

**Two new species of the genus *Chloroepela*
(Hemiptera: Pentatomidae: Pentatominae)
from Brazil^{*)}**

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Abstract. *Chloroepela paveli* sp. nov. and *C. stysi* sp. nov., from Brazil are described, based on the morphology of genitalia for both sexes. Prior to this study, the genus was represented in Amazon region as well as in southern and southeastern Brazil. The addition of the two species described in this paper extends the known geographical distribution to northeastern and central areas of Brazil. A key to the species of *Chloroepela* is presented.

Key words. Heteroptera, Pentatomidae, *Chloroepela*, morphology of genitalia, taxonomy, new species, Neotropical region, Brazil

Introduction

Chloroepela was described by STÅL (1867) to include *Loxa vigens* Stål, 1860, based on the long and evanescent ostiolar rugae (short and truncated in *Loxa* Amyot & Serville, 1843) and, on the obsolete or absent dorsal sulcus towards the apex of tibiae (dorsally sulcated in *Loxa*). Six new species were added to the genus as follows: GRAZIA (1968) described *C. lenti* from Venezuela; GRAZIA-VIEIRA (1969) described *C. nigrispina* from Bolivia and Peru, later synonymized to *C. aurea* (Pirán, 1963) (GRAZIA-VIEIRA 1971); GRAZIA-VIEIRA (1971) described *C. pirani* from Bolivia; GRAZIA-VIEIRA (1973) described *C. rolstoni* from French Guiana; GRAZIA & TERADAIIRA (1980) described *C. tucuruensis* from northern Brazil; GRAZIA (1987) described *C. dollingi* from Guyana and northern Brazil. The species color varies from reddish-brown to yellowish in dry preserved specimens; probably green in life. The general shape is oval and the size ranges from 10 mm to 16 mm, approximately; triangular head, with

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juga surpassing tylus, slightly juxtaposed at apex, rounded; humeral angles produced or not into spines. Diagnostic characters for the genus are of male genitalia: all the species present a well developed hypandrium; the conjunctiva is membranous and reduced (completely obscured by the phallosome); a collar-like process at the base of the vesica is always present. The last two features seem to be unique for the genus.

Chloroepela is considered close related to *Loxa*, *Chlorocoris* Spinola, 1837, *Fecelia* Stål, 1872, *Mayrinia* Hováth, 1925, *Eludocoris* Thomas, 1992, and *Rhyncholepta* Bergroth, 1911 for characteristics of general morphology (GRAZIA 1968, 1976; BECKER & GRAZIA-VIEIRA 1971; GRAZIA-VIEIRA 1972; EGER 1978; THOMAS 1992, 1998). The phylogenetic analyses of this group of genera, as well as a synopsis of the genus *Chloroepela*, are in preparation.

In this paper, two new species are described from Brazil (Amazonas, Rio Grande do Norte, Tocantins and Minas Gerais states). A key to the species, complementing the one included in GRAZIA & TERADAIRA (1980) is offered.

Material and methods

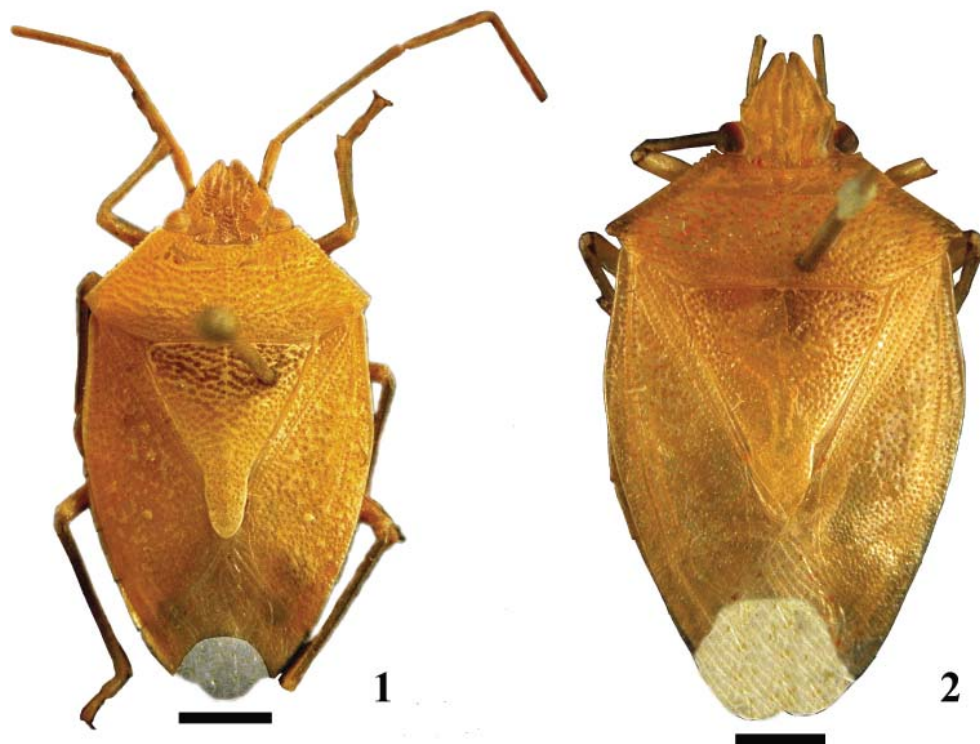
The description was based on nine specimens, six males and three females, which belong to the following collections:

- CZPB Coleção Zoológica Prof. Paulo Bürnheim, Fundação Universidade do Amazonas, Manaus, Amazonas, Brazil;
 FIOC Fundação Instituto Oswaldo Cruz, Rio de Janeiro, Rio de Janeiro, Brazil;
 MCNZ Museu de Ciências Naturais, Fundação Zoobotânica do Rio Grande do Sul, Porto Alegre, Rio Grande do Sul, Brazil;
 UFRG Departamento de Zoologia, Universidade Federal do Rio Grande do Sul, Porto Alegre, Rio Grande do Sul, Brazil.

General and genitalic morphology were illustrated using stereomicroscope and drawing tube; genitalia were cleared with 10% KOH and stained with Congo Red. Genitalic terminology followed GRAZIA (1968), DUPUIS (1970) and SCHAEFER (1977). Morphometric parameters measured: total length, abdominal width, head length, head width, interocular distance, lengths of antennal segments I to V, lengths of rostral segments I to IV, pronotal length, pronotal width, scutellum length, scutellum width. Measurements (mean \pm standard deviation, when available) are given in millimeters; size proportion of both species were defined by comparison with other species of *Chloroepela*.

Key to the species of *Chloroepela*

- 1 Yellowish callus at apex of radial vein present; anterior border of spiracles with a yellowish callus. 3
- 1' Callus at apex of radial vein and at spiracles absent. 2
- 2 Lateral margins of juga uniformly curving towards tip, bordered by black; dorsum of tibia lined by black. *C. aurea* (Pirán, 1963)
- 2' Lateral margins of juga sinuous, not bordered by black; dorsum of tibia not lined by black. *C. pirani* Grazia-Vieira, 1971
- 3 Humeral angles spinose (Grazia 1968: 197, Fig. 2). *C. vigens* (Stål, 1860)



Figs. 1-2. 1 – *Chloropepla paveli* sp. nov. (male holotype). 2 – *C. styssi* sp. nov. (male holotype). Scale bars = 2 mm.

- 3' Humeral angles acute, not produced into spines (Grazia 1968: 197, Fig. 1). 4
 4 Apices of femora with a slightly produced spine. ***C. paveli* sp. nov.**
 4' Apices of femora inconspicuously produced. 5
 5 Ventral rim of pygophore excavated in 'V' mesially; marginal process of dorsal rim of pygophore laminar; laterotergites 8 with acute apex. ***C. lenti*** Grazia, 1968
 5' Ventral rim of pygophore excavated in 'U' mesially; marginal process of dorsal rim of pygophore digitiform; laterotergites 8 rounded at apex. 6
 6 Anterior tooth of bucculae absent. ***C. tucuruensis*** Grazia & Teradaira, 1980
 6' Anterior tooth of bucculae present. 7
 7 Humeral angles bordered by black (Grazia-Vieira 1973: 14, Fig. 1).
 ***C. rolstoni*** Grazia-Vieira, 1973
 7' Humeral angles not bordered by black. 8
 8 Ventral process of hypandrium bilobate (Fig. 6); posterior margins of gonocoxites 8 slightly convex (Fig. 16). ***C. styssi* sp. nov.**
 8' Ventral process of hypandrium digitiform (Grazia 1987: 474, Fig. 3); posterior margins of gonocoxites 8 concave (Grazia 1987: 474, Fig. 8). ***C. dollingi*** Grazia, 1987

Taxonomy

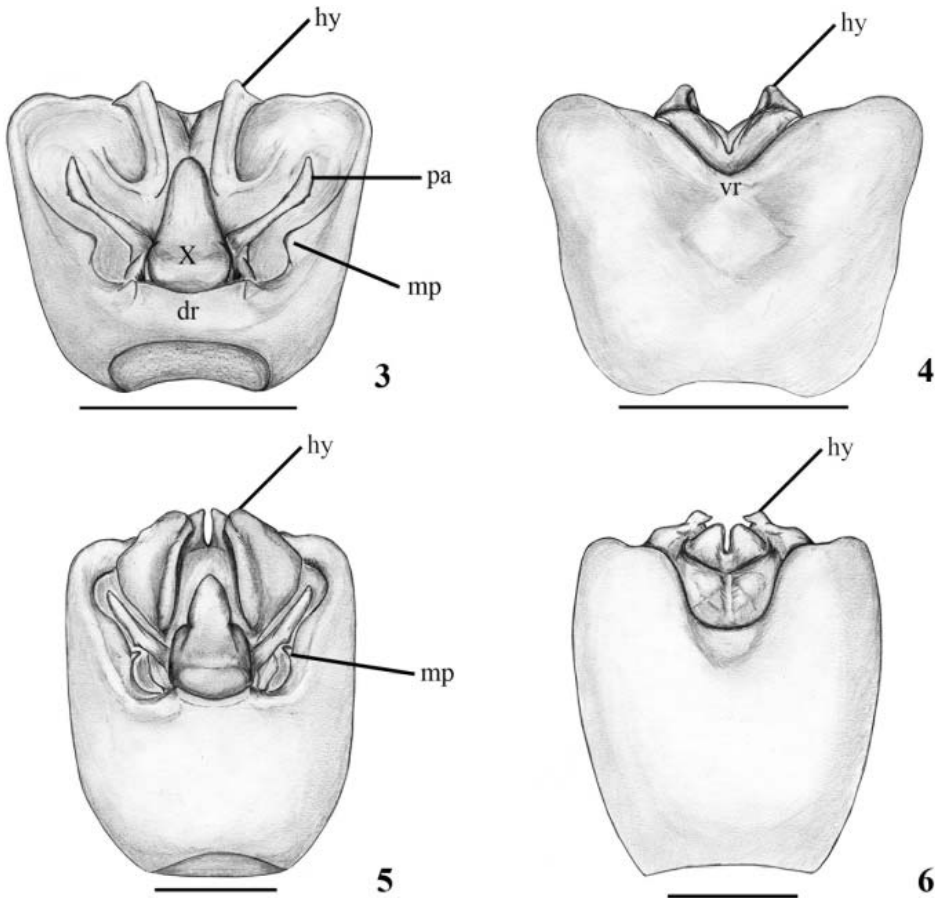
Chloropepla paveli sp. nov.

(Figs. 1, 3-4, 7-10, 15)

Type locality. Brazil, Tocantins: Palmas, S^a do Lageado, Fazenda Céu.

Type material. HOLOTYPE: ♂, **BRAZIL:** 'TOCANTINS, Palmas, S^a do Lageado, Fazenda Céu, xi.1992, Exp. MCN-MZSP' (MCNZ 6-96). PARATYPES: **BRAZIL:** 2 ♂♂, 'RIO GRANDE DO NORTE, Natal, iii.1952, M. Alvarenga' (FIOC); 1 ♀, 'MINAS GERAIS, B[elo] H[orizonte] / Campus UFMG / 3.viii.1978 / Edelberto Dias col.' (UFRG).

Diagnosis. Small size (10-12 mm), general color yellowish in dry preserved specimens; body punctures concolorous. Humeral angles acute, but never produced into spines. Pygophore trapezoidal, dorsal rim strongly concave; marginal processes of dorsal rim subtriangular, rounded



Figs. 3-6. Male external genitalia. 3-4 – *Chloropepla paveli* sp. nov., pygophore. 3 – dorsal view; 4 – ventral view. 5-6 – *C. stysi* sp. nov., pygophore. 5 – dorsal view; 6 – ventral view. Scale bars = 1 mm (dr – dorsal rim; hy – hypandrium; mp – marginal process of dorsal rim; pa – paramere; vr – ventral rim; X – segment X).

at apex. Hypandrium with an apical process ventrally produced; lateral margins of hypandrium dorsally produced and slightly extended posteriorly. Paramere cylindrical, elongated, apex slightly spatulated; apical and medial spines present, close to each other at apical third of the outer surface. Segment X ogival, surface of basal two thirds strongly concave. Phallosome without process. Vesica tubular and narrow. Gonocoxites 8 quadrangular, surface convex; posterior margin slightly convex, apical third of sutural margins divergent. Laterotergites 8 and 9 with apical angles rounded; laterotergites 9 not surpassing laterotergites 8.

Description. General body shape oval (Fig. 1), small in size (male length: 10.4 ± 0.5 , width 5.8 ± 0.2 ; female length: 11.3; width: 6.1).

Coloration. Dry preserved specimens yellowish, probably green in life, punctures colorous.

Head. Triangular in shape, 0.5 times longer than wide (males head length: 2.1 ± 0.2 ; female: 2.1 – males head width: 1.7; female: 1.8 – males interocular distance of: 1.5 ± 0.1 ; female: 1.6). Juga surpassing clypeus, slightly juxtaposed at apex, rounded; lateral margins sinuate. Proportion of antennal segments: $I < II < III < IV \approx V$ (males antennal segments length: $I = 1.0 \pm 0.1$; $II = 1.3 \pm 0.1$; $III = 1.7 \pm 0.3$; $IV = 2.2 \pm 0.2$; $V = 2.1$; females: $I = 1$; $II = 0.88$; $III = 2.08$; $IV = 2.04$). Bucculae evanescent at base of head; anterior angle rounded; first rostral segment slightly surpassing bucculae. Rostrum surpassing metacoxae; proportion of rostral segments: $I < II > III > IV$ (males rostral segments length: $I = 1.0 \pm 0.1$; $II = 1.5$; $III = 1.3 \pm 0.1$; $IV = 1.1 \pm 0.1$; female: $I = 1.2$; $II = 1.8$; $III = 1.4$; $IV = 1.1$).

Pronotum. Trapezoidal, anterior half slightly declivent, punctures denser; cicatrices immaculate. Basal two thirds of anterolateral margins crenulated. Anterior margin concave, behind the eyes truncated. Humeral angles acute, but not produced into spines. Pronotum length: males 1.9 ± 0.1 ; females 2.0; pronotum width: males 5.9 ± 0.2 ; females 5.8.

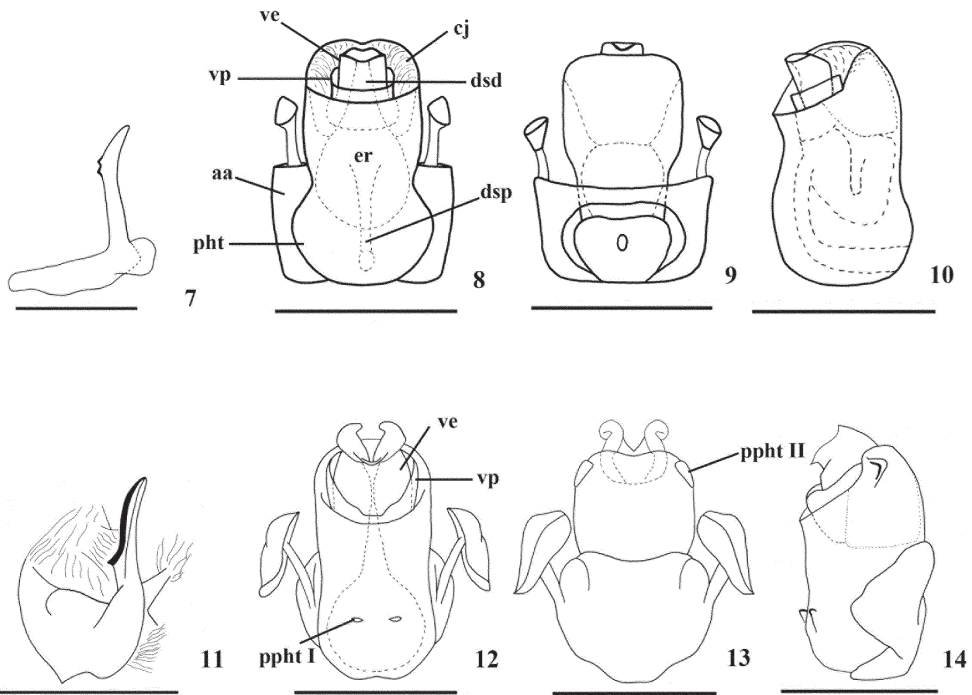
Scutellum. Apex rounded; punctures uniformly distributed. Scutellum length: males 3.7 ± 0.2 ; female: 3.9; scutellum width: males 3.3 ± 0.1 ; females: 3.4.

Hemelytra. Wide, almost covering connexiva completely. Corium uniformly punctured; apical angle of corium rounded, reaching apex of connexivum VII; yellowish callus at apex of radial vein present.

Thoracic venter. Ostiolar rugae attaining nearly $\frac{3}{4}$ of metapleura, ostiolar orifice elliptical. Distal spine of dorsal face of femur slightly produced; at least distal $\frac{1}{2}$ of tibiae dorsally sulcated.

Abdominal venter. Slightly convex; anterior margins of spiracles surrounded by yellowish callus.

Male genitalia (Figs. 3-4, 7-14). Pygophore trapezoidal, dorsal rim strongly concave dorsally (Fig. 3; dr), dorsal wall reduced, more or less $\frac{1}{4}$ the total length of pygophore. Marginal processes of dorsal rim subtriangular (Fig. 3; mp), rounded at apex. Median excavation of ventral rim V-shaped in ventral view (Fig. 4; vr). Hypandrium more or less quadrangular, with an apical process ventrally produced; lateral margins of hypandrium dorsally produced and slightly extended posteriorly (Figs. 3-4; hy). Paramere cylindrical, elongated, apex slightly spatulated; apical and medial spines present, close to each other at apical third of the outer surface (Fig. 7). Segment X ogival; surface of basal two thirds strongly concave and with lateral margins carinated (Fig. 3; X).



Figs. 7-14. Male external and internal genitalia. 7-10 – *Chloropepla paveli* sp. nov. 7 – right paramere, dorsal view; 8 – phallus, dorsal view; 9 – phallus, ventral view; 10 – phallus, lateral view. Scale bars = 0.5 mm. 11-14 – *C. stysi* sp. nov. 11 – right paramere, dorsal view; 12 – phallus, dorsal view; 13 – phallus, ventral view; 14 – phallus, lateral view. Scale bars = 1 mm (aa – articular apparatus; cj – conjuntiva; dsd – ductus seminis distalis; dsp – ductus seminis proximalis; pht – phallotheca; ppht I – processus phallothecae I; ppht II – processus phallothecae II; ve – vesica; vp – vesica collar process).

Articular apparatus about half the length of phallotheca (Figs. 8-9; aa). Phallotheca subcylindrical, wide opened dorsally; without process (Fig. 8). Conjuntiva reduced, completely obscured by phallotheca (Figs. 8-10; cj). Vesica tubular, narrow; basal portion surrounded by a collar-like process (Figs. 8-10; ve, vp).

Female genitalia (Fig. 15). Gonocoxites 8 quadrangular and convex; posterior margin slightly convex, apical third of sutural margins divergent (Fig. 15; gc8). Apical angles of laterotergites 8 and 9 rounded (Fig. 15; la8, la9); laterotergites 9 not surpassing laterotergites 8. Gonocoxites 9 trapezoidal, posterior margins concave (Fig. 15; gc9). Female not dissected.

Differential diagnosis. This species can be distinguished from other species of *Chloropepla* by characters of male and female genitalia. In males the parameres have the apex slightly spatulated; apical and medial spines present, close to each other at apical third of the outer surface (Fig. 7) and hypandrium is more or less quadrangular, with an apical process ventrally produced; lateral margins of hypandrium dorsally produced and slightly extended posteriorly (Figs. 3-4). The shape of gonocoxites 8 and apex of laterotergites 8 not produced into spines (Fig. 15) separate the female of *C. paveli* sp. nov. from the remaining species.

Etymology. This species is dedicated to Prof. Pavel Štys for his great contribution to the knowledge of the heteropterous insects.

Bionomics. Unknown.

Distribution. *Chloroepela paveli* sp. nov. is distributed in the north, northeastern and southeastern Brazil, occurring in Tocantins, Rio Grande do Norte and Minas Gerais states (Fig. 18).

***Chloroepela stysi* sp. nov.**

(Fig. 2, 5-6, 11-14, 16-17)

Type locality. Brazil, Amazonas: Coari, Rio Urucu.

Type material. HOLOTYPE: ♂, **BRAZIL:** 'AMAZONAS, Coari, Rio Urucu, Ig. Marta-3, 4°50'0.73" S 65°02'37" W 14-25.viii.1993, P.F. Bührnheim et al. col., à luz mista de mercúrio' (CZPB). PARATYPES: ♀, same label data as holotype (CZPB); **BRAZIL:** ♂, 'AMAZONAS, Rio Urubu, 2°10' S 59°49'W, 08-09.v.1983, P. Bührnheim, N. Otaviano & F. Peralta col.' (CZPB); ♂, 'BRAZIL, AMAZONAS, Coari, Rio Urucu, LOC - 09', 4°51'56" S 65°04'56" W, 25.i.-10.ii.1995, P.F. Bührnheim et al. col. // à luz mista de mercúrio' (UFRG); ♀, 'BRAZIL, AMAZONAS, Juruá, Mineruazinho, 03°34'85" S 66°59'15" W, 13-25.i.1996 P. Bührnheim, N.O. Aguiar et al. col. // à luz mista de mercúrio' (UFRG).

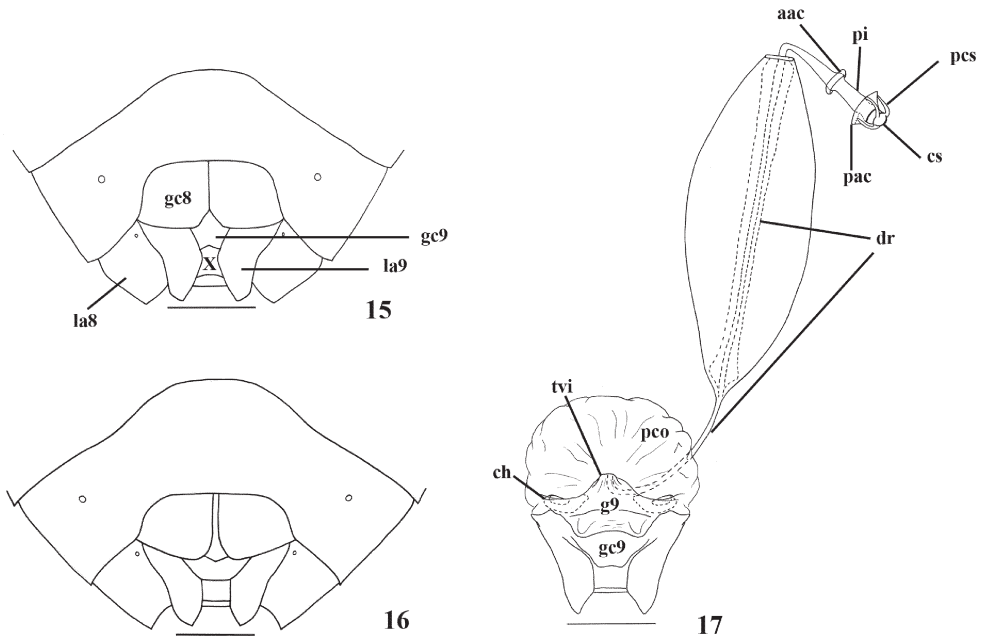
Diagnosis. Medium size (12-15 mm), general color yellowish in dry preserved specimens; body punctures ferruginous. Antennae with dark ornamentation. Humeral angles acute, not produced into spines. Pygophore rectangular, lateral third of dorsal rim folded toward the genital chamber; marginal process digitiform. Hypandrium with a broad laminar-like expansion dorsally; ventrally, with a bilobate process and 1+1 tumescent areas. Parameres apex elongated; apical spine present, medial spine absent. Phallosome with two pairs of processes. Vesica obovate. Gonocoxites 8 quadrangular, posterior margin slightly convex; sutural margins divergent. Apical angles of laterotergites 8 and 9 acute, black in color; laterotergites 9 not surpassing laterotergites 8.

Description. General body shape oval (Fig. 2), medium in size. Males total length of: 12.6 ± 0.1 ; females: 14.3 ± 0.23 ; males abdominal width: 7.2 ± 0.2 ; females: 7.6.

Coloration. Dry preserved specimens yellowish, probably green in life; punctures ferruginous. In black: a longitudinal line in the outer surface of antennal segments I to III, apex of segment II, apical half of segment III, and apical three-fourths of segments IV and V; dorsal punctures on lateral margins of tibia; apical portion of tibia; all first and second tarsi segments and basal half of third. Reddish to grayish spots present on hemelytral membrane.

Head. Triangular, 0.5 times longer than wide (males head length: 2.6 ± 0.1 ; females: 2.6; males head width: 2.0; female: 2.2; males interocular distance: 1.6; females: 1.8 ± 0.06). Juga surpassing clypeus, slightly juxtaposed at apex; external margins convex. Proportion of antennal segments: $I > II > III \approx IV \approx V$ (male antennal segments length: $I = 1.3$; $II = 1.7 \pm 0.11$; $III = 2.1 \pm 0.11$; $IV = 2.1 \pm 0.06$; females: $I = 1.3$; $II = 1.7 \pm 0.11$; $III = 2.1$, $IV = 2.3 \pm 0.11$; $V = 2.3$). Bucculae evanescent at base; anterior angle truncated. Rostrum reaching metacoxae, first rostral segment slightly surpassing bucculae; proportion of rostral segments: $I < II > III \approx IV$ (males rostral segments length: $I = 1.3 \pm 0.06$; $II = 2.0 \pm 0.08$; $III = 1.5 \pm 0.05$; $IV = 1.3 \pm 0.04$; females: $I = 1.5 \pm 0.14$; $II = 2.0 \pm 0.03$; $III = 1.8 \pm 0.06$; $IV = 1.3 \pm 0.11$).

Pronotum. Trapezoidal, punctures denser on posterior half; cicatrices immaculate. Anterior third of anterolateral margins slightly crenulated. Humeral angles acute, but not produced into spines (males pronotum length: 2.7 ± 0.05 ; females: 2.8; males pronotum width: 7.5 ± 0.25 ; females: 8.2 ± 0.11).



Figs. 15-17. Female genitalia. 15 – *Chloropepla paveli* sp. nov., genital plates. 16-17 – *C. stysi* sp. nov., female genitalia. 16 – genital plates; 17 – gonocoxites and gonapophyses of ninth segment and ectodermal genital ducts. Scale bars = 1 mm (aac – anterior annular crest; cs – capsula seminalis; ch – chitinellipson; g9 – gonapophyses 9; gc8 – gonocoxites 8; gc9 – gonocoxites 9; la8 – laterotergites 8; la9 – laterotergites 9; pac – posterior annular crest; pco – pars communis; pi – pars intermedialis; tvi – thickening of vaginal intima; X – segment X).

Scutellum. Apex rounded, punctures uniformly distributed. Scutellum length: males 4.7 ± 0.2 ; females 4.9 ± 0.06 ; scutellum width: males 4.5 ± 0.2 ; females 4.3.

Hemelytra. Wide, almost completely covering connexival segments. Corium uniformly punctured, apical angle rounded and surpassing posterior half of conexivum VII; yellowish callus at apex of radial vein present.

Thoracic venter. Ostiolar rugae attaining nearly $\frac{3}{4}$ of metapleura width, ostiolar orifice elliptical. Dorsal surface of femur with inconspicuous projection at apex; tibiae dorsally sulcated.

Abdominal venter. Strongly convex; anterior margins of spiracles surrounded by yellowish callus.

Male genitalia (Figs. 4-5, 11-14). Pygophore rectangular, 0.1 times longer than wide (Fig. 5-6); dorsal wall with half the length of pygophore. Dorsal rim emarginated medially; lateral third of dorsal rim folded toward the genital chamber; marginal process digitiform (Fig. 5; mp). Posterolateral angles slightly produced. Median excavation of ventral rim U-shaped in ventral view (Fig. 6); infolding of ventral rim with 1+1 darkish process dorsally produced, on the sides of the excavation.

Hypandrium longer than ventral rim, in a broad laminar-like expansion dorsally; ventrally, with a bilobate process and 1+1 tumescent areas (Figs. 5-6). Apex of parameres elongated and

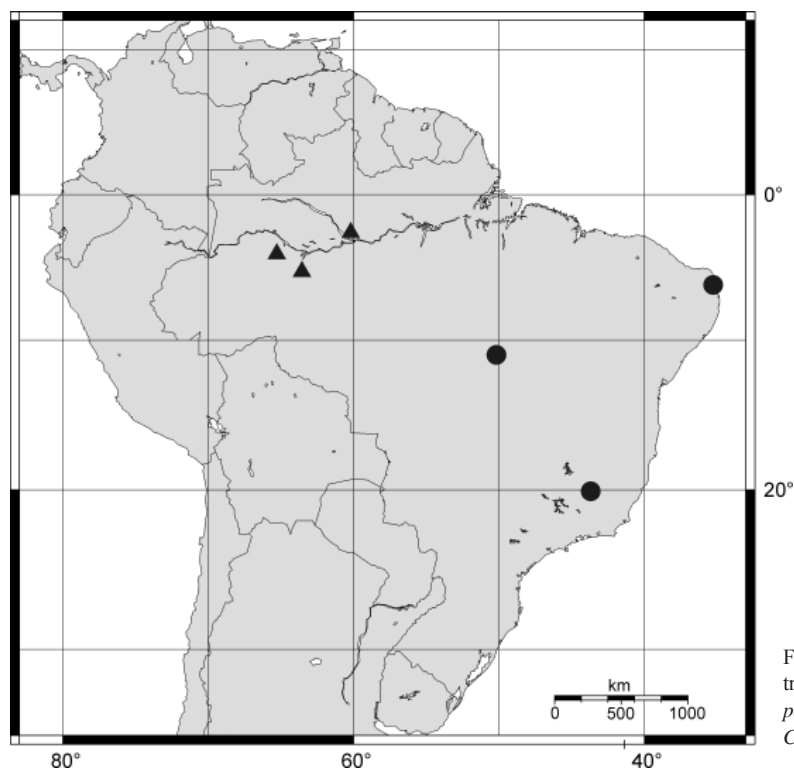


Fig. 18. Geographical distribution of *Chloropepla paveli* sp. nov. (●) and *C. stysi* sp. nov. (▲).

flat at inner surface; apical spine present, medial spine absent (Fig. 11). Segment X constricted medially; basal surface convex, apex ogival (Fig. 5).

Articulatory apparatus about half the length of phallosome (Figs. 12-13). Phallosome cylindrical, opening dorso-posteriorly, with two pairs of processes: 1+1 elliptical at base of dorsal wall (= processus phallosomae I) (Fig. 12; ppht I); 1+1 ear-like at postero-lateral angles of ventral wall (= processus phallosomae II) (Fig. 13; ppht II). Conjunctiva reduced, completely obscured by phallosome. Vesica obovate; basal portion surrounded by a collar-like process (Fig. 12; ve).

Female genitalia (Figs. 16-17). Genital plates hairy. Gonocoxites 8 quadrangular and flat; posterior margin slightly convex; sutural margins divergent at posterior fourth (Fig. 16). Apical angles of laterotergites 8 and 9 acute, black in color; laterotergites 9 not surpassing laterotergites 8 in length (Fig. 16). Gonocoxites 9 trapezoidal, posterior margins subrectilinear (Fig. 16). Capsula seminalis subcylindrical (Fig. 17; cs), with three processes variable in length (Fig. 17; pcs): two reaching the free margin of the annular crest, and one surpassing the margin.

Differential diagnosis. This species can be distinguished from other species of *Chloropepla* by characters of male and female genitalia. In males the parameres with apex elongated; apical spine present, medial spine absent (Fig. 11) and hypandrium with a broad laminar-like expansion dorsally; ventrally, with a bilobate process and 1+1 tumescent areas (Figs. 5-6).

The shape of gonocoxites 8 and apex of laterotergites 8 acute (Fig. 16) separate the female of *C. stysi* sp. nov. from the remaining species.

Etymology. This species is dedicated to Prof. Pavel Štys for his great contribution to the knowledge of the heteropterous insects.

Bionomics. Unknown.

Distribution. *Chloropepla stysi* sp. nov. is distributed in northern Brazil, in Amazonas state, Coari and Juruá localities.

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