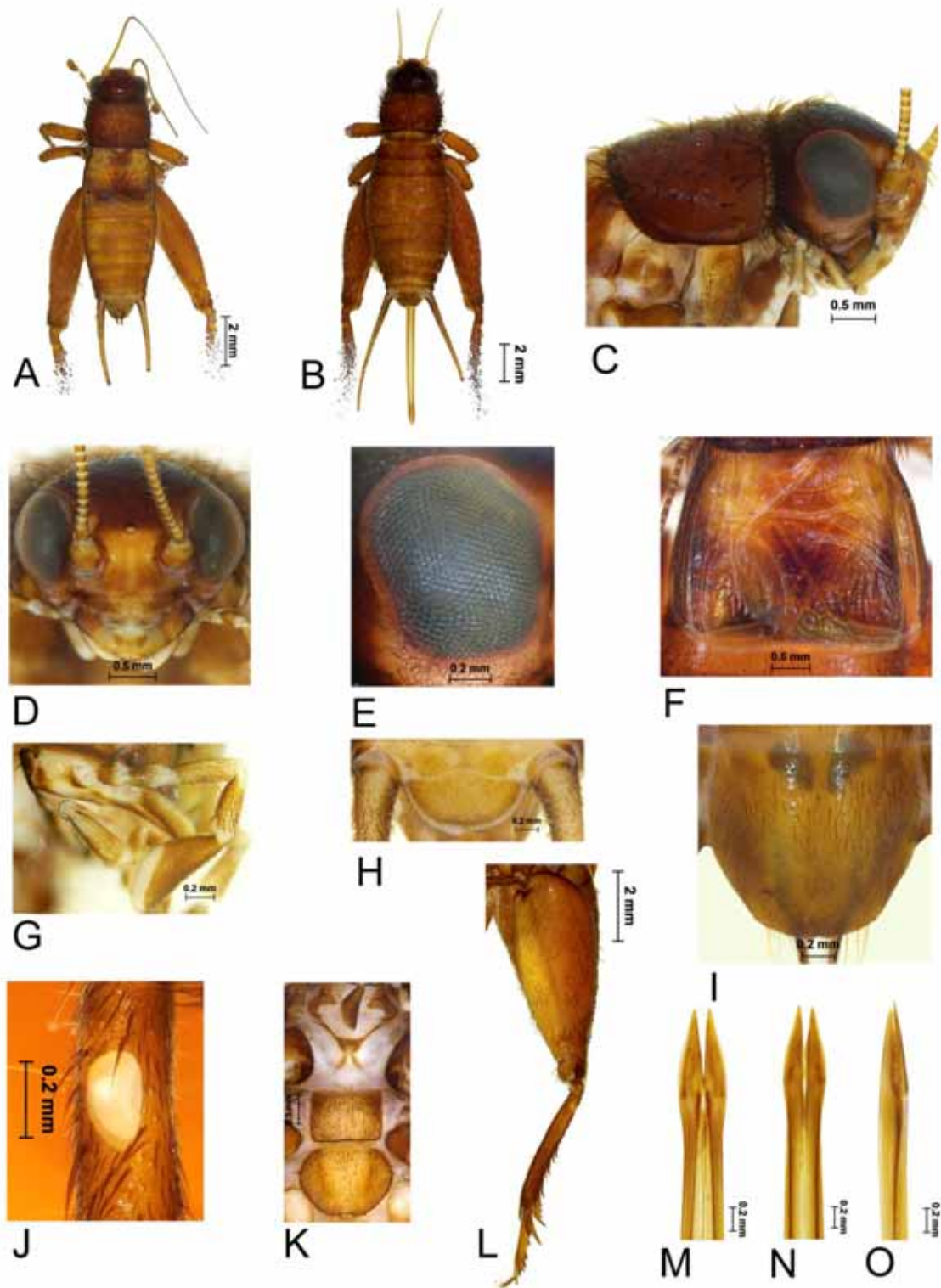


FIGURE 4. *Brasilodontus itabunensis* n. sp. A- male, dorsal; B- female, dorsal ; C- male, lateral head and pronotum; D- male, frontal view of head; E- male eye, perpendicular view; F- male, dorsal field of fore wings; G- male maxillary palpi; H- male supra-anal plate; I- male subgenital plate; J- male, inner face of fore tibia showing tympanum; K- male, thoracic sternites; L- hind leg; M, N, O- ovipositor dorsal, ventral and lateral, respectively.

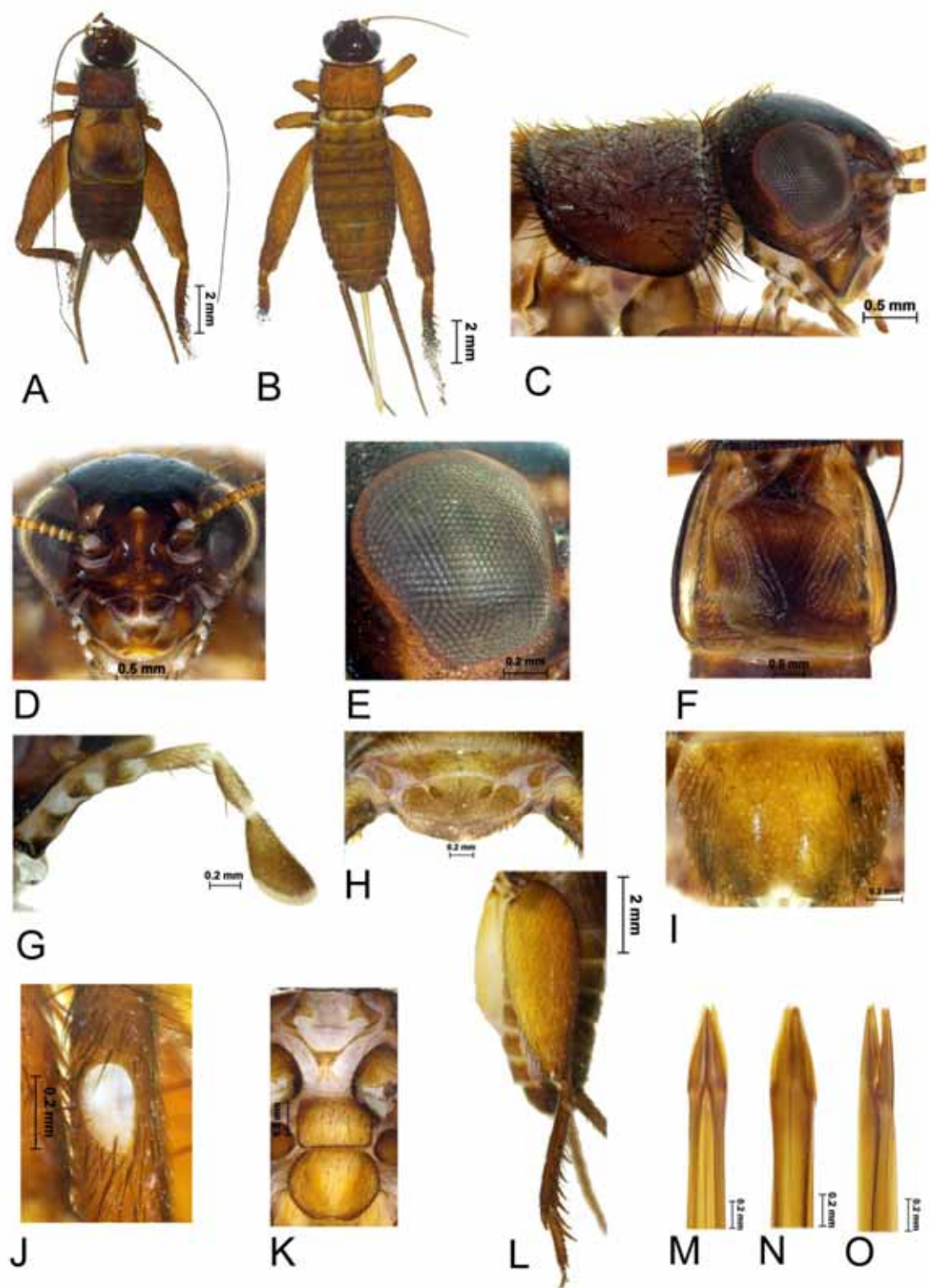


FIGURE 5. *Brasilodontus itamarajuensis* n. sp. **A-** male, dorsal; **B-** female, dorsal ; **C-** male, lateral head and pronotum; **D-** male, frontal view of head; **E-** male eye, perpendicular view; **F-** male, dorsal field of fore wings; **G-** male maxillary palpi; **H-** male supra-anal plate; **I-** male subgenital plate; **J-** male, inner face of fore tibia showing tympanum; **K-** male, thoracic sternites; **L-** hind leg; **M, N, O-** ovipositor dorsal, ventral and lateral, respectively.

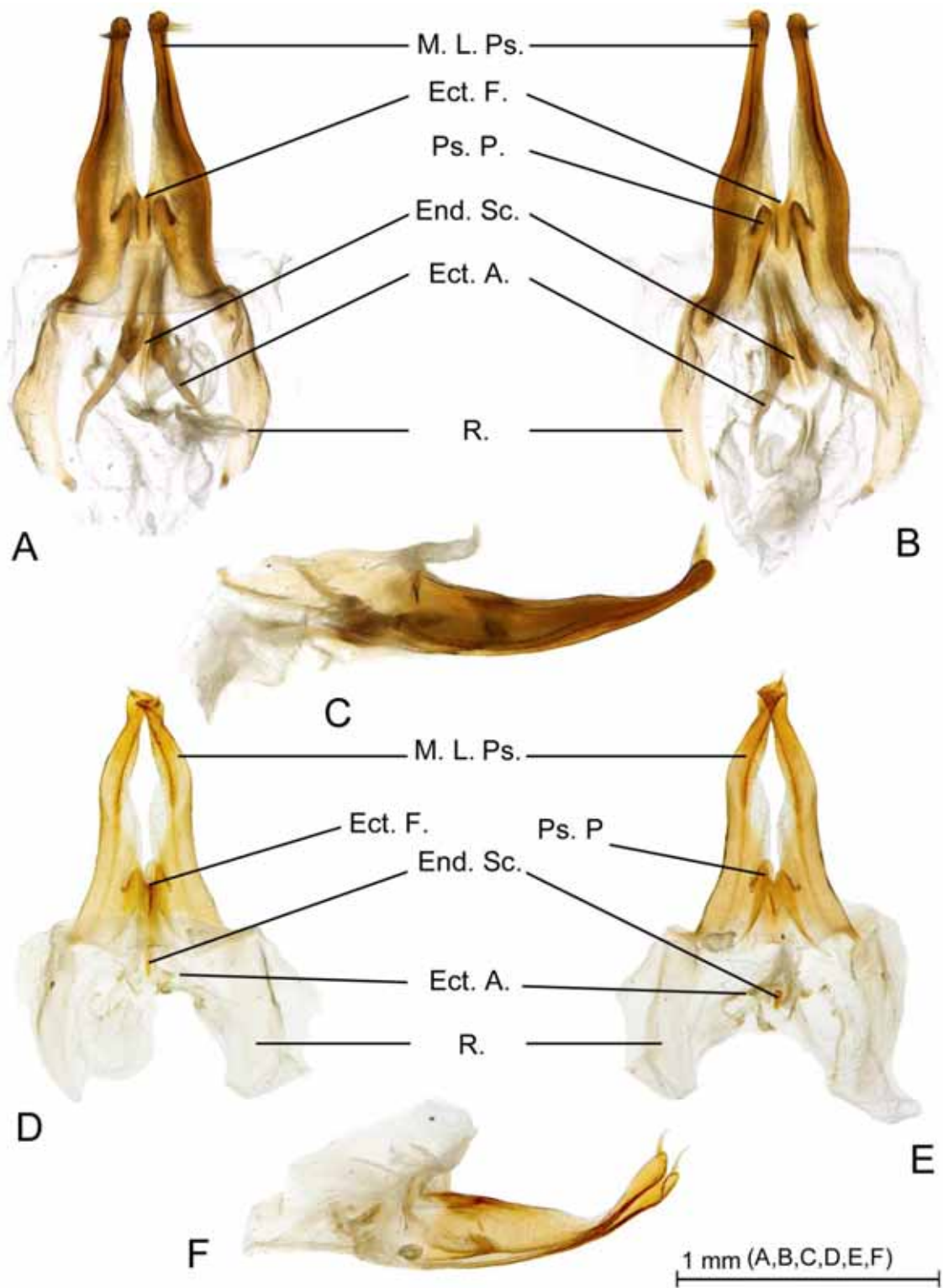


FIGURE 6. *Brasilodontus itabunensis* n. sp. male phallic complex. **A**—dorsal view, **B**—ventral view, **C**— lateral view. *Brasilodontus itamarajuensis* n. sp. male phallic complex. **D**—dorsal view, **E**—ventral view, **F**— lateral view. Conventions: **M. L. Ps.** - main lobe of pseudepiphallus; **Ps. P.**—pseudepiphallic paramere **Ect. F.**—ectophallic fold; **End. Sc.**—endophallic sclerite; **Ect. Ap.**—ectophallic apodeme; **R.**—rami.

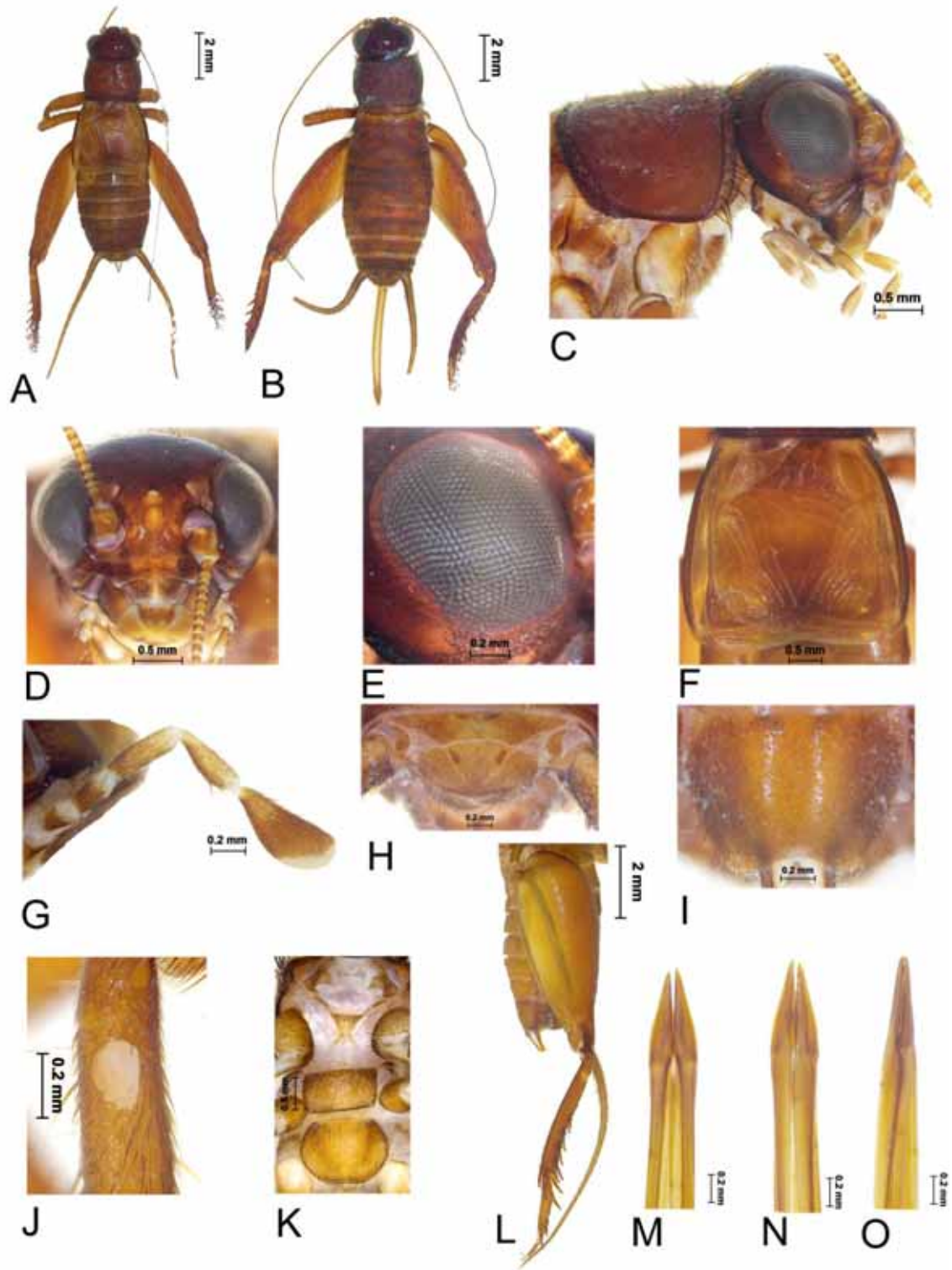


FIGURE 7. *Brasilodontus portosegurensis* n. sp. **A-** male, dorsal; **B-** female, dorsal ; **C-** male, lateral head and pronotum; **D-** male, frontal view of head; **E-** male eye, perpendicular view; **F-** male, dorsal field of fore wings; **G-** male maxillary palpi; **H-** male supra-anal plate; **I-** male subgenital plate; **J-** male, inner face of fore tibia showing tympanum; **K-** male, thoracic sternites; **L-** hind leg; **M, N, O-** ovipositor dorsal, ventral and lateral, respectively.

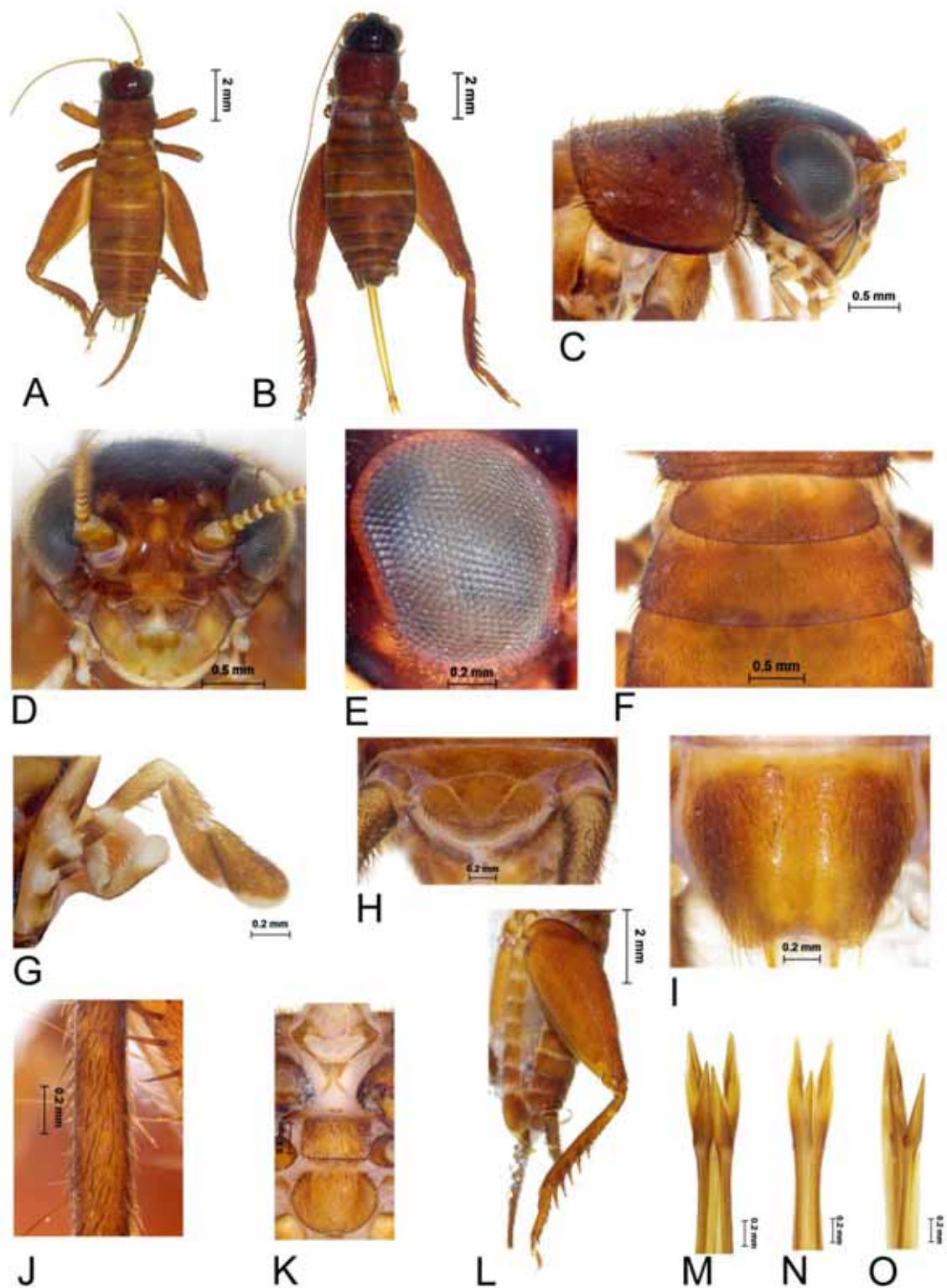


FIGURE 8. *Brasilodontus apterus* n. sp. **A-** male, dorsal; **B-** female, dorsal ; **C-** male, lateral head and pronotum; **D-** male, frontal view of head; **E-** male eye, perpendicular view; **F-** male, fore wings absent; **G-** male maxillary palpi; **H-** male supra-anal plate; **I-** male subgenital plate; **J-** male, inner face of fore tibia without tympanum; **K-** male, thoracic sternites; **L-** hind leg; **M, N, O-** ovipositor dorsal, ventral and lateral, respectively.

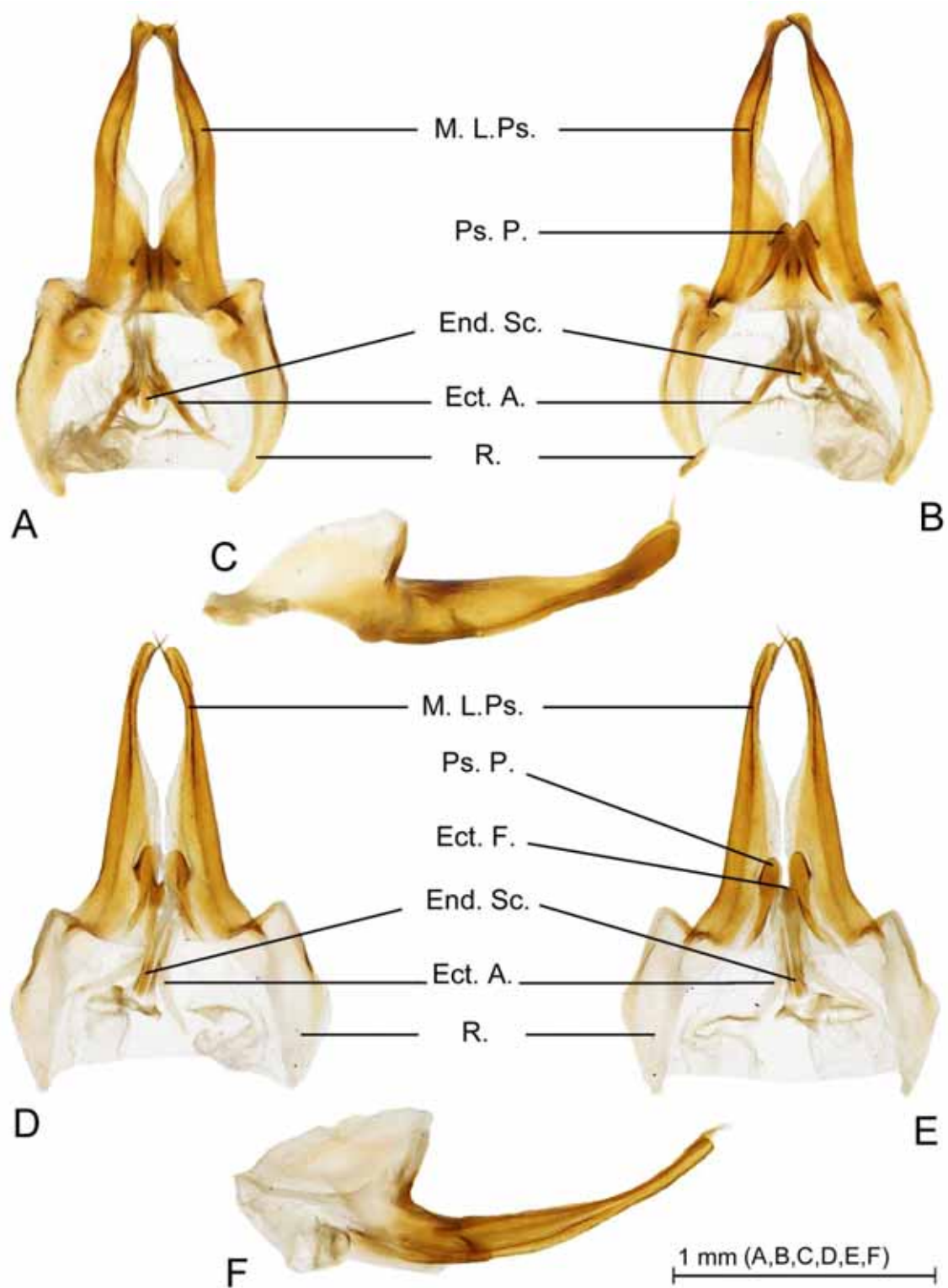


FIGURE 9. *Brasilodontus portosegurensis* n. sp. male phallic complex. **A**—dorsal view, **B**—ventral view, **C**—lateral view. *Brasilodontus apterus* n. sp. male phallic complex. **D**—dorsal view, **E**—ventral view, **F**—lateral view. Conventions: **M. L. Ps.** - main lobe of pseudepiphallus; **Ps. P.**—pseudepiphallic paramere **Ect. F.**—ectophallic fold; **End. Sc.**—endophallic sclerite; **Ect. Ap.**—ectophallic apodeme; **R.**—rami.

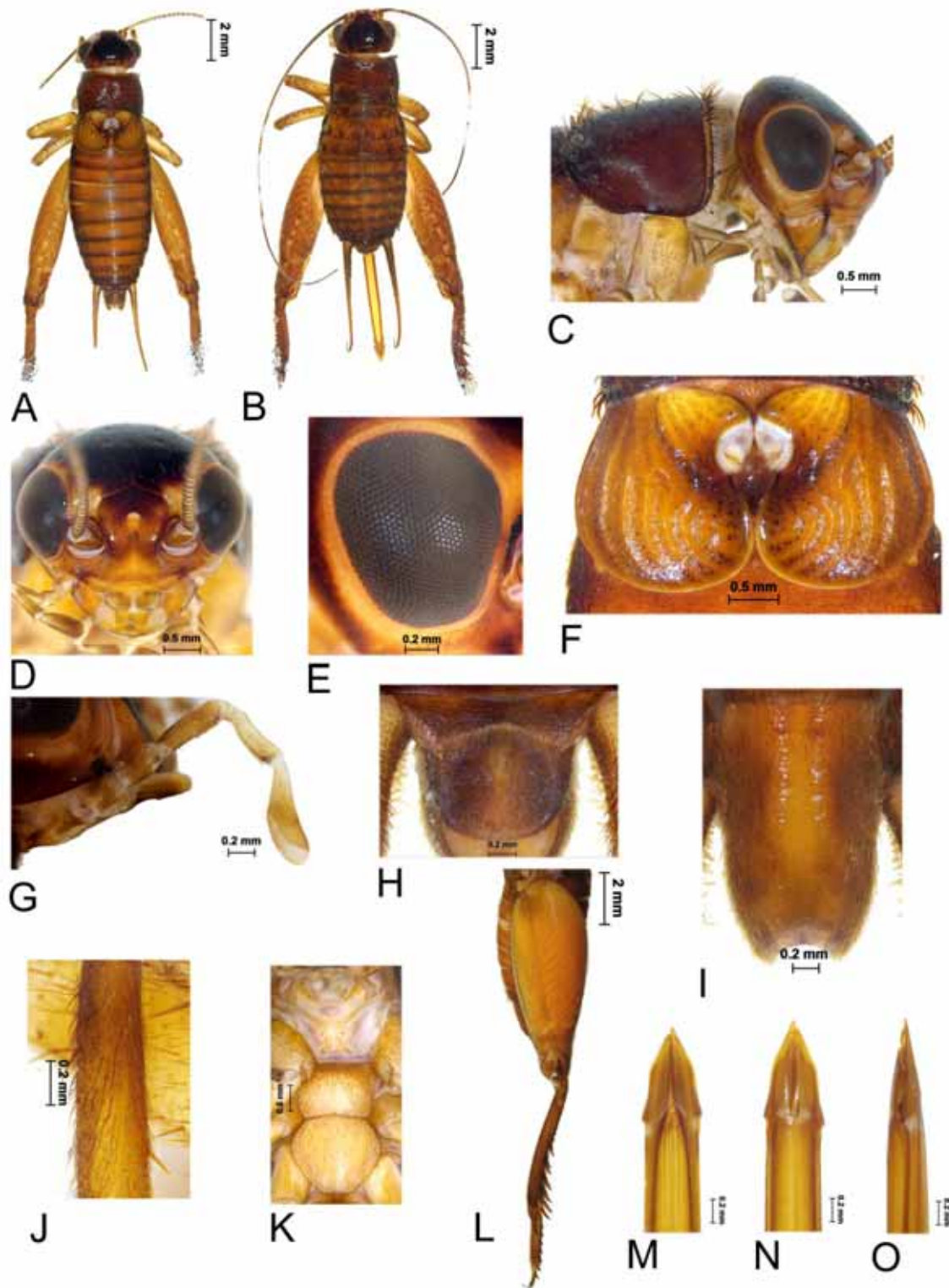


FIGURE 10. *Xulavuna adenoptera* n. gen. **A-** male, dorsal; **B-** female, dorsal; **C-** male, lateral head and pronotum; **D-** male, frontal view of head; **E-** male eye, perpendicular view; **F-** male, dorsal field of fore wings; **G-** male maxillary palpi; **H-** male supra-anal plate; **I-** male subgenital plate; **J-** male, inner face of fore tibia without tympanum; **K-** male, thoracic sternites; **L-** hind leg; **M, N, O-** ovipositor dorsal, ventral and lateral, respectively.

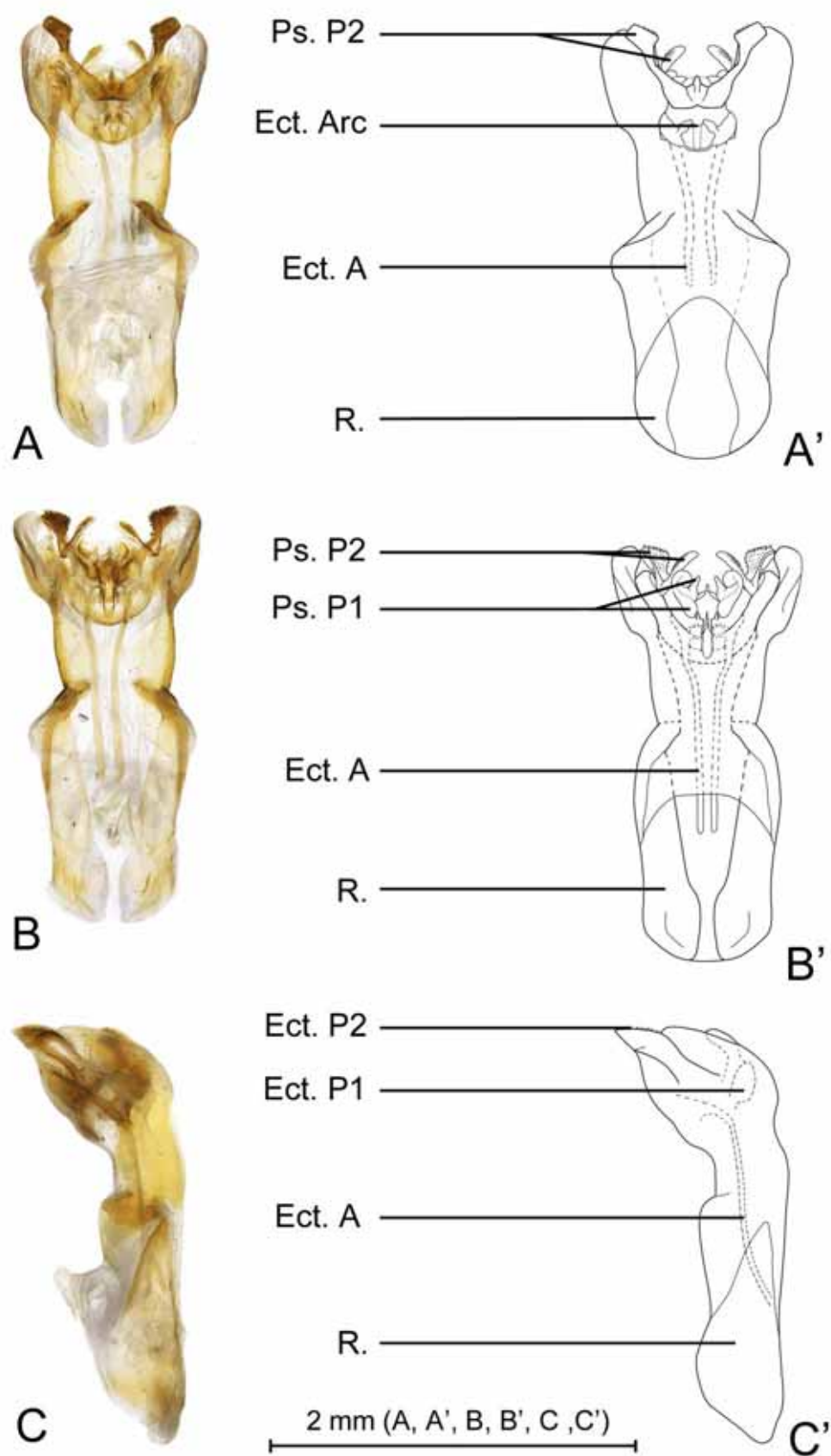


FIGURE 11. *Xulavuna adenoptera* n. gen. male phallic complex. **A, A'**—dorsal view, **B, B'**—ventral view, **C, C'**—lateral view. Conventions: **M. L. Ps.** - main lobe of pseudepiphallus; **Ps. P.**—pseudepiphallic paramere **Ect. Arc.**—ectophallic arc **Ect. F.**—ectophallic fold; **End. Sc.**—endophallic sclerite; **Ect. Ap.**—ectophallic apodeme; **R.**—rami.

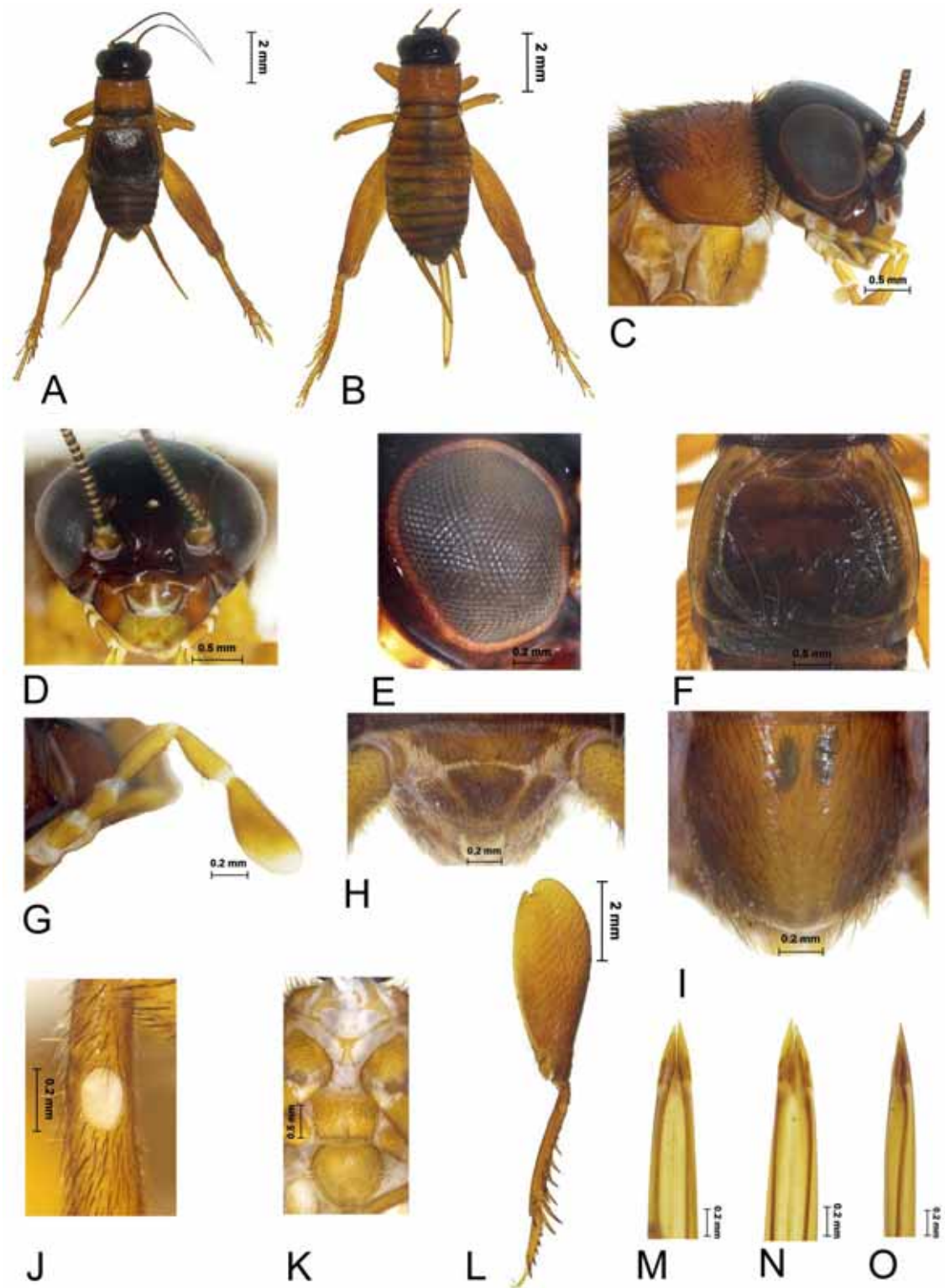


FIGURE 12. *Yarrubura nigricephala* n. gen. **A-** male, dorsal; **B-** female, dorsal ; **C-** male, lateral head and pronotum; **D-** male, frontal view of head; **E-** male eye, perpendicular view; **F-** male, dorsal field of fore wings; **G-** male maxillary palpi; **H-** male supra-anal plate; **I-** male subgenital plate; **J-** male, inner face of fore tibia showing tympanum; **K-** male, thoracic sternites; **L-** hind leg; **M, N, O-** ovipositor dorsal, ventral and lateral, respectively.

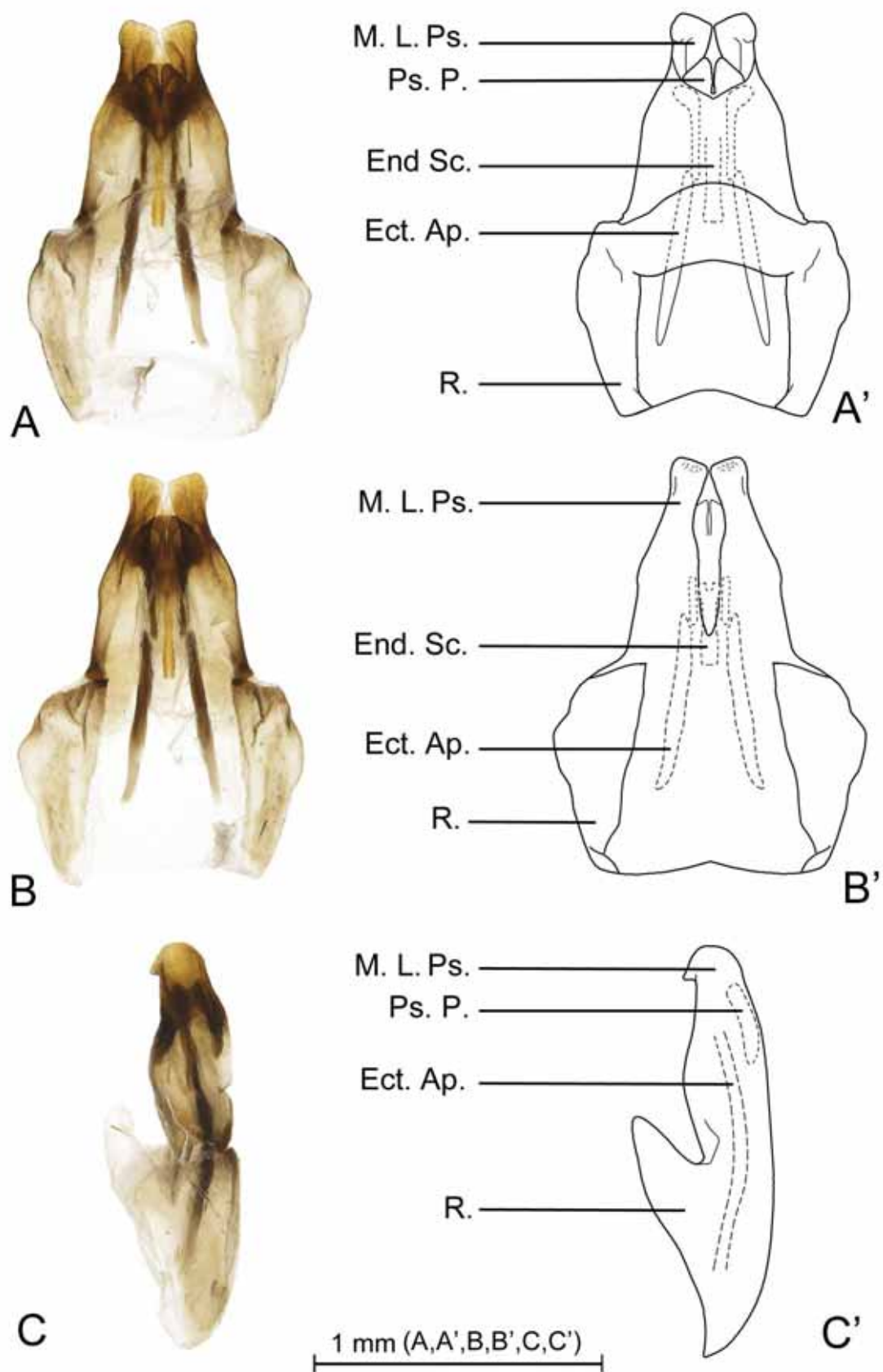


FIGURE 13. *Yarrubura nigricephala* n. gen. male phallic complex. **A, A'**—dorsal view, **B, B'**—ventral view, **C, C'**— lateral view. Conventions: **M. L. Ps.** - main lobe of pseudepiphallus; **Ps. P.**—pseudepiphallic paramere **Ect. F.**—ectophallic fold; **End. Sc.**—endophallic sclerite; **Ect. Ap.**—ectophallic apodeme; **R.**—rami.

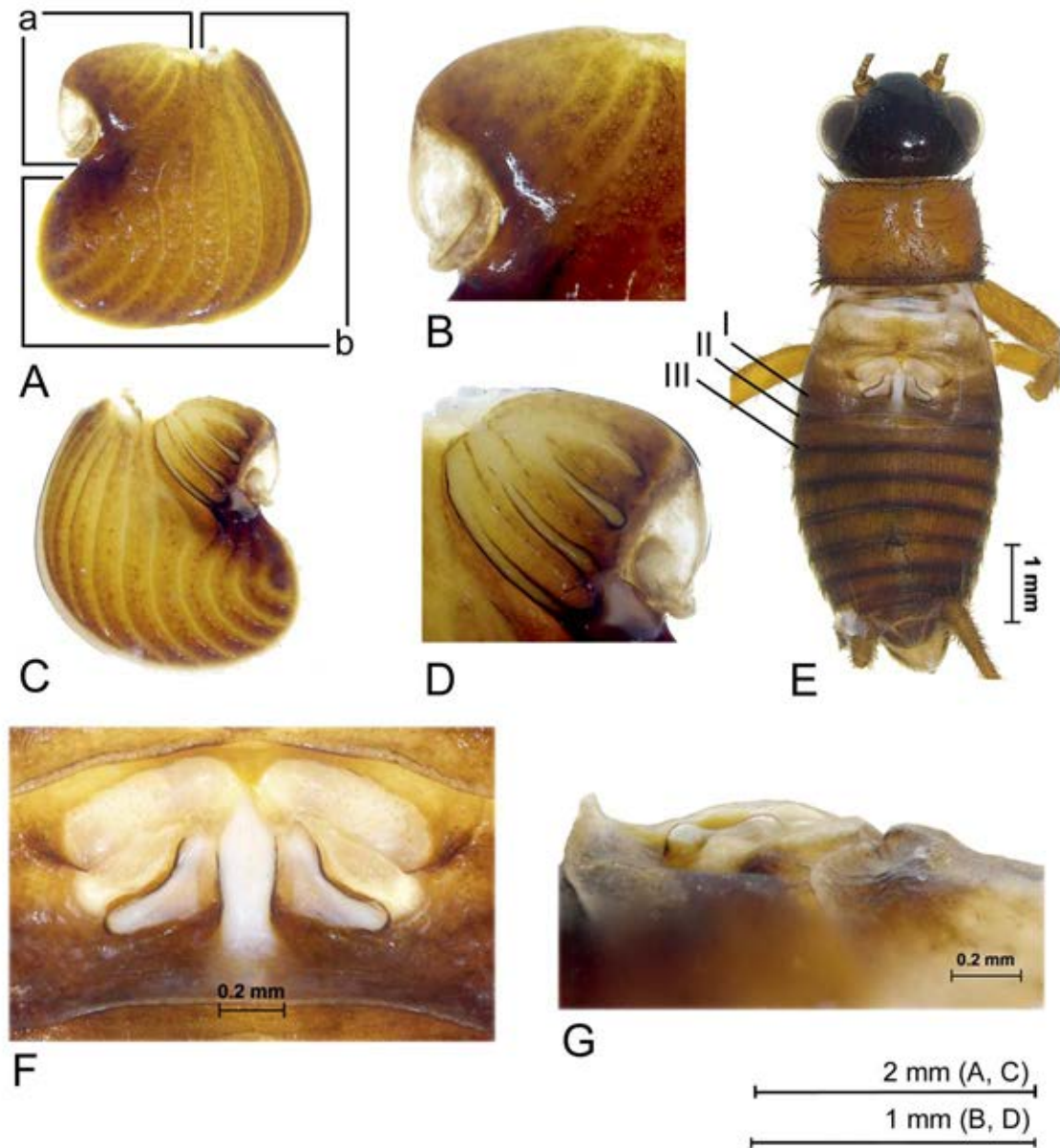


FIGURE 14. (A to D, *Xulavuna adenoptera* n. sp.; E to G, *Yarrubura nigricephala*, n. sp.). A- male right fore wing, dorsal view (a- dorsal field; b- lateral field); B- right fore wing gland, dorsal view; C- right wing ventral view; D- right fore wing, ventral view of dorsal field; E- male body of *Y. nigricephala*, n. sp. after wing removal showing abdominal glandular structures (I, II, III- abdominal tergites); F- Glandular structures on abdominal tergite I; G- same, lateral view.

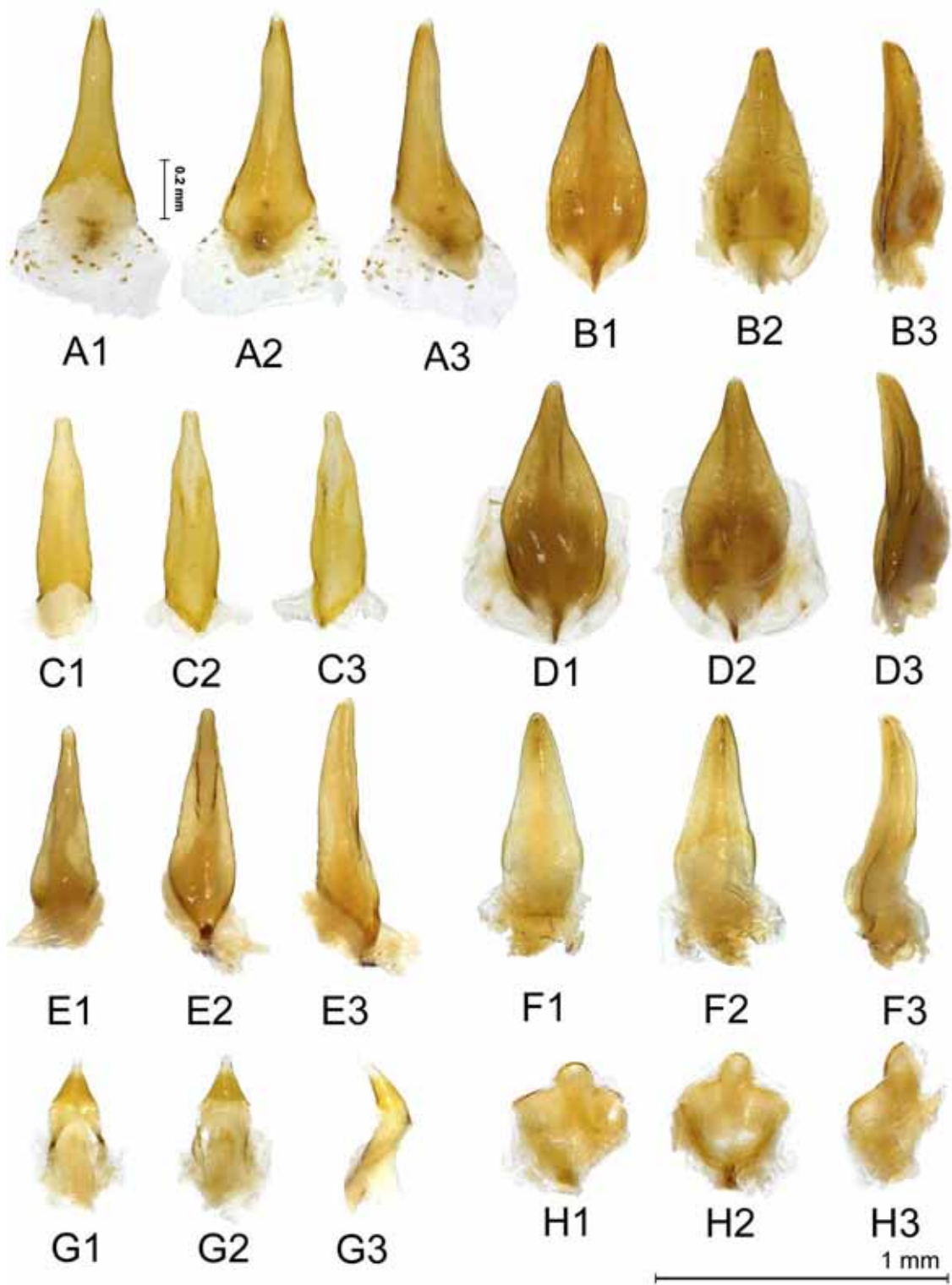


FIGURE 15. Female copulatory papilla dorsal (1) ventral (2) and lateral (3) views. **A-** *Brasilodontus itabunensis* sp. n.; **B-** *B. itamarajuensis* sp. n. ; **C-** *B. riocensis*; **D-** *B. portosegurensis* sp.n. ; **E-** *B. apterus* sp. n.; **F-** *B. mucuriensis*; **G-** *Yarrubura nigricephala* sp. n. ; **H-** *Xulavuna adenoptera* sp. n.

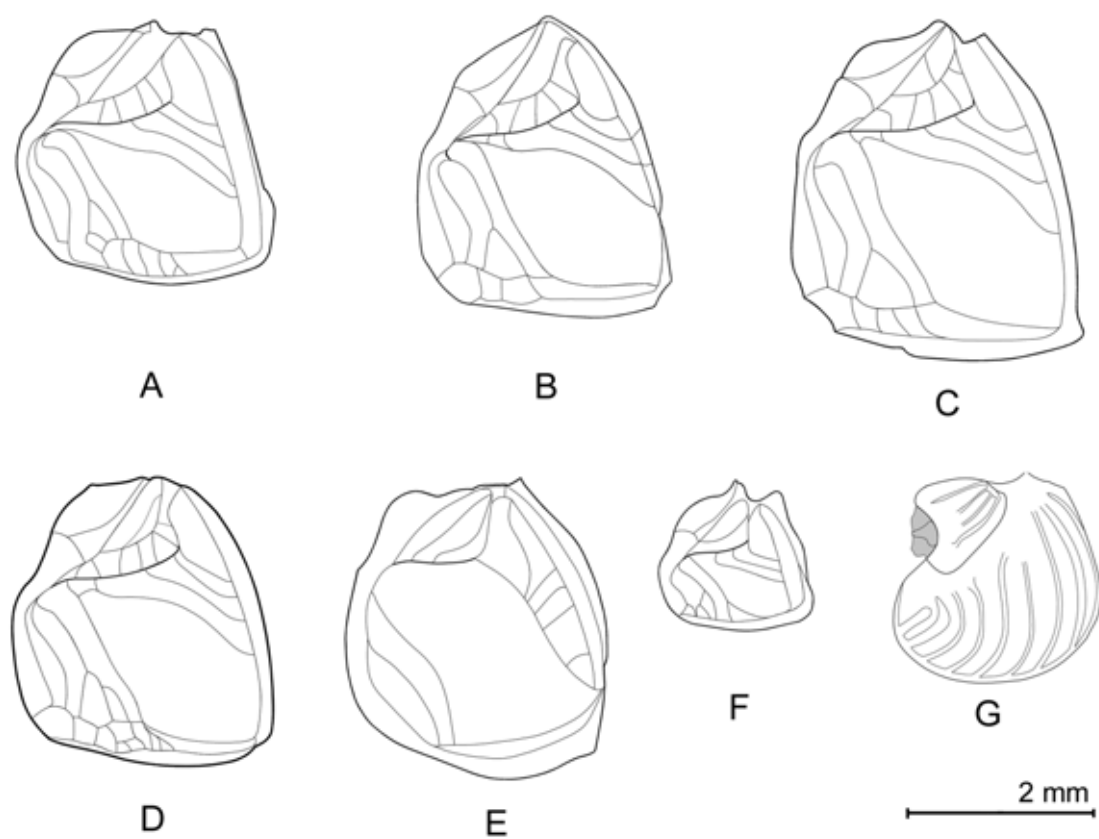


FIGURE 16. Males fore wings. **A-** *Brasilodontus itabunensis* sp. n.; **B-** *B. itamarajuensis* sp. n. ; **C-** *B. portosegurensis* sp. n. ; **D-** *B. mucuriensis*; **E-** *Yarrubura nigricephala* sp. n.; **F-** *B. riodocensis*; **G-** *Xulavuna adenoptera* sp. n.

TABLE I. Measurements (mm) of adult specimens. Conventions: **BL**- body length; **HW**- head width; **IOD**- inter-ocular distance; **PL**- pronotum length; **PW**- pronotum width; **FWL**- fore wing length; **FWW**- fore wing width; **HFL**- hind femur length; **HTL**- hind tibia length; **OL**- ovipositor length.

	<u>BL</u>	<u>HW</u>	<u>IOD</u>	<u>PL</u>	<u>PW</u>	<u>FWL</u>	<u>FWW</u>	<u>HFL</u>	<u>HTL</u>	<u>OL</u>
<i>B. mucuriensis</i>										
male (n=10)										
Range	8.40-11.07	2.25-2.41	1.06-1.19	1.44-1.78	2.38-2.59	2.73-3.18	2.73-3.05	5.19-6.23	2.86-3.70	/
Mean $\pm$ s.d.	9.69 $\pm$ 0.92	2.32 $\pm$ 0.06	1.13 $\pm$ 0.04	1.69 $\pm$ 0.10	2.49 $\pm$ 0.06	2.95 $\pm$ 0.14	2.79 $\pm$ 0.10	5.59 $\pm$ 0.36	3.33 $\pm$ 0.32	/
Female (n=7)										
Range	10.00-13.20	2.50-2.75	1.22-1.44	1.75-1.97	2.69-3.06	/	/	5.78-6.43	3.57-4.16	5.39-6.30
Mean $\pm$ s.d.	11.66 $\pm$ 1.29	2.62 $\pm$ 0.09	1.33 $\pm$ 0.07	1.87 $\pm$ 0.08	2.86 $\pm$ 0.14	/	/	6.19 $\pm$ 0.24	3.93 $\pm$ 0.21	5.95 $\pm$ 0.37
<i>B. riodecensis</i>										
male (n=10)										
Range	7.87-10.27	2.19-2.41	1.09-1.19	1.53-1.81	2.25-2.47	0.71-1.10	1.23-2.08	4.87-5.45	3.25-3.51	/
Mean $\pm$ s.d.	9.07 $\pm$ 0.79	2.29 $\pm$ 0.08	1.14 $\pm$ 0.03	1.61 $\pm$ 0.08	2.34 $\pm$ 0.08	0.87 $\pm$ 0.13	1.36 $\pm$ 0.25	5.22 $\pm$ 0.22	3.41 $\pm$ 0.12	/
Female (n=8)										
Range	8.53-12.00	2.41-2.59	1.22-1.31	1.63-1.88	2.59-2.78	/	/	5.71-6.04	3.64-4.03	5.58-6.23
Mean $\pm$ s.d.	10.48 $\pm$ 1.26	2.50 $\pm$ 0.09	1.27 $\pm$ 0.04	1.72 $\pm$ 0.08	2.70 $\pm$ 0.07	/	/	5.84 $\pm$ 0.13	3.82 $\pm$ 0.12	5.84 $\pm$ 0.19
<i>B. itabunensis n. sp.</i>										
male (n=6)										
Range	9.72-11.07	2.50-2.56	1.19-1.31	1.66-1.94	2.56-2.75	2.47-2.73	2.79-3.05	5.84-6.10	3.83-4.16	/
Mean $\pm$ s.d.	10.43 $\pm$ 0.55	2.51 $\pm$ 0.04	1.25 $\pm$ 0.06	1.84 $\pm$ 0.11	2.64 $\pm$ 0.08	2.61 $\pm$ 0.12	2.91 $\pm$ 0.11	5.99 $\pm$ 0.11	3.95 $\pm$ 0.16	/
Female (n=3)										
Range	12.93-13.47	2.78-2.94	1.34-1.47	2.06-2.13	3.09-3.22	/	/	7.08-7.34	4.42-4.55	6.95-7.47
Mean $\pm$ s.d.	13.29 $\pm$ 0.31	2.88 $\pm$ 0.08	1.41 $\pm$ 0.06	2.08 $\pm$ 0.04	3.18 $\pm$ 0.07	/	/	7.19 $\pm$ 0.14	4.46 $\pm$ 0.07	7.23 $\pm$ 0.26

	<u>BL</u>	<u>HW</u>	<u>IOD</u>	<u>PL</u>	<u>PW</u>	<u>FWL</u>	<u>FWW</u>	<u>HFL</u>	<u>HTL</u>	<u>OL</u>
<i>B. itamarajuensis</i> n. sp.										
male (n=10)										
Range	9.60-11.33	2.31-2.47	1.13-1.25	1.63-1.88	2.31-2.59	2.86-3.57	2.66-3.18	4.94-5.78	3.31-3.64	/
Mean $\pm$ s.d.	10.32 $\pm$ 0.58	2.39 $\pm$ 0.07	1.18 $\pm$ 0.04	1.74 $\pm$ 0.08	2.48 $\pm$ 0.08	3.23 $\pm$ 0.22	2.90 $\pm$ 0.17	5.58 $\pm$ 0.26	3.49 $\pm$ 0.13	/
Female (n=10)										
Range	11.33-13.33	2.50-2.84	1.19-1.41	1.78-2.31	2.56-3.06	/	/	5.84-6.82	3.51-4.35	5.39-6.62
Mean $\pm$ s.d.	12.15 $\pm$ 0.57	2.66 $\pm$ 0.11	1.31 $\pm$ 0.07	1.93 $\pm$ 0.16	2.79 $\pm$ 0.16	/	/	6.35 $\pm$ 0.47	3.97 $\pm$ 0.23	6.10 $\pm$ 0.36
<i>B. portosegurensis</i> n. sp.										
male (n=10)										
Range	9.47-12.80	2.38-2.63	1.22-1.38	1.72-1.91	2.41-2.72	3.05-3.57	2.86-3.38	5.32-6.43	3.64-3.83	/
Mean $\pm$ s.d.	10.84 $\pm$ 1.02	2.48 $\pm$ 0.09	1.26 $\pm$ 0.05	1.81 $\pm$ 0.07	2.56 $\pm$ 0.10	3.30 $\pm$ 0.18	3.16 $\pm$ 0.16	5.84 $\pm$ 0.30	3.72 $\pm$ 0.08	/
Female (n=10)										
Range	11.47-12.87	2.63-2.81	1.28-1.50	1.69-2.06	2.53-3.06	/	/	5.91-6.75	3.77-4.22	5.78-6.88
Mean $\pm$ s.d.	12.11 $\pm$ 0.40	2.65 $\pm$ 0.08	1.36 $\pm$ 0.06	1.80 $\pm$ 0.13	2.81 $\pm$ 0.14	/	/	6.29 $\pm$ 0.28	3.95 $\pm$ 0.15	6.22 $\pm$ 0.34
<i>B. apterus</i> n. sp.										
male (n=10)										
Range	8.40-11.20	2.09-2.53	1.03-1.34	1.38-1.69	2.16-2.63	/	/	4.74-6.04	2.73-3.90	/
Mean $\pm$ s.d.	9.89 $\pm$ 0.79	2.31 $\pm$ 0.12	1.18 $\pm$ 0.10	1.59 $\pm$ 0.09	2.37 $\pm$ 0.14	/	/	5.33 $\pm$ 0.33	3.27 $\pm$ 0.33	/
Female (n=5)										
Range	10.40-12.40	2.44-2.78	1.16-1.47	1.63-1.94	2.63-2.94	/	/	5.91-7.34	3.83-4.22	6.10-6.49
Mean $\pm$ s.d.	11.49 $\pm$ 0.90	2.61 $\pm$ 0.14	1.28 $\pm$ 0.12	1.77 $\pm$ 0.13	2.78 $\pm$ 0.15	/	/	6.61 $\pm$ 0.51	4.06 $\pm$ 0.16	6.29 $\pm$ 0.19

	<u>BL</u>	<u>HW</u>	<u>IOD</u>	<u>PL</u>	<u>PW</u>	<u>FWL</u>	<u>FWW</u>	<u>HFL</u>	<u>HTL</u>	<u>OL</u>
<i>X. adenoptera n. sp.</i>										
male (n=10)										
Range	10.38-12.75	2.97-3.19	1.53-1.77	1.64-1.9	2.85-3.27	1.79-2.2	1.72-1.94	6.25-8.63	4.25-4.86	/
Mean $\pm$ s.d.	11.58 $\pm$ 0.68	3.05 $\pm$ 0.18	1.68 $\pm$ 0.14	1.75 $\pm$ 0.16	3.09 $\pm$ 0.11	1.94 $\pm$ 0.14	1.76 $\pm$ 0.11	7.41 $\pm$ 0.76	4.46 $\pm$ 0.21	/
Female (n=10)										
Range	10.25 - 13.13	3.16 - 3.46	1.5 - 1.95	1.71 - 2.13	3.16 - -3.61	/	/	7.5 - 8.13	4.38 - 5.38	5.39 - 6.88
Mean $\pm$ s.d.	11.84 $\pm$ 0.88	3.33 $\pm$ 0.11	1.83 $\pm$ 0.15	3.52 $\pm$ 0.13	3.45 $\pm$ 0.14	/	/	7.79 $\pm$ 0.24	4.79 $\pm$ 0.38	6.38 $\pm$ 0.40
<i>Y. nigricephala n. sp</i>										
male (n=10)										
Range	5.00-8.75	2.17-2.43	0.88-1.18	1.37-1.52	2.09-2.47	2.70-3.16	2.66-3.31	4.88-5.50	2.88-3.38	/
Mean $\pm$ s.d.	7.53 $\pm$ 1.01	2.30 $\pm$ 0.08	1.06 $\pm$ 0.09	1.45 $\pm$ 0.07	2.31 $\pm$ 0.12	2.93 $\pm$ 0.15	3.06 $\pm$ 0.17	5.35 $\pm$ 0.31	3.13 $\pm$ 0.13	/
Female (n=10)										
Range	6.25-9.50	2.21-2.47	1.15-1.18	1.22-1.41	2.21-2.40	/	/	4.63-5.63	2.88-3.38	3.50-5.25
Mean $\pm$ s.d.	8.15 $\pm$ 0.89	2.37 $\pm$ 0.10	1.16 $\pm$ 0.02	1.32 $\pm$ 0.06	2.29 $\pm$ 0.08	/	/	5.20 $\pm$ 0.39	3.06 $\pm$ 0.17	3.91 $\pm$ 0.50