



# Revision of the Brazilian Species of *Pseudaugochlora* Michener 1954 (Hymenoptera: Halictidae: Augochlorini)

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## Abstract

The Brazilian species of the bee genus *Pseudaugochlora* are revised. *Pseudaugochlora* was erected by Michener to include species previously considered in *Pseudaugochloropsis*. Among the species previously known in the genus, only two — *P. graminea* (Fabricius 1804) and *P. pandora* (Smith 1853) — were known to occur in Brazil. In this study, five new species are described: *P. erythrogaster*, *P. callaina*, *P. flammula*, *P. indistincta*, and *P. simulata*, while *P. graminea* and *P. pandora* are re-described based on their types. An identification key for the seven Brazilian species of *Pseudaugochlora* and a revised diagnosis for the genus are provided.

**Key words:** taxonomy, Neotropical, bee, Apoidea, Halictidae, Augochlorini

## Introduction

*Pseudaugochlora* is a small genus of Augochlorini but with an extensive geographic range (Moure & Hurd 1987). Its species have moderate body size (approximately 1 cm) and are, in general, metallic green although,

of them may have tints of red, gold, blue or even black on some parts or most of the body. Eickwort (1967) gave an account of dichromatism among individuals of *P. sordicutis* (Vachal), some being black and some green even in the same nest.

The genus occurs through South, Central and North America and one species, *P. piscatoria* (Cockerell), is known from the West Indies. *Pseudaugochlora graminea* has the broadest geographic range, from Argentina to the United States (Texas); it thus overlaps with all other species except *P. piscatoria*, which is known only from the West Indies (Moure & Hurd 1987). Seven species were previously known in the genus, among which, only two — *P. graminea* and *P. pandora* — were known from Brazil (Moure & Hurd 1987). Recently, Engel (2000) described an eighth species, *P. pulchra*, known only from Peru.

Schrottky (1906) described *Pseudaugochloropsis*, as a subgenus of *Augochlora*, to include the “*Halicti sericei*” species group of Vachal (1904) and two new species: *Augochlora (Pseudaugochloropsis) sthena* and *A. (P.) euryale*. Subsequently Schrottky (1909) designated *Halictus nigromarginatus* Spinola (= *Pseudaugochlora graminea*) as the type species of the genus. However, as pointed by Michener (1954, 1994), article 69 of the International Code of Zoological Nomenclature (ICZN 1999) dictates that “the first author who subsequently designates one of the originally included nominal species validly designates the type species of the nominal genus or subgenus”. Thus, the designation proposed by Schrottky (1909) is not valid because, although *H. nigromarginatus* is one of the “*H. sericei*”, it was not included nominally in the original publication (*i.e.* Schrottky 1906). The two species originally included nominally in the genus, *Augochlora sthena* and *A. euryale*, are currently considered to belong to *Augochloropsis* and *Augochlora*, respectively (Michener 1954 – referring just to *A. sthena*, Moure & Hurd 1987). Their type depositories are unknown but some details in the description of the female of *A. sthena* suggest that it is really not a *Pseudaugochlora*, such as: “Kopf äussert fein” (head extremely slender) or “Mesonotum und Scutellum glänzend, mit äussert feiner, kaum wahrnehmbarer Punktierung” (mesonotum and scutellum bright, with extremely fine and not very perceptible punctures.) Sandhouse (1943) designated *A. sthena* as the genotype of *Pseudaugochloropsis* making the latter a junior synonym of *Augochloropsis* and, because of that, an unavailable name.

*Pseudaugochlora* was described by Michener (1954), as a subgenus of *Caenaugochlora*, to include the group of species previously considered in *Pseudaugochloropsis* Schrottky. Eickwort (1969) considered the group as a genus, although he kept the name accepted by Moure (1940): *Pseudaugochloropsis*. In 1994, Michener reasserted his point of view and, recently, both Michener (2000) and Engel (2000) gave *Pseudaugochlora* the status of genus.

Schrottky (1906) characterized *Pseudaugochloropsis* as *Augochloropsis* lacking setae on the apical margins of the metasomal terga (“Apicalränder der Abdomensegmente ohne Haarbinden”). Moure (1940) was the first author to precisely define the genus, restricting it to *Pseudaugochloropsis nigromarginata*, and transferring the other species to different genera (most of them to *Augochloropsis*). Eickwort (1969) allowed for a more accurate delimitation of *Pseudaugochlora* (treated as *Pseudaugochloropsis*) in his systematic study of the genera of Augochlorini. As already mentioned by Moure (1940), males possess a combination of exclusive characters that make their identification easier than that of females, particularly the hair brushes on the metasomal sterna and the hook-like projection of the terminal flagellomere.

Based on cladistic analysis of the genera of Augochlorini, Engel (2000) indicated that *Pseudaugochlora* belongs to a clade in which the genera *Megaloptidia*, *Micrommation*, *Ariphanarthra*, *Megommation*, *Megaloptina*, *Cleptommation* and *Stilbochlora* are also included. Thus, *Pseudaugochlora* may not be related to *Caenaugochlora*, as proposed by Eickwort (1969).

*Pseudaugochlora graminea* is the best-studied species of the genus. Besides the detailed morphological description provided by Eickwort (1969) as a model for Augochlorini, detailed studies were made of its glands (Cruz Landim 1967), cephalic muscles (Urban 1963) and cytogenetics (Kerr & da Silveira 1972). Its nest architecture was investigated by Ihering (1904), Michener and Lange (1958), Michener and Kerfoot (1967 — this study also describes nests of *P. sordicutis* (Vachal)), and by Sakagami and Moure (1967). All

nests studied by those authors were found in earth-banks and consisted of a tunnel with one or more chambers, where the brood cells were constructed. Seasonal cycle and social organization of colonies of *P. graminea* are also described and discussed by Michener and Lange (1958), and Michener and Kerfoot (1967). Nests of *P. graminea* can be inhabited by a single female or by a few females with an apparent division between egg-layers and workers (Michener & Lange 1958: 479–484). Similarly, Michener and Kerfoot (1967) provided accounts of possibly facultative semisocial organization of Costa Rican species of *Pseudaugochlora*.

## Methods

### Material studied

The external morphology of about 1500 specimens of *Pseudaugochlora* mainly from Brazil was examined using a stereomicroscope. Identifications were made through comparisons with the types (see below). Of the seven species of *Pseudaugochlora* treated below, five are described as new. Terminalia of males of all species were studied. Multiple representatives of each species from throughout their geographic distribution were examined. The terminalia were removed from the male metasoma, cleared in a 10% solution of NaOH overnight, rinsed in distilled H<sub>2</sub>O, and preserved in propylene glycol.

The following institutions and curators provided material that was examined during the course of this study: **ACRE**, Coleção Entomológica da Universidade Federal do Acre, Rio Branco, Brazil, E. F. Morato; **AMNH**, American Museum of Natural History, New York, USA, J. G. Rozen, Jr., and J. S. Ascher; **BMNH**, The Natural History Museum, British Museum, London, United Kingdom, C. Taylor; **CCRP**, Coleção Camargo, Faculdade de Filosofia Ciências e Letras da Universidade de São Paulo, Ribeirão Preto, Brazil, J. M. F. Camargo; **CMNH**, Carnegie Museum of Natural History, Pittsburgh, USA, R. L. Davidson; **CUIC**, Cornell University Insect Collection, Ithaca, USA, J. K. Liebherr and E. R. Hoebeke; **DZUP**, Coleção Entomológica Pe. J. S. Moure, Departamento de Zoologia, Universidade Federal do Paraná, Curitiba, Brazil, J. S. Moure and G. A. R. Melo; **FCVZ**, private collection of Fernando C. V. Zanella, Universidade Federal de Campina Grande, Patos, Brazil; **KUNHM** University of Kansas Natural History Museum, Division of Entomology, Lawrence, USA, C. D. Michener and Z. H. Falin; **MACN**, Museo Argentino de Ciencias Naturales, Buenos Aires, Argentina, A. Roig-Alsina; **MNHN**, Museum National d'Histoire Naturelle, Paris, France, C. Villemant; **MRSN**, Museo Regionale Scienze Naturali, Turin, Italy, C. Pagliano; **MZUSP**, Museu de Zoologia da Universidade de São Paulo, São Paulo, Brazil, C. R. F. Brandão and B. W. Coelho; **UFMG**, Coleções Taxonômicas da Universidade Federal de Minas Gerais, Belo Horizonte, Brazil, F. A. Silveira; **UFV**, Museu Entomológico da Universidade Federal de Viçosa, Viçosa, Brazil, L. A. O. Campos; **USNM**, United States National Museum, Smithsonian Institution, Washington, USA, T. Schultz, R. J. McGinley, and S. Brady; **ZMHU**, Museum für Naturkunde, Humboldt-Universität, Berlin, Germany, F. Koch; **ZMUC**, Zoological Museum, University of Copenhagen, Denmark, R. Meier and L. Vilhemsén.

An effort was made to examine all types of species assigned to *Pseudaugochlora* by Moure and Hurd (1987). Of those, the type of *Halictus nigromarginatus* Spinola, 1841 could not be located. Types of the following species were examined: *Augochloropsis* (*Pseudaugochloropsis*) *basiatra* Strand (ZMHU); *Augochlora* (*Augochlora*) *binghami* Cockerell (USNM); *Augochlora camuræ* Holmberg (MACN); *Augochlora chapadæ* Cockerell (CMNH); *Halictus crawfordi* Vachal (MNHN); *Halictus nigromarginatus* var. *cyanonigrans* Vachal (MNHN); *Megilla graminea* Fabricius (ZMUC); *Augochlora pandora* Smith (BMNH); *Augochlora piscatoria* Cockerell (USNM); *Halictus praepotens* Vachal (MNHN); *Pseudaugochlora pulchra* Engel (CUIC); *Augochlora sanctula* Cockerell (USNM); and *Halictus sordicutis* Vachal (MNHN). The holotype of *Halictus nigromarginatus* Spinola is apparently lost, but three specimens from the ZMHU determined by Spinola himself were examined: one female from Brazil (state of Bahia), one male from Mexico and another male without specified locality.

## Terminology and Descriptions

Morphological terminology is mainly that of Michener (2000) and Eickwort (1969), unless otherwise specified. The abbreviations F, S and T are employed for flagellomere, metasomal sternum, and metasomal tergum, respectively. *IOC* and *OOC* refer to the interocellar and ocellarocular distances, respectively. *MOD* and *LOD* refer to the median and lateral ocellus diameters, respectively. The *mesoscutal band* is an elongate, parallel-sided area, differentiated by colour, punctation, and sculpture arranged longitudinally on the mesoscutum between mesoscutal and parapsidal lines on each side. The *outer interspace of mandible* is the broad area in the outer surface of the mandible above the condylar ridge and basal to the outer groove (Michener and Fraser 1978). The term *postocellar region* is used here, as proposed by Silveira (1995), to avoid confusion with the preoccipital region. Accordingly, the strong ridge present on the vertex of *Pseudaugochlora* species behind their ocelli will be called here the '*postocellar ridge*'. *Metapostnotum* and *propodeal triangle* are considered to be synonymous terms, and the former is favored hereafter (see Brothers 1976 for discussion). In referring to dorsal and ventral faces of the antennal flagellum, it is assumed that it is extended so that its long axis is perpendicular to the plane of the face. The term *disc* is used to describe the central portion of a surface, which is often distinctive from the marginal areas in terms of sculpturing, punctation, and color (e.g. disc of clypeus, disc of mesoscutum). *Upper corner of the clypeus* refers to the baso-lateral area of the clypeus near the junction of epistomal and subantennal sulci (adjacent to the *dorso-lateral angles* — *sensu* Urban 1967).

When describing the surface sculpturing, the aspect of the integument among punctures is classified into four categories: (1) smooth; (2) rugulose (*i.e.* minutely wrinkled); (3) reticulate (*i.e.* covered with net-like, intermeshed, lines); and (4) rough (*i.e.* not smooth, but not forming well-defined patterns as in reticulate or rugulose sculpturing).

In the description of pubescence, subjective scales are used, as follows: the type of hairs is indicated as simple, fine, plumose, and densely plumose; and the inclination of the hairs is indicated as decumbent, semidecumbent, semierect, and erect. The length of hairs is given in comparison to the diameter of the 5<sup>th</sup> flagellomere: long meaning approximately one and a half times that diameter or longer; short meaning less than one diameter; moderately long meaning an intermediate length.

Punctures can be minute, very fine, fine, moderately fine, moderately coarse, and coarse. Puncture density is given in comparison to the distances between adjacent punctures. When punctation is said to be dense, punctures are separated by one puncture diameter or less, in moderately dense by one to two diameters, in moderately sparse by one to three diameters, in sparse by at least two diameters. An area with very dense punctation (punctures separated by less than one diameter) differs from another with coarsely reticulate integument by having hairs originating from its punctures. Following Cure (1989), the term *beveled puncture* is used to indicate the condition in which punctures are tilted obliquely in relation to the surface of the integument, seeming to be small carinae if observed perpendicularly. The term *protuberant puncture* refers to the condition in which the margins of piligerous punctures are located above the general surface of the integument.

Body length was measured in dorsal view and is the distance between the disc of the clypeus and the posterior margin of the propodeum plus the metasomal length. The interocellar distance is the distance between the inner margins of the lateral ocelli and the ocellar-ocular distance is that between the external margin of the lateral ocelli and the internal margin of the eye. The length of the scape excludes the basal bulb. The pterostigma and marginal cell are measured on the wing margin. Diameter of the ocelli is the maximum diameter measurable. Diameters of scape and F5 are measured at their midpoint.

Variation is described either as a geographically structured pattern of morphological differences associated with specific portions of the distribution range of the species, or as variation in a few individuals but with no geographic structuring.

Period of activity was provided for individual species for the complete geographic range of the species. No pattern involving these two variables could be found. Michener and Lange (1958: 479), and Michener and

Kerfoot (1967: 215) mentioned that individuals of *Pseudaugochlora* spp. may be active throughout the year, and that they only stop flying on cold winter days.

## Taxonomy

### Genus *Pseudaugochlora* Michener

*Augochlora* (*Pseudaugochloropsis*) Schrottky 1909:482.

*Pseudaugochloropsis* Moure 1940:50–51, Eickwort 1969:429–432; Moure and Hurd 1987:229–232; Michener, McGinley and Danforth 1994:135.

*Caenaugochlora* (*Pseudaugochlora*) Michener 1954:77–79, 1994:376, 1997:50.

*Pseudaugochlora* Engel 2000:49, Michener 2000:394.

**Type species:** *Halictus nigromarginatus* Spinola = *Megilla graminea* Fabricius, original designation by Michener (1954). [Note: As already pointed by Engel (2000), Michener (1954) designated *Halictus nigromarginatus* Spinola 1841 as type species for *Caenaugochlora* (*Pseudaugochlora*). However some studies (e.g. Eickwort 1969, Michener 1994, Michener 1997) indicated erroneously *H. nigromarginatus* Spinola 1851 as type species of *Pseudaugochlora*. The species described by Spinola in 1851 is clearly a junior homonym, renamed afterwards as *Caenohalictus oblitus* by Moure and Hurd (1987).]

**Diagnosis.** Characters used by Eickwort (1969) and Engel (2000) for diagnosis and delimitation of *Pseudaugochlora* are presented. Character state descriptions differing from or complementary to previous studies on Augochlorini are printed in italics; cases in which present descriptions differ from previous ones are contrasted with those given by Eickwort (1969) or Engel (2000); characters marked with an asterisk were not studied in all seven species due to lack of specimens for dissection.

**Female:** (1) mandible with strong subapical tooth, *narrower than apical tooth*; (2) labral distal process narrowly triangular, basal elevation orbicular, lateral teeth weak; (3) galea well sclerotized, apex acute, galeal comb absent, galeal base extending to stipital base; (4\*) *relative length of maxillary palpus: extended length of the palpus divided by the total length of galea plus stipes = 0.22 to 0.32* [varying from 0.29 to 0.31 in Eickwort (1969)]; (5\*) *cross-section of prementum approximately rectangular with carinae marking the four corners, posterior surface with two carinae delimiting internal membranous area, anterior surface with weak longitudinal median carina* [“the anterior surface is flattened” – Eickwort (1969)], premental thickenings absent, prementum not greatly elongate: *relative lengths of prementum: length of prementum divided by the width of head = 0.61 to 0.72* [varying from 0.64 to 0.72 in Eickwort (1969)], *width of prementum divided by length of prementum = 0.11 to 0.13* [0.11 in Eickwort (1969)]; (6) salivary plate well sclerotized, *U-shaped* [“V-shaped brace not apparent” – Eickwort (1969)]; (7) glossa very long, *relative lengths of glossa: length of glossa fully extended divided by length of prementum = 0.68 to 0.92* [varying from 0.68 to 0.75 in Eickwort (1969)], *length of glossa divided by width of the head = 0.46 to 0.63* [varying from 0.46 to 0.50 in Eickwort (1969)]; (8) labial palpomeres flattened, first longer than second and third combined; (9) hypostomal ridge carinate, anterior angle rounded (*narrower in P. graminea compared to the other species*); (10) posterior flange of hypostomal carina projecting beyond occiput; (11) length of malar space less than basal mandibular width; (12) epistomal sulcus *approximately orthogonal or forming small and acute paraocular lobe protruding onto clypeus*; (13) ocelli not greatly enlarged, ocellar furrow absent; (14) strong postocellar ridge present; (15) preoccipital ridge rounded, not carinate; (16) pronotal angle obtuse and not produced, dorsal ridge carinate, lateral ridge rounded; (17) mesoscutal anterior border rounded, mesoscutal lip rounded; (18) tegula oval; (19) anterior basitibial brush well defined; (20) *velum of strigilis (antenna cleaner) well developed, length of non-dentate portion of malus approximately 1.5 times longer than the portion that is dentate on both margins*; (21) basitibial plate bordered on all sides; (22) inner hind tibial spur pectinate; (23) apex of marginal cell nar-

rowly truncate; (24) distal hamuli spaced unevenly; (25) basal area of propodeum irregularly reticulate; (26) propodeal pit narrow.



**FIGURE 1.** Distal flagellomeres of male antenna: (a) *P. graminea* (Fabricius 1804); (b) *P. callaina* Almeida, **sp.n.**; (c) *P. erythrogaster* Almeida, **sp.n.**; (d) *P. flammula* Almeida, **sp.n.**; (e) *P. pandora* (Smith 1853). Scale = 0.3 mm.

**Male:** (1) mandible simple; (2) labrum with distal process, basal area notched; (3) antenna extending to scutellum;  $F2/F1 = 1.5$  to  $2.0$  [ $F2$  approximately equal in length to  $F1$ ] Engel (2000)];  $F11$  either not modified (Fig.1d), or with a ventral projection (Fig.1e), or hooked at apex (Figs.1a–c) [ $F11$  hooked at apex” Engel (2000)]; (4) inner hind tibial spur serrate; (5) metasoma oval; (6) T7 abruptly longitudinally convex apically; (7) anal lip of proctiger with post-anal filaments; (8) apical margin of S4 wholly depressed posterior to strong transverse ridge or gently depressed medially and abruptly depressed laterally (forming two swollen lateral areas), emarginate or not, bearing lateral and/or median tuft(s) of hairs (Fig.2) [“Sternum IV with modified apical margin depressed posterior to strong ridge, bearing distinctive lateral or median tufts of long setae” – Eickwort (1969)]; (9) apical margin of S5 bearing lateral or median tuft(s) of setae (Fig.2), posterior marginal area (strongly or slightly) depressed [“Sternum V with modified apical margin, usually bearing lateral tufts of setae, postgradular area variously ridged and depressed” – Eickwort (1969)]; (10) S6 strongly depressed apically, apical margin emarginate; (11) S7 with postero-lateral corners strongly produced and pointed (less so in *P. pandora* and much less in *P. flammula*), apodemes recurved anteriorly (Fig.3); (12) spiculum of S8 moderately broad (longer than broad); posterior margin bearing long, strong setae (Fig.3); (13) gonobasal bridge narrow or membranous, dorsal lobe strong, ventral lobe slightly produced; (14) ventral gonostylus a caudally directed seta-bearing lobe (Fig.4); (15) parapenial lobe present as a thin transparent flap, basal process of gonostylus absent; (16) ventral surface of penis valve unmodified, with darkly pigmented crest dorsally; (17) volsella emarginate on inner margin, notch near apex, base not narrowed.

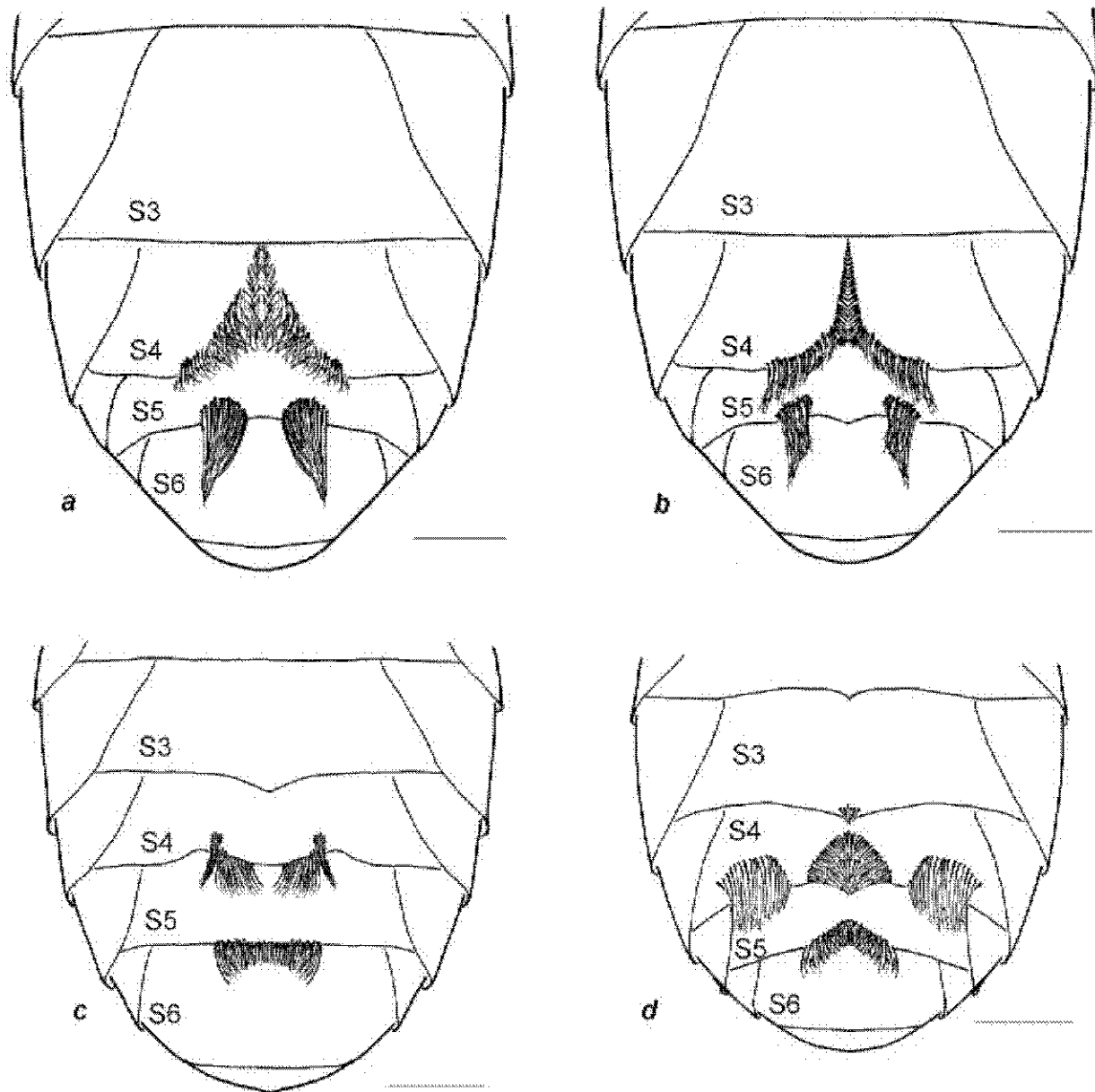
Based on the diagnostic characters listed above, some modifications are required in the keys previously published for the genera of Augochlorini (e.g. Eickwort 1969; Engel 2000; Michener 2000; Michener *et al.* 1994) in order to correctly identify all species belonging to *Pseudaugochlora*. Special attention should be paid to the characters **12 of female** and **3, 8, 9 of male**. Despite the inclusion of *P. pandora* among the species of *Pseudaugochlora* by Moure and Hurd (1987), differences between this species and *P. graminea* (and those morphologically similar to *P. graminea*) have not been considered previously, particularly the modifications in the epistomal sulcus of the female and last flagellomere of the male and the hair tufts of S5 and S6 of the male.

### Species previously erroneously placed in *Pseudaugochlora*

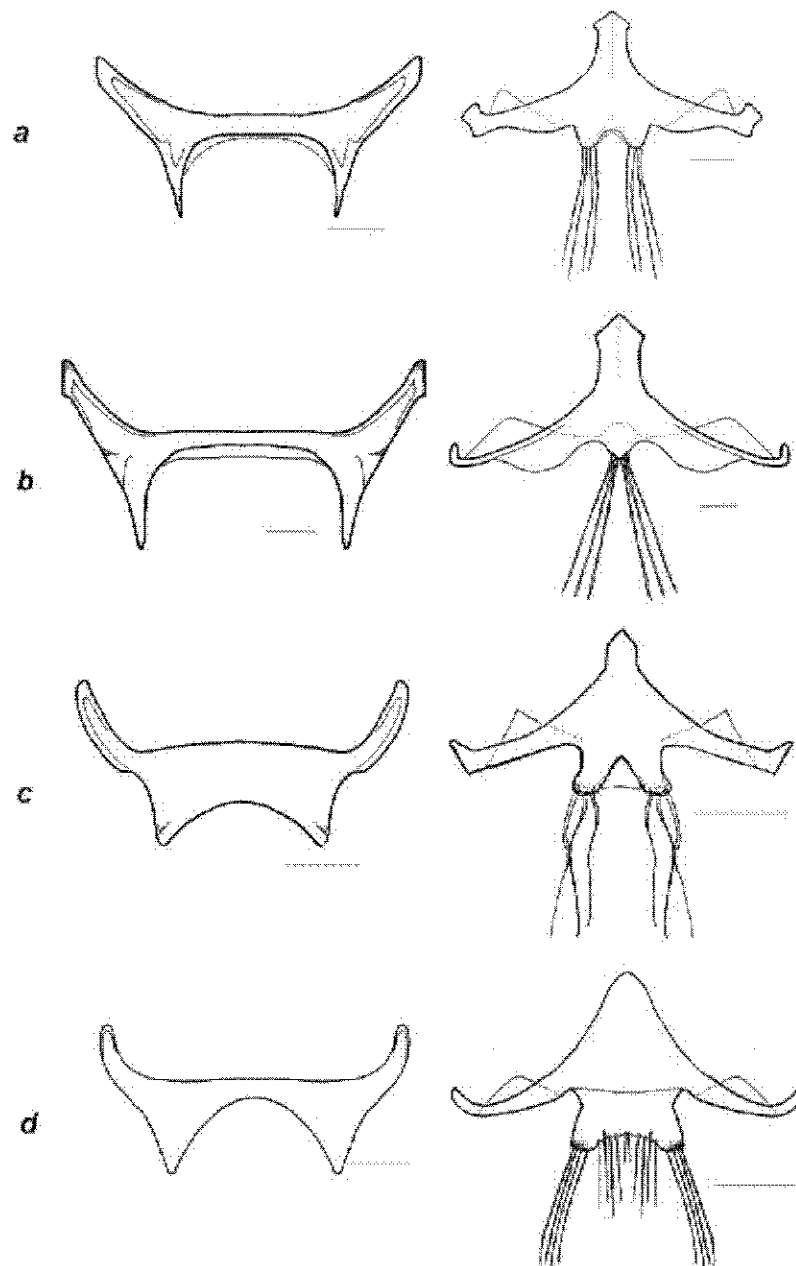
*Caenaugochlora* (*Pseudaugochlora*) *nigromarginata* Michener 1994: 376, 1997: 50 = *Caenohalictus obitus* Moure and Hurd 1987 [designation by Moure and Hurd (1987)].

*Pseudaugochloropsis nigromarginata* Eickwort 1969: 429 = *Caenohalictus obitus* Moure and Hurd 1987 [designation by Moure and Hurd (1987)].

*Augochloropsis* (*Pseudaugochloropsis*) *sthena* Schrottky 1906, Sandhouse 1943: 593 = *Augochloropsis sthena* (Schrottky 1906) [designation by Moure and Hurd (1987)].  
*Augochloropsis* (*Pseudaugochloropsis*) *euryale* Schrottky 1906 = *Augochlora* (*Oxystoglossela*) *euryale* (Schrottky 1906) [designation by Moure and Hurd (1987)].  
*Augochloropsis* (*Pseudaugochloropsis*) *basiatra* Strand 1910 = *Thectochlora alaris* (Vachal 1904) [designation by Gonçalves and Melo (2006)].  
*Pseudaugochloropsis costaricensis* Michener and Kerfoot 1967: 205–232, Eickwort 1967: 232 = *Caenaugochlora costaricensis* (Friese 1917) [designation by Moure and Hurd (1987)].



**FIGURE 2.** Ventral view of metasoma of male: (a) *P. graminea* (Fabricius 1804); (b) *P. callaina* Almeida, sp.n.; (c) *P. flammula* Almeida, sp.n.; (d) *P. pandora* (Smith 1853). Pubescence, except tufts on S4 and S5, omitted. Scale = 0.5 mm.



**FIGURE 3.** Seventh and eighth metasomal sterna (S7 and S8) of male: **(a)** *P. graminea* (Fabricius 1804); **(b)** *P. callaina* Almeida, **sp.n.**; **(c)** *P. flammula* Almeida, **sp.n.**; **(d)** *P. pandora* (Smith 1853). Scale = 0.2 mm.

### *Pseudaugochlora graminea* (Fabricius)

*Megilla graminea* Fabricius 1804: 334. Type depository: ZMUC (examined).

*Halictus nigromarginatus* Spinola 1841: 137. Type depository: unknown.

*Halictus nigromarginalis* Reed 1892: 231. *Lapsus calami*.

*Augochlora* (*Augochlora*) *binghami* Cockerell 1897: 5–6.; 1900: 361; 1905: 362; 1910: 490–491; 1913: 57. Type depository: USNM (examined).

*Augochlora nigromaculata* — Dominique 1898: 62. *Lapsus calami*.

*Augochlora graminea* — Cockerell 1900: 361; 1905:362. Friese 1921:86

*Augochlora chapadae* Cockerell 1900: 361–362; Schrottky 1901:213. Type depository: CMNH (examined).

*Augochlora* (*Augochloropsis*) *graminea* — Schrottky 1902: 373–375.



*Halictus nigro-marginatus* — Vachal 1904: 16, 18, 23; 1911:50.  
*Augochlora graminea* — Ihering 1904: 465 *Lapsus calami*.  
*Augochlora (Pseudaugochloropsis) nigromarginata* — Schrottky 1909: 482; Cockerell 1910: 490–491; 1913: 56.  
*Augochloropsis nigromarginata* — Strand 1910: 474.  
*Augochlora (Pseudaugochloropsis) binghami* — Cockerell 1932: 11.  
*Pseudaugochloropsis nigromarginata* — Moure 1940: 51; 1944:70.  
*Caenaugochlora (Pseudaugochlora) nigromarginata* — Michener 1954: 77–79.  
*Pseudaugochloropsis graminea* — Moure 1960: 105–106. Eickwort 1967:233–237. Moure and Hurd 1987:230.  
*Caenaugochlora (Pseudaugochlora) graminea* — Michener 1994: 376.  
*Pseudaugochlora graminea* — Engel 2000: 49; Michener 2000: 394; Silveira *et al.* 2002: 181.

**Description.** FEMALE (Lectotype)

**Color:** metallic green with bluish highlights especially with oblique light except: yellow highlights on paraocular area, pronotum and propodeum; mandible dark brown, its apex black; labrum and apical margin of clypeus black; scape, flagellum dorsally, and pedicel blackish brown; ventral surface of flagellum dark brown; tegula mostly brown, its proximal area greenish; wing veins and pterostigma brown (C and R blackish); tarsi, internal face of femora and tibiae dark brown; trochanters dark brown with weak greenish highlights; external face of femora and tibiae blackish with weak greenish highlights; strigilis and hind tibial spurs light ferruginous; apical margin of T1 with broad blackish brown band, those of T2 and T3 darker, T4 with narrow blackish apical band; T2 with narrow pre-marginal band with bluish and lilac highlights; that on T3 similar, but brownish with weak bluish highlights; T5 around pseudopygidial area with lilac, purple and golden highlights; metasomal sterna brown with broad median transverse band green. Wings dusky-hyaline.

**Pubescence:** on clypeus, frons and vertex between ocelli brown; on supraclypeal area, most of paraocular area and upon postocellar ridge light brown; inferiorly on paraocular area and on gena white; on mesoscutum and scutellum fuscous; on metanotum, propodeum and mesepisternum whitish; on legs light brown, lighter on front leg; short hairs of T1–T4 whitish, long hairs dark brown; on T5 dark brown; on metasomal sterna whitish. On condylar groove and interspace of mandible long, simple and erect, shorter apicad, on outer surface shorter and semidecumbent; on labrum apparently absent (although apical margin hidden by mandibles); on disc of clypeus moderately long, fine and semierect to semidecumbent, on apical margin long, simple and erect; on paraocular area short, densely plumose and erect, intermixed with moderately long, fine to moderately plumose and semierect hairs; on anterior face of supraclypeal area very short, simple and erect, on the remainder short, densely plumose and semierect; on frons long, plumose and semierect; on vertex moderately long, moderately plumose and semierect; on gena long, plumose and semidecumbent, short, plumose and semierect close to eye margin; on postocellar ridge moderately long, moderately fine and semierect; on scape short, simple and semidecumbent, long and moderately fine near base; on pedicel minute and semidecumbent, with a median ring of long apically directed setae; on flagellum minute and semidecumbent; on dorsal surface of pronotum short, moderately plumose and erect, on pronotal dorsal carina longer; on mesoscutum moderately short, plumose and semierect, intermixed with very short and simple hairs; on scutellum long, plumose and erect, intermixed with simple and very short hairs; on metanotum long, densely plumose and erect to semierect, intermixed with simple and very short hairs; on metapostnotum absent; on posterior surface of propodeum and mesepisternum moderately long, densely plumose and semierect; on wings denser apically; on disc of T1 short and simple intermixed with moderately long, plumose and semierect hairs; on T2–T4 very short, intermixed with short and semidecumbent setae; on T5 moderately long, moderately plumose and decumbent; on metasomal sterna long and semidecumbent, shorter near apical margin. Scopa, except on tibia, constituted by long hairs, branched at approximately their distal half and forming a tangle; on hind tibia hairs are less dense and branched approximately at distal third.

**Sculpture:** integument smooth and shiny except: outer interspace of mandible longitudinally microgrooved except near base; basal area of labrum rough near edges, smoother near basal elevation; clypeus laterally with microgrooved zone, anteriorly rough; anterior face of supraclypeal area microrugulose, except for its

anterior surface, medially; vertex by lateral ocellus microrugulose; scape microreticulate; mesoscutum microreticulate (Fig.5a), anteriorly rough; metanotum irregularly reticulate, microrugulose inside reticulations; metapostnotum reticulate, posteriorly microreticulate inside reticulations; upper corner of posterior surface of propodeum microrugulose; basitibial plate microreticulate.

**Punctures:** on outer interspace of mandible moderately fine and moderately dense, coarser near outer border; on basal area of labrum absent; on clypeus coarse and dense, intermixed with finer punctures; on anterior face of supraclypeal area fine and sparse, on the remainder beveled, moderately coarse and dense; on frons moderately fine and very dense; on paraocular area fine and moderately dense, beveled above antennal socket, intermixed with coarser and sparser beveled punctures; on vertex protuberant, fine and moderately sparse; on scape beveled fine and very sparse; on F1 beveled and very fine, on F2 beveled, moderately fine and sparse, on F3–F10 beveled fine and dense; on dorsal surface of pronotum very fine and moderately dense, intermixed with coarser beveled punctures; on disc of mesoscutum moderately fine and very dense, sparser between and upon mesoscutal bands; on scutellum fine and dense intermixed with coarser and sparser punctures; on metanotum minute and sparse on anterior third, moderately coarse and sparse on remainder of the disc; on metapostnotum absent; on posterior surface of propodeum beveled, moderately fine and dense, intermixed with coarser and moderately dense punctures; on the anterior declivous surface of T1 moderately fine and sparse, on disc of T1 moderately fine and dense, sparser toward anterior margin, finer toward posterior margin; on T2 as on T1, but finer; on T3 and T4 fine to very fine and moderately dense.

**Structure:** disc of clypeus not depressed; epistomal sulcus forming approximately orthogonal angle; frontal carina well marked; angle of the frontal line between supraclypeal and frontal areas gently declivous (approximately 140° — Fig.6a); seven unevenly spaced hamuli on hind wing; left inner hind tibial spur with 5 teeth, right with 4 teeth; basal area of basitibial plate slightly elevated.

**Measurements** (mm). Approximate length of body = 8.9, anterior wing = 6.3. Length and width of head = 2.17, 2.60. Maximum, inferior and superior distances between eyes = 1.76, 1.22, 1.29. IOC, OOC = 0.27, 0.34; MOD, LOD = 0.19, 0.17. Length and diameter of scape = 0.96, 0.16. Length of pedicel, F1, F2, F3 and F10 = 0.14, 0.15, 0.16, 0.19, 0.29. Diameter of F5 = 0.18. Length and width of mesoscutum = 1.64, 1.84. Length and width of prestigma = 0.27, 0.18. Length and width of pterostigma = 0.77, 0.18. Length and width of marginal cell = 1.43, 0.42.

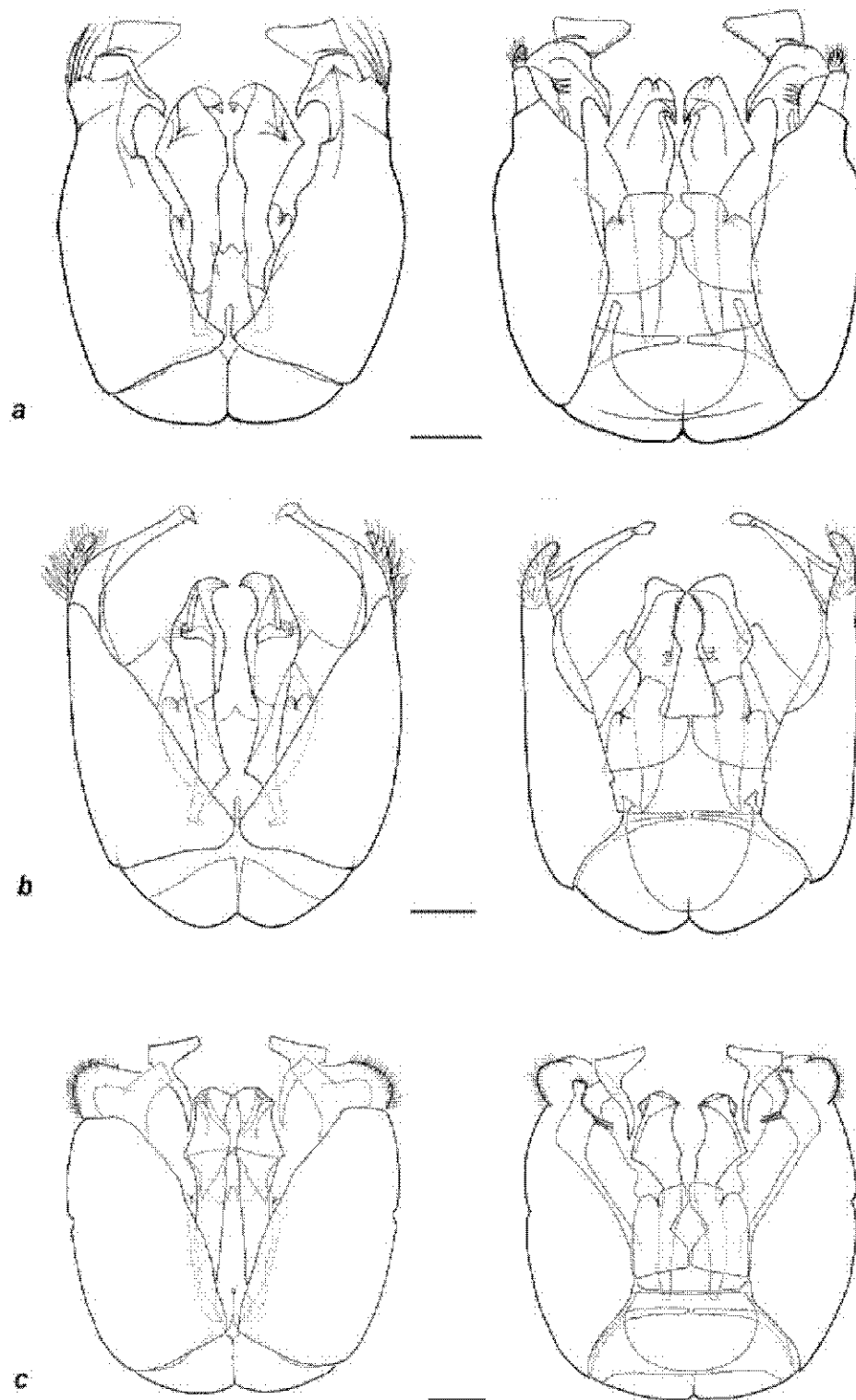
MALE (“P.E.M.Guimarães; São Gonçalo MG, BRASIL, 26/12/1997, P.E.M.Guimarães”, “1972–5989”, “*Pseudaugochlora graminea* (Fabricius, 1804) F.A.Silveira, det. 1998” — UFMG)

Differs from female as follows:

**Color:** mandible, labrum and apical area of clypeus yellow with brown borders; scape blackish brown with yellowish highlights; ventral surface of flagellum light brown; pedicel and flagellum dorsally blackish; tarsi black, apex of tarsomeres brown; femora, tibiae and trochanters green with blue highlights, their apices blackish; tibial spurs and strigilis light yellow; apical margin of T1–T5 black, pre-marginal band of T2 weakly bluish; metasomal sterna dark brown with greenish blue highlights.

**Pubescence:** predominantly light yellow, lighter ventrally (white on some parts); dark brown on S4–S6. On disc of labrum, between and anterior to the two basal elevations, very short and erect; on scape moderately long and moderately plumose; on frons, supraclypeal area and on metasomal terga longer than on female; tufts of setae on S4 and S5 as shown in Fig.2a: S4 with a Y-shaped hair patch, hair apices on the stem of this patch entangled and unordered (Fig.2a), S5 with two lateromedial tufts (Fig.2a); on S6 moderately long, forming an apical fringe.

**Sculpture:** integument smooth, except: outer interspace of mandible weakly microrugulose, almost smooth; on metanotum irregularly rugulose; on propodeum reticulate, but lacking posterior microreticulate band; upper corner of posterior surface of propodeum rugulose.



**FIGURE 4.** Genital capsule of male: **(a)** *P. graminea* (Fabricius 1804); **(b)** *P. flammula* Almeida, sp.n.; **(c)** *P. pandora* (Smith 1853). Scale = 0.2 mm.

**Punctures:** on outer interspace of mandible absent; on clypeus deeper than on females; on scutellum moderately coarse and dense; on metanotum fine and moderately sparse; on disc of T1 moderately fine and moderately dense; very fine and sparse near posterior margin of T1 and on other terga.

**Structure:** epistomal sulcus forming approximately orthogonal angle (more rounded than in female); F11 hooked (Fig.1a); frontal carina discrete and present only on supraclypeal area; angle of the frontal line between supraclypeal and frontal areas gently declivous (approximately 140°, as in Fig.6a); seven unevenly spaced hamuli on hind wing; apical margin of S4 emarginate, posterior marginal area of S4 and S5 depressed; S7, S8 and genitalia as in Figs.3a, 4a.

**Measurements** (mm). Approximate length of body = 10.5; anterior wing = 8.3. Length and width of head = 2.47, 2.77. Maximum, inferior and superior distances between eyes = 1.86, 1.09, 1.44. IOC, OOC = 0.31, 0.41; MOD, LOD = 0.22, 0.18. Length and diameter of scape = 0.71, 0.26. Length of pedicel, F1, F2, F3 and F10 = 0.12, 0.15, 0.25, 0.25, 0.33. Diameter of F5 = 0.23. Length and width of mesoscutum = 1.91, 2.15. Length and width of prestigma = 0.28, 0.21. Length and width of pterostigma = 0.85, 0.24. Length and width of marginal cell = 1.78, 0.51.

**Variation:** The color of individuals of *P. graminea* is extremely variable; the most common color patterns are green with yellowish and bluish highlights, some specimens have bronze highlights (some have head and mesosoma completely bronze), some have lilac and reddish orange highlights and some specimens are strongly bluish, some females are predominantly light green and have brown apical margins of the metasomal terga. Color of antenna varies from black to light brown. Pubescence on the frons varies from yellowish light brown to dark brown. The microreticulate area on the clypeus of female most commonly does not form a continuous U-shaped band along the epistomal sulcus, it generally is interrupted medially; in two females (Cuiabá [Mato Grosso] and one from Itatiaia [Rio de Janeiro]) this area covers more than half of the clypeus; in some specimens it is restricted to the upper corner of the clypeus and a very narrow band along the lateral margin. The apical portion of clypeus may appear depressed but, if so, never as strongly as in *P. indistincta* or *P. callaina*. The anterior face of the supraclypeal area of females may be rugulose in some cases and almost smooth in others (the lateral margin is always rough, but not rugulose). The upper corner of the posterior surface of the propodeum varies from rugulose to microrugulose. The area on the mesoscutum of female sparsely punctate can be small (restricted to a small posterior area on the mesoscutum) or it may reach the mesoscutal line, as in *P. callaina*. Some females have fine punctures on the disc of T1, intermixed with coarser punctures (Figs.7b,c), resembling the pattern of punctation on the disc of T1 observed in *P. simulata* and *P. erythrogaster* (Figs.7d–f); however, the punctation of *P. graminea* is denser and coarser than in those species. Examples of localities from where females with finer punctation were examined include Esteio (Rio Grande do Sul), Cáceres (Mato Grosso), and Tupuruquara (Amazonas), indicating this kind of morphology is not geographically structured in Brazil. The hook of F11 of the male forms a generally slightly oblique angle (as in Fig.1a), sometimes it is approximately orthogonal (as in Fig.1c). The mesoscutum of the male may have areas with sparser punctures or be almost uniform in puncture density. Slight variation in shape and relative length of parts of the genitalia and hidden sterna of the male were observed but, for the most part were not interpreted to be taxonomically significant (additional comments below).

**Distribution in Brazil:** *P. graminea* occurs in all geographic regions of Brazil and appears to be present in a wide range of biomes (it is recorded from the states of Acre, Amapá, Amazonas, Bahia, Distrito Federal, Espírito Santo, Goiás, Maranhão, Mato Grosso, Mato Grosso do Sul, Minas Gerais, Pará, Paraíba, Paraná, Rio de Janeiro, Rio Grande do Sul, Rondônia, Roraima, Santa Catarina, São Paulo, and Tocantins). It is not known from a few states, probably mostly due to historical sampling biases.

**Comments:** As for the material of *Pseudaugochlora* examined for this study, most specimens from the Amazonian region were identified as *P. graminea*, although one male from the state of Amazonas (CCRP) has the gonocoxite and the gonostylus modified in relation to typical *P. graminea*. Moreover, the shape of the hooked F11 in males is slightly different in specimens from the western portion of the Brazilian Amazon (especially in the state of Acre). Since no other differences could be noticed in external morphology neither of males nor of females from that region, it seemed premature to describe new species from the Amazon. *P. graminea* is distributed from Argentina to Texas, USA (Moure & Hurd 1987). Increased knowledge of mor-

phological variation of this species in Central and northern South America may indicate whether it should be considered as one single species with a wide range and extensive morphological variation, or broken down into smaller units.

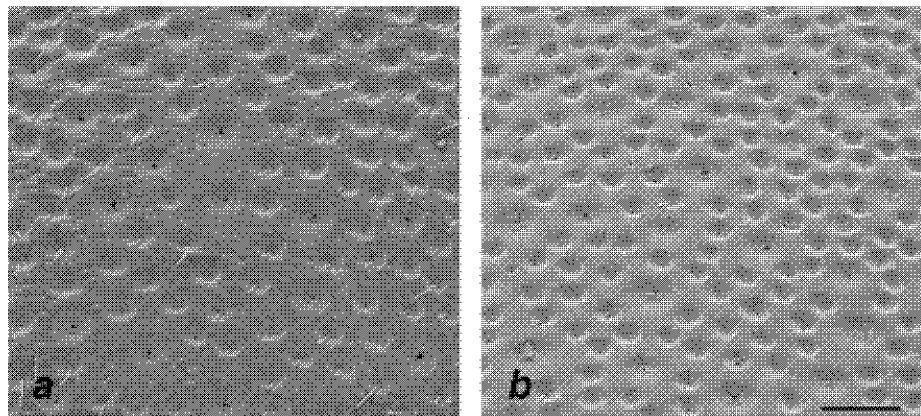
For the most part, intraspecific variation in the morphology of the male genitalia appeared to be as profound as interspecific variation among *P. graminea*, *P. callaina*, *P. erythrogaster*, *P. indistincta*, and *P. simulata*. Therefore only the genitalia of *P. graminea* are illustrated (Fig.4a).

**Period of activity:** every month of the year.

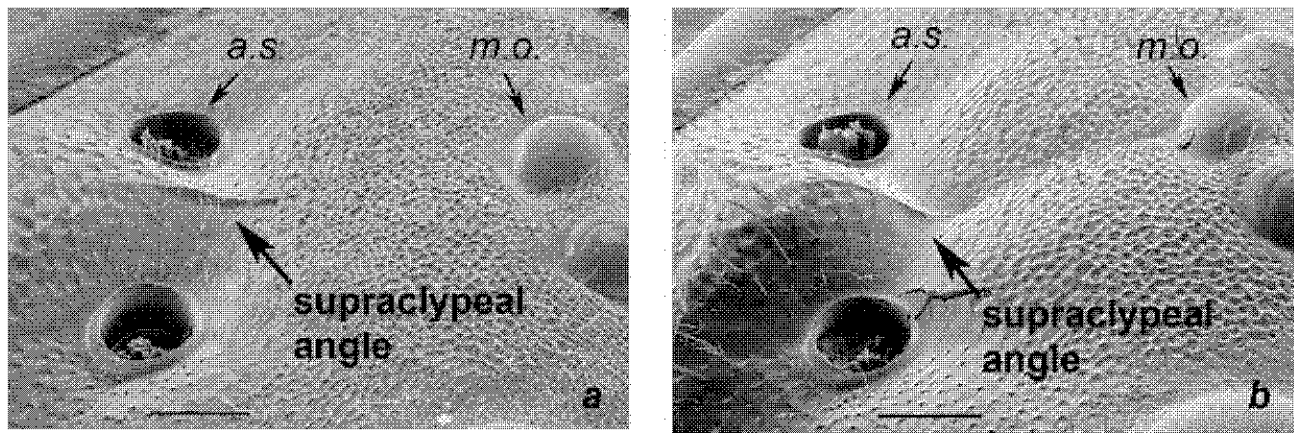
**Lectotype** (female): “*M. graminea* Am. Mer. Nohmus [according to Moure (1960): “America Meridionalis”];” “TYPE” “LECTOTYPE [“LECTOTYPE” is handwritten over “PARATYPE”] *Pseudaugochloropsis graminea* (F) J. S. Moure 1958”. Type depository: ZMUC (examined).

**Paralectotypes:** another female also deposited in the Lund Collection (Copenhagen) and two other females in the Fabricius Collection (Zoologisches Institut, Kiel), designated by Moure (1960), were not examined.

**Additional material examined:** approximately 1100 specimens were studied and their collecting localities are listed below organized by Brazilian state: Acre: Acrelândia, Rio Branco; Amapá: Oiapoque; Amazonas: Camanaus (Rio Negro), Itacoatiara (estrada de Manaus, km 64), Manaus, Puraquequara Tupuruquara, São Paulo de Oliveira, 15km jusante de Camaruã Parus (64°25’W, 05°40’S); Bahia: Anagé, Cruz das Almas, Itambé, Itapetinga, Jequié, Maracás, Mucuri; Distrito Federal: Água Limpa, Brasília; Espírito Santo: Bairro Guandu, Domingos Martins, Guarapari, Linhares (Parque Sorotema), Santa Tereza, S.J.Petrópolis, Viana; Goiás: Catalão, Santa Bárbara, São Domingos; Maranhão: São Luís; Mato Grosso: Cáceres, Chapada dos Guimarães, Cuiabá, Serra do Roncador; Mato Grosso do Sul: Miranda; Minas Gerais: Aimorés, Barbacena, Belo Horizonte, Bocaiúva, Brasilândia de Minas, Brumadinho, Coronel Fabriciano (Acesita), Felixlândia, Ibiá, Itamarandiba, Jaíba, Marliéria, Moeda, Paineiras, Paraopeba, Passos, Sabará, Santa Juliana, Santana do Riacho, São Gonçalo, São Gotardo, Taiobeiras, Uberaba, Uberlândia, Varginha, Viçosa; Pará: Conceição do Araguaia, Fordlândia (Rio Tapajós), Gorotire (Gradaus), Óbidos (Colônia Rio Branco), “BR 174 km 70 (PDBFF)”; Paraíba: Buraquinho, João Pessoa, Mamanguape (Reserva Biológica Guaribas); Paraná: Caviuna, Curitiba, Foz do Iguaçu, Maringá, Rolândia; Rio Grande do Sul: Esteio; Rio de Janeiro: Angra dos Reis, Gávea Pequena, Guanabara, Ilha do Governador, Itatiaia, Represa Rio Grande, Rio de Janeiro (Floresta da Tijuca), São Bento (Duque de Caxias); Rondônia: Guajará Mirim, Ouro Preto do Oeste, Porto Velho, Vilhena; Roraima: “Ireng R. to”; Santa Catarina: Blumenau, Itajaí, Joenvile, Nova Teutonia; São Paulo: Araraquara, Batatais, George Oeterer, Porto Cabral (R. Paraná), Rio Claro, São Carlos, São Paulo, Sertãozinho; Tocantins: Dianópolis.



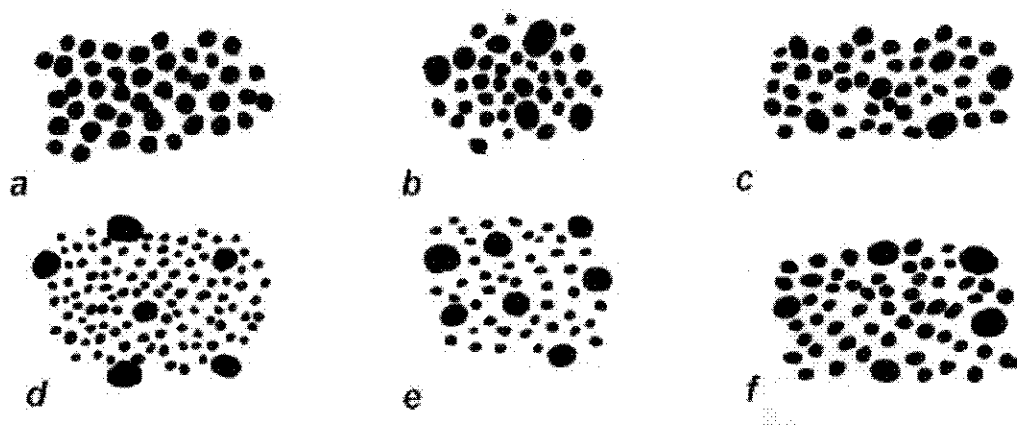
**FIGURE 5.** Integument of mesoscutum of female: (a) *P. graminea* (Fabricius 1804); (b) *P. flammula* Almeida, sp.n. Scale = 0.2 mm.



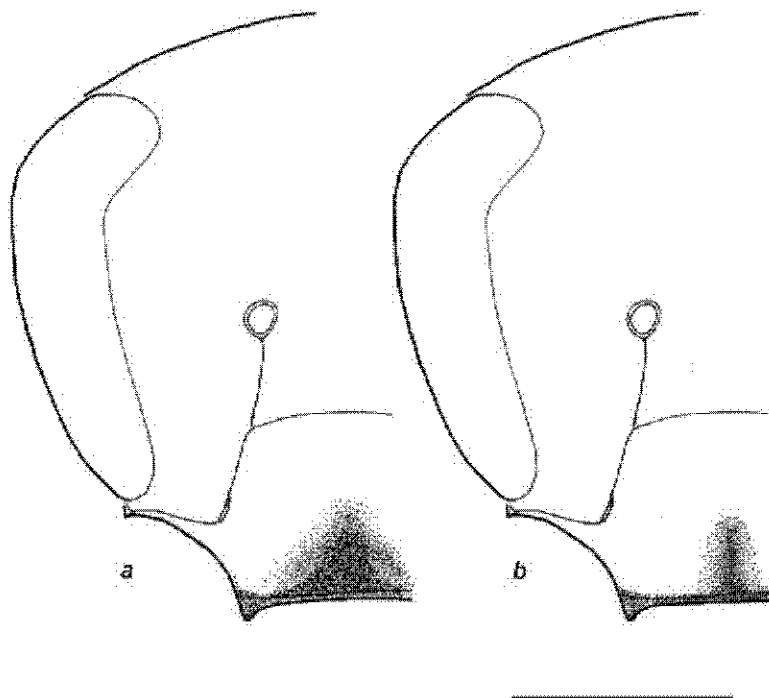
**FIGURE 6.** Fronto-lateral view of head of female: **(a)** *P. graminea* (Fabricius 1804); **(b)** *P. flammula* Almeida, sp.n. *a.s.* = antennal socket; *m.o.* = median ocellus. Scale = 1.0 mm.

***Pseudaugochlora callaina* sp. n.**

**Diagnosis.** This species is most similar to *P. graminea*, *P. erythrogaster*, *P. indistincta*, and *P. simulata*. The female can be distinguished from those of the other species by the broadly depressed clypeus (Fig.8a — in *P. indistincta* the clypeus is also depressed medially, Fig.8b, but not as broadly as in *P. callaina*; in the other three species the clypeus is flat or very weakly concave); the sparse punctures around distal third of metasomal line (generally dense in *P. graminea*, *P. erythrogaster*, *P. indistincta*, and *P. simulata*); the very fine and sparse punctures on the disc of T1, intermixed with fine and sparse punctures (in *P. graminea* and *P. indistincta* the punctures are moderately coarse and dense). The male can be distinguished by the weakly hooked F11 (strongly hooked in *P. graminea*, *P. erythrogaster*, and *P. simulata*), and by the hair apices on the stem of Y-shaped hair patch of S4 aimed at its midline (Fig.2b; unordered and forming a tangle in *P. graminea*, *P. erythrogaster*, *P. indistincta*, and *P. simulata* — Fig.2a).



**FIGURE 7.** Six punctation patterns (a–f) observed on disc of T1 of females of *Pseudaugochlora* spp.



**FIGURE 8.** Frontal view of head of female *Pseudaugochlora* spp. showing depressed area of clypeus **(a)** *P. callaina* Almeida, sp.n.; **(b)** *P. indistincta* Almeida, sp.n. Scale = 1 mm.

**Description. FEMALE (Holotype)**

**Color:** bluish green with weak yellowish highlights, except: mandibles black, small basal area with discrete greenish highlights, apex, preapical area and mandibular condyle blackish ferruginous; labrum and apex of clypeus blackish brown; transverse line close to dark apical margin of clypeus with purple highlights; frons and microreticulate basal area of clypeus bluish; scape, pedicel, and flagellum dorsally black; ventral surface of flagellum blackish brown; mesoscutal bands purplish; tegula brown with proximal area green, posterior margin blackish; wings dusky; veins at anterior half of forewing dark brown, at posterior half of forewing, pterostigma and hind wing light brown; tarsal claws ferruginous; tarsi blackish; tibiae black with green areas on outer surface; femora and trochanters black with greenish highlights; tibial spurs and strigilis light yellow; terga predominantly dark blue with green highlights; apical margin of T1–T4 with broad black bands; T2–T4 with narrow sub-marginal blackish bands with bluish highlights; T5 around pseudopygidial area with lilac, purple and yellow highlights; metasomal sterna black with greenish highlights.

**Pubescence:** predominantly fuscous; on paraocular area, between ocelli and upon postocellar ridge black; on vertex light brown; on mesoscutum, scutellum and metanotum light brown intermixed with darker hairs; on propodeum and anterior surface of T1 whitish; on T1–T4 short hairs white with few black long setae; on T5 blackish brown, lighter on apex of pseudopygidial area; on scopa, gena, mesosoma ventrally and metasomal sterna white. On condylar groove and interspace of mandible long, simple and erect, shorter apicad, on outer surface shorter and semidecumbent; on labrum apparently absent (although apical margin hidden by mandibles); on disc of clypeus moderately short, fine and semidecumbent, on apical margin long, simple and semierect; on paraocular area moderately long, densely plumose and semierect, intermixed with moderately long, fine and erect hairs; on frons long, plumose and semierect; on postocellar fringe moderately short, moderately plumose and semierect; on gena long, plumose and semidecumbent, shorter toward eye margin; on scape short, simple and semidecumbent, moderately long and moderately fine near base; on pedicel minute and semidecumbent, with a median ring of long apically directed setae; on flagellum minute and semidecumbent; on dorsal surface of pronotum short, moderately plumose and erect, on pronotal dorsal carina longer; on

mesoscutum moderately long, plumose and semidecumbent to semierect; on scutellum long, plumose and semierect; on metanotum long, densely plumose and semierect to semierect; on metapostnotum absent; on posterior surface of propodeum moderately long, plumose and semierect; on wings denser apically; on anterior vertical surface of T1 short fine and erect; on disc of T1 moderately long, moderately plumose and semidecumbent, shorter near apical margin, intermixed with very short and semidecumbent hairs; on T2–T4 short, very fine to simple and semidecumbent, intermixed with very short and simple hairs; on T5 moderately short, moderately plumose and decumbent, intermixed with longer hairs; on metasomal sterna long and semidecumbent, shorter near apical margin.

**Sculpture:** integument smooth and shiny except: outer interspace of mandible longitudinally microrugulose except near base; basal area of labrum weakly microreticulate laterally; lateral area of clypeus microreticulate; anterior face of supraclypeal area weakly microrugulose; vertex behind ocelli irregularly microreticulate; scape microreticulate; dorsal ridge of pronotum irregularly microrugulose; mesoscutum microreticulate (as in Fig.5a), anteriorly rough; metanotum irregularly reticulate; metapostnotum coarsely reticulate, posteriorly microreticulate inside reticulations; upper corner of posterior surface of propodeum microreticulate; basitibial plate microreticulate.

**Punctures:** on outer interspace of mandible fine and moderately sparse; on basal area of labrum absent; on clypeus coarse and dense, finer near lateral and posterior margins; on anterior face of supraclypeal area moderately coarse and moderately dense, on the remainder beveled, moderately coarse and dense; on frons moderately coarse and very dense, not differentiated on frontal line; on paraocular area beveled, moderately coarse and dense; anterior to median ocellus and laterally to lateral ocellus absent; on vertex behind ocelli (anterior face of postocellar ridge) protuberant, fine and moderately sparse; on vertex, between eye and lateral ocellus as on frons near median ocellus, protuberant, very fine and moderately sparse; on gena very fine and sparse, intermixed with coarser and sparser beveled punctures; on scape beveled fine and very sparse; on F1 beveled and very fine, on F2 beveled, moderately fine and sparse, on F3–F10 beveled fine and dense; on dorsal ridge of pronotum protuberant, very fine and sparse; on disc of mesoscutum moderately coarse and very dense, intermixed with few coarser punctures, between and upon mesoscutal bands sparser, around distal third of mesoscutal line moderately dense; on scutellum fine and dense intermixed with coarser and sparser punctures; on metanotum moderately fine and sparse; on metapostnotum absent; on posterior surface of propodeum beveled, moderately coarse and moderately dense; on anterior vertical surface of T1 minute and very sparse, on disc of T1 very fine and sparse, intermixed with moderately fine and sparse punctures, on apical margin absent; on T2–T4 denser than on T1.

**Structure:** disc of clypeus broadly depressed; epistomal sulcus forming approximately orthogonal angle; frontal carina well marked; angle of frontal line between supraclypeal and frontal areas gently declivous (approximately 140°, as in Fig.6a); eight unevenly spaced hamuli on hind wing; inner hind tibial spur with 6 teeth; basal area of basitibial plate slightly elevated.

*Measurements* (mm). Approximate length of body = 9.9, anterior wing = 7.9. Length and width of head = 2.25, 2.69. Maximum, inferior and superior distances between eyes = 1.92, 1.52, 1.39. IOC, OOC = 0.25, 0.42; MOD, LOD = 0.18, 0.15. Length and diameter of scape = 1.07, 0.17. Length of pedicel, F1, F2, F3 and F10 = 0.17, 0.18, 0.20, 0.19, 0.34. Diameter of F5 = 0.18. Length and width of mesoscutum = 1.68, 1.94. Length and width of prestigma = 0.29; 0.20. Length and width of pterostigma = 0.88, 0.26. Length and width of marginal cell = 1.56, 0.51.

**MALE** (Allotype)

Differs from female as follows:

**Color:** metallic green with yellowish and bluish highlights; labrum and apical margin of clypeus yellow with dark ferruginous edges; ventral surface of antenna and mandible brown; tibial spurs and strigilis light yellow; external face of legs except tarsi brown with green highlights, hind tarsus without highlights; antenna dorsally, fore and mid tarsi dark brown; internal surface of legs brown; apical margin of T1–T5 semi-translu-



cent black; S2 and S3 brown with green lateral spots not reaching apical margin; S4–S6 dark brown; post-anal filaments pale light yellow.

**Pubescence:** on posterior surface of propodeum, anterior vertical surface of T1 and short hairs of metasomal terga white; on clypeus, anterior face of supraclypeal area, vertex, scutellum and mesoscutum blackish intermixed with few light yellow hairs; on metasomal terga long setae black with yellow apices; on remainder of supraclypeal area, most of paraocular area and frons light yellow; on inferior portion of paraocular area white. On basal area of labrum very fine, short and erect between and anterior to the two basal protuberances; on scape and frons longer than on female; on S4 and S5 with hair patches forming tufts: S4 with a Y-shaped hair patch, hair apices on the stem of this patch ordered — aimed at its midline (Fig.2b), S5 with two latero-medial tufts (Fig.2a); on S6 moderately long, forming an apical fringe.

**Sculpture:** integument smooth and shiny except: outer interspace of mandible weakly microrugulose, almost smooth; clypeus microreticulate; on vertex rough; on scutellum coarse and irregularly reticulate (reticulum reaching anterior margin); on metanotum irregularly rugulose; upper corner of the posterior surface of propodeum deeply microreticulate.

**Punctures:** on outer interspace of mandible absent; on supraclypeal area not beveled, moderately fine and very dense (as on frons); on vertex close to eye very fine and sparse (more than three diameters apart); on disc of mesoscutum moderately coarse and dense, sparser in areas near parapsidal lines; on scutellum moderately coarse and moderately dense, intermixed with very fine and sparse punctures, moderately fine and dense on median transverse line; on scutellum fine and moderately sparse; on T1–T3 moderately coarse and dense, finer and sparser apicad, apical margin impunctate.

**Structure:** epistomal sulcus forming approximately orthogonal angle (more rounded than in female); F11 hooked as in Fig.1b; frontal carina weak and well-defined only on upper part of supraclypeal area; clypeus strongly convex; angle of the frontal line between supraclypeal and frontal areas gently declivous (approximately 140°, as in Fig.6a); margin of S4 emarginate, posterior marginal area of S4 and S5 depressed; seven unevenly spaced hamuli on hind wing; S7, S8 as in Fig.3b; genitalia structurally similar to those of *P. graminea* (Fig.4a).

**Measurements** (mm). Approximate length of body = 10.0, anterior wing = 8.2. Length and width of head = 2.38, 2.60. Maximum, inferior and superior distances between eyes = 1.70, 1.06, 1.28. IOC, OOC = 0.26, 0.31; MOD, LOD = 0.16, 0.17. Length and diameter of scape = 0.73, 0.20. Length of pedicel, F1, F2, F3 and F10 = 0.15, 0.15, 0.30, 0.30, 0.36. Diameter of F5 = 0.22. Length and width of mesoscutum = 1.65, 1.96. Length and width of prestigma = 0.33, 0.19. Length and width of pterostigma = 0.86, 0.25. Length and width of marginal cell = 1.65, 0.53.

**Variation:** In general, punctures on the disc of T1 are very fine intermixed with distinctly coarser punctures (Figs.7d,e); in some females punctures can be coarser and denser (Fig.7f). The clypeus of the female is more broadly and deeply depressed than in any other Brazilian species of *Pseudaugochlora* but its depth and width are somewhat variable among individuals. The wings of females vary from lightly to strongly dusky. The anterior face of the supraclypeal area in females may be smooth. Some females from Barueri, Cajuru, Campinas (São Paulo), and Viçosa (Minas Gerais) are black with bluish and purple highlights; one male from Viçosa and one female from Corumbataí (São Paulo) are dark blue with purple highlights. The apical margins of the metasomal terga of male may be dark brown.

**Etymology:** The specific epithet is derived from the latin word “*callainus*”, which means bluish-green and refers to the color of the body (especially on metasoma).

**Distribution in Brazil:** central and southern Brazil (states of Distrito Federal, Espírito Santo, Minas Gerais, Paraná, Rio de Janeiro, and São Paulo).

**Period of activity:** every month of the year.

**Holotype** (female): “Belo Horizonte MG BRASIL 30/07/1996 R.M.Carmo”, “Abelhas da Zona Metalúrgica MG, Mus. Hist. Nat., 0406-1038”. Type depository: UFMG.

**Allotype** (male): “Est.Silvestre, Distrito Federal, BRASIL (= Rio de Janeiro, RJ), 25/II/1953, C.A.C.Seabra”, “Coleção Campos Seabra” (DZUP).

**Paratypes** (listed by Brazilian state):

Distrito Federal: “Brasília, Escola Agrícola, 19-6-1977, coll. A.Raw”, “*Pseudaugochloropsis* sp.4” (1♀: UFV); Espírito Santo: “Colatina, ES, Brasil, 25-IV-64, C.Elias, Leg.” (1♀: DZUP); “Dom. Martins - ES, Brasil, 19/04/89, F.A. da Silveira”, “721/1925” (1♀: UFV); “Parque Sooretama, LINHARES, Esp. Santo, BRASIL, V-1953, P.A.Teles Col.”, “Coleção Campos Seabra” (6f: DZUP); “Santa Tereza – ES, BRASIL, 27/8/1967, C.T. and C.Elias lg”, “Depto Zoologia, UF–Paraná” (3♀: DZUP); “Santa Tereza – ES; BRASIL 11/10/1967; C.T. and C.Elias lg”, “Depto Zoologia, UF–Paraná” (1♀: DZUP); “Santa Tereza – ES; BRASIL 27/9/1967; C.T. and C.Elias lg”, “Depto Zoologia, UF–Paraná” (1♀: DZUP); “Santa Tereza – ES; BRASIL 08/11/1967; C.T. and C.Elias lg”, “Depto Zoologia, UF–Paraná” (2♀: DZUP); “Santa Tereza – ES; BRASIL 27/8/1967; C.T. and C.Elias lg”, “Depto Zoologia, UF–Paraná” (1♀: DZUP); “Santa Tereza – ES; BRASIL 23/12/1967; C.T. and C.Elias lg”, “Depto Zoologia, UF–Paraná” (1♀: DZUP); “Santa Tereza – ES; BRASIL 4/9/1967; C.T. and C.Elias lg”, “Depto Zoologia, UF–Paraná” (1♀: DZUP); “Santa Tereza – ES; BRASIL 22/11/1967; C.T. and C.Elias lg”, “Depto Zoologia, UF–Paraná” (4♀: DZUP); “Santa Tereza – ES; BRASIL 8/11/1967; C.T. and C.Elias lg”, “Depto Zoologia, UF–Paraná” (1♀: DZUP); “Santa Tereza – ES; BRASIL 25/10/1967; C.T. and C.Elias lg”, “Depto Zoologia, UF–Paraná” (1♀: DZUP); “Santa Tereza – ES; BRASIL 27/8/1967; C.T. and C.Elias lg”, “Depto Zoologia, UF–Paraná” (1♀: DZUP); “Santa Tereza – ES; BRASIL 23/XII/1967; C.T. and C.Elias lg”, “Depto Zoologia, UF–Paraná” (1♂: DZUP); “Santa Tereza – ES, Brasil, 22/V/1967, C.Elias leg” (1♀: DZUP); Minas Gerais: “Belo Horizonte, MG, Brasil, 25/06/1996, R.M.Carmo”, “Abelhas da Zona Metalúrgica MG, Mus.Hist.Nat., 0358–0940” (1♀: UFMG); “Belo Horizonte, MG, Brasil, 18/07/1996, R.M.Carmo”, “Abelhas da Zona Metalúrgica MG, Mus.Hist.Nat., 0382–1002” 1 (1♀: UFMG); “Belo Horizonte, MG, Brasil, 11/07/1996, R.M.Carmo”, “Abelhas da Zona Metalúrgica MG, Mus.Hist.Nat., 0371–0974” (1♀: UFMG); “Belo Horizonte, MG, Brasil, 11/07/1996, R.M.Carmo”, “Abelhas da Zona Metalúrgica MG, Mus.Hist.Nat., 0370–0971” (1♀: UFMG); “Belo Horizonte, MG, Brasil, 11/07/1996, R.M.Carmo”, “Abelhas da Zona Metalúrgica MG, Mus.Hist.Nat., 0369–0968” (1♀: UFMG); “Belo Horizonte, MG, Brasil, 11/07/1996, R.M.Carmo”, “Abelhas da Zona Metalúrgica MG, Mus.Hist.Nat., 0378–0990” (1♀: UFMG); “Belo Horizonte, MG, Brasil, 30/04/1997, R.M.Carmo”, “Abelhas da Zona Metalúrgica MG, Mus.Hist.Nat., 1330–3400” (1♀: UFMG); “Belo Horizonte, MG, Brasil, 13/10/1998, J.C.Moreira”, “Abelhas da Zona Metalúrgica MG, Copasa/Barreiro, 2934–8675” (1♀: UFMG); “Belo Horizonte, MG, Brasil, 27/05/1999, G.Sousa”, “Abelhas da Zona Metalúrgica MG, Copasa/Barreiro, 5702–15559” (1♀: UFMG); “Belo Horizonte, MG, Brasil, 06/05/1999, G.Sousa”, “Abelhas da Zona Metalúrgica MG, Pq. Mangabeiras, 5669–15499” (1♀: UFMG); “Belo Horizonte, MG, Brasil, 26/09/1995, F.A. Silveira”, “Abelhas da Zona Metalúrgica MG, Est.Ecológica, 0016–0049” (1♀: UFMG); “Viçosa, MG, 01/12/1985, G.A.de Melo”, “982-I-55” (1♀: UFV); “Brasil, Minas Gerais, Viçosa, M. do Paraíso, 5.I.1995, G.A.R.Melo” (2♀: DZUP); “Viçosa, MG, Brasil, 01/12/89, M.Thiengo”, “Mata do Paraíso, Área 8, Pta.1, Horário: 14:15” (1♂: UFV); “Viçosa – MG, Brasil, 11/10/87, G.A.R.Melo”, “1065.163” (1♂: UFV); “Viçosa, MG, Brasil, 14/12/85, G.A.R.Melo”, “1082.1.64” (1♂: UFV); “Viçosa, MG, 01/12/1985, G.A. de Melo”, “982-I-55”, “*Pseudaugochloropsis graminea*” (1♂: UFV); “Local: Viçosa, Data 23/08/86, Col. G. Melo”, “*Pseudaugochloropsis* sp.” (1♂: UFV); Paraná: “Pto. Britania, Paraná, Br, 9-XI-1910”, “*Augochlora nigromarginata* (Spinol.), C. Schrottky det. 1911”, “17.6.29”, “100.416” (1♂: MZUSP); “Pto. Guayra, Paraná, Br, 31-X-1910”, “*Augochlora nigromarginata* (Spinol.), C. Schrottky det. 1910” 17 – 629”, “100.415” (1♀: MZUSP); “S. João Petrópolis – PR – Brasil, 06-12/6/67, C.T. and C.Elias”, “Depto Zoologia, UF–Paraná” (1♀: DZUP); “BRAZIL; Caviuna, Parana; April 1947”; “A. Maller, Coll.; Frank Johnson; Donor” (1♀: AMNH); Rio de Janeiro: “Alto da Bôa Vista, Tijuca, (D.F.), I-1951, C.A.C.Seabra col.” (1♂: MZUSP); “Floresta da Tijuca, Distrito Federal, Brasil, II-954, C.A.C.Seabra Col.”, “Coleção Campos Seabra” (2♀: DZUP); “Gávea Pequena, Distrito Federal, Brasil, I-III-953, C.A.C.Seabra Col.”, “Coleção Campos Seabra” (6f: DZUP); “Gávea Pequena, Distrito Federal, Brasil,

16-III-955, C.A.C.Seabra Col.", "Coleção Campos Seabra" (1♀: DZUP); "Gávea Pequena, Distrito Federal, Brasil, 25-III-955, C.A.C.Seabra Col.", "Coleção Campos Seabra" (1♀: DZUP); "Gávea Pequena, Distrito Federal, Brasil, 1-III-955, C.A.C.Seabra Col.", "Coleção Campos Seabra" (2♀: DZUP); "Est.Silvestre, Distrito Federal, Brasil, 08/III/953, C.A.C.Seabra", "Coleção Campos Seabra" (1♀: DZUP); "Est.Silvestre, Distrito Federal, Brasil, 25/II/953, C.A.C.Seabra", "Coleção Campos Seabra" (1♂: DZUP); "Estr. Sumaré, Distrito Federal, Brasil, IV-1954, C.A.C.Seabra Col.", "Coleção Campos Seabra" (1♀: DZUP); "Itatiaya, 700m, E. do Rio, 5-951, W.Zikan", "IEEA" (1♀: DZUP); "S. Antônio Imbé, S. M. Madalena. E. Rio, Brasil, VII-1960, M.Alvarenga leg." (1♀: DZUP); "COLEÇÃO CAMPOS SEABRA"; "Gavea Pequena; Distrito Federal BRASIL; 1-III-1953; C. A. Seabra, Col." (2♀: KUNHM); São Paulo: "Barueri, São Paulo, Brasil, 9-VII-1966, K.Lenko col." (2♀: MZUSP); "Barueri, São Paulo, Brasil, 2-I-1966, K.Lenko col." (1♀: MZUSP); "Barueri, São Paulo, Brasil, 17-III-1962, K.Lenko col." (1♀: MZUSP); "Campinas, SP, Mata da Faz. Sta. Genebra, 30/03/1989", "*Pseudaugochlora* prov.sp.n. aff. *Sordicus* (Vachal, 1904) Det. Camargo, 1990" (1♀: CCRP); "Corumbataí – SP, Brasil, 08/03/1983, M.J.O.Campos", "COR 8.03.83, P\*67, 10.25h CL", "*Pseudaugochloropsis* cf. *pandora* (Smith) Det. Camargo 1988, Det. Camargo" (1♀: CCRP); "Faz. Sta. Carlota – SP – BRASIL, hs 12-14, 03/XI/1988, M.Mazucato leg, FL 91962", "Cerrado – 0120 *Solanum paniculatum*, Solanacea", "*Pseudaugochloropsis graminea* (Fabricius, 1804) Det. Camargo, 1983" (1♀: CCRP); "E. de S. Paulo, Juquiá, Faz. Poço Grande, 27.VI.1948, F.Lane col." (1♀: MZUSP); "Brasil: SP: São Sebastião, praia Brava, 30xii1989, M.G.Oliveira", "morto a beira mar" (1♀: MZUSP).

***Pseudaugochlora erythrogaster* Almeida sp.n.**

**Diagnosis.** This species is most similar to *P. graminea*, *P. callaina*, *P. indistincta*, and *P. simulata*. The female can be distinguished from those of other species by the characteristic golden, coppery, and/or reddish highlights on their bodies (particularly on the metasoma) (in *P. graminea*, *P. callaina*, *P. indistincta*, and *P. simulata* body color is variable, but it is generally not as described for *P. erythrogaster*); the fine and sparse punctures on the disc of T1, intermixed with fine and sparse punctures (in *P. graminea* and *P. indistincta* the punctures are moderately coarse and dense). The male can be distinguished by the strongly hooked F11 (Fig.1c; not as strongly hooked in *P. graminea* [Fig.1a], *P. callaina* [Fig.1b], and *P. indistincta*). In *P. flammula* the characteristic golden, coppery, and/or reddish highlights are also observed — in *P. erythrogaster* the angle of the frontal line between supraclypeal and frontal areas gently declivous (approximately 140°, as in Fig.6a; in *P. flammula* this angle is more abruptly declivous, approximately 100°, Fig.6b); in *P. erythrogaster* the integument of the female mesoscutum is microreticulate among punctures (as in Fig.5a; in *P. flammula* it is smooth: Fig.5b).

**Description.** FEMALE (Holotype)

**Color:** metallic green with yellowish highlights except: metasomal terga with reddish and coppery highlights; yellow highlights on a narrow band adjacent to eye margin; labrum and most of mandible blackish brown, second third of mandible and its apex dark ferruginous, interspace of mandible with green highlights; apical band on margin of clypeus black, preceded by narrow reddish and golden bands; scape, pedicel and flagellum dorsally blackish brown; ventral surface of flagellum dark brown; tegula brown, inner half with green highlights; wing veins and pterostigma light brown (C and R blackish brown); legs brown, outer face of femora and tibiae with green highlights, distitarsi lighter than other tarsomeres; strigilis and hind tibial spurs ferruginous; marginal area of T1–T4 dark brown, weakly translucent; metasomal sterna blackish brown with weak green highlights. Wings dusky-hyaline.

**Pubescence:** on clypeus, frons, and vertex between ocelli dark brown to black; on postocellar ridge light brown; on most of paraocular area and on gena white; on mesoscutum dark fuscous; on scutellum and metanotum fuscous; on metapostnotum, propodeum, and mesepisternum whitish; on tibiae and tarsi fuscous; on

femora and trochanter whitish; short hairs of T1–T4 whitish, long hairs black; on T5 blackish brown to black; on metasomal sterna pale yellow. On condylar groove and interspace of mandible long, simple and erect; on disc of clypeus moderately long, fine and semierect to semidecumbent, on apical margin longer, simple, and erect; on paraocular area short, densely plumose and erect, intermixed with longer and less plumose hairs; on supraclypeal area short, plumose, and semierect to semidecumbent; on upper portion of frons and on vertex moderately long, moderately plumose, and semierect; on gena long, plumose, and semidecumbent — short, plumose and semierect close to eye margin; on mesoscutum moderately long, moderately plumose, and semierect, intermixed with very short and simple hairs; on scutellar and metanotal fringe long, plumose, and erect, intermixed with simple and very short hairs; on metapostnotum absent; on propodeum and mesepisternum long, densely plumose, and semierect; on anterior surface of T1 moderately long, moderately plumose, and erect; on T2–T4 very short, intermixed with short and semidecumbent setae; on T5 moderately long, moderately plumose and decumbent; on metasomal sterna long, simple, and semidecumbent.

**Sculpture:** integument smooth and shiny except: outer interspace of mandible longitudinally microrugulose except near base; basal area of labrum rough, smoother near basal elevation; lateral area and upper corner of the clypeus microreticulate, irregularly microreticulate also on median basal area, but here weaker than on sides, most of median region of the disc of the clypeus smooth to weakly rough; anterior face of supraclypeal area (except for a narrow band adjacent to clypeus) and paraocular area rough; on vertex reticulate to rough, with some small smooth regions; scape microreticulate; mesoscutum microreticulate (as in Fig.5a), anteriorly rough; metanotum irregularly reticulate, microrugulose inside reticulations; metapostnotum reticulate, posteriorly microreticulate inside reticulations; upper corner of posterior surface of propodeum microrugulose; basitibial plate microreticulate; on discs of T1–T4 microreticulate, weak on T1 and T2.

**Punctures:** on outer interspace of mandible moderately fine and moderately dense, coarser near outer border; on basal area of labrum absent; on clypeus moderately coarse and dense, becoming coarser toward median portion of clypeus and coarse and beveled on apical third; on anterior face of supraclypeal area fine and sparse (three or more diameters apart) intermixed with minute punctures, elsewhere on the supraclypeal area beveled, moderately coarse and dense; on frons moderately fine and very dense; on paraocular area moderately fine and sparse (two to five diameters apart), becoming denser and beveled on its lower portion; on vertex between ocelli protuberant, fine and moderately sparse, between lateral ocellus and eye fine and moderately sparse (one to three diameters); on gena protuberant, moderately coarse and with fine sparse punctures intermixed, finer toward eye margins; on scape beveled fine and very sparse; on dorsal surface of pronotum very fine and moderately dense, intermixed with coarser beveled punctures; on disc of mesoscutum moderately fine (intermixed with coarser punctures) and very dense, sparser between and upon mesoscutal bands; on scutellum fine to minute and dense intermixed with coarse and sparse punctures; on metanotum protuberant fine and sparse; on metapostnotum absent; on posterior surface of propodeum beveled, fine and dense, intermixed with coarser and moderately dense punctures; on anterior surface of T1 moderately fine and sparse, on disc of T1 moderately fine and dense, intermixed with moderately coarse and sparse punctures; on T2 as on T1, but considerably finer; on T3 and T4 minute and moderately sparse.

**Structure:** disc of clypeus not depressed; epistomal sulcus forming approximately orthogonal angle; frontal carina well marked; angle of the frontal line between supraclypeal and frontal areas gently declivous (approximately 140°, as in Fig.6a); seven unevenly spaced hamuli on hind wing; left inner hind tibial spur with 5 teeth, right spur not visible; basal area of basitibial plate slightly elevated.

**Measurements** (mm). Approximate length of body = 10.9, anterior wing = 7.8. Length and width of head = 2.4, 3.0. Maximum, inferior and superior distances between eyes = 2.0, 1.58, 1.5. IOC, OOC = 0.29, 0.37; MOD, LOD = 0.22, 0.20. Length and diameter of scape = 1.18, 0.20. Length of pedicel, F1, F2, F3 and F10 = 0.18, 0.17, 0.22, 0.25, 0.36. Diameter of F5 = 0.21. Length and width of mesoscutum = 1.80, 2.05. Length and width of prestigma = 0.26, 0.18. Length and width of pterostigma = 0.93, 0.24. Length and width of marginal cell = 1.76, 0.53.

**MALE** (Allotype).

Differs from female as follows:

**Color:** mandible, labrum and apical area of clypeus yellow with brown borders; face light metallic green with yellow and red highlights; scape brown with yellow apical rim; ventral surface of flagellum brown, dorsally blackish brown, except for F1, which is yellowish; tarsi light brown; femora, tibiae and trochanters mostly light green with yellow highlights; tibial spurs and strigilis light yellow; apical margin of T1–T5 translucent dark brown; metasomal sterna light brown, darker on more apical sterna.

**Pubescence:** predominantly light yellow; whitish on paraocular area, gena, and ventral surface of mesosoma; brownish on S4–S6, especially the hair tufts. On disc of labrum, between and anterior to the two basal elevations, very short and erect; on scape moderately long and moderately plumose; on frons, supraclypeal area and on metasomal terga longer than on female; on S4 and S5 with hair patches forming tufts: S4 with a Y-shaped hair patch, hair apices on the stem of this patch entangled and unordered (as in Fig.2a, but Y-stem slightly shorter and narrower than in *P. graminea*), S5 with two lateromedial tufts (as in Fig.2a); on S6 moderately long, forming an apical fringe.

**Sculpture:** integument smooth, except: outer interspace of mandible weakly microrugulose, almost smooth; on metanotum irregularly rugulose; on propodeum reticulate, but lacking posterior microreticulate band; upper corner of posterior surface of propodeum rugulose.

**Punctures:** on outer interspace of mandible absent; on clypeus deeper than on females; on scutellum moderately coarse and dense; on metanotum fine and moderately sparse; on disc of T1 moderately coarse and dense; on T2 as on T1, but finer; on T3 and T4 very fine and moderately sparse.

**Structure:** epistomal sulcus forming approximately orthogonal angle (more rounded than in female); F11 strongly hooked (Fig.1c); angle of the frontal line between supraclypeal and frontal areas gently declivous (approximately 140°, as in Fig.6a); six unevenly spaced hamuli on hind wing; apical margin of S4 emarginate, posterior marginal area of S4 and S5 depressed, forming protuberant anterior meso-lateral areas on S4; S7, S8 and genitalia structurally similar to those of *P. graminea* (Figs.3a, 4a).

**Measurements** (mm). Approximate length of body = 9.7, anterior wing = 6.2. Length and width of head = 2.14, 2.39. Maximum, inferior and superior distances between eyes = 1.65, 1.05, 1.24. IOC, OOC = 0.18, 0.24; MOD, LOD = 0.19, 0.19. Length and diameter of scape = 0.68, 0.23. Length of pedicel, F1, F2, F3 and F10 = 0.12, 0.17, 0.31, 0.29, 0.30. Diameter of F5 = 0.18. Length and width of mesoscutum = 1.50, 1.75. Length and width of prestigma = 0.30, 0.17. Length and width of pterostigma = 0.84, 0.21. Length and width of marginal cell = 1.44, 0.42.

**Variation:** The integument of some specimens is not intensely reddish or golden green, but every specimen studied possesses noticeable reddish and golden highlights on the green background, at least on the metasoma; body length varies from ~1.1 – 1.4 mm. The clypeus of the female is weakly concave anteriorly in some specimens; punctation on the disc of T1 of some females can be denser (as in Figs.7c,d,f); integument of the disc of T1 varies from completely smooth and shiny to weakly microreticulate.

**Etymology:** ‘erythrogaster’ refers to the peculiar reddish (from Greek, “erytho”) metasoma (from Greek, “gaster”) of bees of this species.

**Distribution in Brazil:** southeastern and central Brazil (states of Espírito Santo, Minas Gerais, Rio de Janeiro, and São Paulo).

**Period of activity:** every month of the year, except September and October.

**Holotype** (female): “Brasil, São Paulo, Luis Antonio, Est. Ecol. De Jataí, 22.iv.1999, G.A.R.Melo.”. Type depository: DZUP.

**Allotype** (male): – “Sta. TEREZA-ES, Brasil 23-I-64, C. ELIAS leg.” (DZUP).

**Paratypes** (listed by Brazilian state): Minas Gerais: “Abelhas-Cerrado; Mannesmann; Faz. Itapoã; 5817-15905. Paraopeba MG; BRASIL; 02/12/1999; V. Silva” (1♀: UFMG); “Viçosa MG; Brasil 23/02/86; L.A.O.Campos. 1026/1/62” (1♀: UFV); “DPT<sup>o</sup> ZOOL; UF-PARANÁ.”, “ARAXÁ - MG; BRASIL 1/7/1965;

Moure-Elias leg" (1♀: DZUP); Viçosa MG; Brasil 03/03/87; L.A.O. Campos", "1023/1/61" (1♀: UFV); "Ponte Nova - MG; Brasil, 14/06/87; F.A. Silveira", "H: 10: 18 P1: 05; A: A.2 F: 0; No: 944/3415" (1♀: UFV); "DPT<sup>o</sup> ZOOL; UF-PARANÁ.", "IBIÁ - BRASIL; MG-10/12/1965; C.Elias leg." (1♂: DZUP); "COLEÇÃO CAMPOS SEABRA", "Sta. Bárbara; M.Gerais BRASIL; V-1955; A.G.A.Silva", "Mun. S. Bárbara - MG- 10-V-955 - Agas." (1♂: DZUP); "DPT<sup>o</sup> ZOOL; UF-PARANÁ.", "IBIÁ BRASIL, MG- 10/12/1965; C.Elias leg." (1♂: DZUP); "Abelhas Cerrado; Mannesmann; Faz. Santa Cruz; 5799-15845", "Felixlândia MG; BRASIL 17/11/1999; A.A. Azevedo" (1♂: UFMG); CAMPOS ALTOS-MG; BRASIL-28/8/965; C.Elias leg", "*Pseudaugochloropsis*" (1♀: DZUP); Espírito Santo: "DPT<sup>o</sup> ZOOL; UF-PARANÁ.", "STA. TEREZA-E.STO; BRASIL 16-28/8/67; C.&C.T.Elias leg" (1f, 1♂: DZUP); "DPT<sup>o</sup> ZOOL; UF-PARANÁ", "STA. TEREZA-E.STO; BRASIL 5/2/67; C.T&C.Elias leg" (1♀: DZUP); PARANÁ: "Campus-UEL Londrina; PR, BR 5/VI/1991; Sofia, S.H. leg.", "PI=24; h: 8-10", "*Pseudaugochloropsis pandora*" (1♀: DZUP); "Maringa - PR; Brasil V-1961; Marston Laroca" (1♀: DZUP); "MARINGÁ - PR; Brasil V-1961; Morston Laroca" (1♀: DZUP). "MARINGÁ - PR; Brasil V-1961; S. LAROCA leg." (1♂: DZUP); "BRAZIL - Parana; Curitiba; February 1956; (C. D. Michener)"; "G. C. Eickwort; slide no.; 66-0173-4"; "G. C. Eickwort; slide no.; 67-0117-12" (1♂: KUNHM); Rio de Janeiro: "COLEÇÃO CAMPOS SEABRA", "S. Bento D.Caxias; Est. Rio de Janeiro; BRASIL VIII-1953; P.A.Teles" (2♀: DZUP); "COLEÇÃO CAMPOS SEABRA", "S. Bento; D.Caxias; Est. Rio de Janeiro BRASIL 27-VI-954 P.A.Teles" (1♀: DZUP); "S. Bento D. Caxias; Est. Rio Janeiro; BRASIL VIII-1953; P. A. Telles" (1♀: KUNHM); São Paulo: "Brasil, São Paulo, Teodoro Sampaio, P.E. Morro do Diabo; 22°33'S 52° 19'W. 15.ii.1999, G.A.R.Melo" (1♀: DZUP).

### *Pseudaugochlora flammula* Almeida sp.n.

**Diagnosis.** This species is most similar to *P. erythrogaster* and *P. pandora* from which it can be distinguished by the abruptly declivous angle of the frontal line between supraclypeal and frontal areas (approximately 100°: Fig.6b; in *P. erythrogaster* and *P. pandora* this angle is more gently declivous, approximately 140°, as in Fig.6a). *P. flammula* can also be distinguished by the unmodified F11 of the male (Fig.1d; in *P. erythrogaster* it is hooked [Fig.1c] and in *P. pandora* it is curved ventrally [Fig.1e]), and by the hair tufts of S4 and S5 and the genitalia of the male as shown in Figs.3c and 4b (*P. erythrogaster*: as in Figs.3a, 4a; *P. pandora*: Figs.3d, 4c); and the smooth integument of the female mesoscutum among punctures (Fig.5b; microreticulate in *P. erythrogaster*, as in Fig.5a).

#### **Description.** FEMALE (Holotype)

**Color:** metallic green with yellow and blue highlights, except: mandible black with brown condyle, on apical third dark brown, with weak greenish spot in the base; dorsal keel of labrum ferruginous brown, remainder of labrum and apical margin of clypeus black, transverse line next to black apical margin of clypeus with yellowish and reddish highlights; tegula mostly light brown, except for a greenish anterior spot; wing hyaline; wing veins light brown (R darker); tarsi and internal face of tibiae dark brown, apex of tarsomeres and whole anterior face of distitarsus light brown; internal face of femora black with greenish highlights; tibial spurs and strigilis light yellow; on disc of T2–T5 with golden and bronze highlights; T2–T5 with dark brown apical margin; pre-marginal band of T2 with blue, rosy and brownish highlights; T5 around pseudopygidial area with dark blue and lilac highlights; anterior half of postgradular area of metasomal sterna blackish.

**Pubescence:** predominantly light yellow, except: dark brown around ocelli; on mesoscutum and scutellum yellowish intermixed with sparse dark hairs; golden yellow on T2–T5; on pseudopygidial area brown; on metasomal sterna creamy. On condylar groove and interspace of mandible long, simple and semierect, shorter apicad, on outer surface shorter and very fine; on labrum absent, except marginal fringe; on disc of clypeus moderately short, moderately plumose and semidecumbent, on apical margin long, simple and erect; on malar area very short; on paraocular and supraclypeal areas moderately long, densely plumose and semierect to

erect; on frons long, plumose and semierect, finer near ocelli; on postocellar fringe moderately plumose and semierect; on gena long, plumose and semidecumbent, very short and densely plumose near eye margin; on scape short, simple and semidecumbent, moderately long and moderately fine near base; on pedicel minute and semidecumbent, with a median ring of long apically directed setae; on flagellum minute and semidecumbent, longer on F1; on dorsal surface of pronotum short, moderately plumose and erect, on pronotal dorsal carina longer; on mesoscutum short, plumose and erect, intermixed with minute, fine and erect setae; on scutellum, metanotum, mesepisternum and posterior surface of propodeum moderately long, densely plumose and erect to semierect; on wings denser apically; on T1–T4 very short, fine and decumbent, intermixed with long and decumbent setae; on T5 short, fine and decumbent; on pseudopygidial area moderately short, plumose and semierect; on metasomal sterna moderately long and semidecumbent, shorter distad to apical margin. Scopa, except on tibia, constituted by long hairs, branched at approximately their distal half and forming a tangle; on hind tibia hairs are less dense and branched approximately at distal third.

**Sculpture:** integument smooth among punctures (Fig.5b) except: outer interspace of mandible longitudinally microrugulose; basal area of labrum microrugulose except a smooth area near basal elevation; near apical margin of clypeus microrugulose; paraocular area rough; vertex between eye and lateral ocelli rough; scape microreticulate; dorsal ridge of pronotum irregularly microrugulose; mesoscutum near anterior margin irregularly microreticulate; metanotum coarsely reticulate, microreticulate inside reticulations; metapostnotum coarse and deeply reticulate, posteriorly microreticulate inside reticulations; disc of T1 weakly microreticulate anteriorly.

**Punctures:** on outer interspace of mandible moderately coarse and moderately dense; on basal area of labrum absent; on clypeus coarse and dense, finer near lateral and posterior margins, on apical margin moderately fine and dense; on anterior face of supraclypeal area moderately coarse and dense, on the remainder beveled, moderately coarse and dense; between supraclypeal and frontal areas very fine and sparse; on frons moderately fine and very dense; on paraocular area beveled, moderately fine and moderately dense; on vertex behind ocelli (anterior face of postocellar ridge) protuberant, very fine and moderately sparse; on vertex between eye and lateral ocellus beveled and fine; on gena beveled, moderately coarse and moderately dense, finer and denser near eye margin; on scape beveled fine and very sparse; on F1 beveled and very fine, on F2 beveled, moderately fine and sparse, on F3–F10 beveled fine and dense; on dorsal ridge of pronotum protuberant, very fine and sparse; on disc of mesoscutum moderately fine and dense, intermixed with few coarser and sparser punctures; on scutellum dense – fine, very fine and coarse punctures intermixed; on anterior third of metanotum minute and sparse, on remainder moderately coarse; on metapostnotum absent; on posterior surface of propodeum beveled, coarse and moderately sparse; on mesepisternum moderately fine and very dense; on anterior vertical surface of T1 fine and sparse (two to four diameters apart), on disc of T1 fine and sparse, sparser toward anterior and posterior margins, finer medially; on T2–T4 very fine and sparse (more than three diameters apart), intermixed with few fine punctures.

**Structure:** disc of clypeus almost flat; epistomal sulcus forming small and acute paraocular lobe protruding onto clypeus; frontal carina weakly marked; angle of the frontal line between supraclypeal and frontal areas abruptly declivous (approximately 100° — Fig.6b); six unevenly spaced hamuli on hind wing; right inner hind tibial spur with 5 teeth (the left spur was not visible); basitibial plate slightly convex longitudinally, basal area approximately flat.

**Measurements** (mm). Approximate length of body = 8.9, anterior wing = 7.5. Length and width of head = 2.21, 2.73. Maximum, inferior and superior distances between eyes = 1.94, 1.36, 1.49. IOC, OOC = 0.31, 0.40; MOD, LOD = 0.19, 0.18. Length and diameter of scape = 0.96, 0.17. Length of pedicel, F1, F2, F3 and F10 = 0.13, 0.17, 0.15, 0.17, 0.31. Diameter of F5 = 0.18. Length and width of mesoscutum = 1.78, 2.11. Length and width of prestigma = 0.27, 0.19. Length and width of pterostigma = 0.78, 0.23. Length and width of marginal cell = 1.56, 0.48.

MALE (Allotype)

Differs from female as follows:

**Color:** mandible, labrum and apical margin of clypeus yellow with ferruginous edges; supraclypeal area with bronze highlights; metasomal terga metallic green with yellowish highlights; pre-marginal band of T2 lacking; basitarsi, tibial spurs and strigilis light yellow; base of tibiae with yellow marking; mediotarsi, distitarsi and internal face of tibiae light brown; femora and trochanters brown with greenish highlights and green markings; S1–S3 light green with yellow highlights, apical margin light yellow; S4–S6 dark brown.

**Pubescence:** predominantly white; on frons, mesoscutum and scutellum yellowish; T2–T5 with few light yellow setae; on T4–T6 fuscous. Disc of labrum with some very short and erect hairs between and anterior to the two basal elevations; on scape moderately long and fine; inferiorly on paraocular area short, densely plumose and semidecumbent to decumbent; S4 and S5 with hair patches forming tufts (Fig.2c); S4 with two pairs of lateromedial tufts in which the lateral-most one is narrower than the medial and they have a concave aspect seen together; S5 with hairs forming a broad V-shaped tuft; on S6 moderately long, forming an apical fringe.

**Sculpture:** integument smooth and shiny except: outer interspace of mandible weakly microrugulose, almost smooth; metanotum irregularly reticulate, not reaching anterior margin, forming thus a narrow smooth band; metapostnotum reticulate, posterior microreticulate band lacking; upper corner of posterior surface of propodeum rugulose.

**Punctures:** on outer interspace of mandible moderately fine and moderately dense; on scutellum coarse and dense, intermixed with finer punctures; on metanotum and metapostnotum absent; on disc of T1 moderately fine and dense; on T2 finer and sparser; near apical margins of the metasomal terga very fine and sparse (two to three diameters apart).

**Structure:** epistomal sulcus forming slightly acute paraocular lobe (less protruded onto clypeus than in female); F11 not modified (Fig.1d); frontal line with small carina well-defined only on upper part of supraclypeal area (very weak to absent on frons); posterior surface of supraclypeal area abruptly declivous, angle formed with frons slightly greater than on female; six unevenly spaced hamuli on hind wing; S4 not emarginate and with two swollen lateral areas, apical margin projected medially; posterior margin of S5 slightly depressed; S7, S8 as shown in Fig.3c and genitalia as in Fig.4b.

**Measurements** (mm). Approximate length of body = 8.2, anterior wing = 7.1. Length and width of head = 2.17, 2.49. Maximum, inferior and superior distances between eyes = 1.70, 1.06, 1.33. IOC, OOC = 0.28, 0.37; MOD, LOD = 0.20, 0.19. Length and diameter of scape = 0.63, 0.21. Length of pedicel, F1, F2, F3 and F10 = 0.13, 0.15, 0.21, 0.20, 0.29. Diameter of F5 = 0.18. Length and width of mesoscutum = 1.60, 1.92. Length and width of prestigma = 0.28, 0.18. Length and width of pterostigma = 0.86, 0.23. Length and width of marginal cell = 1.39, 0.48.

**Variation:** The color of the metasoma varies from green with weak yellowish highlights to green with strong golden, orange and bronze highlights. The apical margin of the metasomal terga vary from dark brown to light brown, and can be very translucent. Three females from the state of Pará are slightly lighter than specimens from other states.

**Etymology:** The name *flammula* refers to the golden highlights observed in the metasoma of bees of this species.

**Distribution in Brazil:** central and northeastern Brazil (states of Acre, Espírito Santo, Goiás, Mato Grosso, Mato Grosso do Sul, Minas Gerais, Pará, Paraíba, Rondônia, and São Paulo).

**Period of activity:** every month of the year.

**Holotype** (female): “Brasília de Minas MG, BRASIL, 29/12/1998, V. Silva” “Abelhas– Cerrado, Manesmann, Fazenda Brejão, 2797 – 8209”. Type depository: UFMG.

**Allotype** (male): “BRASIL, Est. Goiás, Parque Nac. das Emas, A.Raw, 05-05-1980” “*Pseudaugochloropsis* sp.02?”(UFV).

**Paratypes** (listed by Brazilian state): Acre: “BRASIL. Acre.; Rio Branco.; 09°58’S 67°48’W; 24/VII/2001; M.L. Oliveira leg” (1♀: UFMG); “Brasil. Acre; Acrelândia; 10°04’S/65°25’W”, “02-04/XI/2001;



Oliveira, Morato & Cunha leg.” (1♀: UFMG); Espírito Santo: “B.Guandú – ES, Brasil, 23-31.I.1970, Tadeu and C.Elias col.”, “Depto. Zool. UF-Paraná”, “*Pseudaugochloropsis*” (1♀: DZUP); Goiás: “Sta. Bárbara, Goiás Velho, 04-06-1979, coll. A.Raw”, “*Pseudaugochloropsis* sp.1” (1♀: UFV); “Est. Goiás, P. Nacional das Emas, Sede, 13-4-1980”, “*Pseudaugochloropsis* sp.2” (1♀: UFV); Mato Grosso: “BRAZIL: Barra do Tapirape, Mato Grosso, XII-28-1965 - I-15-1966” (1♂: AMNH); “DPT<sup>o</sup> ZOOL; UF-PARANÁ”, “Cáceres, MT; 27-III-1985; C.Elias leg.; POLONOROESTE” (1♀: DZUP); “DPT<sup>o</sup> ZOOL; UF-PARANÁ”, “Cáceres, MT; 3-III-1985; C.ELIAS leg.; POLONOROESTE” (1♀: DZUP); “DPT<sup>o</sup> ZOOL; UF-PARANÁ”, “Chap. Guimarães-MT; 03-XII-1983; Exc.Dep.Zool.-UFPR; (Polonoroeste)” (1♀: DZUP); Mato Grosso do Sul: “Serra do Urucum, Corumbá, Mato Grosso, Brasil, 27-XI-1960, K.Lenko col.” (1♀: MZUSP); “DPT<sup>o</sup> ZOOL; UF-PARANÁ”, “Dourados – MS; XII-1975; J.Lorenzoni col.” (1♂: DZUP); Minas Gerais: “Brasilândia de Minas, MG, Brasil, 23/03/1999, A.A.Azevedo”, “Abelhas–Cerrado, Mannesmann, Fazenda Brejão, 3125–9135” (1♀: UFMG); “Brasilândia de Minas, MG, Brasil, 26/05/1999, A.A.Azevedo”, “Abelhas–Cerrado, Mannesmann, Fazenda Brejão, 4117–11684” (1♀: UFMG); “Brasilândia de Minas, MG, Brasil, 26/05/1999, A.A.Azevedo”, “Abelhas–Cerrado, Mannesmann, Fazenda Brejão, 4109–11669” (1♀: UFMG); “Brasilândia de Minas, MG, Brasil, 29/06/1999, V.Silva”, “Abelhas–Cerrado, Mannesmann, Fazenda Brejão, 4752–13112” (1♀: UFMG); “Brasilândia de Minas, MG, Brasil, 29/06/1999, V.Silva”, “Abelhas–Cerrado, Mannesmann, Fazenda Brejão, 4757–13120” (1♀: UFMG); “Brasilândia de Minas, MG, Brasil, 30/09/1999, V.Silva”, “Abelhas–Cerrado, Mannesmann, Fazenda Brejão, 5864–16118” (1♂: UFMG); “Brasilândia de Minas, MG, Brasil, 30/11/1999, A.A.Azevedo”, “Abelhas–Cerrado, Mannesmann, Fazenda Brejão, 5844–16041” (1♂: UFMG); “Brasilândia de Minas, MG, Brasil, 30/11/1999, A.A.Azevedo”, “Abelhas–Cerrado, Mannesmann, Fazenda Brejão, 5831–16007” (1♂: UFMG); “Brasilândia de Minas, MG, Brasil, 30/11/1999, A.A.Azevedo”, “Abelhas–Cerrado, Mannesmann, Fazenda Brejão, 5833–16009” (1♀: UFMG); “Brasilândia de Minas, MG, Brasil, 30/11/1999, V.Silva”, “Abelhas–Cerrado, Mannesmann, Fazenda Brejão, 5869–16151” (1♂: UFMG); “Brasilândia, MG, Brasil, 21/10/1996, A.G.Damasceno”, “Projeto Abelhas de Brasilândia, *D. alata*, 09:00-10:00” (1♀: UFMG); “Brasilândia, MG, Brasil, 28/11/1996, A.G.Damasceno”, “Projeto Abelhas de Brasilândia, *P. emarginatum*, 13:00-14:00” (1♀: UFMG); “Brasilândia, MG, Brasil, 24/09/1996, A.G.Damasceno”, “Projeto Abelhas de Brasilândia, *P. emarginatum*, 11:00-12:00” (1♀: UFMG); “Brasilândia, MG, Brasil, 26/09/1996, A.G.Damasceno”, “Projeto Abelhas de Brasilândia, *P. emarginatum*, 17:00-18:00” (1♀: UFMG); “Felixlândia, MG, Brasil, 08/12/1998, A.A.Azevedo”, “Abelhas–Cerrado, Mannesmann, Fazenda Sta. Cruz, 2714 – 8071” (1♂: UFMG); “Uberlândia, MG, N<sup>o</sup> 143, Estação Ecológica do Panga, Col. Stefan Knaus, data: 24/08/97; 10:45h”, “Nektarraub auf H108, *Macroptilium glacilis* (Poepp ex Benth) Urban, Cerrado” (1♀: UFMG); “Uberlândia, MG, N<sup>o</sup> 144, Estação Ecológica do Panga, Col. Stefan Knaus, data: 28/08/97; 10:49h”, “Nektarraub auf H108, *Macroptilium glacilis* (Poepp ex Benth) Urban, Cerrado” (1♀: UFMG); “Monitor. V&M; Vochysia rufa; Faz. Brejão; 7881-23979”, “Brasilândia de Minas MG; BRASIL 23/05/2002; A.A.Azevedo” (1♂: UFMG); “Monitor. V&M; Vochysia rufa; Faz. Brejão; 7931-24146”, “Brasilândia de Minas MG; BRASIL 23/05/2002; R.B.Martines” (1♂: UFMG); “Monitor. V&M; Vochysia rufa; Faz. Brejão; 7931-24145”, “Brasilândia de Minas MG; BRASIL 23/05/2002; R.B.Martines” (1♂: UFMG); “Monitor. V&M; Vochysia rufa; Faz. Brejão; 7914-24081”, “Brasilândia de Minas MG; BRASIL 22/05/2002; R.B.Martines” (1♂: UFMG); “Monitor. V&M; Vochysia rufa; Faz. Brejão; 7860-23887”, “Brasilândia de Minas MG; BRASIL 22/05/2002; A.A.Azevedo” (1♂: UFMG); “Monitor. V&M; Vochysia rufa; Faz. Brejão; 7915-24093”, “Brasilândia de Minas MG; BRASIL 22/05/2002; R.B.Martines” (1♂: UFMG); “Monitor. V&M; Vochysia rufa; Faz. Brejão; 7857-23876”, “Brasilândia de Minas MG; BRASIL 22/05/2002; A.A.Azevedo” (1♂: UFMG); “Monitor. V&M; Vochysia rufa; Faz. Brejão; 7916-24098”, “Brasilândia de Minas MG; BRASIL 22/05/2002; R.B.Martines” (1♀: UFMG); “Monitor. V&M; Vochysia rufa; Faz. Brejão; 7875-23935”, “Brasilândia de Minas MG; BRASIL 23/05/2002; A.A.Azevedo” (1♀: UFMG); “Monitor. V&M; Vochysia rufa; Faz. Brejão; 7866-23913”, “Brasilândia de Minas MG; BRASIL 22/05/2002; A.A.Azevedo” (1♀: UFMG); “Monitor. V&M; Vochysia rufa; Faz. Brejão; 7860-23888”, “Brasilândia de Minas MG; BRASIL

22/05/2002; A.A.Azevedo" (1♀: UFMG); "Monitor. V&M; Vochysia rufa; Faz. Brejão; 8387-25585", "Brasilândia de Minas MG; BRASIL 23/05/2002; B.A.Ribeiro" (1♀: UFMG); "Monitor. V&M; Vochysia rufa; Faz. Brejão; 9315-27725", "Brasilândia de Minas MG; BRASIL 23/05/2002; R.B.Martines" (1♀: UFMG); "Monitor. V&M; Vochysia rufa; Faz. Brejão; 7403-21916", "Brasilândia de Minas MG; BRASIL 20/05/2001; A.A.Azevedo" (1♀: UFMG); "Monitor. V&M; Vochysia rufa; Faz. Brejão; 7624-22610", "Brasilândia de Minas MG; BRASIL 10/10/2001; R.Loyola" (1♀: UFMG); "Monitor. V&M; Vochysia rufa; Faz. Brejão; 7630-22637", "Brasilândia de Minas MG; BRASIL 10/10/2001; R.Loyola" (1♀: UFMG); Pará: "Belém, Pará, Brasi;, X-1954, O.Rego", "Coleção Campos Seabra" (3♀: DZUP); "BRASIL: Val de Cans. Belém, Pará; Nov.20-21.1963"; "Oliveira & Wygodzinsky Coll." (1♀: AMNH); "Aurá BELÉM; Pará BRASIL; 22-XI-1955; Michener e Moure" (2♂: DZUP); "Brasil-Pará, Belem; November 1985; (Damasceno)" (1♀: DZUP); "COLEÇÃO CAMPOS SEABRA", "GUAMÁ; Pará BRASIL; 8.V.1956; E. LOBATO" (2♀: DZUP); "COLEÇÃO CAMPOS SEABRA", "BELEM; Para BRASIL; 20-XI-1955; Michener e Moure" (1♀: DZUP); Paraíba: "Mamanguape PB Brasil 25/06/1999 A.J.C.Aguiar", "6137-17136 Res. Biol. Guaribas" (1♀: UFMG), "Mamanguape PB Brasil 22/08/1999 A.J.C.Aguiar", "6141-17146 Res. Biol. Guaribas" (1♀: UFMG); Rondônia: "Brasil, Rondônia; Guajará Mirim; Sa Pacaés Novos", "10°48'S, 65°22'W; 12-14/X/2001; Oliveira, Morato & Cunha leg." (1♀: UFMG); "Brasil, Rondônia; Guajará Mirim; 10°48'S, 65°22'W", "12-14/X/2001; Oliveira, Morato & Cunha leg." (1♀, 2♂: DZUP); "Brasil, Rondônia; Guajará Mirim; 10°48'S, 65°22'W", "12-14/X/2001; Oliveira, Morato & Cunha leg." (1♀, 3♂: UFMG); "Porto Velho-RO; Estrada Madeira-Mamoré – Brasil; Data: 26/II/2001; E.F.Morato leg." (1♂: UFMG); São Paulo: "Ribeirão Preto, SP, BRASIL, SF-23; 48-21d", "24-VII-1972, M.Mazucato leg.", "A-593", "T A 5" (1♂: CCRP); "Ribeirão Preto, SP, Brasil, SF-23; 48-21d", "28-VII-1972, M.Mazucato leg.", "A-617", "M B 41" (1♀: CCRP); "Ribeirão Preto, SP, Brasil; SF-23; 48-21d", "16-VIII-1972, M.Mazucato leg.", "A-1042", "M C 28" (1♀: CCRP).

### ***Pseudaugochlora indistincta* Almeida sp.n.**

**Diagnosis.** This species is most similar to *P. graminea*, *P. callaina*, *P. erythrogaster*, and *P. simulata*. The female can be distinguished from those of the other species by the furrow-like depression on the apical portion of the clypeus (Fig.8b — in *P. callaina* the clypeus is broadly depressed medially, Fig.8a; in the other three species the clypeus is flat or very weakly concave); the moderately coarse and moderately dense punctures on disc of T1 (in *P. callaina*, *P. erythrogaster*, and *P. simulata* the punctures are very fine intermixed with coarser punctures). The male can be distinguished by the weakly hooked F11 (strongly hooked in *P. graminea*, *P. erythrogaster*, and *P. simulata*); and by the entangled and unordered hair apices of the stem of the Y-shaped hair patch (as in Fig.2a; in *P. callaina* apices of hairs of the Y-shaped are ordered and aim at midline of the Y-stem, Fig.2b). and by the entangled and unordered hair apices of the stem of the Y-shaped hair patch (as in Fig.2a; in *P. callaina* apices of hairs of the Y-shaped are ordered and aim at midline of the Y-stem, Fig.2b).

#### **Description.** FEMALE (Holotype)

**Color:** green with blue and purple highlights, except: mandibles blackish ferruginous with some areas black; labrum and transverse apical band on clypeus black; region of paraocular area and vertex close to eye margin, and basal area and side of clypeus bluish; antenna blackish brown; mesoscutal bands and anterior margins of metanotum and metapostnotum with purple highlights; tegula, most veins of hind wing, and pterostigma brown, with proximal area of tegula bluish green; R and Rs darker than other wing veins; wings dusky hyaline; tarsal claws brown; tarsi blackish brown; tibiae black with green areas on outer surface; femora and trochanters black with greenish highlights; tibial spurs and strigilis light brown; terga predominantly bluish green, but with weak yellowish highlights; apical margin of T1-T4 blackish brown, weakly translucent; metasomal sterna blackish brown with greenish highlights.

**Pubescence:** predominantly fuscous; on apical margin of clypeus, mandible, and legs light brown; on mesepisternum, propodeum, scopa, and anterior surface of T1 whitish to pale yellow; on discs of T2–T4 short white hairs intermixed with black long setae; on metasomal sterna light yellow. On condylar groove and interspace of mandible long, simple and erect, shorter apicad, on outer surface shorter and semidecumbent; on basal area of labrum absent; on disc of clypeus moderately short, fine and semidecumbent, on apical margin long, simple and semierect; on paraocular area and vertex moderately long, plumose, and semierect; on frons long, plumose and semierect, shorter on frons; on postocellar fringe moderately short, moderately plumose and semierect; on gena long, plumose and semidecumbent, shorter toward eye margin; on dorsal surface of pronotum short, moderately plumose and erect, on pronotal dorsal carina longer; on mesoscutum moderately long, plumose and semidecumbent to semierect; on mesepisternum and scutellum long, plumose and semierect; on metanotum long, densely plumose and semierect to semierect; on metapostnotum absent; on posterior surface of propodeum moderately long, plumose and semierect; on wings denser apically; on anterior vertical surface of T1 short fine and erect; on disc of T1 moderately long, moderately plumose and semidecumbent, shorter near apical margin, intermixed with very short and semidecumbent hairs; on T2–T4 short, very fine to simple and semidecumbent, intermixed with very short and simple hairs; on T5 moderately short, moderately plumose and decumbent, intermixed with longer hairs; on metasomal sterna long and semidecumbent, shorter near apical margin.

**Sculpture:** integument smooth and shiny except: outer interspace of mandible longitudinally microrugulose except near base; disc of clypeus weakly microreticulate, distinctively microreticulate on a continuous darker band formed on sides and base of clypeus; anterior face of supraclypeal area rough to irregularly microrugulose; lower portion of paraocular area microreticulate; vertex behind ocelli smooth surrounded by irregularly microreticulate areas; mesoscutum microreticulate (as in Fig.5a); metanotum irregularly rugulose; metapostnotum coarsely reticulate, posteriorly and on posterior vertical surface rugulose; basitibial plate rough to weakly microreticulate.

**Punctures:** on outer interspace of mandible fine to moderately coarse and sparse; on basal area of labrum absent; on clypeus coarse and dense, finer near lateral and posterior margins, beveled on apical half; on anterior face of supraclypeal area moderately fine to moderately coarse and moderately dense, on the remainder beveled, moderately coarse and dense; on frons moderately coarse and sparse, undifferentiated from the background reticulation of the integument; on paraocular area beveled, moderately coarse and dense; on vertex, around and between ocelli, absent to minute and sparse; on vertex, between eye and lateral ocellus, protuberant, very fine and sparse; on gena very fine and moderately sparse, intermixed with coarser and sparser beveled punctures; on dorsal ridge of pronotum protuberant, minute and sparse; on disc of mesoscutum moderately coarse and very dense, intermixed with few coarser punctures, between and upon mesoscutal bands sparser, around distal third of mesoscutal line moderately dense; on scutellum fine and dense intermixed with coarser and sparser punctures; on metanotum moderately fine and sparse; on metapostnotum absent; on posterior surface of propodeum beveled, moderately coarse and moderately dense; on anterior vertical surface of T1 minute and very sparse, on disc of T1 moderately coarse to moderately fine and dense, on apical margin absent; on T2 as on T1, but sparser; on T3 and T4 fine and moderately dense.

**Structure:** disc of clypeus depressed medially (Fig.8b); epistomal sulcus forming an angle approximately orthogonal; frontal carina well marked; angle of the frontal line between supraclypeal and frontal areas gently declivous (approximately 140°, as in Fig.6a); seven unevenly spaced hamuli on the left wing and eight on the right wing; inner hind tibial spur with 6 teeth; basal area of basitibial plate slightly elevated.

**Measurements** (mm). Approximate length of body = 11.4, anterior wing = 7.0. Length and width of head = 2.33, 2.84. Maximum, inferior and superior distances between eyes = 1.98, 1.58, 1.4. IOC, OOC = 0.24, 0.36; MOD, LOD = 0.25, 0.23. Length and diameter of scape = 1.25, 0.17. Length of pedicel, F1, F2, F3 and F10 = 0.19, 0.19, 0.20, 0.29, 0.34. Diameter of F5 = 0.21. Length and width of mesoscutum = 1.85, 2.20. Length and width of prestigma = 0.27, 0.19. Length and width of pterostigma = 0.88, 0.27. Length and width of marginal cell = 1.71, 0.53.

MALE (Allotype)

Differs from female as follows:

**Color:** mostly metallic green, with yellowish highlights on head and bluish highlights on mesosoma and metasoma; labrum and apical margin of clypeus yellow with dark ferruginous edges; mandible dark brown on basal half, lighter on apex; ventral surface of antenna brown, dorsally blackish; tibial spurs, tarsal claws, and strigilis light yellow; external face of legs except tarsi brown with green highlights; tarsi blackish brown; internal surface of legs brown; apical margin of T1–T5 semi-translucent black; S2 and S3 brown with green lateral spots not reaching apical margin; S4–S6 dark brown; post-anal filaments pale light yellow.

**Pubescence:** mostly light yellow, except: on posterior surface of propodeum, anterior vertical surface of T1 and short hairs of metasomal terga whitish; on clypeus, anterior face of supraclypeal area, vertex, scutellum and mesoscutum blackish intermixed with few light yellow hairs; on metasomal terga long setae black with yellow apices; on inferior portion of paraocular area white. On basal area of labrum very fine, short and erect between and anterior to the two basal elevations; on scape and frons longer than on female; on S4 and S5 with hair patches forming tufts: S4 with a Y-shaped hair patch, hair apices on the stem of this patch entangled and unordered (as in Fig.2a), S5 with two lateromedial tufts (as in Fig.2a); on S6 moderately long, forming an apical fringe.

**Sculpture:** integument smooth and shiny except: outer interspace of mandible weakly microrugulose, almost smooth; disc of clypeus weakly and irregularly microreticulate, narrow basal band smooth; on vertex rough; on scutellum coarse and irregularly reticulate (reticulum reaching anterior margin); on metanotum irregularly rugulose; upper corner of the posterior surface of propodeum deeply microreticulate.

**Punctures:** on outer interspace of mandible absent; on supraclypeal area not beveled, moderately fine and very dense (as on frons); on vertex close to eye very fine and sparse (more than three diameters apart); on disc of mesoscutum moderately coarse and dense, sparser in areas near parapsidal lines; on scutellum moderately coarse and moderately dense, intermixed with very fine and sparse punctures, moderately fine and dense on median transverse line; on scutellum fine and moderately sparse; on T1–T3 moderately coarse and dense, finer and sparser apicad, apical margin impunctate.

**Structure:** epistomal sulcus forming approximately orthogonal angle (more rounded than in female); F11 weakly hooked (as in Fig.1b); frontal carina weak and well-defined only on upper part of supraclypeal area; angle of the frontal line between supraclypeal and frontal areas gently declivous (approximately 140°, as in Fig.6a); margin of S4 emarginate, posterior marginal area of S4 and S5 depressed; seven unevenly spaced hamuli on hind wing; S7, S8 and genitalia structurally similar to those of *P. graminea* (Figs.3a, 4a).

**Measurements** (mm). Approximate length of body = 10.2, anterior wing = 7.8. Length and width of head = 2.45, 2.87. Maximum, inferior and superior distances between eyes = 1.94, 1.30, 1.44. IOC, OOC = 0.22, 0.23; MOD, LOD = 0.34, 0.41. Length and diameter of scape = 0.73, 0.24. Length of pedicel, F1, F2, F3 and F10 = 0.12, 0.17, 0.35, 0.32, 0.28. Diameter of F5 = 0.21. Length and width of mesoscutum = 1.78, 2.13. Length and width of prestigma = 0.24, 0.22. Length and width of pterostigma = 0.83, 0.25. Length and width of marginal cell = 1.68, 0.54.

**Variation:** The color varies from green with bluish highlights to metallic blue with purple and green highlights; body length varies from 8 – 13 mm; microreticulate basal band varying in width from very narrow (approximately ¼ flagellar width) to almost as wide as lateral microreticulate bands; some females from the states of Santa Catarina and São Paulo possess punctation on the disc of T1 fine, resembling that of females of *P. simulata* (Figs.7d,f); the depressed area on the clypeus of females from southern Brazil is slightly wider and deeper than observed in females from Minas Gerais and Rio de Janeiro states.

**Etymology:** the specific epithet alludes to the similarity of this species and *P. graminea*, *P. callaina*, and *P. simulata*, and the difficulty of distinguishing these species.

**Distribution in Brazil:** southeastern and southern Brazil, south of Minas Gerais (states of Minas Gerais, Paraná, Rio Grande do Sul, Rio de Janeiro, Santa Catarina, and São Paulo).

**Period of activity:** every month of the year except May, June, and September.

**Holotype** (female): "COLEÇÃO CAMPOS SEABRA" "EST. SUMARÉ. Distrito Federal BRASIL; I-1954; C.A.C. SEABRA". Type depository: DZUP.

**Allotype** (male): "B. de COTEGIPE; R.Gr.S. - BRASIL; 21/I/1967; F. Giacomel leg." (DZUP).

**Paratypes** (listed by Brazilian state): Minas Gerais: "Local: Araponga-MG; Data 25/03/86; Col. G.Melo", "Nº 253/1/15" (1♀: DZUP); "COLEÇÃO CAMPOS SEABRA", "S. Cipó; M. Gerais Brasil; VIII-1951; F.M.Oliveira" (1♀: DZUP); Paraná: "DPTº ZOOL; UF-PARANÁ", "MORRETES (MARUMBI); PR-BR 13-14/VIII/66; F.Giacomel leg" (2♀: DZUP); "S.J.PINHAIS-PR; Brasil - III-63; C.Elias leg." (1♂: DZUP); "S.J.PINHAIS-PR; Brasil - III-63; S.Laroca leg." (1♂: DZUP); "R. ITINGA - PR; Brasil - VII-64; S.LAROCA leg" (1♀: DZUP); "DPTº ZOOL; UF-PARANÁ.", "PIRAQUARA - PARANÁ; BRASIL 15/XI/74; Pe. Moure leg." (1♀: DZUP); "CASTRO PR; Brasil 20-X-1966; Olavo Fonseca Jr." (1♀: DZUP); "COLEÇÃO CAMPOS SEABRA", "CURITIBA; Paraná BRASIL; I-XI-1955; Michener e Lange" (1♀: DZUP); "Curitiba - Pr.; XII-1954; R.Lange leg", "3" (1♀: DZUP); "CURITIBA-PR; Brasil II-65; M.H.NOUEIRA" (1♂: DZUP); "BRASIL - Paraná, Curitiba; 4 November, 1943; (Ralph Hertel)" (1♀: KUNHM); Rio de Janeiro: "COLEÇÃO CAMPOS SEABRA", "Maromba Itatiaia; 1200m E. Rio, BRASIL; 26-XII-1953 Seabra e Alvarenga Colls." (2♀: DZUP); "COLEÇÃO CAMPOS SEABRA", "Estr. Sumaré; D. Federal BRASIL; IV-1954; C.A.C.Seabra Coll." (1♀: DZUP); "COLEÇÃO CAMPOS SEABRA", "Floresta da Tijuca; D. Federal BRASIL; II-1954; C.A.C.Seabra Coll." (1♀: DZUP); "COLEÇÃO CAMPOS SEABRA", "Gavea Pequena; Distrito Federal BRASIL; 28-III-955; C.A.C.SEABRA Col." (1♀: DZUP); "Alto Boa Vista; Tijuca - D.F.; 2-III-952 CACS.", (11 (1♀: DZUP); "COLEÇÃO CAMPOS SEABRA" "Gavea Pequena; Distrito Federal BRASIL; I-III-953; C. A. C. SEABRA Col." (1♀: KUNHM); Santa Catarina: "Brasilien; Nova Teutonia; 27°11' 8 52°23' L; Friz Plaumann; III-1950; 300 bis 500 m" (1♀: DZUP); "COLEÇÃO CAMPOS SEABRA", "NOVA TEUTONIA; S.Catarina BRASIL; Dezembro 1955; F.Plaumann" (1♀: DZUP); "COLEÇÃO CAMPOS SEABRA", "NOVA TEUTONIA; S.Catarina BRASIL; Outubro 1956; F.Plaumann" (1♀: DZUP); "BLUMENAU-SC; Brasil 1-X-55; VINALTO Graf" (1♀: DZUP); "Nova Teutonia; S. Catarina Braz.; 3-II-54; Fritz Plaumann" "G. C. Eickwort; slide no.; 67-0331-5" (1♀: KUNHM); "Nova Teutonia; S. Catarina Braz.; IV-28-51; Fritz Plaumann" "G. C. Eickwort; slide no.; 66-0701-5" (1♀: KUNHM); "Nova Teutonia; S. Catarina Braz.; IV-29-51; Fritz Plaumann", "G. C. Eickwort; slide no.; 67-0117-5" (1♀: KUNHM); "Nova Teutonia; S. Catarina Braz.; II-3-50; Fritz Plaumann" (1♀: KUNHM); "Nova Teutonia; S. Catarina Braz.; XI-51; Fritz Plaumann" (2♀: KUNHM); "Nova Teutonia; S. Catarina Braz.; XII-52; Fritz Plaumann" (1♀: KUNHM); "Nova Teutonia; S. Catarina Braz.; XII-4-53; Fritz Plaumann" (1♀: KUNHM); "BRAZIL; Santa Catarina; Nova Teutonia; 16 Feb. 1956; (F. Plauman)" (1♀: KUNHM); "Brasilien; Nova Teutonia; 27°11'B 52°23'L; 300-500 m; Fritz Plaumann; II-24-1951" (1♀: KUNHM); São Paulo: "COLEÇÃO CAMPOS SEABRA", "QUELUZ; S.PAULO-BR; 2-I-1954; L.C.ALVARENGA" (1♀: DZUP); "COLEÇÃO CAMPOS SEABRA", "CAMPOS DO JORDÃO; S.Paulo BRASIL; XII-1957; K.Lenko leg." (1♀: DZUP); "Sa. BOCAINA-1500m; S.J.BARREIRO - SP; BRASIL 4.XI.1965; F.M.Oliveira leg" (1♀: DZUP).

### *Pseudaugochlora pandora* (Smith)

*Augochlora pandora* Smith 1853: 74. Type depository: BMNH (examined).

*Pseudaugochloropsis pandora* — Moure and Hurd 1987: 231.

*Pseudaugochlora pandora* — Engel 2000: 89; Silveira *et al.* 2002: 181.

### **Description. FEMALE (Holotype)**

**Color:** metallic green with yellowish and bluish highlights, except: mandible blackish brown with small bluish basal area; labrum and apex of clypeus blackish brown; transverse line near clypeus (dark) apical mar-

gin with yellowish and reddish highlights; scape blackish brown with apex lighter; ventral surface of flagellum brown, dorsally dark brown; tegula mostly light brown, except for a greenish anterior spot; wings hyaline; wing veins light brown (R darker); internal face of fore and mid tibiae and femora, hind tibia and hind femur, and tarsi brown with greenish highlights; tibial spurs and strigilis light yellow; apical margin of T1–T4 light brown; transverse submarginal band of T2 brown with bluish highlights; yellow highlights of T2–T4 lighter than on other parts of body, without bluish highlights; metasomal sterna bluish green in the middle, dark brown on apical and lateral margins.

**Pubescence:** predominantly white; on vertex light brown; on mesoscutum and scutellum light brown with some darker hairs intermixed; on T2–T5 except pseudopygidial area yellowish to ferruginous (long hairs), short hairs of T2–T4 light yellow to cream, on pseudopygidial area blackish. On condylar groove and interspace of mandible long, simple and erect, shorter apicad, on outer surface shorter and semidecumbent; on labrum apparently absent (although apical margin hidden by mandibles); on disc of clypeus moderately long, plumose and semidecumbent, on apical margin long, simple and erect; on paraocular and supraclypeal areas moderately long (shorter on supraclypeal area), densely plumose and semierect to erect; on frons moderately long, plumose and semierect; on postocellar fringe densely plumose and erect; on gena moderately long, simple and semierect to semidecumbent, short and plumose near eye margin; on scape short, simple and semidecumbent, moderately long and moderately plumose and semierect near base; on pedicel minute and semidecumbent, with a median ring of long apically directed setae; on flagellum minute and semidecumbent; on dorsal surface of pronotum short, moderately plumose and erect, on pronotal dorsal carina longer; on mesoscutum short, plumose and erect; on scutellum, metanotum and posterior surface of propodeum moderately long, plumose and erect (more densely plumose on metanotum, shorter on propodeum); on metapostnotum absent; on mesepisternum moderately long, plumose and semierect; on wings denser apically; on disc of T1 short, moderately plumose and semierect, on marginal area of T1 and T2–T4 short, simple and decumbent, intermixed with long, simple and decumbent hairs; on T5 moderately long, moderately plumose and decumbent; on metasomal sterna moderately long and semidecumbent, shorter distad to apical margin. Scopa, except on tibia, constituted by long hairs, branched at approximately their distal half and forming a tangle; on hind tibia hairs are less dense and branched approximately at distal third.

**Sculpture:** integument smooth (as in Fig.5b) except: outer interspace of mandible longitudinally microrugulose; on narrow stripes close to margins rough; anterior face of supraclypeal area microrugulose; paraocular area rough; scape microreticulate; dorsal ridge of pronotum irregularly microrugulose; mesoscutum near anterior margin rough; metanotum irregularly reticulate; metapostnotum coarsely reticulate, posteriorly microreticulate inside reticulations; upper corner of posterior surface of propodeum weakly microreticulate.

**Punctures:** on outer interspace of mandible moderately coarse and moderately sparse; on basal area of labrum absent; on clypeus coarse and dense, finer near lateral and posterior margins; on anterior face of supraclypeal area moderately fine and sparse, on the remainder beveled, moderately fine and moderately sparse; between supraclypeal and frontal areas very fine and sparse; on frons moderately fine and very dense, except on frontal line which is impunctate; on paraocular area beveled, moderately fine and irregularly spaced; on vertex behind ocelli (anterior face of postocellar ridge) protuberant and fine, sparser near eye margin; on gena fine and sparse, denser near eye margin; on scape beveled fine and very sparse; on F1 beveled and very fine, on F2 beveled, moderately fine and sparse, on F3–F10 beveled fine and dense; on dorsal surface of pronotum minute and sparse; on dorsal carina of pronotum protuberant, very fine and sparse; on mesoscutal lips absent; on disc of mesoscutum moderately fine and dense, intermixed with coarser punctures, denser near margins; on scutellum dense with three sizes of punctures intermixed (moderately coarse, fine and minute); on anterior metanotum coarse and irregularly spaced, intermixed with very fine punctures; on metapostnotum absent; on posterior surface of propodeum very fine and sparse, intermixed with beveled, coarse and moderately dense punctures, denser laterally; on mesepisternum moderately coarse and very dense; on anterior vertical surface of T1 fine and sparse (more than three diameters apart), on disc of T1 fine and moderately sparse, sparser toward anterior and posterior margins; on T2–T4 very fine and sparse.

**Structure:** disc of clypeus almost flat; epistomal sulcus forming small and acute paraocular lobe protruding onto clypeus; frontal carina weakly marked; angle of the frontal line between supraclypeal and frontal areas gently declivous (approximately  $140^\circ$ , as in Fig.6a); six unevenly spaced hamuli on hind wing; inner hind tibial spur with 6 teeth; basitibial plate almost flat, basal area approximately flat.

**Measurements** (mm). Approximate length of body = 8.6, anterior wing = 7.5. Length and width of head = 2.12, 2.73. Maximum, inferior and superior distances between eyes = 1.94, 1.30, 1.41. IOC, OOC = 0.29, 0.40; MOD, LOD = 0.19, 0.18. Length and diameter of scape = 0.98, 0.15. Length of pedicel, F1, F2, F3 and F10 = 0.14, 0.14, 0.15, 0.18, 0.31. Diameter of F5 = 0.17. Length and width of mesoscutum = 1.70, 2.06. Length and width of prestigma = 0.25, 0.20. Length and width of pterostigma = 0.80, 0.24. Length and width of marginal cell = 1.56, 0.48.

MALE ("Ilhéus, BA, BRASIL; 29/V/1977" — UFV)

Differs from female as follows:

**Color:** mandible, labrum and apical margin of clypeus yellow with brown edges; paraocular areas and area near apical margin of clypeus with orange and bronze highlights; scape and flagellum (until half of F10) ventrally light brown, pedicel and flagellum dorsally brown; scape dorsally dark brown; tarsi (except mid and hind basitarsi) brown, femora and tibiae brown with greenish highlights; mid and hind basitarsi, tibial spurs and strigilis light yellow; coxae trochanters dark brown with greenish highlights; apical margin of T1–T5 and S2–S3 (S1 not visible) semi-translucent becoming thus greenish (terga and sterna below them green); S4–S6 dark brown; post-anal filaments pale light yellow.

**Pubescence:** predominantly light yellow, lighter ventrally (white on some regions); on S4–S6 dark brown. On basal area of clypeus very short and erect (between and anterior to the two basal elevations); on scape with moderately long and moderately plumose hairs; on frons, supraclypeal area and terga longer than on female; S4 and S5 with hair patches forming tufts (Fig.2d): S4 with two lateral tufts composed of long hairs and a median one composed of sparser and shorter hairs, S5 with dense hairs forming a V-shaped patch; on S6 moderately long, forming an apical fringe.

**Sculpture:** integument smooth and shiny except: outer interspace of mandible weakly microrugulose, almost smooth; metanotum rough, anterior margin smooth; propodeum reticulate, but without posterior microreticulate area; upper corner of posterior surface of propodeum rugulose.

**Punctures:** on outer interspace of mandible absent; on clypeus deeper than on females; on scutellum moderately coarse and dense; on metanotum fine and sparse; on metanotum fine and sparse; on disc of T1 moderately fine and moderately dense; very fine and sparse near apical margin of the metasomal terga.

**Structure:** epistomal sulcus forming a slightly acute paraocular lobe (less protruded onto clypeus than in female); F11 with a ventral projection on the apical half (Fig.1d); frontal line transformed in a small carina in the supraclypeal area; angle of the frontal line between supraclypeal and frontal areas gently declivous (approximately  $140^\circ$ , as in Fig.6a); six unevenly spaced hamuli on hind wing; S4 not emarginate and with two swollen lateral areas, apical margin projected medially; posterior margin of S5 weakly depressed; S7, S8 as shown in Fig.3d, and genitalia as in Fig.4c.

**Measurements** (mm). Approximate length of body = 7.7, anterior wing = 6.1. Length and width of head = 2.11, 2.34. Maximum, inferior and superior distances between eyes = 1.61, 0.98, 1.22. IOC, OOC = 0.30, 0.30; MOD, LOD = 0.19, 0.19. Length and diameter of scape = 0.60, 0.22. Length of pedicel, F1, F2, F3 and F10 = 0.10, 0.11, 0.21, 0.22, 0.32. Diameter of F5 = 0.17. Length and width of mesoscutum = 1.47, 1.81. Length and width of prestigma = 0.24, 0.17. Length and width of pterostigma = 0.78, 0.20. Length and width of marginal cell = 1.57, 0.41.

**Variation:** The punctures on the disc of T1 of female can be very fine and moderately dense varying to fine and coarse and denser. The metasomal terga are variable in color: in some specimens it is green with weak yellowish highlights and some have brown areas or bands. The apical margin of the metasomal terga vary from brown to very light brown. One female from Mamanguape (state of Paraíba) is larger than standard: approximately 9.6 mm (generally they are not larger than 7.0 mm.)

**Comments** – Schrottky (1902), probably misidentifying specimens of Halictidae, pointed that thorax and/or abdomen of *P. pandora* may be dark purple. Metasoma of specimens from the state of Rio Grande do Norte had bluish lilac highlights, but none of the specimens examined during this study had either the thorax or the abdomen dark purple.

**Distribution in Brazil:** central and northern Brazil, north of São Paulo (states of Bahia, Espírito Santo, Goiás, Maranhão, Mato Grosso, Mato Grosso do Sul, Minas Gerais, Pará, Paraíba, Pernambuco, Rio de Janeiro, Rio Grande do Norte, São Paulo, and Tocantins).

**Activity period:** every month of the year.

**Holotype** (female): “Type H.T.”; “B.M.TYPE HYM. 14.A.1228”; “B.M.TYPE HYM. *augochlora* (sic) *pandora* Smith, 1853” “*Pandora* Type. Sm.”; “BRAZIL”. Type depository: BMNH (examined).

**Additional specimens examined:** approximately 90 specimens were studied and their collecting localities are listed organized by Brazilian state: Bahia: Ilhéus, Oliveira, Santa Rita de Cássia; Espírito Santo: Baixo Guandu, Conceição da Barra, Guarapari; Goiás: Aragarças; Maranhão: São Luiz; Mato Grosso: Cáceres, Cuiabá; Mato Grosso do Sul: Dourados; Minas Gerais: Brasilândia de Minas, Januária, Jaíba, Januária (APA Cavernas de Peruaçu), Riacho dos Machados, São Gonçalo do Rio Preto, Uberlândia; Pará: Belém; Paraíba: Joazeirinho, Soledade (Joazeirinho), Santa Luzia (Serra do Brandão), Mamanguape (Reserva Biológica Guaribas); Pernambuco: Petrolina; Rio de Janeiro: Macaé (Lagomar – Restinga); Rio Grande do Norte: Serra Negra do Norte (Estação Ecológica Seridó); São Paulo; Tocantins: 110km N Dianópolis (46°17'W, 10°56'S).

### *Pseudaugochlora simulata* Almeida sp.n.

**Diagnosis.** This species is most similar to *P. graminea*, *P. callaina*, *P. erythrogaster*, and *P. indistincta*. The female can be distinguished from those of *P. callaina* and *P. indistincta* by the flat or weakly depressed disc of clypeus (distinctively depressed in *P. callaina* and *P. indistincta*, Fig.8); the punctation of T1 composed of very fine and moderately sparse punctures intermixed with fine and sparse punctures (Figs.1d–f; in *P. graminea*, *P. indistincta* the punctures are coarse and moderately dense to dense, as in Figs.1a–c); and the microreticulate area on the clypeus most commonly restricted to the lateral area and upper corner of the clypeus (sides and base of clypeus extensively microreticulate, forming a rough U-shaped band adjacent to the epistomal sulcus in *P. callaina*, *P. erythrogaster*, and *P. indistincta*). The male can be distinguished by the strongly hooked F11 (as in Fig.1c; weakly hooked in *P. callaina* [Fig.1b] and *P. indistincta*; in *P. graminea* [Fig.1a], F11 is not as strongly produced into a hook as in *P. simulata*); and by the entangled and unordered hair apices of the stem of the Y-shaped hair patch (as in Fig.2a; in *P. callaina* apices of hairs of the Y-shaped are ordered and aim at midline of the Y-stem, Fig.2b). Males and females of *P. simulata* can be distinguished from *P. erythrogaster* by the lack of conspicuous reddish highlights on metasoma (present in *P. erythrogaster*).

#### **Description.** FEMALE (Holotype)

**Color:** metallic green with yellowish and bluish highlights, except: mandible black, apex blackish ferruginous, basal area with greenish highlights; labrum and apex of clypeus black; transverse line near apical dark margin of clypeus with yellowish and reddish highlights; scape, pedicel and flagellum dorsally black; ventral surface of flagellum brown; mesoscutal bands dark blue; tegula light brown with proximal border green; wings hyaline with apex dusk-hyaline; wing veins and pterostigma light brown (R black); external face of tarsi and femora brown, internal face dark brown (femora with greenish highlights); tibial spurs and strigilis light yellow; apical margin of T1–T4 black; pre-marginal band of T2 blue; apical margin of S2–S4 light brown, followed by a pre-marginal (broader) band dark brown with bluish green highlights, basal area dark brown; T5 around pseudopygidial area with yellowish highlights.

**Pubescence:** on paraocular area, mandible, clypeus, supraclypeal area, apical margin of clypeus and metasomal sterna whitish brown; on frons and vertex dark brown; on gena, lateral and ventral areas of mesosoma, posterior surface of propodeum, T1–T4 white; on mesoscutum and scutellum brown, intermixed with



longer black hairs; on pseudopygidial area brown to dark brown. On condylar groove and interspace of mandible long, simple and semierect, shorter apicad, on outer surface shorter and semidecumbent; on labrum apparently absent (apical margin hidden by mandibles); on disc of clypeus long, fine and semidecumbent, on apical margin long, very fine to simple and semierect; on supraclypeal area moderately long, plumose and semierect to erect; on paraocular area long, plumose and erect; on frons long, moderately plumose and semierect to erect; on postocellar fringe moderately long, plumose and semierect; on gena long, plumose and semierect to erect, very short and densely plumose near eye margin; on scape short, simple and semidecumbent, long, fine and semierect near base; on pedicel very short and decumbent, with a median ring of long apically directed setae; on flagellum minute and semidecumbent; on dorsal surface of pronotum short, moderately plumose and erect, on pronotal dorsal carina longer; on mesoscutum moderately short, plumose and semierect; on scutellum, metanotum, mesepisternum and posterior surface of propodeum moderately long, densely plumose and erect; on metapostnotum absent; on wings denser apically; on T1–T4 very short, fine and decumbent, intermixed with short to moderately long setae; on T5 moderately long, moderately plumose and decumbent; on metasomal sterna moderately long and semidecumbent, shorter distad to apical margin. Scopa, except on tibia, constituted by long hairs, branched at approximately their distal half and forming a tangle; on hind tibia hairs are less dense and branched approximately at distal third.

**Sculpture:** integument smooth and shiny except: outer interspace of mandible longitudinally microrugulose near superior margin (mostly smooth); basal area of labrum irregularly microrugulose basally (mostly smooth); near apical margin of clypeus rough, lateral area and upper corner of the clypeus microreticulate; on anterior surface of supraclypeal area irregularly microrugulose near carina; scape microreticulate; dorsal ridge of pronotum irregularly microrugulose; mesoscutum microreticulate (as in Fig.5a); metanotum irregularly reticulate, irregularly microreticulate inside reticulations; metapostnotum coarsely reticulate, posteriorly microreticulate inside reticulations; upper corner of posterior surface of propodeum and close to margin of basal area of propodeum microreticulate; disc of T1 weakly microreticulate; basitibial plate microreticulate.

**Punctures:** on outer interspace of mandible fine and moderately dense; on basal area of labrum absent; on clypeus coarse and dense, finer near lateral and posterior margins; on anterior face of supraclypeal area moderately coarse and moderately sparse, on the remainder beveled, moderately coarse and moderately dense; between supraclypeal and frontal areas very fine and sparse; on frons moderately fine and very dense; on paraocular area beveled, moderately fine and moderately sparse, denser toward eye margin and frons; on vertex behind ocelli (anterior face of postocellar ridge) protuberant, fine and sparse; on vertex between eye and lateral ocellus dense (as on frons near ocelli), near eye protuberant, fine and sparse; on gena beveled, moderately fine sparse, finer near eye margin; on scape beveled fine and very sparse; on F1 beveled and very fine, on F2 beveled, moderately fine and sparse, on F3–F10 beveled fine and dense; on dorsal ridge of pronotum protuberant, very fine and sparse; on disc of mesoscutum fine and dense, intermixed with few coarser punctures, denser near margins, upon mesoscutal bands and toward mesoscutal line (but not reaching it) sparser; on scutellum moderately fine and dense, intermixed with coarser and sparser punctures; on metanotum minute and sparse, intermixed with coarser and sparser punctures inside reticulations; on metapostnotum absent; on posterior surface of propodeum beveled, moderately coarse and moderately sparse; on mesepisternum moderately coarse and very dense; on anterior vertical surface of T1 fine and sparse (more than three diameters apart), on disc of T1 very fine and sparse (more than two diameters apart), intermixed with fine and sparse punctures (as in Fig.7e), sparser toward anterior and posterior margins; on T2–T4 very fine and sparse.

**Structure:** epistomal sulcus forming approximately orthogonal angle; disc of clypeus almost flat; frontal carina weakly marked on supraclypeal area; angle of the frontal line between supraclypeal and frontal areas gently declivous (approximately 140°, as in Fig.6a); seven unevenly spaced hamuli on hind wing; right inner hind tibial spur with 4 teeth, the left spur with 4 teeth; basal area of basitibial plate slightly elevated.

**Measurements** (mm). Approximate length of body = 9.0, anterior wing = 7.8. Length and width of head = 2.21, 2.69. Maximum, inferior and superior distances between eyes = 1.86, 1.41, 1.38. IOC, OOC = 0.32, 0.35; MOD, LOD = 0.18, 0.18. Length and diameter of scape = 1.14, 0.14. Length of pedicel, F1, F2, F3 and

F10 = 0.14, 0.18, 0.15, 0.18, 0.33. Diameter of F5 = 0.20. Length and width of mesoscutum = 1.62, 2.00. Length and width of prestigma = 0.23, 0.18. Length and width of pterostigma = 0.78, 0.24. Length and width of marginal cell = 1.46, 0.48.

**MALE (Allotype)**

Differs from female as follows:

**Color:** mostly green with blue highlights, particularly on metasoma; mandible, labrum and apical area of clypeus yellow with brown borders; scape dark brown with a lighter apical rim; ventral surface of flagellum brown, dorsally blackish brown, except for F1, which is light brown; tarsi brown to dark brown; tibial spurs and strigilis light yellow; apical margin of T1–T5 translucent dark brown; metasomal sterna light brown, darker on apical sterna.

**Pubescence:** predominantly light yellow; whitish on paraocular area, gena, and ventral surface of mesosoma; yellowish on S4–S6, especially on the hair tufts. On disc of labrum, between and anterior to the two basal elevations, very short and erect; on scape moderately long and moderately plumose; on frons, supraclypeal area and on metasomal terga longer than on female; on S4 and S5 with hair patches forming tufts: S4 with a Y-shaped hair patch, hair apices on the stem of this patch entangled and unordered (as in Fig.2a, but basal branch slightly shorter and narrower than in *P. graminea*), S5 with two lateromedial tufts (as in Fig.2a); on S6 moderately long, forming an apical fringe.

**Sculpture:** integument smooth, except: outer interspace of mandible weakly microrugulose, almost smooth; basal half of clypeus microreticulate; on metanotum irregularly rugulose; on propodeum reticulate, but lacking posterior microreticulate band; upper corner of posterior surface of propodeum rugulose.

**Punctures:** on outer interspace of mandible absent; on clypeus deeper than on females; on scutellum moderately coarse and dense; on scutellum moderately coarse and moderately dense, intermixed with minuscule points; on metanotum fine and moderately sparse; on T1 coarse and dense; on T2–T4 as on T1, but progressively finer.

**Structure:** epistomal sulcus forming approximately orthogonal angle (more rounded than in female); F11 strongly hooked (as in Fig.3c); frontal carina weak and well-defined only on upper part of supraclypeal area; angle of the frontal line between supraclypeal and frontal areas gently declivous (approximately 140°, as in Fig.6a); seven unevenly spaced hamuli on hind wing; apical margin of S4 emarginate, posterior marginal area of S4 and S5 depressed, forming protuberant anterior meso-lateral areas on S4; S7, S8 and genitalia structurally similar to those of *P. graminea* (Figs.3a, 4a).

**Measurements** (mm). Approximate length of body = 10.3, anterior wing = 7.4. Length and width of head = 2.83, 2.48. Maximum, inferior and superior distances between eyes = 1.85, 1.15, 1.38. IOC, OOC = 0.28, 0.39; MOD, LOD = 0.24, 0.24. Length and diameter of scape = 0.81, 0.31. Length of pedicel, F1, F2, F3 and F10 = 0.15, 0.18, 0.29, 0.30, 0.32. Diameter of F5 = 0.23. Length and width of mesoscutum = 2.28, 2.05. Length and width of prestigma = 0.26, 0.17. Length and width of pterostigma = 0.95, 0.26. Length and width of marginal cell = 1.84, 0.53.

**Variation:** Specimens from Southern Brazil (especially from Santa Catarina and Rio Grande do Sul states) tend to have more typical traits of this species: *i.e.* integument green with conspicuous blue highlights; microreticulation on the clypeus of the female restricted to the upper corner; the disc of the clypeus weakly concave apically (not forming furrow as in *P. indistincta*); wings hyaline; the punctation on the disc of T1 as shown in Figs.7d,e; the integument of the disc of T1 is smooth or weakly microreticulate, rendering a shiny aspect to its surface. The width of microreticulate lateral band on the clypeus varies from almost imperceptible (very narrow) to about ¼ of one flagellar diameter; it can also be well-developed and approach a U-shaped band interrupted medially. The punctation on the disc of T1 of the female can be more densely distributed in some specimens (as in Figs.7d,f – two females from Óbidos, state of Pará), but the punctures are separated by at least one puncture diameter. One female from Parque Nacional das Emas (state of Goiás) had strong yellowish highlights; specimens from Amapá and Pará states were more golden than bluish.

**Etymology:** the specific epithet refers to the great similarity between this species and *P. graminea*, with which it can be easily confounded.

**Distribution in Brazil:** widely distributed in most regions of Brazil, except the Northeast (states of Acre, Amapá, Bahia, Distrito Federal, Goiás, Minas Gerais, Pará, Paraná, Rio Grande do Sul, Rio de Janeiro, Santa Catarina, São Paulo).

**Comments:** this species may, in the future, be split into two species more geographically restricted. Due to the lack of consistent geographically structured morphological variation, it seemed premature to recognize more than one species in this study.

**Period of activity:** every month of the year.

**Holotype** (female): "Brasil, Distr. Federal, Brasília, Faz. Água Limpa (UnB). 26.v.1993, G. A. R. Melo". Type depository: UFMG.

**Allotype** (male): "COLEÇÃO CAMPOS SEABRA", "Floresta da Tijuca; D. Federal BRASIL; II-1954; C. A. C. Seabra, Coll." (DZUP).

**Paratypes** (listed by Brazilian state): Acre: "R.Branco Acre; BR 15-20-XI 61; F.M.Oliveira" (2♂: DZUP); Amapá: "COLEÇÃO CAMPOS SEABRA", "SERRA DO NAVIO; Terr. Amapá BRASIL; Out-1957; K. Lenko leg" (2♀: DZUP); "OIAPOQUE Amapá; Brasil V-1959; M.Alvarenga" (1♀: DZUP); Bahia: "DPT<sup>o</sup> ZOOL; UF-PARANÁ", "Anagé-Bahia Brasil; 28-VI-1976; C.Elias&Enoque col." (1♂: DZUP); "COLEÇÃO CAMPOS SEABRA", "VITORIA DA CONQUISTA; BAHIA Brasil; 5/9-V-1961; F.M.Oliveira" (1♂: DZUP); Distrito Federal: "Brasília, DF, BRASIL, 28/08/99, C.Freitas" "RECOR-IBGE, 4264-15475" (1♀: DZUP); "Brasília - DF, Brasil" "30-VI-1972, Camargo, Leg." (1♀: CCRP); "Brasília - DF, SD-23, 48-16" "11-XI-1971, A.C.Santos, Leg." (1♀: CCRP); Goiás: "Est. Goiás, Parque Nac. das Emas, 12-6-1980", "*Pseudaugochloropsis* sp.5" "*P. graminea*" (1♀: UFV); "COLEÇÃO CAMPOS SEABRA"; "JATAI Goiás; BRASIL I-1955; F.Pereira" (1♀: DZUP); "Est. Goiás; P. Nacional das Emas; Sede - 13/4/1980", "*Pseudaugochloropsis graminea*" (1♂: UFV); Minas Gerais: "S. Seb. Paraíso; MG Brasil - VI-61; C.Elias leg" (1♀: DZUP); "TAPIRA - MG; Brasil 27-V-65; C. ELIAS leg" (1♀: DZUP); "PASSOS-MG; Brasil V-1961; Claudionor Elias" (1♀: DZUP); "S. DO SALITO MG; Brasil IV-66; C.ELIAS leg" (1♀: DZUP); "Abelhas Cerrado; Mannesmann; Fazenda Sta. Cruz; 2711-8066", "Felixlândia MG; BRASIL 08/12/1998; A.A.Azevedo" (1♂: UFMG); Pará: BRASIL-Para, Belem; November 1955; (Damasceno)" (1♀: DZUP); "OBIDOS; Pará BRASIL; Jan/Maio 1959; F.M.Oliveira" (1♀: DZUP); "COLEÇÃO CAMPOS SEABRA", "OBIDOS; Pará BRASIL; XI-1953; F.M.Oliveira" (1♀: DZUP); Rio de Janeiro: "COLEÇÃO CAMPOS SEABRA"; "Gavea Pequena; Distrito Federal BRASIL; I-III-1953; C. A. Seabra, Col." (1♂: DZUP, 2♂: KUNHM); "COLEÇÃO CAMPOS SEABRA"; "S. Bento; Duque de Caxias; Est. do Rio BRASIL; julh-1955; F.Oliveira" (1♀: DZUP); "Terezópolis; Parque Nac. Serra dos Orgãos; 23-VIII-1947; C.R.Hathaway", "11♂" (1♂: DZUP); Paraná: "COLOMBO - PR; Brasil - XI-63; S.LAROCA leg" (1♀: DZUP); "DPT<sup>o</sup> ZOOL; UF-PARANÁ", "União Vitória - PR; Br - 10/IV/1966; E.V.Breyer - leg."; "S.J.PINHAIS-PR; Brasil - III-63; C.Elias leg" (2♀: DZUP); "CASTRO PR; Brasil - 20-X-1966; Olavo Fonseca Jr" (2♀: DZUP); "CASTRO PR; Brasil - 8-IX-1966; Marinoni, Fonseca" (1♀: DZUP); "DPT<sup>o</sup> ZOOL; UF-PARANÁ", "CASTRO-PR-BRASIL; 28/IV/73; S.Laroca leg." (1♀: DZUP); "COLEÇÃO CAMPOS SEABRA", "CURITIBA 980m; Paraná BRASIL; 27-IX-1955 Moure, Michener e Lange" (1♀: DZUP); "BRAZIL - Parana; February 1956; (C. D. Michener)" (1♀: KUNHM); Rio Grande do Sul: "B. de COTEGIPE; R.Gr.S. - BRASIL; 15/I/1967; F.Giacomel lg" (2♀: DZUP); "B. de COTEGIPE; R.Gr.S. - BRASIL; 21/I/1967; F.Giacomel leg" (1♀: DZUP); "DPT<sup>o</sup> ZOOL; UF-PARANÁ", "B. COTEGIPE - RS; BRASIL; 04/12/1967; F.Giacomel leg" (1♀: DZUP); "BAGE - RS; Brasil - II-61; N.L.Marston" (1♀: DZUP); "Pelotas, Brazil; R.G. do Sul; VI-7-1956; C. Biezanko" (1♀: AMNH); Santa Catarina: "CORUPA - SC; Brasil I-1956; A.Maller, leg (2♂: DZUP); "DPT<sup>o</sup> ZOOL; UF-PARANÁ", "Itapema - SC; 7-I-1976; Luiz Perereira col" (1♂: DZUP); "COLEÇÃO CAMPOS SEABRA", "NOVA TEUTONIA; S. Catarina BRASIL; Dezembro 1956; F.Plaumann" (1♂: DZUP); "Cauna; S. Cath., Brazil; XII 1945"; "A. Maller, Coll.; Frank Johnson; Donor" (1♀: AMNH); "Nova Teutonia; Santa

Catarina; Brasil 22-IV-1954; Fritz Plauman" (1: KUNHM); São Paulo: "São Carlos - SP; Brasil — 18-XII-45; D.P.S.DIAS leg" (1♀: DZUP); "BRAZIL São Paulo: Cosmopolis; Jan 22, 1925"; "A. Maller, Coll.; Frank Johnson; Donor" (1♀: AMNH); "BRASIL - São Paulo; Batatais August 1943 (Stafuzza)" (1♀: KUNHM).

### Key to the Brazilian species of *Pseudaugochlora*

- 1 Metasomal terga generally with black apical margins (rarely dark brown); epistomal sulcus of female forming an approximately orthogonal angle; integument of female mesoscutum, among punctures, microreticulate (Fig.5a); basitibial plate of female microreticulate; F11 of male hooked (Figs.3a–c); S4 of male with a Y-shaped hair patch (Figs.2a,b), S5 of male with two lateral hair patches (Figs.2a,b).....2
- Metasomal terga generally with black apical margins dark brown, brown or light brown; epistomal sulcus forming small and acute paraocular lobe protruding onto clypeus (less evident in male); integument of mesoscutum of female (among punctures) smooth (Fig.5b); basitibial plate of female smooth; F11 of male with a ventral projection not as strongly developed as a hook (Fig.1e), or unmodified (Fig.1d); S4 with hair patches, but never of male not Y-shaped, on S5 V-shaped (Figs.2c,d).....6
- 2 Disc of clypeus of female medially depressed for its distal third, forming a longitudinal furrow or a broad depressed area (Fig.8); sides and base of clypeus of female extensively microreticulate forming a rough U-shaped band adjacent to the epistomal sulcus; F11 of male weakly hooked, resembling a ventrally pointed projection (Fig.1b) .....3
- Disc of clypeus of female flat or weakly concave for its distal third; lateral portions of clypeus of female microreticulate (especially upper corner of the clypeus) — basal portion of clypeus *often* not microreticulate medially; F11 of male strongly hooked (Figs.1a,c) .....4
- 3 Disc of clypeus of female broadly depressed for its distal third (Fig.8a); metasoma of female bluish green, T1 very finely and weakly punctate, intermixed with coarser punctures (Figs.7d,e); mesoscutum of female with extensive sparsely punctate areas, *generally* surrounding posterior third of mesoscutal line; mandible of male *generally* brown to light brown; hair apices on stem of the Y-shaped hair patch on S4 of male ordered, aiming at midline of this patch (Fig.2b).....*P. callaina* Almeida
- Apical third of clypeus of female depressed as a short longitudinal groove (Fig.8b); color of female metasoma variable, rarely bluish green, punctation on disc of T1 of female dense and moderately coarse (Figs.7a–c); mesoscutum of female with sparsely punctate areas generally restricted to the mesoscutal bands and reaching posterior end of mesoscutal line (but not surrounding it); mandible of male yellow to light brown; hair apices on stem of the Y-shaped hair patch on S4 of male unordered and entangled (as in Fig.2a).....*P. indistincta* Almeida
- 4 Punctures of disc of T1 of female moderately dense to dense, generally uniform in diameter (Fig.7a), sometimes with a few slightly coarser punctures intermixed among the others (Figs.7b,c); hook of F11 of male antenna as in Fig.1a; F5 of male less than 1.5x longer than wide .....*P. graminea* (Fabricius)
- Punctures of disc of T1 of female generally fine intermixed with noticeably coarser punctures (Figs.7d–f), punctation sparse or moderately dense; F11 of male strongly hooked (Fig.1c); F5 of male 1.5x longer than wide or longer.....5
- 5 Metasoma with distinctive reddish and golden highlights; sides and base of clypeus of female extensively microreticulate, forming a rough U-shaped band adjacent to the epistomal sulcus .....*P. erythrogaster* Almeida
- Color of metasoma variable, but never with reddish and golden highlights; microreticulation of clypeus of female restricted its upper corner, median area adjacent to epistomal sulcus smooth. *P. simulata* Almeida
- 6 Angle of the frontal line between supraclypeal and frontal areas gently declivous (approximately 140° — Fig.6a); apical margins of T1–T4 light brown to greenish; basal area of labrum of female smooth; T2–T5

- of female often with weak bluish and yellowish highlights; F11 of male with a ventral projection, but not hooked (Fig. 1e); hair tufts of S4 and S5 of male as in Fig. 2d..... *P. pandora* (Smith)
- Angle of the frontal line between supraclypeal and frontal areas abruptly declivous (approximately 100° — Fig. 6b); apical margins of T1–T4 brown to dark brown (generally lighter on males); basal area of labrum of female microrugulose, except region near basal elevation; T2–T5 of female often with reddish, golden, and/or bronze highlights; F11 of male not modified (Fig. 1d); hair tufts of S4 and S5 of male as in Fig. 2c..... *P. flammula* Almeida

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