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Two new species of *Chnoodes* Chevrolat (Coleoptera: Coccinellidae) from Brazil

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Abstract

Two new species of *Chnoodes* from Brazil are described: *C. machadoi* sp. nov. (Holotype male deposited in DZUP: Mato Grosso State, Cáceres municipality, 13.XI.1984, Buzzi, Mielke, Elias & Casagrande leg.) and *C. unimaculata* sp. nov. (Holotype female deposited in DZUP: Amapá State, Oiapoque municipality, V.1959, M. Alvarenga leg.). They can be distinguished from all previously described species mainly by the yellowish border of the elytra in *C. machadoi* sp. nov., and the large mid-dorsal pale spots in *C. unimaculata* sp. nov. Six species are redescribed: *Chnoodes brasiliensis* Korschefsky, *C. chaudierei* Mulsant, *C. discomaculata* (Crotch), *C. pentagona* Crotch, *C. pseudosanguinea* Brèthes, and *C. tarsalis* Weise. A key to Brazilian species of *Chnoodes* and new records are also given.

Key words: Chnoodini, Coccidulinae, Neotropical region, taxonomy

Resumo

Duas novas espécies de *Chnoodes* são descritas: *C. machadoi* sp. nov. (Holótipo macho depositado no DZUP: Mato Grosso, Cáceres, 13.XI.1984, Buzzi, Mielke, Elias & Casagrande leg.) e *C. unimaculata* sp. nov. (Holótipo fêmea depositado no DZUP: Amapá State, Oiapoque, V.1959, M. Alvarenga leg.). Estas espécies podem se distinguir das demais previamente descritas principalmente pela borda amarelada em *C. machadoi* sp. nov., e pela grande mácula dorsal em *C. unimaculata* sp. nov. Seis espécies são redescritas: *Chnoodes brasiliensis* Korschefsky, *C. chaudierei* Mulsant, *C. discomaculata* (Crotch), *C. pentagona* Crotch, *C. pseudosanguinea* Brèthes and *C. tarsalis* Weise. Uma chave para as espécies brasileiras de *Chnoodes* é incluída, além de novos registros.

Palavras-chave: Chnoodini, Coccidulinae, Neotropical, taxonomia.

Introduction

Mulsant (1850) proposed “Chnoodiens” as Chnoodaires, Azyaires and Siolaires; the Chnoodaires included the genera *Chnoodes* and *Exoplectra*. The tribe Chnoodini was first used by Sicard (1909), and was considered valid by Bouchard (2011).

Chnoodini include *Chnoodes* Chevrolat, 1849, *Coeliaria* Mulsant, 1850, *Dapolia* Mulsant, 1850, *Dioria* Mulsant, 1850, *Exoplectra* Chevrolat, 1844, *Gordonita* González, 2013, *Incurvus* González, 2013, *Neorhizobius* Crotch, 1874, *Siola* Mulsant, 1850 and *Vedalia* Mulsant, 1850. All of these are rather homogeneous genera that are difficult to separate (González 2013).

Chnoodes was described by Chevrolat (1849). Mulsant (1850) described seven species from Brazil and six from Colombia, and in the appendix to that volume (Additions et Rectifications) transferred five of them to his newly proposed subgenus *Dapolia* Mulsant, 1850, based on the presence of a wide prominent prothoracic pit. In 1853, Mulsant added two species, *C. haemorrhoids* and *C. trivialis*, to the genus and presented the following diagnostic characters: tibia angulate on the outer margin; pronotum sinuous or slightly sinuous at the base; and epipleura with or without a shallow fovea. Chapuis (1876) added the following characters: pronotum transverse,

rounded anteriorly; eyes emarginate by genae; antennae short; and abdomen with five ventrites, the sixth vestigial. Crotch (1874) described *Chnoodes clarkii* and *C. pentagona* from Brazil; confirmed the transfer of some species by Mulsant to *Dapolia*; added two species to the genus *Dapolia*, *D. deglandi* and *D. athena*; and designated *Chnoodes fallax* Mulsant, 1850 as the type species of *Chnoodes*. Kirsch (1876) described two new species, *C. abendrothi* and *C. dorsalis* from Peru. Gorham (1895) described *C. bipunctatus*, *C. cinctipennis* and *C. decipiens* from Central America. Weise (1895, 1904) described *C. nigra* and *C. tarsalis* from South America. Sicard (1912) added three new species, *C. centralis*, *C. gounellei* and *C. nigripes*; and Brèthes (1925) described *C. arrowi* and *C. pseudosanguinea*.

Korschevsky (1932) listed 21 species in the genus and indicated *C. puberula* as the type species, but in the same catalog transferred it to *Dapolia*; later, Korschevsky (1935) described *C. brasiliensis* Korschevsky, 1935. Blackwelder (1945) listed 20 species of the genus *Chnoodes* from the Neotropical region.

Gordon (1996) proposed *Chapinella* as a new generic replacement name for *Chnoodes*, but subsequently Gordon (2007) recognized *Chnoodes* as a valid genus, with *Chnoodes chaudierei* Mulsant as the type species.

Currently, the genus contains 24 species from South America, including 12 from Brazil; and 3 from Central America (González 2013).

In the present paper we redescribe and illustrate all Brazilian species of *Chnoodes*, describe two new species, compare them to previously known species, and report new records.

Material and methods

The specimens examined are deposited at:

DZUP	Coleção Entomológica Pe. J. S. Moure, Department of Zoology, Universidade Federal do Paraná, Curitiba, Paraná, Brazil;
FZRS	Fundação Zoobotânica do Rio Grande do Sul, Porto Alegre, Rio Grande do Sul, Brazil;
IBSP	Instituto Biológico de São Paulo, Brazil;
MNRJ	Museu Nacional, Universidade Federal do Rio de Janeiro, Brazil;
MZSP	Museu de Zoologia da Universidade de São Paulo, Brazil;
USNM	National Museum of Natural History, Smithsonian Institution, Washington, DC, United States of America;
ZMUC	Zoological Museum, University of Copenhagen, Copenhagen, Denmark.

Some structures (mouthparts, antennae, legs, abdomen and genitalia) were mounted in glycerin on a slide under a cover slip, and photographed using a Sony Cyber-shot DSC-W300 digital camera attached to a Standard M 20 compound microscope and Zeiss Stemi SV6 and Stereo Discovery V20 stereomicroscopes. The photographs were taken with a Leica DFC 500 digital camera using Auto-Montage Pro (Syncroscopy) software and a Leica MZ16 stereomicroscope.

The following abbreviations for Brazilian states are used in the geographical distribution: AM = Amazonas; AP = Amapá; BA = Bahia; CE = Ceará; ES = Espírito Santo; GO = Goiás; MG = Minas Gerais; MT = Mato Grosso; PR = Paraná; RJ = Rio de Janeiro; RS = Rio Grande do Sul; SC = Santa Catarina; SP = São Paulo.

Terminology used in the descriptions of genitalia follows Costa *et al.* (2008). The labels of the type materials are arranged in sequence from top to bottom of the pin, where data for each label are within double quotes (""), a slash (/) separates the rows, and information within brackets ([]) provides additional details.

Results

Chnoodes Chevrolat, 1849

Chnoodes Chevrolat in D'Orbygni, 1849: 612 (original description); Mulsant, 1850: 908 (systematics); Crotch, 1874: 286 (systematics); Chapuis, 1876: 221, 222 (systematics); Gorham, 1895: 215 (systematics); Korschevsky, 1932: 225 (catalogue); Blackwelder, 1945: 450 (catalogue); Fürsch, 1990: 9 (catalogue); Bouchard *et al.*, 2011: 375 (catalogue). *Chapinella* Gordon, 1996:27 (new name); Gordon, 2007: 1 (synonymy).

Type species: *Chnoodes chaudori* Mulsant, 1850, by subsequent designation (Gordon, 2007).

Diagnosis. Antenna 11-segmented; labrum truncate; two parallel carinae on lateral margins; thoracic foveae absent; tibia flat, with or without widening; abdomen with five visible sternites in females and six in males. Abdominal postcoxal line incomplete, recurved. Male with basal lobe and parameres symmetrical. Siphon slender, with well-developed siphonal capsule. Female genitalia with genital plate elongate; spermatheca C-shaped, simple.

Key to species of *Chnoodes* Chevrolat from Brazil

1. Pronotum and elytra yellowish brown or black, with spots 2
- 1'. Dorsal color pattern different 3
- 2(1). Pronotum and elytra yellowish brown, with a quadrangular black spot in the middle of the elytra and two on the lateral margin of each elytron, one elongated spot below the humeral callus and another transverse spot on the apex (Fig. 1) *Chnoodes brasiliensis* Korschefsky
- 2'. Elytra yellowish brown, with four black spots: a central fused pentagonal spot, and three spots on the lateral margin of each elytron (one triangular spot on the humeral callus, one rectangular in the middle, and one small triangular on the apex) (Fig. 4) *Chnoodes pentagona* Crotch
- 3(1'). Pronotum and elytra dark brown or black, without spots 4
- 3'. Pronotum and elytra dark brown or black, with yellowish border 5
- 4(3). Center disc bare (Fig. 3) *Chnoodes discomaculata* (Crotch)
- 4'. Center disc with pubescence; pronotum and elytra metallic dark brownish, anterior pronotal border castaneous (Fig. 6) *Chnoodes tarsalis* Weise
- 5(3'). Elytra black with or without spots 6
- 5'. Elytra reddish with or without spots 7
- 6(5). Elytra with a yellowish border and two yellowish areas below the callus and near the apex (Fig. 7) *Chnoodes machadoi* sp.nov.
- 6'. Elytra with one elongated yellowish spot on the disc (Fig. 8) *Chnoodes unimaculata* sp.nov.
- 7(5'). Pronotum with two basal black spots, sometimes fused; each elytron with three black spots: two rounded in the basal third and one elongated transverse spot on the apex (Fig. 2) *Chnoodes chaudoiri* Mulsant
- 7'. Pronotum with one black spot, elytra without spots (Fig. 5) *Chnoodes pseudosanguinea* Brèthes

Chnoodes brasiliensis Korschefsky, 1935

(Figure 1)

Chnoodes brasiliensis Korschefsky, 1935: 254; Blackwelder, 1945: 450.

Material examined. BRAZIL: *Ceará*: Iguatá, IX.1939, 1 specimen (DZUP). *Bahia*: Maracás, 19.XI.1965, Depto Zool. UF-Paraná, F.M. Oliveira leg., 1 specimen (DZUP). *Minas Gerais*: Belo Horizonte (campus UFMG), 26.XI–2.XII.1991, 1 specimen; 18–21.VI.1991, 1 specimen, A.F. Kumagai (DZUP); Ijaci, 07.VIII.2001, L.V.C. Santa-Cecília leg., 1 specimen (DZUP); Lagoa Santa, Rhils., 2 specimens (ZMUC); Lambari, II.1924, 15495, J. Guerin leg., 1 specimen (IBSP); Catas Altas (Serra do Caraça), 1380 m, XI.1961, Kloss, Lenko, Martins & Silva leg., 2 specimens (MZSP); Varginha, IX.1961, M. Alvarenga leg., 4 specimens (DZUP); Vila Monte Verde, 10.XII.1969, 9279, J. Halik leg., 1 specimen (MZSP). *Rio de Janeiro*: Teresópolis (Parque Nacional [da] Serra dos Órgãos), XI.2006, Vivian leg., 1 specimen (DZUP). *São Paulo*: Barueri, I.1966, K. Lenko leg., 2 specimens (MZSP, DZUP); Campinas, F.C.C.65, 1 specimen (MNRJ); Campos do Jordão (Estação Eugênio Lefevre), 1200 m, 4–8.IX.1953, Pd. Pereira & Medeiros leg., 1 specimen (MZSP); Campos do Jordão, 14.XII.1944, F. Lane leg., 1 specimen (MZSP); Diadema, 12.II.1961, Reichardt leg., 2 specimens (MZSP, DZUP); Itú (Fazenda Pau d'Alho), II.1959, U. Martins leg., 1 specimen (MZSP); Parque Estado São Paulo, 16.I.1940, 1038, J. Halik leg., 1 specimen (MZSP); Salesópolis (Estação Biológica [de] Boracéia), 14–18.XI.1973, Exp. Mus. Zool. leg., 1 specimen (MZSP); São José do Barreiro (Serra da Bocaina), 1689 m, III.1973, Coleção M. Alvarenga, F. M. Oliveira leg., 1 specimen (MZSP); São Paulo (Cantareira), II.1962, J. Halik leg., 2 specimens (MZSP, DZUP); São Paulo (Horto Florestal), 11.XII.1959, 3570, J. Halik leg., 1 specimen (MZSP); São Paulo (Zoológico Água Funda), 17.III.1961, K. Lenko leg., 1 specimen (MZSP). *Paraná*: Fênix (Reserva Est. - ITCF), Malaise, 26.I.1987, 1 specimen; 10.XI.1986, 2 specimens; 24.XI.1986, 1 specimen; 13.X.1986, 1 specimen; 06.X.1986, 1 specimen, Lev. Ent. PROFAUPAR (DZUP); Guarapuava (Gp. PR H.U., 53), III.1988, Hipólito Schneider leg., 1 specimen (DZUP);

Telêmaco Borba (Reserva Samuel Klabin), Malaise, 20.X.1986, Lev. Ent. PROFAUPAR leg., 1 specimen (DZUP). *Santa Catarina*: Joinville, Dirings leg., 1 specimen (MZSP); Seara (Nova Teutônia), 27°11' B 52°23' L, 7.X.1937, 1 specimen; 16.IX.1948, 1 specimen; X.1940, 1 specimen; 4.VI.1937, 1 specimen; 30.V.1951, 1 specimen; XII.1980, 1 specimen, Fritz Plaumann leg. (DZUP); Seara (Nova Teutonia), III.1935, B. Pohl leg., 1 specimen (MZSP). *Rio Grande do Sul*: Derrubadas (Parque Estadual do Turvo), 05.V.2004, I. Heydrich leg., 1 specimen; 22.X.2004, L. Podgaiski leg., 1 specimen (FZRS); Derrubadas, (Parque Estadual do Turvo, Estrada para Garcia), 27°13'23.9"S 53°59'24.1"W, 28.IV.2005, I. Heydrich leg., 1 specimen (FZRS); Derrubadas, (Parque Estadual do Turvo, Estrada para Garcia), 27°14'12,9"S 53°58'43,2"W, 29.IV.2005, R. Ott leg., 1 specimen (FZRS).

Male. Length 2.72–3.32 mm, width 2.32–2.98 mm. Body elongate-oval with sparse yellowish pubescence. General color yellowish brown, pronotum with central black spot; scutellum black or yellow. Elytra yellowish brown, with quadrangular black spot in middle of elytra and two on lateral margin of each elytron, one elongated below humeral callus, and another transversely elongated spot on apex (Figs 1A–D). Antennae, mouthparts, hypomera, epipleura and legs yellowish brown, femur sometimes dark brown (Fig. 1B). Meso- and metasternum and anterior half of first abdominal ventrite black.



FIGURE 1. *Chnoodes brasiliensis* Korschefsky, 1935. **A–D.** habitus; A. dorsal; B. ventral; C. frontal view; D. lateral; **E–G.** male genitalia; E. tegmen, ventral; F. tegmen, lateral; G. siphon lateral view; **H–I.** female genitalia; H. coxites; I. spermatheca.

Genitalia symmetrical; basal lobe shorter than parameres, acuminate at apex (Fig. 1E). Parameres elongated, slightly widened, with long bristles throughout their length, these bristles shorter at base (Fig. 1F). Siphon with emarginate apex and elongated siphonal capsule (Fig. 1G).

Female. Length 2.80–4.00 mm, width 2.24–3.08 mm. Coxites longer than wide, subtriangular; apex mammilliform, with long bristles (Fig. 1H). Spermatheca C-shaped, elongated with rounded apex (Fig. 1I).

Geographical distribution. Brazil (CE, BA, MG, RJ, SP, PR, SC, RS).

Remarks. *Chnoodes brasiliensis* (Fig. 1) is most similar to *C. pentagona* (Fig. 4), but is clearly distinguished by the arrangement of spots on the elytra, and the pattern of the genitalia.

***Chnoodes chaudi* Mulsant, 1850**

(Figure 2)

Chnoodes chaudi Mulsant, 1850: 911; Crotch, 1874: 286; Brèthes, 1925b: 207; Korschefsky, 1932: 226; Blackwelder, 1945: 450; Gordon, 1987: 34.

Material examined. BRAZIL: Chapada Brazil Acc. No. 2966, Oct., *Chnoodes chaudi* Muls. det. Dieke 1954, G.H. Dieke Coll'n. 1965, 2 specimens (USNM); Minas Gerais: Lagoa Santa, Mus. Western., Brasil, Rhds, 1 specimen (ZMUC); Lagoa Santa, *Chnoodes* sp. det. R. Gordon 86, 1 specimen (ZMUC); Catas Altas (Serra do Caraça), 27.XI–5.XII.1972, Exp. Mus. Zool. leg., 1 specimen (MZSP); III.1963, F. Werner, U. Martins & L. Silva leg., 1 specimen (MZSP). Espírito Santo: Rio São José, XI.1952, B. Soares leg., 1 specimen (DZUP). Rio de Janeiro: Ilha Grande (Vila Dois Rios), 18.V.2008, Proj. Coleop. leg., 1 specimen (DZUP); Petrópolis, 5–7.III.1962, J. Bechyné leg., 1 specimen (DZUP); Rio de Janeiro (Corcovado), 15.IX.1961, J.S. Moure, Alvarenga & Seabra leg., 1 specimen (MNRJ); Rio de Janeiro (Corcovado), X.1961, Ex-coleção M. Alvarenga, M. Alvarenga leg., 1 specimen (MNRJ); Rio de Janeiro (Corcovado), 3.XII.1965, Moure & Seabra leg., 1 specimen (DZUP); Rio de Janeiro (Corcovado), Coleção M. Alvarenga, X.1967, 1 specimen; II.1961, 1 specimen; X.1967, 1 specimen; V.1963, 2 specimens, Alvarenga & Seabra leg. (DZUP, MNRJ); Rio de Janeiro (Corcovado), 15.X.1976, 2 specimens; 27.X.1975, 2 specimens, M. A. Monné & C. A. Campos Seabra leg. (MNRJ); Rio de Janeiro, X.1963, M. Alvarenga leg., 1 specimen (USNM); Rio de Janeiro (Floresta da Tijuca), Coleção M. Alvarenga, II.1961, 2 specimens; I.1961, 1 specimen, C.A. Campos Seabra (MNRJ); Rio de Janeiro (Floresta da Tijuca), IV.1961, Ex-coleção M. Alvarenga, M. Alvarenga leg., 1 specimen (MNRJ); Rio de Janeiro (Represa Rio Grande), IX.1961, Coleção M. Alvarenga, F.M. Oliveira leg., 1 specimen (DZUP); Rio de Janeiro (Represa Rio Grande), 25.III.1961, 2 specimens; 10.XI.1966, 1 specimen; III.1969, 1 specimen, F.M. Oliveira leg. (DZUP); Rio de Janeiro (Represa Rio Grande), Depto Zool. UF - Paraná, III.1972, 1 specimen; 20.V.1967, 2 specimens; 13.X.1967, 1 specimen, F.M. Oliveira leg. (DZUP); Teresópolis (Parque Nacional Serra dos Órgãos), VIII.2007, Vivian leg., 2 specimens (DZUP). São Paulo: Caraguatatuba (Reserva Florestal), 40 m, VII.1965, Exp. Dep. Zool., 1 specimen (MZSP); São Paulo (Cantareira), II.1962, J. Halik leg., 1 specimen (MZSP).

Male. Length 3.14–3.58 mm, width 2.52–3.00 mm. Body rounded, with sparse yellowish pubescence. General color reddish, pronotum with two basal black spots, sometimes fused; scutellum reddish or black. Elytra reddish, each with three black spots: two rounded spots in the basal third and one transversely elongated spots on apex (Figs 2A–D). Antennae, mouthparts, hypomera, epipleura and legs reddish, except femora, which are dark brown or black (Fig. 2B). Meso-, metasternum and anterior half of first abdominal ventrite reddish or black.

Genitalia symmetrical; basal lobe shorter than parameres, apex acute (Fig. 2E). Parameres elongated, with long bristles throughout their length (Fig. 2F). Siphon with emarginate apex and elongated siphonal capsule (Fig. 2G).

Female. Length 3.2–4.00 mm, width 2.66–3.36 mm. Coxites longer than wide, subtriangular; apex mammilliform, with long bristles (Fig. 2H). Spermatheca C-shaped, elongated, with slightly acuminate apex (Fig. 2I).

Geographical distribution. Brazil (MG, ES, RJ, SP).

Remarks. *Chnoodes chaudi* differs from other species of the genus in the elytral and pronotal color; it also differs in the shape of the male and female genitalia.



FIGURE 2. *Chnoodes chaudiroi* Mulsant, 1850. **A–D.** habitus; **A.** dorsal; **B.** ventral; **C.** frontal view; **D.** lateral; **E–G.** male genitalia; **E.** tegmen, ventral; **F.** tegmen, lateral; **G.** siphon lateral view. **H–I.** female genitalia; **H.** coxites; **I.** spermatheca.

***Chnoodes discomaculata* (Crotch, 1874)**

(Figure 3)

Ladoria discomaculata Crotch, 1874: 280; Korschevsky, 1932: 231; Blackwelder, 1945: 451.

Chnoodes discomaculata: Gordon, 1987: 34.

Material examined. BRAZIL: *Minas Gerais*: Pouso Alegre, IX.1962, 6 specimens (MZSP); IX.1962, 2 specimens, F.S. Pereira leg. (DZUP). *Paraná*: Morretes, 20.VII.1995, 1 specimen; 05.V.1995, 1 specimen, Reynaud D.T. leg. (DZUP).

Male. Length 2.80–2.92 mm, width 2.52–2.56 mm. Body rounded, with sparse whitish pubescence. General color black, center disc bare (Figs 3A–D). Antennae, mouthparts, apex of femur, tibia and tarsomeres brownish (Fig. 3B). Apical third of abdominal ventrites brownish.

Genitalia symmetrical; basal lobe shorter than paramere, tapered at apex (Fig. 3E). Parameres wide, elongated, with long bristles throughout their length (Fig. 3F). Siphon with rounded apex and short siphonal capsule (Fig. 3G).

Female. Length 2.92–3.08 mm, width 2.48–2.56 mm. Coxites longer than wide, slender, subtriangular; apex mammilliform, with long bristles (Fig. 3H). Spermatheca C-shaped, elongated, with slightly acuminate apex (Fig. 3I).

Geographical distribution. Brazil (MG, PR).

Remarks. *Chnoodes discomaculata* (Fig. 3) resembles *C. tarsalis* (Fig. 6) and *C. machadoi* (Fig. 7) in the color pattern, but is clearly distinguished by the absence of pubescence on the center disc; it also differs in the shape of the male and female genitalia.



FIGURE 3. *Chnoodes discomaculata* (Crotch, 1874). **A–D.** habitus; A dorsal; B. ventral; C. frontal view; D. lateral. **E–G.** Male genitalia: E. tegmen, ventral; F. tegmen, lateral; G. siphon lateral view. **H–I.** female genitalia; H. coxites; I. spermatheca.

Chnoodes pentagona Crotch, 1874

(Figure 4)

Chnoodes pentagona Crotch, 1874: 287; Sicard, 1912: 305; Korschefsky, 1932: 226; Blackwelder, 1945: 450.

Material examined. BRAZIL: Amazonas: Itacoatiara, V.1962, Dirings leg., 1 specimen (MZSP). Amapá: Macapá,

2.II.2004, A.A.B. Barbosa leg., 2 specimens (DZUP). *Mato Grosso*: Barra do Tapirapé, 14.XII.1964, B. Malkin leg., 1 specimen (DZUP).

Male. Length 3.12 mm, width 2.64 mm. Body elongate-oval, with long dense yellowish pubescence. General color yellowish brown, pronotum with central black spot; scutellum black. Each elytron with four black spots: the central spots fused, forming a pentagonal spot; and three on the lateral margin of each elytron, one triangular spot on the humeral callus, one rectangular spot in the middle, and one small triangular spot on the apex (Figs 4A–D). Antennae, mouthparts, hypomera, epipleurum and legs yellowish-brown. Meso, metasternum and first abdominal ventrite black (Fig. 4B).

Genitalia symmetrical; basal lobe wide, half length of parameres, tapered at apex (Fig. 4E). Parameres wide, elongated, with long bristles throughout their length (Fig. 4F). Sipho sinuous, with wide siphonal capsule (Fig. 4G).

Female. Length 3.00–3.40 mm, width 2.40–2.80 mm. Coxites longer than wide, subtriangular; apex mammilliform, with long bristles (Fig. 4H). Spermatheca C-shaped, elongated, with slightly narrowed apex (Fig. 4I).

Geographical distribution. Brazil (AM, AP, MT).

Remarks. *Chnoodes pentagona* (Fig. 4) resembles *C. brasiliensis* (Fig. 1), but is clearly distinguished by the size and distribution of the spots on the elytra, and the shape of the genitalia.



FIGURE 4. *Chnoodes pentagona* Crotch, 1874. **A–D.** habitus; A. dorsal; B. ventral; C. frontal view; D. lateral. **E–G.** male genitalia: E. tegmen, ventral; F. tegmen, lateral; G. siphon lateral view. **H–I.** female genitalia; H. coxites; I. spermatheca.

***Chnoodes pseudosanguinea* Brèthes, 1925**

(Figure 5)

Chnoodes pseudosanguinea Brèthes, 1925a: 7; Korschefsky, 1932: 226; Blackwelder, 1945: 450.



FIGURE 5. *Chnoodes pseudosanguinea* Brèthes, 1925. A–D. Habitus; A. dorsal; B. ventral; C. frontal view; D. lateral. E–G. Male genitalia; E. tegmen, ventral; F. tegmen, lateral; G. siphon lateral view. H–I. female genitalia; H. coxites; I. spermatheca.

Material examined. BRAZIL: *Minas Gerais*: Catas Altas (Serra do Caraça), 1380 m, XI.1961, Kloss, Lenko, Martins & Silva leg., 1 specimen (MZSP); Vila Monte Verde, 10.III.1970, 9827, J. Halik leg., 1 specimen (MZSP). *São Paulo*: Barueri, XII.1965, K. Lenko leg., 1 specimen (MZSP); Barueri, 30.V.1959, K. Lenko leg., 1 specimen (MZSP); Barueri, 2.X.1954, Coleção M. Alvarenga, K. Lenko leg., 1 specimen (MZSP); Batêa (?), 2.XI.1940, F. Lane leg., 2 specimens (MZSP); Campos do Jordão, XII.1963, Coleção M. Alvarenga, Seabra & Oliveira leg., 1 specimen (DZUP); Campos do Jordão, 23.II.1937, Osw. Guilherme leg., 1 specimen (DZUP); Guarulhos (Sítio Bananal), 15.X.1936, 9745, 1 specimen; 6.X.1957, 3621, 1 specimen, 29.IX.1957, 3137, J. Halik leg., 1 specimen (MZSP, USNM); Jundiaí, 30.I.1964, 2657, J. Halik leg., 1 specimen (MZSP); Par. Mathias (?), 2.I.1960, 3625, J. Halik leg., 1 specimen (MZSP); Salesópolis (Estação Biológica [de] Boracéia), 21–22.III.1973, S. Vanin & M. Jorge leg., 1 specimen (MZSP); São Paulo (Cantareira), 27.XII.1985, 11770, 1 specimen; 4.XII.1958, 11311, 2 specimen; 8.IV.1959, 12890, 1 specimen, J. Halik leg. (USNM); São Paulo (Cantareira), II.1962, J. Halik leg., 5

specimens (MZSP); São Paulo (Cantareira), XI.1939, Dirings leg., 1 specimen (MZSP); São Paulo (Horto Florestal), 11.XII.1959, 3278, J. Halik leg., 1 specimen (MZSP); São Paulo (Represa Billings, Rio Grande), XII.1952, B. Pohl leg., 1 specimen (MZSP); São Paulo (Serra da Cantareira) 9.XII.1943, F. Lane leg., 1 specimen (MZSP). *Paraná*: Ponta Grossa (Pedreira), IX.1944, Guarda Chuva, 1907, Coleção F. Justus Jor, 1 specimen (DZUP); Ponta Grossa, I.1946, 1907, Coleção F. Justus Jor, 1 specimen (DZUP).

Male. Length 3.04–3.12 mm, width 2.56–2.68 mm. Body oval, with sparse yellowish pubescence. Pronotum orange with one central black spot. Scutellum black or red. Elytra red, without spots (Figs 5A–D). Head, antennae, mouthparts, hypomera, epipleuron and legs orange or brownish. Meso-, metasternum and central part of first abdominal ventrites black (Fig. 5B).

Genitalia symmetrical; basal lobe shorter than parameres, rounded, tapered at apex (Fig. 5E). Parameres narrow, elongated, with long bristles throughout their length (Fig. 5F). Siphon emarginate at apex, with elongated siphonal capsule (Fig. 5G).

Female. Length 3.32–3.44 mm, width 2.64–2.68 mm. Coxites longer than wide, subtriangular; apex mammilliform, with long bristles (Fig. 5H). Spermatheca C-shaped, elongated, rounded at apex (Fig. 5I).

Geographical Distribution. Brazil (MG, SP, PR).

Remarks. *Chnoodes pseudosanguinea* differs from other species of the genus in the elytral and pronotal color; it also differs in the shape of the male and female genitalia.

***Chnoodes tarsalis* Weise, 1904**

(Figure 6)

Chnoodes tarsalis Weise, 1904: 197; Korschefsky, 1932: 226; Blackwelder, 1945: 450.

Material examined. TRINIDAD AND TOBAGO: *Trinidad*: Morne Bleu, Trinidad, W. I., 2700', 21.VIII.1969, H. & A. Howden leg., 1 specimen (USNM). BRAZIL: Brasil, Dalbonzo leg., 1 specimen (ZMUC). *Mato Grosso*: Chapada Guimarães, 25.XI.1983, Dptº Zool. UF - Paraná, Exc. Dep. Zool - UFPR (Polonoroeste) leg., 2 specimens (DZUP); Poconé, 28.III.1998, Arm. Mal. Acuri, 1 specimen (DZUP). *Goiás*: Dianópolis, 16–22.I.1962, 1 specimen; 11–14.I.1962, J. Bechyné leg., 1 specimen (DZUP). *Minas Gerais*: Lagoa Santa, R., 3 specimens (ZMUC); Lagoa Santa, R., *Chnoodes tarsalis* Weise det. R. Gordon 86, 1 specimen (ZMUC); Lagoa Santa, Rhds., 2 specimens (ZMUC); Santa Rita de Caldas, XII.1953, Pe. Pereira leg., 1 specimen (DZUP). *Espírito Santo*: Buenos Aires, 10 km W de Guarapari, 500 m, 6.I.1996, GAR Melo leg., 1 specimen (DZUP); Guarapari, IX.1960, M. Alvarenga leg., 1 specimen (DZUP). *Rio de Janeiro*: Rio de Janeiro (Represa Rio Grande), Dptº Zool. UF - Paraná, 13.X.1967, F. Oliveira leg., 1 specimen (DZUP). *São Paulo*: São Sebastião (Barra do Una) 8.VII.1961, K. Lenko leg., 1 specimen (MZSP); Batêa (?) 5–8.XI.1940, 1 specimen; 2.XI.1940, 1 specimen, F. Lane leg. (MZSP); Cananéia, 5–6.VI.1976, L.R. Fontes leg., 1 specimen (MZSP); Caraguatatuba (Reserva Florestal), 40 m, VII.1965, Exp. Dep. Zool., 1 specimen (MZSP); Itú, II.1959, Col. U. Martins leg., 1 specimen (MZSP); Salesópolis (Estação Biológica Boracéia), 30.IV.1973, Jorge & Vanin leg., 1 specimen (MZSP), São José do Barreiro (Serra da Bocaina), 1650 m, XI.1968, Alvarenga & Seabra leg., 1 specimen (MZSP); São Paulo, IV.1954, Coleção J. Lane, J. Lane leg., 1 specimen (MZSP). *Paraná*: Castro (Estrada Castro-Tibagi Km 110), 24°45'57" S 50°09'00" W, altitude 1121 m, 8.IX.2007, P. Grossi & D. Parizotto leg., 1 specimen (DZUP); Ponta Grossa, Guarda chuva, IX.1944, 1919, Coleção F. Justus Jor, V. Vilella leg., 4 specimens (DZUP). *Santa Catarina*: Corupá (Rio Vermelho), III.1952, 2 specimens; X.1952, 1 specimen, Dirings leg. (MZSP); Imbituba (Praia do Rosa), 01.I.2001, R. Araujo leg., 1 specimen (FZRS); Seara (Nova Teutônia), 27°11' B 52°23' L, 6.XII.1939, Fritz Plaumann leg., 1 specimen (DZUP); Seara (Nova Teutonia), 27°11' B 52°23' L, 300–500 m, XI.1976, Fritz Plaumann leg., 1 specimen (DZUP). *Rio Grande do Sul*: Cambará do Sul, 25.XI.1993, A. Bonaldo leg., 1 specimen; 19–21.XII.1994, L. Moura leg., 1 specimen (FZRS); Canela (Barragem dos Bugres), 04.XI.1998, L. Moura leg., 1 specimen (FZRS); Derrubadas (Parque Estadual do Turvo), 21.X.2004, R. Ott leg., 1 specimen (FZRS); Torres (Parque Estadual de Itapeva), 13.I.2005, L. Moura & I. Heydrich leg., 1 specimen; L. Moura leg., 1 specimen (FZRS).

Male. Length 2.60–3.00 mm, width 2.12–2.68 mm. Body oval, with sparse white pubescence. Pronotum and elytra metallic dark-brownish, anterior border castaneous (Figs 6A–D). Head, antennae and mouthparts black or dark brown. Meso-, metasternum and epipleuron black. Tarsomeres light brown, last three abdominal ventrites dark brown (Fig. 6B). Genitalia with basal lobe symmetrical, enlarged, shorter than parameres, apex bluntly

pointed (Fig. 6E). Parameres two times longer than basal lobe (Fig. 6F). Siphon turned outward at apex, emarginate, siphonal capsule short and wide (Fig. 6G).

Female. Length 2.64–3.06 mm, width 2.24–2.60 mm. Genitalia with genital plates rectangular, elongate, styli with setae (Fig. 6H). Spermatheca C-shaped, with apex emarginate (Fig. 6I).

Geographical Distribution. Trinidad and Tobago; Brazil (MT, GO, MG, ES, RJ, SP, PR, SC).

Remarks. *Chnoodes tarsalis* (Fig. 6) is similar to *C. discomaculata* (Fig. 3) in color pattern, but is clearly distinguished by the metallic dark-brownish color of the pronotum and elytra; it also differs from this species in the shape of the male and female genitalia.



FIGURE 6. *Chnoodes tarsalis* Weise, 1904. **A–D.** habitus: A. dorsal; B. ventral; C. frontal view; D. lateral. **E–G.** male genitalia: E. tegmen, ventral; F. tegmen, lateral; G. siphon lateral view. **H–I.** female genitalia; H. coxites; I. spermatheca.

***Chnoodes machadoi* sp. nov.**

(Figure 7)

Material examined. BRAZIL: Mato Grosso: “Cáceres, MT./13.XI.1984/Buzzi, Mielke, Elias/Casagrande leg./

Proj. Polonoroeste”, “Dpt° Zool./UF - Paraná”, “DZUP 188269”, “HOLOTYPE/ *Chnoodes machadoi* Krüger, Castro-Guedes & Almeida, 2015” [red label]; “Cáceres, MT./11.XI.1984/Buzzi, Mielke, Elias/Casagrande leg./Proj. Polonoroeste”, “Dpt° Zool./UF - Paraná”, [DZUP 188250, 188272], “PARATYPE/ *Chnoodes machadoi* Krüger, Castro-Guedes & Almeida, 2015” [yellow label]; “Cáceres, MT./13.XI.1984/Buzzi, Mielke, Elias/Casagrande leg./Proj. Polonoroeste”, “Dpt° Zool./UF - Paraná”, [DZUP 188249, 188270], “PARATYPE/ *Chnoodes machadoi* Krüger, Castro-Guedes & Almeida, 2015” [yellow label]; “Cáceres, MT./19.XI.1984/Buzzi, Mielke, Elias/Casagrande leg./Proj. Polonoroeste”, “Dpt° Zool./UF - Paraná”, [DZUP 188266, 188267], “PARATYPE/ *Chnoodes machadoi* Krüger, Castro-Guedes & Almeida, 2015” [yellow label]; “Cáceres, MT./10.XI.1984/Buzzi, Mielke, Elias/Casagrande leg./Proj. Polonoroeste”, “Dpt° Zool./UF - Paraná”, [DZUP 188271], “PARATYPE/ *Chnoodes machadoi* Krüger, Castro-Guedes & Almeida, 2015” [yellow label]. Goiás: “Dianópolis/GO, Brasil/16–22.I.1962/J. Bechyné col.”, [DZUP 188237] “PARATYPE/ *Chnoodes machadoi* Krüger, Castro-Guedes & Almeida, 2015” [yellow label].



FIGURE 7. *Chnoodes machadoi* sp. nov. Paratype male. **A–D.** habitus; A. dorsal; B. ventral; C. frontal view; D. lateral; **E–G.** male genitalia; E. tegmen, ventral; F. tegmen, lateral; G. siphon lateral view. **H–I.** female genitalia; H. coxites; I. spermatheca.

Male. Length 2.84–2.88 mm, width 2.08–2.16 mm. Body oval, with sparse white pubescence. Pronotum black with yellowish border and two small lateral spots. Elytra black with yellowish border and two yellowish areas below callus and near apex (Figs 7A–D). Head, antennae and mouthparts orange. Meso- and metasternum dark brown or black; legs yellowish; epipleuron yellowish; first ventrites black or brownish (Fig. 7B).

Genitalia with basal lobe symmetrical, stout, shorter than parameres, apex bluntly pointed (Fig. 7E). Parameres short and narrow (Fig. 7F). Siphon rounded at apex, siphonal capsule rounded and short (Fig. 7G).

Female. Length 3.04–3.16 mm, width 2.20–2.24 mm. Genitalia with genital plates triangular, elongated, styli with setae (Fig. 7H). Spermatheca C-shaped, short, apex narrow (Fig. 7I).

Etymology. This species is named in honor of the dedicated entomologist Doctor Angelo Barbosa Monteiro Machado, an expert in the taxonomy of dragonflies (Odonata) and endangered species, on the occasion of his 80th birthday.

Geographical Distribution. Brazil (MT, GO).

Remarks. *Chnoodes machadoi* sp. nov. (Fig. 7) is similar to *C. discomaculata* (Fig. 3) and *C. tarsalis* (Fig. 6) in the color pattern, but is distinguished by the yellowish border of elytra. The male and female genitalia are also distinct.

Chnoodes unimaculata sp. nov.

(Figure 8)



FIGURE 8. *Chnoodes unimaculata* sp. nov. holotype female. A–D. habitus; A. dorsal; B. ventral; C. frontal view; D. lateral. E–F. female genitalia; E. coxites; F. spermatheca.

Material examined. BRAZIL: Amapá: “Oiapoque/Amapá - Brasil/V.1959/M. Alvarenga col.”, “Ex-Coleção/M. Alvarenga”, [DZUP 188165] “HOLOTYPE [female] *Chnoodes unimaculata* Krüger, Castro-Guedes & Almeida,

2015” [red label]; “Brasil - Amapá/Macapá/16.III.2004/J. F. F. Martins, [DZUP 186838] “PARATYPE [female]/ *Chnoodes unimaculata* Krüger, Castro-Guedes & Almeida, 2015” [yellow label].

Holotype. Female. Length 3.16 mm, width 2.40 mm. Body round, with sparse yellowish pubescence. Pronotum black, with yellowish lateral border. Elytra black with one elongated yellowish spot on disc (Figs 8A–D). Head, antennae and mouthparts dark yellowish. Meso- and metasternum dark brown or black; legs yellowish; epipleuron with black spots; first ventrites black (Fig. 8B).

Genitalia with genital plates triangular, elongated, styli with setae (Fig. 8E). Spermatheca C-shaped, apex short and rounded (Fig. 8F).

Male. Unknown.

Etymology. The name of this species refers to the single spot on each elytron.

Geographical Distribution. Brazil (AP).

Remarks. *Chnoodes unimaculata* **sp. nov.** (Fig. 8) resembles *C. machadoi* **sp. nov.** (Fig. 7), but is clearly distinguished by the color, shape and number of spots on the elytra; it also differs in the shape of the female genitalia.

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