

NEW NEOTROPICAL LEAFHOPPERS FROM PERU AND BOLIVIA (HOMOPTERA: CICADELLIDAE)¹

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SUMMARY

The following new leafhopper taxa are described from Peru and Bolivia: *Perubala cochabamba* sp.n., *Tenucephalus quadricornis* sp.n., *T. sagittarius* sp.n., *Amplicephalus transversalis* sp.n., *A. paradoxus* sp.n., *Icaia appendiculata* sp.n., *Yungasia pungens* sp.n., *Y. coroicoa* sp.n., *Y. longipennis* sp.n., *Capnodellus quadrimaculatus* gen. et sp.n., *Napo brazosellus* gen. et sp.n., *Parandanus ornatus* gen. et sp.n.,

P. hiliaris sp.n., *Pachytettix elegans* sp.n., *Brazosa appendiculata* sp.n., *Atanus cristatus* sp.n., *A. picchuanus* sp.n., *A. bicornis* sp.n., *A. bos* sp.n., *A. horridus* sp.n. and *Picchustelus Inca* sp.n. The genus *Tubulanus* Lv. is synonymized with *Atanus* Qm. The male genitalia of *Exitianus quadratulus* (Osb.) are illustrated for the first time.

INTRODUCTION

Most of the insects treated in the following pages were collected in the high altitudes of Peru and Bolivia. The specimens from Peru were collected at 2300 m. alt. mostly on the sides and near the top of the mountain above the Machu Picchu restored village of the Incas. The vegetation is composed mostly of tall grasses mixed with composites and other types of herbaceous vegetation. The specimens were obtained by sweeping. Few trees and shrubs occur at this altitude although a few short seedlings were observed. The vegetation is very dense and about a meter in height.

The steep incline, below the village to the canyon below, contains many shrubs and a few sweepings were made in this area. Collections were also made in the dense tropical vegetation in the canyon but no material discussed in the following pages was collected from that area.

The Bolivia specimens were collected by light at San Esteban some 49 km. N. of Santa Cruz and were received for study through the courtesy of Robert E. Woodruff. The type of vegetation upon which they lived is not known.

A few specimens collected at Sinchona near Tingo Maria, Peru were collected by J.G. Sanders from wooded areas where trees were being removed for making quinine during the early 1940s.

N e o b a l i n a e

1. *PERUBALA COCHABAMBA* SP. N.

Fig. 1. Length 5.5 mm. Black. Crown yellow, lateral margins black, disk with a transverse bright orange inverted C-shaped figure, basal margin with two dark reddish brown triangles joined to the orange figure apically; eyes dark greyish brown. Pronotum black, anterior margin narrowly brownish with a yellow spot on either side. Elytra black; clavus (Fig. 2) with a large elongately triangular yellow spot. Anterior and middle legs pale ochraceous. Hind legs, excluding tips of femora, blackish.

Like the other species of the genus. Male genitalia (Figs. 3-7): Apophysis of style long and relatively slender. Aedeagal shaft long and gracile, provided with two long falcate apical appendages.

Bolivia: Cochabamba, Chapare, Alto Palmar, 1100 m. 1 male type, X. 1960, F. H. Walz, in coll. DeLong.

Readily distinguished from the six previously known species of the genus by the coloring and the genitalia.

D e l t o c e p h a l i n a e

TENUCEPHALUS DeL.

Large yellowish or greyish green species; anterior margin of head whitish, bordered with black narrow line both above and below.

Body elongate, somewhat depressed. Head broader than pronotum, roundedly bluntly angular. Face finally shagreened, flattish, broad, lower part semicircular in outline; anteclypeus parallel-sided, frontoclypeus broad, expanding dorsad; lora fairly large, genae bluntly notched near eyes, ocellular area broad. Crown flattish, anterior margin transversely striated; frontal region narrow, finely rugose, not distinctly delimited, discal region indistinctly longitudinally striated; ocelli about their own diameter from eyes. Pronotum broad, lateral margins longish and carinate, disk finely rugose. Scutellum large, finely shagreened. Elytra long and narrowish; appendix distinct, 2 long and parallel-sided closed subapical cells, no extra cross veins. Spinulation of fore tibiae 1 + 4 or 1 + 5, of hind knees 2 + 2 + 1. Apodemes of last and 2nd sternites (male) short.

Male genitalia: Pygofer large, sclerified dorsally; side lobes with appendages and macrosetae. Anal tube membranous. Genital plates broad, lateral margin rounded, macrosetae uniseriate. Style robust. Connective broad, fused to aedeagus, arms close to each other. Aedeagus provided with appendages; phragma forming large setose lobes; gonopore ventral. Pygofer (female) strongly prolonged, ovipositor sheath extending far beyond pygofer.

Distinguished from all other Hecalini genera (Linnavuori 1957 and 1975) by the fused connective. The genus was originally described as monotypic from Mexico (DeLong 1944). The male genitalia of the genotype, *T. marginellus* DeL. are illustrated in Figs. 8-12.

2. *TENUCEPHALUS QUADRICORNIS* SP. N.

Fig. 13. Length 5.25 mm. Like *T. marginellus* but much bigger (*marginellus* male 4.2 mm, female 4.5-4.75 mm) and with dissimilar genitalia (Figs. 14-21): Genital plates long, nearly parallel-sided. Apophysis of style long, digitate. Appendages of side lobes of pygofer recurved ventrad, slightly expanded and truncate apically. Aedeagus with 3 long falcate basal appendages; shaft short, lamellate, provided with a claw like process on dorsal surface.

Bolivia: Coroico, 1 male type, in coll. Osborn, the Ohio State University.

3. *TENUCEPHALUS SAGITTARIUS* SP. N.

Length male 5.25 mm, female 6.5 mm. Like *T. marginellus* but much bigger and with dissimilar genitalia (Figs. 22-26): Genital plates tapering apicad. Apophysis of style

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short, digitate. Appendages of side lobes of pygofer short, claw-like. Aedeagus with two long basal appendages; shaft long, depressed, with a pair of falcate processes on ventral surface. Ovipositor sheath (female) extending far (in *margineilus* only slightly) beyond apex of elytra.

Peru: Machu Picchu, 1 male, type and 1 female paratype, XI.25.1967., DeLong, in coll. DeLong.

4. *AMPLICEPHALUS TRANSVERSALIS* SP. N.

Fig. 27. Length 4.2-4.25 mm. Shiny. Greyish ochraceous. Frontoclypeus black with median stripe and lateral arcs pale; median band on anteclypeus, margins of lora, antennal pits and two spots on ocular area dark. Anterior margin of

crown whitish, a transverse band behind ocelli black, disk light brown, basal margin pale ochraceous; eyes greyish. Anterior margin of pronotum narrowly dark brown, disk pale brown with basal margin whitish. Basal triangles of scutellum dark brown. Elytra hyaline yellow-brown, scutellar and commissural margins of clavus darker, veins pale. Dorsum of abdomen and under surface black with segmental margins narrowly pale. Femora black, other parts of legs pale ochraceous, hind tibiae with dark spots and longitudinal bands.

Body robust and somewhat depressed. Head a little broader than pronotum. Crown of nearly uniform length, 1.08-1.09 x as long at middle as laterally, 0.7 x as long as broad, 0.65-0.67 x as long as median length of pronotum;

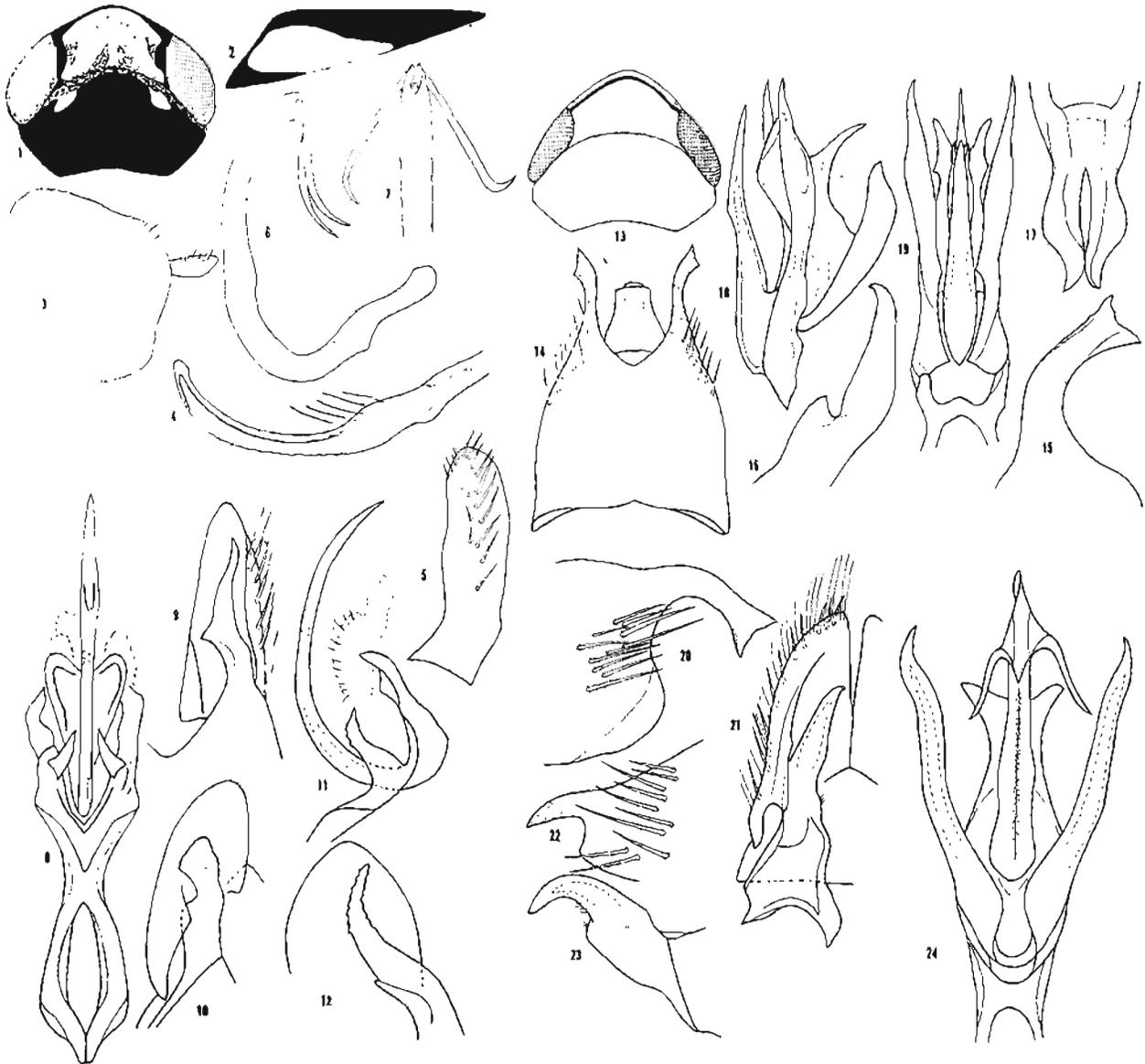


PLATE I

PERUBALA COCHABAMBA SP.N.: 1, head and pronotum; 2, clavus; 3, side lobe of pygofer, lateral aspect; 4, style; 5, genital plate; 6, aedeagus, lateral aspect; 7, apex of same, ventral aspect. *TENUCEPHALUS MARGINELLUS* DeL.: 8, aedeagus and connective, ventral aspect; 9, side lobe of pygofer, dorsal aspect; 12, same, median aspect; 10, genital plate (without macrosetae) and style; 11, aedeagus, lateral aspect. *TENUCEPHALUS QUADRICORNIS* SP.N.: 13, head and pronotum; 14, pygofer, dorsal aspect; 15, appendage of same; 16, apex of style; 17, connective; 18, aedeagus in lateral; 19, in ventral aspect; 20, side lobe of pygofer, lateral aspect; 21, genital plate and style. *TENUCEPHALUS SAGITTARIUS* SP.N.: 22, side lobe of pygofer, lateral aspect; 23, apex of style; 24, aedeagus, ventral aspect.

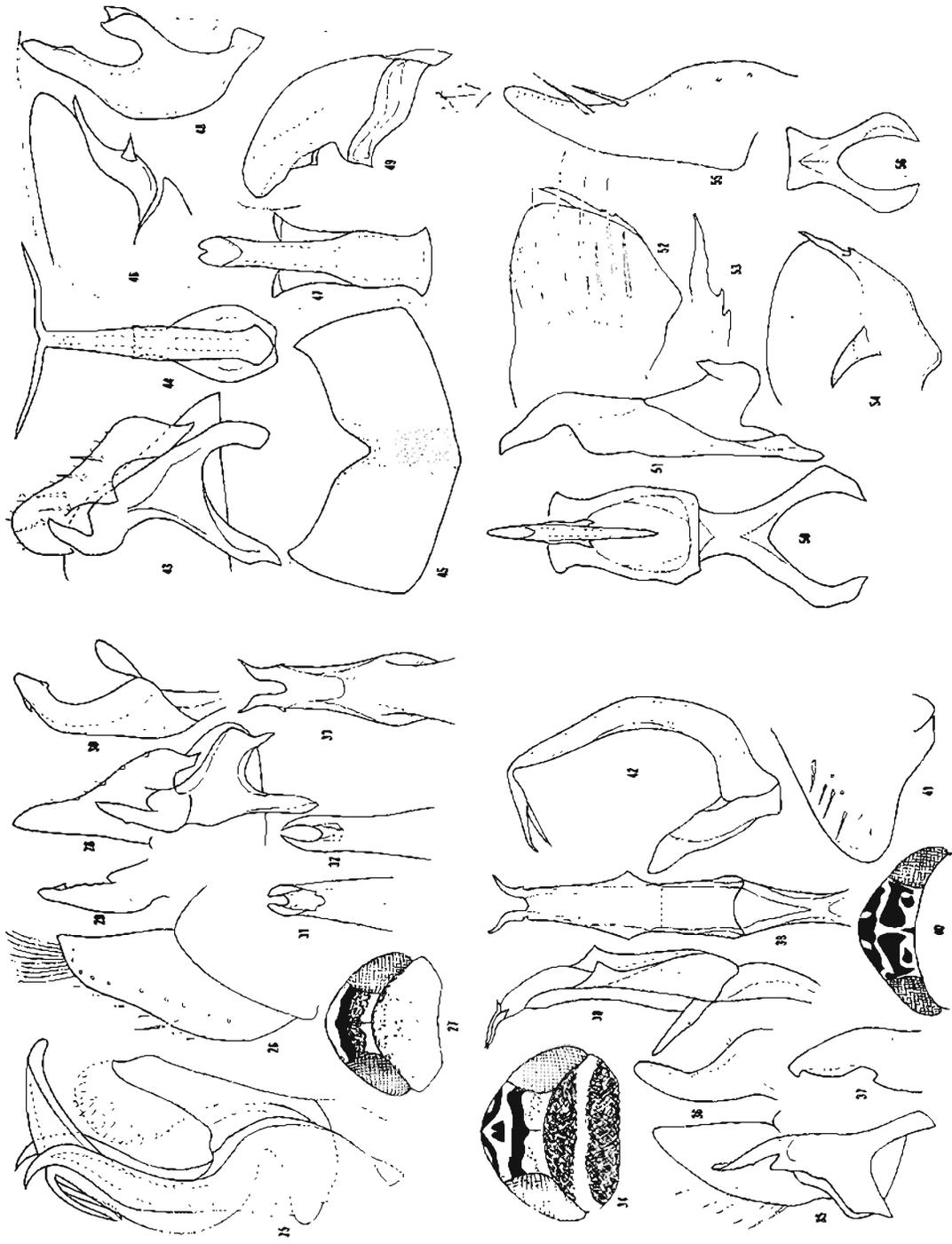


PLATE 11
 TENUCEPHALUS SAGITTARIUS SP. N.: 25, aedeagus, lateral aspect; 26, genital plate, lateral aspect; 27, head and pronotum; 28, genital plate and style; 29, apex of style; 30, aedeagus, lateral aspect; 31, apex of same in dorsal; 32, in ventral aspect. AMPLICEPHALUS PARADOXUS SP. N.: 33, apex of aedeagus, dorsal aspect; 34, head and pronotum; 35, genital plate and style; 36-37, apex of style; 38, aedeagus, in lateral; 39, in ventral aspect. ICAIA APPENDICULATA SP. N.: 40, head; 41, side lobe of pygote; 42, side lobe of pygote; 43, genital plate and style; 44, aedeagus, ventral aspect; 45, in sternite (female). JUN-GASIA KUNIGENS SP. N.: 46, side lobe of pygote; 47, aedeagus, in ventral; 48, in lateral aspect. YUNGASIA COROTICOA SP. N.: 49, aedeagus, lateral aspect; 50, aedeagus, ventral aspect; 51, style; 52, side lobe of pygote; 53, connective, ventral aspect; 54, in median aspect; 55, in lateral aspect; 56, in ventral aspect. YUNGASIA LONGIPENNIS SP. N.: 57, connective, ventral aspect; 58, connective, lateral aspect; 59, connective, ventral aspect; 60, connective, lateral aspect.

frontal region densely shagreened, discal region finely microsculptured; ocelli near eyes. Pronotum 2.2-2.3 x as broad as long at middle. Elytra a little longer than abdomen, with two closed subapical cells, the central one not divided. Spinulation of fore tibiae 1 + 4.

Male genitalia in Figs. 28-32. Genital plates sharply triangular, lateral margin shallowly insinuated. Aedeagal shaft recurved dorsad, apex with a pair of triangular lobes both on dorsal and ventral surface; gonopore on the fairly sclerified dorsal surface. Hind margin of 7th sternite (female) truncate.

Bolivia: San Esteban, 49 km N Sta. Cruz, 1120 ft, 1 male type, X.26.1959, 2 female paratypes, XII.7.1959, R. Cummings, in coll. DeLong.

Resembling *A. lineatus* (Osb.) but differing in the coloring, the undivided central subapical cell of the elytra and the male genitalia.

5. *AMPLICEPHALUS PARADOXUS* SP. N.

Fig. 34. Length 3.5 mm. Shiny. Pale ochraceous. Frontoclypeus dark brown with several lateral arcs and a broken midline pale. Apical spot on anteclypeus, margins of lora, some spots on genae and ocellular area dark. Anterior margin of crown with a black arc on either side and with two black triangular middle spots, a broad transverse black band behind ocelli, disk with two faint roundish fulvous spots; eyes reddish brown. Pronotum dark brown with a transverse whitish band. Scutellum pale, immaculate. Elytra brownish hyaline, costal margin yellowish; veins whitish, fore and middle femora with dark spots on anterior surface.

Body robust. Head large, broader than pronotum (44:38), anterior margin rounded. Face flattish, lower part bluntly angular in outline; frontoclypeus broad, distinctly expanding upwardly. Crown 1.27 x as long at middle as laterally, 0.74 x as long as broad, 0.78 x as long as median length of pronotum; the shagreened frontal region rounded to face anteriorly, discal region flat, finely microsculptured; ocelli near eyes. Pronotum 2.1 x as broad as long at middle, basal margin straight. Elytra a little longer than abdomen, 2-3 closed subapical cells, the central one not divided. Spinulation of fore tibiae 1 + 4.

Male genitalia in Figs. 33 and 35-39. Genital plates broad, lateral margins curvate. Shaft of aedeagus nearly straight, ventral surface with a longitudinal triangular lamella on either side, apex with two claw-like processes, dorsal surface membranous; gonopore dorsal.

Peru: Machu Picchu, 1 male type, XI.25.1967, DeLong, in coll. DeLong.

The species apparently bridges the gap between the genera *Amplicephalus* Del. and *Mendozellus* Lv. (originally described as a subgenus of *Amplicephalus* [Linnavuori 1959: 117, later regarded as a separate genus by Kramer (1971: 263.) It resembles the latter genus in the aedeagal structure (save in the dorsal gonopore), while the body form, coloring and the other genital characters are as in *Amplicephalus*.

6. *ICAIA APPENDICULATA* SP. N.

Fig. 40. Length 2.5 mm male 3.2 mm female. Rather shiny. Yellow-brown. Frontoclypeus with dark lateral arcs, antennal pits dark. Anterior margin of head with 3 separate or confluent black spots. Crown with transverse medially broken band and two basal spots black. Eyes greyish brown. Pronotum with a transverse row of small dark spots along anterior margin, disk with faint brown irroration. Scutellum with dark basal triangles and middle spots. Elytra subcoriaceous, finely irrorated with brown. Dorsum of abdomen with abundant dark markings basally and laterally. Under surface with ± distinct infuscations. Femora with dark spots and lines. Hind tibiae with dark dots.

Resembling *I. gnathenion* Lv. Crown roundedly bluntly angular, about 1.33 x as long at middle as laterally, 1.7 x as broad as long, distinctly concave, anterior margin shiny and faintly microsculptured, disk longitudinally striated and

shagreened. Anterior margin of pronotum densely shagreened, disk transversely wrinkled. Elytra rugose, extending to 8th tergite.

Male genitalia in Figs. 41-44. Aedeagal shaft long and gracile, provided with a pair of falcate apical appendages. 7th sternite (female) in Fig. 45. Ovipositor sheath strongly protruding.

Peru: Machu Picchu, 1 male type, 14 paratypes, IX.25.1967, DeLong, in coll. DeLong.

I. gnathenion (Linnavuori 1973: 15-16) (Peru) differs in the longer crown, the simple aedeagus and the subtruncate hind margin of the 7th sternite (female).

7. *YUNGASIA PUNGENS* SP. N.

Length 4.0-4.5 mm. Like *Y. coroihoa* but elytra with 3 closed subapical cells, appendages of side lobes of pygofer (Fig. 46) bifid and aedeagal shaft (Figs. 47-48) tubular.

Bolivia: San Esteban, 49 km. N. Sta. Cruz, 1120 ft, 1 male type and 4 males paratypes, XII.7.1959, R. Cummings, in coll. DeLong.

8. *YUNGASIA COROICOA* SP. N.

Length 4.25 mm. Pale greyish. Face with brown lateral arcs on frontoclypeus; faint median figure on anteclypeus, margins of lora and genae below antennal pits ± infuscate. Anterior margin of crown with 4 small black spots, disk with fulvous and brown pattern as in *Y. falcata* Lv. Eyes greyish brown. Anterior margin of pronotum fulvous with two small dark spots behind either eye; disk pale grey trace of 6 longitudinal fulvous bands and with slight brown irroration. Scutellum whitish, median figure and basal triangles fulvous. Elytra pale greyish, partly with fulvous tinge, brachial cell and costal margin with transverse fuscous false veins, also other cells with minute fuscous irroration; veins brown, cross veins of 5th apical cell with a squarish dark spot. Under surface and legs yellowish brown with fuscous spots.

Head distinctly narrower than pronotum. Crown roundedly produced, 0.71 x as long as broad, 1.18 x as long at middle as laterally. Anterior margin of pronotum not sinuated behind eyes. Elytra with 2 closed subapical cells.

Male genitalia in Figs. 49-55. Side lobes of pygofer with a trifid process on ventral margin and a falcate appendage on median surface. Anal tube broadly conical, sclerified. Shaft of aedeagus broad, lamellate, with a pair of small triangular lobes on dorsal surface.

Bolivia: Coroico, 1 male type, in coll. Osborn, the Ohio State University.

Readily distinguished from the previously described species (*Y. digitata* Lv. Bolivia and Brazil, *Y. trispinosa* Lv. Peru, *Y. falcata* Lv. Ecuador and Peru, *Y. serrata* Lv. & Hell. Peru and *Y. ornata* Lv. & Hell. Peru; descriptions in Linnavuori 1959: 207-209 and Linnavuori & Heller 1961: 9-10) by the open inner subapical of the elytra and the male genitalia.

9. *YUNGASIA LONGIPENNIS* SP. N.

Fig. 57. Length 4.75-5 mm. Like *Y. coroihoa* but 1) ground coloring whitish without fulvous tinge, pronotum with distinct black spots in anterior margin and dark brown irroration on disk, 2) body more gracile, 3) crown longer, 1.3 x as long at middle as laterally, 0.72 x as long as broad, 4) elytra much longer, extending far beyond tip of abdomen, about 4.2 x as long as broad, with 2 or 3 closed subapical cells, and 5) with dissimilar male genitalia (Figs. 56 and 58-64): Side lobes of pygofer broad, provided with a triangular sclerified lobe on ventral margin. Anal tube large, slightly tapering apicad, sclerified. Aedeagal shaft long, provided with a serrate longitudinal lamella on either side. Hind margin of 7th sternite (female) with a black bifid median lobe.

Peru: Machu Picchu, 1 male type, 8 paratypes, XI.25.1967, DeLong, in coll. DeLong.

Easily recognized by the long elytra and the male genital characters.

CAPHODELLUS GEN. N.

Medium-sized pale ochraceous leafhoppers with black spots on head, pronotum, scutellum and elytra.

Body elongate. Head as broad as pronotum with anterior margin rounded to face. Lower part of face bluntly angular in outline; anteclypeus distinctly expanding apicad, frontoclypeus narrow, gradually broadening upwardly, rather flat; lora large, extending to lateral margins of genae apically, genae distinctly notched near eyes, ocellular area relatively narrow. Crown only slightly longer at middle than laterally, anterior margin rounded; frontal region broad, shagreened, well separated from the indistinctly microsculptured discal region; ocelli large, close to eyes. Lateral margins of pronotum long, slightly diverging caudad. Elytra elongate, appendix narrow, 2 closed parallel-sided subapical cells,

without extra cross veins and false veins. Spinulation of fore tibiae 1 + 4, of hind knees 2 + 2 + 1.

Male genitalia: Pygofer short, sclerified dorsally; side lobes broad, strongly setose, apical margin concavely truncate. Anal tube tapering apicad, extending to apex of pygofer, sclerified. Valve triangular. Genital plates narrow, lateral margins nearly straight, macrostae uniseriate. Apophysis of style incrassate, minutely tuberculate, preapical angle obtuse. Connective robust, articulated, arms close to each other. Aegeagus with shaft digitate, provided with long apical appendages; gonopore subapical on dorsal surface. Hind margin of 7th sternite (female) excavated with a produced bifid median lobe.

Type: *C. quadrimaculatus* sp. n.

Near *Caphodus* Om. but crown shorter, elytra without false veins and with different male genitalia. The genus *Caphodus* is redescribed in *Linnavuori* 1959: 225-227.

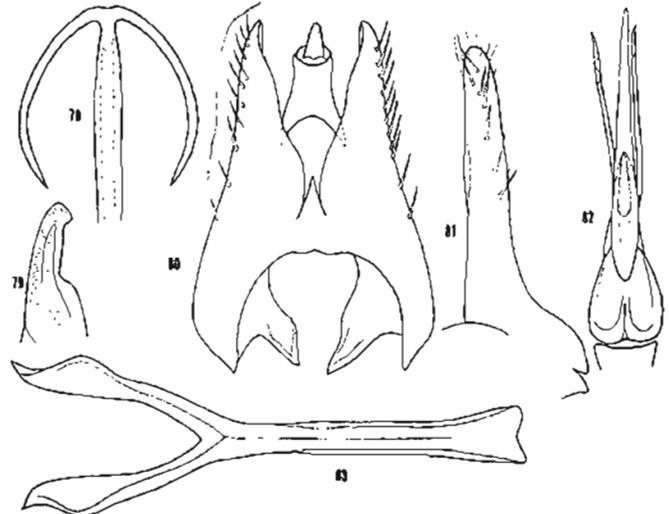
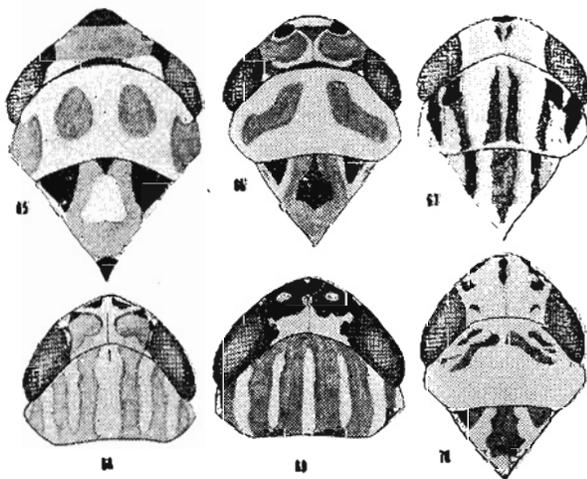
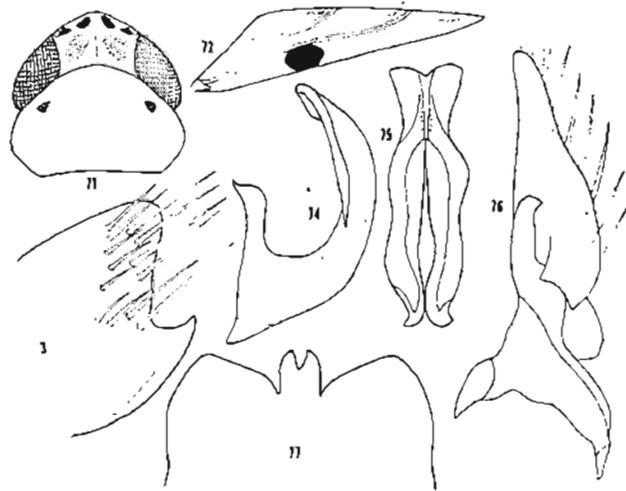
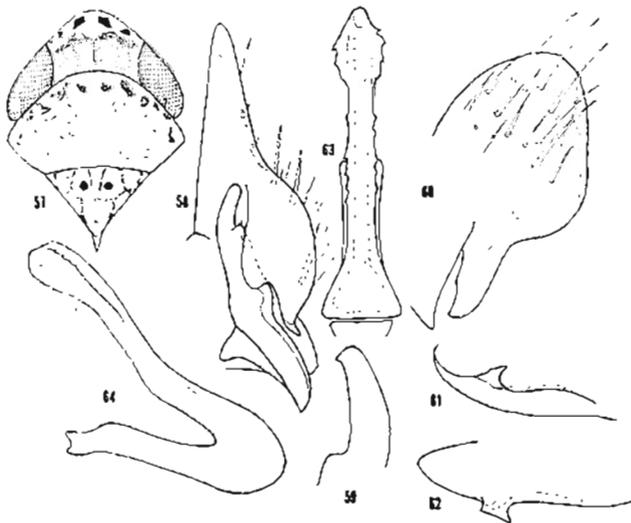


PLATE III

YUNGASIA LONGIPENNIS SP. N.: 57, head, pronotum and scutellum; 58, genital plate and style; 59, apex of style; 60, side lobe of pygofer, lateral aspect; 61, same, ventral aspect; 62, same (of another ex); 63, aedeagus in ventral; 64, in lateral aspect. BRAZOSA APPENDICULATA SP. N.: 65, head, pronotum and scutellum. NAPO BRAZOSSELLUS GEN. ET SP. N.: 66, same. PACHYTETIX ELEGANS SP. N.: 67, same. PARANDANUS HILARIS GEN. ET SP. N.: 68, head and pronotum. PARANDANUS ORNATUS SP. N.: 69, same. PICCHUSTELES INCA GEN. ET SP. N.: 70, head, pronotum and scutellum. CAPHODELLUS QUADRIMACULATUS GEN. ET SP. N.: 71, head and pronotum; 72, clavus; 73, side lobe of pygofer, lateral aspect; 74, aedeagus, lateral aspect; 75, connective; 76, genital plate and style; 77, 7th sternite (female); 78, apex of aedeagus, ventral aspect; 79, apex of style. NAPO BRAZOSSELLUS SP. N.: 80, pygofer, dorsal aspect; 81, genital plate; 82, aedeagus, ventral aspect; 83, connective.

10. *CAPHODELLUS QUADRIMACULATUS* SP. N.

Figs. 71-72. Length 5.0-5.25 mm. Shiny. Pale ochraceous. Frontoclypeus with brown lateral arcs, antennal pits embrowned. Crown whitish ochraceous, anterior margin with 4 small black spots, a small dark dot behind ocelli, disk with two large reddish brown spots. Eyes grey. Anterior margin of pronotum orangish with a small round dark spot behind eyes, disk with traces of 4 longitudinal orangish bands. Apex of scutellum with a small dark spot in lateral margins. Elytra yellowish hyaline, a large round spot on clavus and an elongate spot on inner discal cell blackish, cells otherwise with a few slight infuscations, veins pale, cross veins of 5th apical cell with dark triangular spot. Dorsum of abdomen largely darkened. Femora and tibiae with dark spots.

Body as above. Male genitalia in Figs. 73-76 and 78-79. 7th sternite (female) in Fig. 77.

Bolivia: San Esteban, 49 km. N. Sta Cruz; 1120 ft, 1 male, type, X.26.1959, 3 female paratypes, XII.7.1959 and Dept. of Santa Cruz, Saavedra Exp. Sta., 1 female paratype, I.3.1960, R. Cummings, in coll. DeLong.

NAPO GEN. N.

Relatively large yellow-brown leafhoppers with black and red markings on head and thorax. Elytra hyaline, unicolor.

Body elongate. Head broader than pronotum, short, anterior margin rounded to face. Face fairly convex, slightly broader than high, lower part nearly rectangular in outline; anteclypeus slightly expanding apicad, frontoclypeus relatively parallel-sided, densely shagreened; lora largish; genae broad, slightly insinuated near eyes, ocellular are broadish. Crown of nearly uniform length, gradually sloping apicad, frontal region densely shagreened, discal region slightly rugose, coronal suture short; ocelli small, a little below anterior margin of head, not visible from above, about 2.5 x of their own diameter from eyes. Pronotum convex, broad. Elytra long appendix distinct, 2 long parallel-sided closed subapical cells. Spinulation of fore tibiae 1 + 4, of hind knees 2 + 2 + 1.

Male genitalia: Pygofer long, conical, dorsal surface with a narrow incision on either side of a triangular median lobe; side lobes elongately triangular, with numerous short macrosetae. Anal tube long, conical, sclerified. Valve short, semicircular. Genital plates long and very narrow, base strongly expanded, macrosetae in a fluctuate row arising far from lateral margin. Style small, apophysis short and strongly bent, preapical angle blunt, basal part broad. Connective very long, articulated, arms divergent. Aedeagus with a pair of long and gracile basal appendages, shaft slender; gonopore subbasal on ventral surface.

Type: *N. brazosellus* sp. n.

Related to *Andanus* Lv. (*Linnavuori* 1959: 237-238) but differing in the broader ocellular area, the longer distance between the ocellus and the eye, the shape of the genital plates and the styles, the long and distinctly Y-shaped connective and the aedeagal structure.

11. *NAPO BRAZOSELLUS* SP. N.

Fig. 66. Length 5.75 mm. Yellow-brown. Face yellow. Crown with two roundish black spots in anterior margin, a triangular dark brown middle spot at apex of coronal suture and two large transverse red discal spots; eyes reddish brown. Pronotum with two large transverse red spots. Scutellum with basal triangles and a triangular middle spot blackish, disk broadly red at middle. Elytra vitreous with slight brownish tinge, the delicate veins yellowish, scutellar and commissural margins of clavus dark. Dorsum of abdomen dark brown with lateral margins yellow. Under surface and legs yellow.

Body as above. Crown 3.5 x as broad as long at middle, 1.2 x as long at middle as laterally. Male genitalia in Figs. 80-85.

Peru: Napo R., 1 male type and 4 males paratypes, in coll. De Long.

PARANDANUS GEN. N.

Like *Andanus* Lv. but 1) body more gracile, parallel-sided, 2) head narrower than pronotum, 3) crown longer and narrower, and 4) genital segment (male) with numerous long macrosetae, genital plates ending in a long narrow apical part, apophysis of style short and aedeagus provided with basal or subbasal appendages directed dorsad.

Type *P. ornatus* sp. n.

12. *PARANDANUS ORNATUS* SP. N.

Fig. 69. Length 5.0-5.25 mm. Shiny. Face darkly yellowish brown; upper margin and ocellular area black; frontoclypeus with a pale median stripe bordered with fuscous, lora and median margin of genae pale. Crown yellow-brown; anterior part black with pale spots as indicated in Fig. 69, a small blackish spot at basal angle of eyes; eyes dark brown. Pronotum reddish brown with 7 narrow longitudinal greyish bands. Scutellum pale yellowish with reddish brown basal triangles and a narrow dark median line. Elytra hyaline reddish brown, apex smoky, costal margin and veins pale. Under surface largely dark brown. Legs yellowish brown.

Body elongate. Head narrower than pronotum. Face relatively flat, elongate, lower part triangular in outline; anteclypeus parallel-sided; frontoclypeus rather narrow, moderately broadening upwardly; genae broad, only indistinctly insinuated near eyes; ocellular area narrow. Crown of nearly uniform length, 1.09 x as long at middle as laterally, 0.63 x as long as broad, 0.48 x as long as median length of pronotum; the shagreened frontal region rounded to face, discal region finely longitudinally striated; ocelli near eyes. Pronotum twice as broad as long, anterior margin slightly excavated laterally. Elytra long and narrow, appendix distinct, two long parallel sided closed subapical cells. Spinulation of fore tibia 2 + 4, of hind knees 2 + 2 + 1.

Male genitalia in Figs. 86-89, 92 and 94. Pygofer short, sclerified dorsally; side lobes broad with apical margin excavated, ventral margin broadly turned mesad and a falcate sclerification on inner surface. Anal tube membranous. Valve broadly triangular. Genital plates with lateral margins strongly insinuated, macrosetae uniseriate. Apophysis of style short, preapical angle distinct. Connective fused to aedeagus, arms close to each other. Aedeagus with a long elongated basal part, shaft digitate, a pair of long falcate appendages extending near to apex of shaft; gonopore subapical on dorsal surface.

Peru: Sinchono near Tingo Maria, 1 male, type and 1 male paratype, J.G. Sanders, in coll. DeLong.

13. *PARANDANUS HILARIS* SP. N.

Fig. 68. Length 5.5-5.75 mm. Shiny. Whitish ochraceous. Frontoclypeus with faint light brown lateral arcs, also other parts of face with faint brownish markings. Anterior margin of crown with 6 dark brown spots, disk with irregularly shaped orange figure on either side; eyes reddish brown. Pronotum with 6 longitudinal orangish bands. Basal triangles and a narrow midline on scutellum orangish. Elytra yellowish hyaline; veins pale, slightly bordered with fuscous. Under surface mainly pale yellowish. Legs pale ochraceous, femora and tibiae with fuscous spots.

Like the preceding species but somewhat bigger. Face a little broader. Crown about 1.17 x as long at middle as laterally, 0.67 x as long as broad, 0.56 x as long as median length of pronotum.

Male genitalia (Figs. 90-91, 93 and 95-96): Side lobes of pygofer rounded apically. Apical part of genital plates very narrow and long. Aedeagal appendages short.

Peru: Sinchono near Tingo Maria, 1 male type and 2 males paratypes, J.G. Sanders, in coll. DeLong.

14. *PACHYTETIX ELEGANS* SP. N.

Fig. 67. Length 4.75 mm. Opaquely shiny. Yellowish white. Median stripe on frontoclypeus and broad bands from antennal pits to tip of anteclypeus black. Crown with

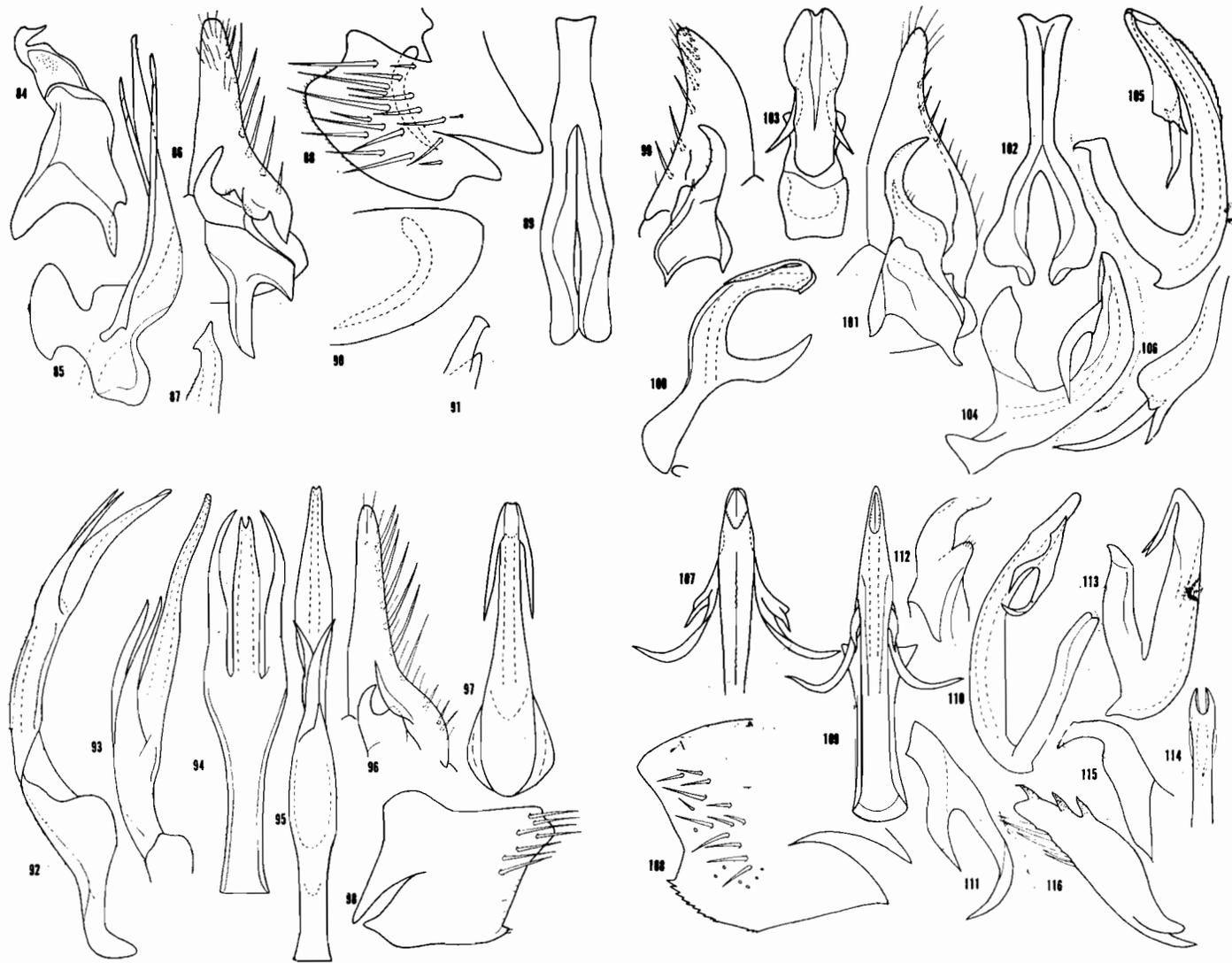


PLATE IV

NAPO BRAZOCELLUS SP. N.: 84, style; 85, aedeagus, lateral aspect. **PARANDANUS ORNATUS** SP. N.: 86, genital plate and style; 87, apex of style; 88, side lobe of pygofer, lateral aspect; 89, connective; 92, aedeagus and connective, lateral aspect; 94, aedeagus, ventral aspect. **PARANDANUS HILARIS** SP. N.: 90, side lobe of pygofer (without macrosetae) lateral aspect; 91, apex of style; 93, aedeagus in lateral, 95, in ventral aspect; 96, genital plate and style. **PACHYTETIX ELEGANS** SP. N.: 97, aedeagus, ventral aspect; 99, genital plate and style; 100, aedeagus, lateral aspect. **BRAZOSA APPENDICULATA** SP. N.: 98, side lobe of pygofer, lateral aspect; 101, genital plate and style; 102, connective; 103, aedeagus in ventral; 104, in lateral aspect. **ATANUS CRISTATUS** SP. N.: 105, aedeagus, lateral aspect; 106, appendage of same; 107, apex of aedeagus, ventral aspect. **ATANUS PICCHUANUS** SP. N.: 108, side lobe of pygofer, lateral aspect; 109, aedeagus in ventral; 110, in lateral aspect; 111, appendage of same; 112, apex of style. **ATANUS BICORNIS** SP. N.: 113, aedeagus, lateral aspect; 114, apex of same, ventral aspect; 116, side lobe of pygofer, ventral aspect.

a black apical spot and two dark brown dashes at apex of coronal suture; eyes pale grey. Pronotum with 6 longitudinal blackish or dark brown bands. Basal triangles and median stripe on scutellum dark fuscous. Elytra dark brown, apical margin vitreous; apical veins and lower vein of outer subapical cell concolorous, other veins ivory or orange; lower claval vein, middle of Cu and an oblique triangular spot from base of outer subapical cell to costal margin callose and ivory. Under surface and legs yellowish white.

Like *P. sagittarius* Lv. but body more parallel-sided, head a little broader than pronotum, crown broader, lateral margins of pronotum longer, and elytra longer with the outer subapical cell triangular (parallel-sided in *sagittarius*).

Male genitalia in Figs. 97 and 99-100. Side lobes of pygofer rounded. Genital plates sharply triangular with macrosetae in a fluctuate row. Apophysis of style digitate. Aedeagus provided with a pair of falcate apical appendages.

Bolivia: Dept. Santa Cruz, Saavedra Exp. Sta. 1 male, type, 1.6.1960, R. Cummings, in coll. DeLong.

Readily distinguished from *P. sagittarius* Lv. (Peru, Bolivia; description in Linnavuori 1959: 244-245).

15. *BRAZOSA APPENDICULATA* SP. N.

Fig. 65. Length 5 mm. Face black; a median stripe on frontoclypeus, outer margins of genae narrowly and antennae yellowish brown, upper margin of frontoclypeus with two squarish red spots. Crown with apex and a squarish spot at anterior corner of eyes black, disk with a broad transverse red band, basal lateral angles yellowish brown; eyes grey. Pronotum yellowish brown, anterior margin narrowly black, disk with 4 large red spots. Scutellum with basal triangles, a middle spot in basal margin and tip black, disk otherwise red with middle spot and extreme lateral margins yellow. Elytra brownish hyaline, veins concolorous, clavus with a broad callose red band along suture. Under surface blackish. Femora blackish, fore femora apically reddish. Other parts of legs yellowish brown, fore and middle tibiae with reddish tinge.

Head slightly narrower than pronotum. Face flattish, genae only indistinctly insinuated near eyes. Crown distinctly produced at middle. Pronotum flatter than in the other species.

Male genitalia (Figs. 98 and 101-104): Pygofer short, broadly conical; side lobes with several macrosetae. Anal tube broadly conical, membranous. Connective longer than in the other species. Aedeagus with a pair of falcate appendages.

Bolivia. San Esteban, 49 km. N. Sta. Cruz, 1120 ft, 1 male, type, XII.7.1959, R. Cummings, in coll. DeLong.

Key to the genus *Brazosa* Om.

- 1 (2) Length 7.2 Elytra with two longitudinal red bands *caesarea* Lv. & Hell. (Peru)
- 2 (1) Length at most 5 mm. Elytra with one longitudinal red band 3.
- 3 (4) Face mainly yellowish. Crown of uniform length. Aedeagus simple *picturella* (Bak.) (Peru, Bolivia, Brazil)
- 4 (3) Face mainly black. Crown angulate. Aedeagus with a pair of appendages *appendiculata* sp. n.

ATANUS OM.

Atanus Oman 1936: 381. Type: *Eutettix dentatus* Osb. (*coronatus* Berg).

Tubulanus Linnavuori 1955: 109-110. Type: *T. nitidus* Lv., syn. n.

The genera *Atanus* and *Tubulanus* were separated on the basis of certain differences in the male genital structure (Linnavuori 1959: 30): side lobes of pygofer with appendages in *Tubulanus*, unarmed in *Atanus*; aedeagus with apical appendages in *Atanus*, simple or with basal appendages in *Tubulanus*. A study of a larger amount of species has revealed that both taxa are connected with intermediate (in

bicornis and *bos* the ventral margin of the side lobes is provided with several sclerified claw-like appendages, while the aedeagus has apical processes). Consequently it seems justified to regard *Tubulanus* as a synonym of *Atanus*. Five new species of his large genus are described below.

16. *ATANUS CRISTATUS* SP. N.

Length 4.5 mm. Like pale specimens of *A. coronatus* (Berg) (re-described by Linnavuori 1959: 297-298). Male genitalia as in *A. contrarius* Lv. (Linnavuori 1959: 299) (apical margin of side lobes of pygofer concavely truncate, ventral margin serrate), but shaft of aedeagus (Figs. 105-107) with a serrate median lamella on ventral surface and with differently shaped apical appendages.

Bolivia: San Esteban, 49 km. N. Sta. Cruz, 1120 ft, 1 male, type, IX.7.1959, R. Cummings, in coll. DeLong.

17. *ATANUS PICCHUANUS* SP. N.

Length 3.5 mm. Pale ochraceous with abundant fuscous markings. Frontoclypeus dark brown with lateral arcs and median stripe pale; median stripe on anteclypeus, margins of lora and spots on genae and ocellular area dark brown. Crown with fuscous pattern as in *A. coronatus*. Eyes greyish brown. Pronotum with abundant fuscous mottling. Basal triangles of scutellum orange, disk embrowned, base with 4 apex with 3 pale spots. Elytra hyaline; clavus and cells of discal and apical area partly infuscated with milky spots. Dorsum of abdomen and under surface mainly black, segmental margins pale. Legs with fuscous stripes and spots.

Resembling *A. coronatus* but smaller. Male genitalia in Figs. 108-112. Apical margin of side lobes of pygofer concavely truncate, ventral margin serrate. Aedeagal shaft with a pair of faint longitudinal keels on ventral surface; dorsal branch of apical appendages much longer than the ventral one. 7th sternite (female) as in *A. coronatus*.

Peru: Machu Picchu, 1 male, type, 2 female paratypes XI.25.1967, DeLong, in coll. De Long.

Near *A. contrarius* Lv. but smaller, darker and with differently shaped aedeagus (the dorsal branch of the apical appendages is much shorter than the ventral one).

18. *ATANUS BICORNIS* SP. N.

Length 3.75 mm. Like pale exx of *A. coronatus* but with dissimilar male genitalia (Figs. 113-116): Ventral margin of side lobes of pygofer with 2 or 3 black claw-like processes. Shaft of aedeagus short and straight, with a pair of falcate apical processes directed dorsobasad. Genital plates as in *A. coronatus*.

Bolivia: San Esteban, 49 km. N. Sta. Cruz, 1120 ft, 1 male type, X.26.1959, R. Cummings, in coll. DeLong.

19. *ATANUS BOS* SP. N.

Length 4 mm. Like pale specimens of *A. coronatus* but with dissimilar male genitalia (Figs. 117-123): Apical margin of side lobes of pygofer concave, ventral margin provided with several black spines. Anal tube with a pair of long appendages arising from the apicoventral angles. Genital plates of the usual shape. Apophysis of style gracile. Dorsal surface of aedeagal shaft scored; two pairs of bifid apical appendages.

Bolivia: San Esteban, 49 km. N. Sta. Cruz, 1120 ft. 1 male, type, X.26.1959, R. Cummings, in coll. DeLong.

This and the following species differ from other representatives of *Atanus* in the long appendages of the anal tube. A tendency towards prolongation of the apicoventral angles of the anal tube is seen in *A. serricauda* (Lv.) (Fig. 135), however, that so bridges the gap between the two groups. No subgeneric splitting is therefore proposed for *bos* and *horridus*.

20. *ATANUS HORRIDUS* SP. N.

Length 3.75 mm. Shiny. Pale ochraceous. Face brownish, lateral arcs and median stripe on frontoclypeus and margins

of genae pale. Crown with 6 small partly confluent dark spots in anterior margin; eyes grey. Anterior margin of pronotum with dark spots behind eyes, disk with fuscous irroration. Scutellum with dark brown basal triangles, disk with slight fuscous suffusion. Elytra yellowish hyaline, commissural margin of clavus with 3 round milky spots, 3rd apical cell largely fuscous; claval veins yellowish, other veins brownish. Ventral surface with abundant fuscous markings. Legs dark yellowish brown.

Body form as in *A. nitidus* (Lv.) Male genitalia (Figs. 124-129): Side lobes of pygofer triangular, ventral margin with two appendages, the first trifid one directed apicad, the second falcate one directed mesad. Anal tube with long processes arising from apicoventral angles. Aedeagal shaft with a basal median lamella on dorsal surface and with a pair of small triangular lateral lobes.

Bolivia: San Esteban, 49 km. N. Sta. Cruz, 1120 ft, 1 male, type, X.26.1959, R. Cummings, in coll. DeLong.

21. *EXITIANUS QUADRATULUS* (Osb.)

Male genitalia in Figs. 130-132.

Peru: Machu Picchu, several exx, XI. 23-28. 1967, DeLong, in coll. DeLong. Previously recorded from Brazil and Bolivia.

PICCHUSTELES GEN. N.

Medium-sized yellow species with ± developed dark pattern.

Body relatively robust and somewhat depressed. Head as broad as pronotum. Face densely shagreened, flattish, lower part roundedly bluntly angular in outline; anteclypeus parallelsided, frontoclypeus rather narrow, moderately broadening upwardly; lora elongate, genae only shallowly insinuated near eyes, ocellular area narrow. Crown of nearly uniform length, rather flat, densely shagreened; ocelli in anterior margin of their own diameter from eyes. Pronotum and scutellum densely shagreened. Elytra (Fig. 139) longer than abdomen, appendix distinct, 4 apical cells, 1 closed subapical cell. Flying wings (Fig. 140) with 3 apical cells. Spinulation of fore tibiae 1 + 4, of hind knees 2 + 2 + 1.

Male genitalia: Macrosetae of genital segment not hairy. Pygofer conical, sclerified dorsally; side lobes triangular, without appendages. Valve triangular. Genital plates sharply triangular, lateral margins straight, macrosetae uniseriate. Apophysis of style claw-like, preapical angle blunt. Connective Y-shaped. Aedeagus simple, shaft digitate; gonopore apical. Hind margin of 7th sternite (female) truncate with a slight median excavation.

Type. *P. inca* sp. n.

Of the tribe Macrostelini. *Dalbulus* DeL. differs in the elongate gracile body and the presence of four apical cells in the flying wings, *Cortona* Om. in the produced crown, the venation of the elytra (5 apical cells) and the shape of the connective and aedeagus. In all other Neotropical Macrostelini genera the macrosetae of the genital segment are hairy.

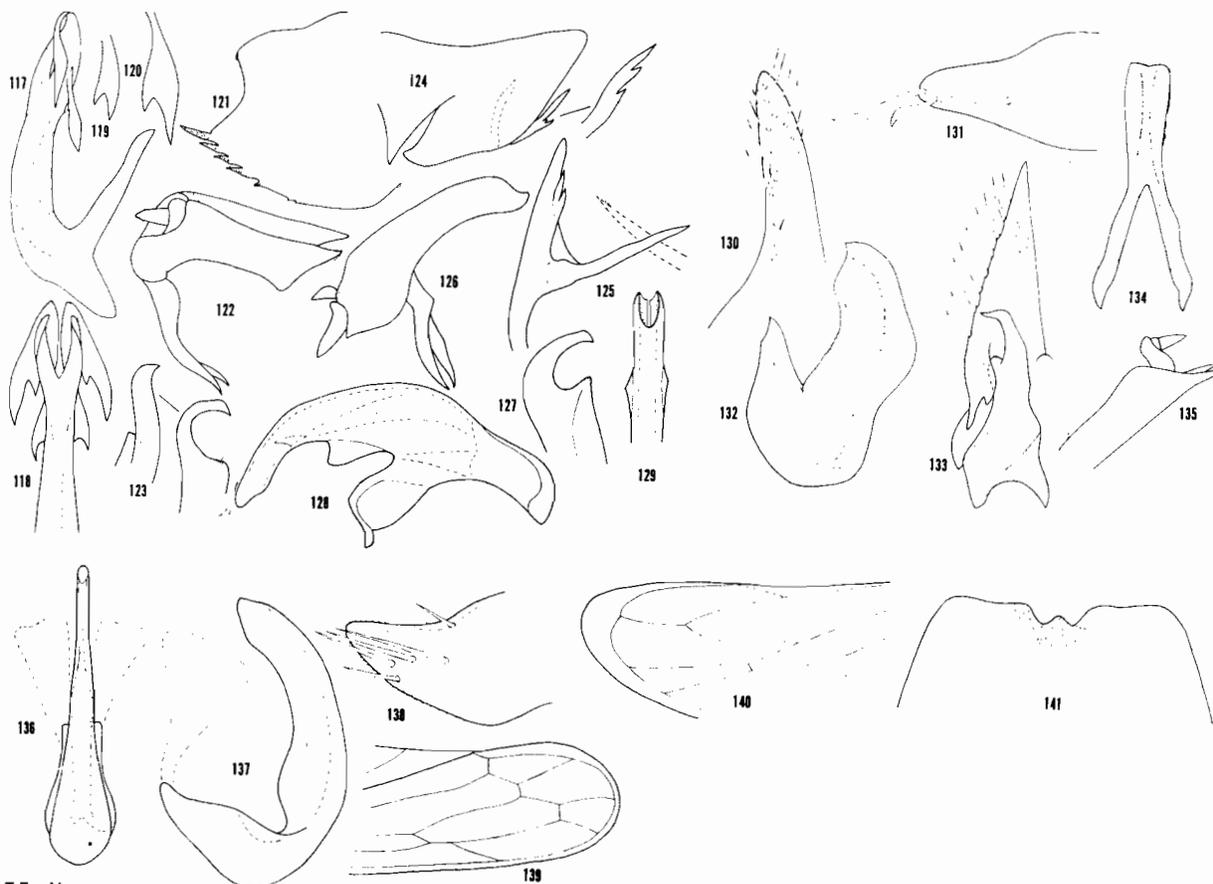


PLATE V

ATANUS BOS SP. N.: 117, aedeagus, lateral aspect; 118, apex, of same, ventral aspect; 119, lower; 120, upper aedeagal appendage; 121, side lobe of pygofer, median aspect; 122, anal tube, lateral aspect; 123, apex of style. *ATANUS HORRIDUS* SP. N.: 124, side lobe of pygofer (without macrosetae) in lateral; 125, in ventral aspect; 126, anal tube, lateral aspect; 127, apex of style; 128, aedeagus, lateral aspect; 129, apex of same, ventral aspect. *EXITIANUS QUADRATULUS* (OSB.): 130, genital plate; 131, side lobe of pygofer, lateral aspect; 132, aedeagus, lateral aspect. *PICCHUSTELES INCA* SP. N.: 133, genital plate and style; 134, connective; 136, aedeagus in ventral; 137, in lateral aspect; 138, side lobe of pygofer, lateral aspect; 139, apex of elytron; 140, apex of flying wing; 141, 7th sternite (female). *ATANUS SERRICAUDA* (LV.): 135, anal tube, lateral aspect.

22. *PICCHUSTELES INCA* SP. N.

Fig. 70. Length 4.2-4.75 mm. Opaquely shiny. Yellow. Frontoclypeus with two transverse black spots in upper margin and with a few lateral arcs and a narrow \pm broken median line brown or blackish; at least apex of anteclypeus black; antennal pits and the adjacent parts of genae black. Sometimes entire face, excluding the two black spots in upper margin, pale. In darkest specimens the face is black with only the lateral arcs on the frontoclypeus and the lower parts of the genae pale. Crown with 3 black apical spots and a pair of curved dark discal spots; eyes greyish brown. Anterior margin of pronotum entirely or partly dark. Scutellum with dark basal triangles and middle spot. Elytra yellowish hyaline, apex often dark, veins pale. Dorsum of abdomen yellowish or black with pale segmental margins. Under surface yellowish or \pm largely darkened. Legs pale, femora and hind tibiae sometimes infuscate.

Crown 1.27-1.36 x as long as middle as laterally, 0.71-0.74 x as long as broad, about 0.7 x as long as median length of pronotum.

Male genitalia in Figs. 133-134 and 136-138. Genital segment (female) elongate with ovipositor sheath extending far beyond tip of pygofer. 7th sternite in Fig. 141.

Peru: Machu Picchu, 1 male, type, 22 paratypes, XI.25. 1967, DeLong, in coll. DeLong.

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