

Research article

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Contributions to the knowledge of tiger beetles in Paraguay, with new country and departmental records (Coleoptera: Cicindelidae)

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Abstract

We report on three new country records of tiger beetles in Paraguay and 22 an additional 18 new departmental records based on specimens in Paraguayan collections. We also document substantial increases to the knowledge on distributions of numerous species in the country through additional specimen records. The first tiger beetle records from south-western Ñeembucú are also provided. New country records are illustrated and comments on previous works dealing with the Paraguayan Cicindelid fauna are summarised.

Key words: taxonomy, biogeography, *Brasiella*, *Cylindera*, *Tetracha*, *Mesochila*.

Introduction

Tiger beetles (Coleoptera: Cicindelidae) are widely regarded as effective indicator species due to their responses to forest degradation (Rodríguez et al. 1998) and the sensitivity of the relatively immobile larvae (Knisley 1987; Hadley et al. 1990). As such, their presence and diversity in given regions and habitats are of crucial importance to understanding ecosystem health and function.

Despite a biogeographically unique location in the heart of South America, at the intersection of some of the most threatened biomes on the continent (Olson et al. 2001), the Paraguayan entomofauna remains poorly known in comparison to its neighbours (Pett 2019). This is predictably true also of the Paraguayan Cicindelidae, for which few data have been published.

Varas Arangua (1925) provided the first Paraguayan reports, listing 12 species from “Trinidad y Asunción” in Central department. Horn (1926) listed 26 species from Paraguay and Schade (1933) reported on 19 species, but over half a century later those numbers had barely risen. Wiesner (1992), in his checklist of the Cicindelidae of the world, associated just 35 species with the country. The most recent complete synopsis of the Paraguayan fauna (Sawada & Wiesner 2002) reviewed 2388 Paraguayan specimens, and registered a total of 48 species in Paraguay. Though this was by far the most thorough review of Paraguayan specimens to date, including samples from

all ecoregions, a key gap from their research was the lack of any records from Ñeembucú department in the extreme southwest of the country. More recently small numbers of species have been added to the Paraguayan fauna (Naviaux 2007; Moravec & Brzoska 2014), and one erroneous record has been removed (Moravec 2018) giving a working total of 52 species documented in the country.

In this paper we increase the knowledge on distribution of Paraguayan Cicindelidae by presenting three new country records and 22 an additional 18 new departmental records, including the first records of tiger beetles from Ñeembucú, the only Paraguayan department that was previously unsampled. Additionally, we present an adapted table from Sawada & Wiesner (2002) to summarise the current state of knowledge of the distribution of the Paraguayan tiger beetle fauna.

Materials and Methods

We examined specimens of tiger beetles from the Colección Zoológica Para La Tierra (CZPLT, Pilar, Paraguay), including specimens from the CIPLT-E (Colección Invertebrados Para La Tierra- Entomología) and IBIS (Instituto de Bioecología e Investigación Subtropical) collections. Additional specimens were examined from the Museo Nacional de Historia Natural del Paraguay (MNHNP, San Lorenzo, Paraguay).

Specimens were examined under an AmScope stereo microscope or an OMAX 40x-2000x trinocular stereo microscope and identified using taxonomic literature including Sawada & Wiesner (2002), Wiesner & Bandinelli (2014) and Moravec (2018). Dorsal habitus photographs of new country records were taken using a Nikon D3500 with macro lens, and 5 to 10 images stacked using the HeliconFocus program (version 6.7) and edited using GIMP (www.gimp.org).

Specimens details are listed in the following format: **DEPARTMENT** “Locality” (Specimen Numbers; Collector(s); Date);

When the specimens were collected by one of the authors they are listed using their initials only. Descriptions of known distributions follow Sawada & Wiesner (2002), Naviaux (2007), Moravec (2018) and Moravec & Brzoska (2014). We provide an updated departmental tiger beetle distribution list in Table 1.

Co-ordinates of frequently mentioned specimen collection localities are listed in Table 2.

Results

New country records

Three species are reported for Paraguay for the first time. Specimen details are provided below.

Brasiella misella misella (Chaudoir, 1854)

Material examined (2 specimens): CONCEPCIÓN “Cororó” (MNHNP-HX 594, leg. Carlos Aguilar: 24 November 1998); **ÑEEMBUCÚ** “Ciudad de Pilar” (CIPLT-E 8090, leg. B.L.P.: 28 December 2019).

Distribution. Argentina, Bolivia, Brazil, Costa Rica, Ecuador, Nicaragua, Panama, Venezuela. Reported for Paraguay for the first time based on two specimens from the Paraguay River Basin in the Humid Chaco ecoregion.

Comments. Distinguished from *B. dolosula* by a hook-shaped appendage at tip of the aedeagus (Wiesner, pers. comm.).

Cylindera obsoletesignata (Horn, 1895)

Material examined (1 specimen): ÑEEMBUCÚ “Estancia Santa Ana” (CIPLT-E 7415; leg. R.W. & B.L.P.: 10 December 2019).

Distribution. Argentina, Brazil. Historically reported from Paraguay by Horn (1926), but Sawada & Wiesner (2002), removed *C. obsoletesignata* from the country list, pending verifiable specimens. The species is reinstated on the basis of the specimen presented here, from the Humid Chaco ecoregion.

Comments. The specimen was collected at a grassland site.

Cylindera eugeni (Laporte de Castelnau, 1834)

Material examined (1 specimen): PRESIDENTE HAYES “Ruta Trans Chaco km 310” (MNHNP-HX 580; leg. Carlos Aguilar: 25 October 1990).

Distribution. Argentina. Reported for Paraguay for the first time based on a specimen from the Humid Chaco ecoregion.

New departmental records

New departmental records are provided for 15 species, updating the distributions given by Sawada & Wiesner (2002). Some comments on ecoregion association are provided.

Brasiella cuyabaensis (Mandl, 1970)

Material examined (2 specimens): SAN PEDRO “Rancho Laguna Blanca” (CIPLT-E 7130, 7140; leg. Unknown: 17 February 2016).

Distribution. Previously documented from Concepción and Amambay, this new record is also from the Cerado ecoregion.

Cylindera apiata apiata (Dejean, 1825)

Material examined (1 specimen): ÑEEMBUCÚ “Military Base” (CIPLT-E 8091, leg. Shawn Smith: 17 February 2020).

Distribution. Previously known from Concepción, Amambay, Canindeyú, Cordillera, Paraguairí and Itapúa in the Cerrado and Atlantic Forest ecoregions. This is the first specimen record from Ñeembucú, part of the Humid Chaco ecoregion.

Cylindera confluentesignata (Horn, 1915)

Material examined (1 specimen): ÑEEMBUCÚ “Ruta IV, 6 km east of Pilar (26°53'6" S, 57°43'1W)” (MNHNP-HX 581; leg. D. Brzoska: 08 November 2012).

Distribution. Previous Paraguayan specimens from the Humid Chaco in Presidente Hayes, and the Atlantic Forest region of Paraguairí and Guairá (Sawada & Wiesner 2002). The Ñeembucú specimen is from the Humid Chaco ecoregion.

Iresia lacordairei Dejean, 1831

Material examined (2 specimens): CAAZAPÁ “Parque Nacional Caaguazú” (MNHNP-HX 579; leg. Carlos Aguilar: 1-8 November 1990); **ITAPÚA** “Pro Cosara/Estancia Nueva Gambach” (CIPLT-E 7495; leg. R.W.: 08 January 2020).

Distribution. These specimens, and previous Paraguayan specimens from Guairá and Caaguazú, are all from the Atlantic Forest ecoregion (Sawada & Wiesner 2002).

Mesacanthina reductesignata Horn, 1905

Material examined (6 specimens): ÑEEMBUCÚ “Pilar” (CIPLT-E 7443; leg. Julio R. Contreras: 08 December 2012); (CIPLT-E 7434; leg. Julio R. Contreras: 27 December 2012);

Table 1 – Updated departmental lists for tiger beetles in Paraguay. ‘X’ denotes previous specimen records from Sawada & Wiesner (2002) Naviaux (2007), Moravec (2014, 2019, 2020) and Moravec et al. (2017) ‘O’ represents a new record reported in this paper.

| | Alto Paraguay | Boquerón | Pte. Hayes | Concepción | Amambay | San Pedro | Canindeyú | Central | Cordillera | Caaguazú | Alto Paraná | Paraguari | Guairá | Caazapa | Ñeembucú | Misiones | Itapúa |
|---|---------------|----------|------------|------------|---------|-----------|-----------|---------|------------|----------|-------------|-----------|--------|---------|----------|----------|--------|
| <i>Ctenostoma ichneumon ellipticum</i> Naviaux | | | | | | | | | | | | | X | | | | |
| <i>Ctenostoma schmalzi paraguayensis</i> Nidek | | | | | | | | | | | | | | | | | X |
| <i>Phaeoxantha bucephala</i> Horn | | X | | | | | | | | | | | | | | | |
| <i>Phaeoxantha cruciata</i> (Brullé) | | | | X | | X | | | | | | | | | | | X |
| <i>Phaeoxantha limata</i> (Perty) | | | | X | | | | | | | X | | | | | | X |
| <i>Tetracha distinguenda</i> Dejean | | X | X | X | | | | X | X | | | | X | | | | X |
| <i>Tetracha orbignyi</i> Naviaux | X | X | X | | | | | | | | | | | | | | |
| <i>Tetracha fulgida</i> (Klug) | | X | X | X | X | X | X | X | X | | | X | X | | | X | |
| <i>Tetracha wiesneri</i> Naviaux | | X | | | | | | | | | | | | | | | |
| <i>Tetracha pilosipennis</i> (Mandl) | | X | | X | | | X | | | | | | | X | | | |
| <i>Tetracha horni</i> Ruge | | | | X | | | | X | | | | | | | | | |
| <i>Tetracha pseudodistinguenda</i> Horn | X | X | X | | | | | X | | | | | X | | | | O |
| <i>Tetracha cyanea</i> (Horn) | | X | X | | | | | | | | | | X | | | | |
| <i>Tetracha bilunata</i> Klug | | | | X | X | | | | | | | | | | | | |
| <i>Tetracha sobrina longipennis</i> Chaudoir | | | | X | | | | | | | | | | | | | |
| <i>Tetracha affinis brevisulcata</i> Horn | X | X | X | | | O | | | | | | | | | O | | |
| <i>Tetracha brasiliensis brasiliensis</i> (Kirby) | | X | | X | X | X | | X | X | | O | X | X | X | O | X | X |
| <i>Tetracha lafertei</i> Thomson | | | | X | X | | | | | | | | X | | | | O |
| <i>Tetracha chacoensis</i> Sawada & Wiesner | X | X | | | | | | | | | | | | | | | |
| <i>Tetracha femoralis</i> Perty | | | | | | | X | | | | | | X | | | | X |
| <i>Oxycheila pinelii</i> Guérin-Méneville | | | | | | | | | | | | | | | | | X |
| <i>Oxycheila femoralis</i> Castelnau | | | | | | | | | | | | X | | | | | |
| <i>Oxycheila pochoni</i> Mandl | | | | X | X | | | | | | | X | | | | | |
| <i>Oxycheila labiata</i> Brullé | | | | X | | | | | | | | | X | | | | |
| <i>Odontocheila chrysis</i> (Fabricius) | | X | X | X | X | X | X | X | | X | O | | X | X | O | | X |
| <i>Odontocheila nitidicollis</i> (Dejean) | | | | X | | X | O | | | | | | X | | O | | |
| <i>Odontocheila rutilans</i> (Klug) | | | | | X | X | | O | | | | | | | | | |
| <i>Odontocheila fulgens</i> (Klug) | | | | X | | | | X | | | | | | | | | |
| <i>Mesochila (Eumesochila) discrepans</i> (Horn) | | | | X | X | X | | | | | | | | | | | |
| <i>Mesochila (Mesochila) drechseli</i> (Sawada & Wiesner) | | | | X | X | | X | | | | | | | | | | |
| <i>Poecilochila cupricollis</i> (Kollar) | | | | X | X | | X | X | X | | | X | X | | | | |
| <i>Poecilochila sinnamarica</i> (Fleutiaux) | X | X | X | X | | | | X | | | | | | | O | | |
| <i>Pentacomia lanei</i> (Horn) | | | | | | | | | | X | | | | | | | |
| <i>Pentacomia sericina</i> (Klug) | | | | | | | | | | | | | | X | | | |
| <i>Pentacomia degandei</i> (Tatum) | | | | | X | | | | | | | | | | | | |
| <i>Mesacanthina reductesignata</i> (Horn) | | X | X | | | | | X | X | | | | X | | O | | |
| <i>Mesacanthina punctum</i> (Klug) | | | | X | X | X | X | X | X | X | | | X | X | | X | |
| <i>Cheilonycha auripennis auripennis</i> Horn | X | | | X | X | X | X | | | X | | X | X | | | | |
| <i>Eulampra miranda</i> (Chaudoir) | | | | X | | | | | | X | | | X | | | | |
| <i>Iresia lacordairei</i> Dejean | | | | | | | | | | X | | | X | O | | | O |

| | Alto Paraguay | Boquerón | Pte. Hayes | Concepción | Amambay | San Pedro | Canindeyú | Central | Cordillera | Caaguazú | Alto Paraná | Paraguarí | Guairá | Caazapá | Ñeembucú | Misiones | Itapúa |
|--|---------------|----------|------------|------------|---------|-----------|-----------|---------|------------|----------|-------------|-----------|--------|---------|----------|----------|--------|
| <i>Cylindera (Cylindera) confluentesignata (Horn)</i> | | | X | | | | | | | | | X | X | | O | | |
| <i>Cylindera eugeni (Laporte de Castelnau)</i> | | | O | | | | | | | | | | | | | | |
| <i>Cylindera obsoletesignata (Horn)</i> | | | | | | | | | | | | | | | O | | |
| <i>Cylindera (Plectographa) sinuosa (Brullé)</i> | | | | | | | | X | | | | | | | | | |
| <i>Cylindera (Plectographa) apiata apiata (Dejean)</i> | | | | X | X | | X | | X | | | X | | | O | | X |
| <i>Brasiella (Brasiella) argentata argentata (Fabricius)</i> | | X | | | | | | | | | | | | | | | |
| <i>Brasiella (Brasiella) argentata pseudoargentata Mandl</i> | X | | | X | X | X | X | X | X | X | | X | | X | | X | |
| <i>Brasiella (Brasiella) obscurella (Klug)</i> | | | | | | | | | | | X | | X | | | | |
| <i>Brasiella (Brasiella) aureola aureola (Klug)</i> | | | | X | | X | | | | X | | | X | | | | |
| <i>Brasiella (Brasiella) cuyabaensis Mandl</i> | | | | X | X | O | | | | | | | | | | | |
| <i>Brasiella (Brasiella) dolosulaffinis Mandl</i> | X | X | X | X | X | X | | X | X | | | X | | | | | X |
| <i>Brasiella (Brasiella) banghaasi (Horn)</i> | | X | | | | | | | | | | | | | | | |
| <i>Brasiella (Brasiella) minarum (Putzeys)</i> | | | | | X | | | | X | | X | | | | | | |
| <i>Brasiella (Gaymara) chlorosticta (Kollar)</i> | | | | X | X | | X | | | | | | X | | | | X |
| <i>Brasiella (Brasiella) misella misella (Chaudoir)</i> | | | | O | | | | | | | | | | | O | | |

(CIPLT-E 7484; leg. Julio R. Contreras: 12 January 2013); (CIPLT-E 7442, 7444; leg. Julio R. Contreras: 22 February 2013); (CIPLT-E 7427; leg. B.L.P.: 29 December 2019).

Distribution. The species is distributed in the Dry and Humid Chaco ecoregions (Boquerón, Central, Ñeembucú and Presidente Hayes) and marginally into the Atlantic Forest ecoregion (Cordillera and Guairá) (Moravec & Huber 2015; Sawada & Wiesner 2002).

Comments. Previously treated as a subgenus of *Pentacomia*, *Mesacanthina* was elevated to separate genus by Moravec & Huber (2015).

Mesochila (Mesochila) drechseli (Sawada & Wiesner, 1997)

Material examined (1 specimen): CONCEPCIÓN “Cororó” (MNHNP-HX 587, leg. Carlos Aguilar: 14 November 1995).

Distribution. This species is also known from Brazil and Bolivia, and in Paraguay is distributed in the Cerrado ecoregion (Concepción, Amambay and Canindeyú). We add an additional specimen record from Concepción.

Odontocheila chrysis (Fabricius, 1801)

Material examined (35 specimens): ALTO PARANÁ “Kanindeyú Industrial Estate” (CIPLT-E 7493; leg. Lorenzo Bertola: 15-18 December 2019); **ITAPÚA** “Ciudad de Encarnación” (CIPLT-E 7272, 7273; leg. P.S.: 07 January

2019); **ÑEEMBUCÚ** “Estancia Santa Ana” (CIPLT-E 7441, 7422; leg. R.W. & B.L.P.: 10 December 2019); (CIPLT-E 7418, 7419, 7420, 7421; leg. R.W. & B.L.P.: 27 December 2019); (CIPLT-E 7501, 7502; leg. R.W. & B.L.P.: 24 January 2020); (CIPLT-E 7503, 7504, 7505, 7506; leg. R.W. & B.L.P.: 31 January 2020); “Pilar” (CIPLT-E 7452; leg. Julio R. Contreras: 02 December 2012); (CIPLT-E 7453; leg. Julio R. Contreras: 04 January 2013); (CIPLT-E 7447; leg. Julio R. Contreras: 09 January 2013); (CIPLT-E 7450; leg. Julio R. Contreras: 19 January 2013); (CIPLT-E 7448; leg. Julio R. Contreras: 11 February 2013); (CIPLT-E 7446; leg. Julio R. Contreras: 12 February 2013); (CIPLT-E 7449, 7451; leg. Julio R. Contreras: 22 February 2013); (CIPLT-E 7357; leg. Lorenzo Bertola: 01 December 2019); “Pilar Military base” (CIPLT-E 7416; leg. R.W. & B.L.P.: 27 February 2019); (CIPLT-E 7423, 7424, 7438, 7439, 7440; leg. R.W. & B.L.P.: 10 December 2019); (CIPLT-E 7435, 7436, 7437; leg. R.W. & B.L.P.: 27 December 2019).

Distribution. This species apparently occurs across most (if not all) of the country in all ecoregions. Previous specimen records from Amambay, Boquerón, Caaguazú, Caazapá, Canindeyú, Central, Concepción, Guairá, Presidente Hayes and San Pedro (Sawada & Wiesner 2002). Records provided here fill in two of the remaining departments for which there have been no previous reports (Alto Paraná and Ñeembucú).

Comments. This species was found predominantly in forested habitats. This is mostly consistent with pre-

vious ecological findings for the *Odontocheila* genus, generally showing an affinity for forested habitats but also being recorded in more open habitats (Adis et al. 1998; Cividanes & Ferraudo 2017). Additional specimens from Itapúa listed here were collected in a suburban garden, attracted to house lights (specimen records previously existed from Itapúa).

Odontocheila nitidicollis (Dejean, 1825)

Material examined (2 specimens): ITAPÚA “Ciudad de Encarnación” (CIPLT-E 7494; leg. P.S.: 22-24 November 2019); CANINDEYÚ “Reserva Bosque Mbaracayú” (MNHNP-HX 584; leg. Carlos Aguilar: 18 January 1997).

Distribution. Previous records show distribution in the Cerrado (San Pedro), Humid Chaco (Concepción), and Atlantic Forest ecoregions (Guairá) (Sawada & Wiesner 2002; Moravec et al. 2017). Both new specimens are from the Atlantic Forest ecoregion.

Comments. The Itapúa specimen was collected in a suburban garden at a house light.

Odontocheila rutilans Klug, 1834

Material examined (1 specimen): CENTRAL “Jardín Botánico de Asunción” (MNHNP-HX 583; leg. Carlos Aguilar; 23 February 1994).

Distribution. Previous specimens from Amambay and San Pedro are from the Cerrado ecoregion (Sawada & Wiesner 2002). The Central specimen is from the Humid Chaco ecoregion.

Poecilochila sinnamarica (Fleutiaux, 1886)

Material examined (3 specimens): ÑEEMBUCÚ “Pilar Military Base” (CIPLT-E 7425, 7426; leg. R.W. & B.L.P.: 10 December 2019); (CIPLT-E 7417; leg. R.W. & B.L.P.: 27 December 2019).

Distribution. Occurs in the Dry Chaco (Alto Paraguay, Boquerón) and Humid Chaco ecoregions (Central, Concepción, Ñeembucú and Presidente Hayes) (Sawada & Wiesner 2002).

Comments. Previously treated as a subgenus of *Pentacomia*, *Poecilochila* was elevated to a separate genus in a taxonomic revision by Moravec (2018) that also saw this species combined with *Poecilochila rhytidopteroides*. The revision also states that this species may be synonymous with *Poecilochila lacordairei* but it is currently treated separately until more specimens are examined.

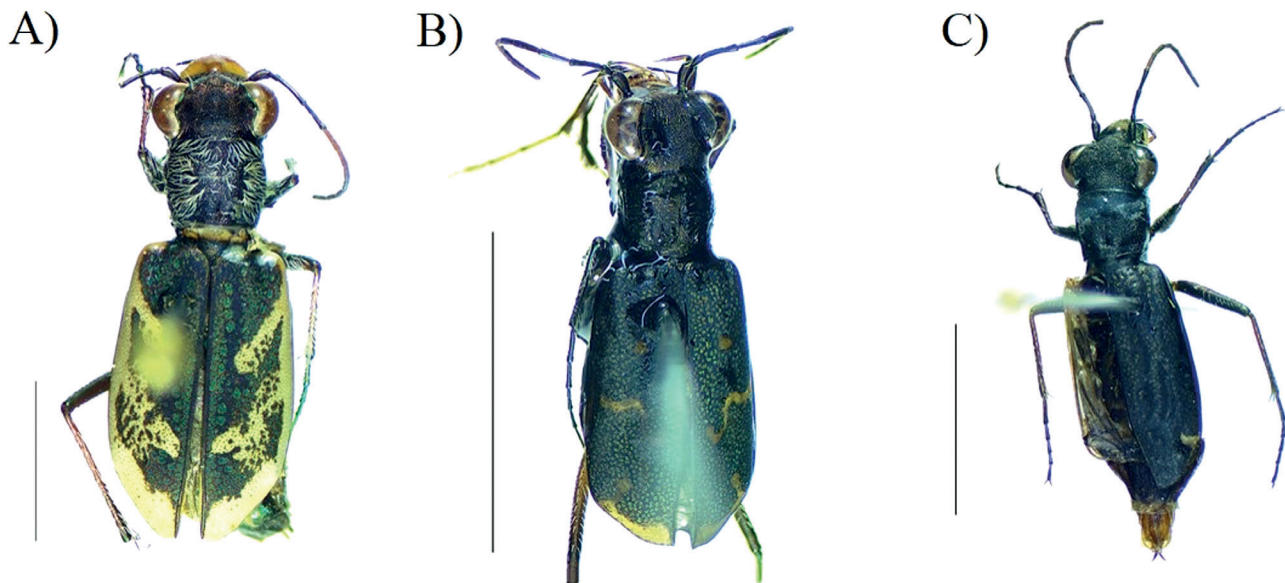
Tetracha affinis brevisulcata Horn, 1907

Material examined (71 specimens): BOQUERÓN “Fortín Toledo” (CIPLT-E 7263, 7264, 7265, 7266; leg. P.S.: 29 November 2018); PRESIDENTE HAYES “Laguna Capitán” (CIPLT-E 7257, 7258; leg. P.S.: 27 November 2018); ÑEEMBUCÚ “Pilar Military Base” (CIPLT-E 7260, 7261; leg. B.L.P.: 16 December 2018); (CIPLT-E 7476, 7477, 7478; leg. B.L.P. & Jack H. McBride: 23 November 2019); (CIPLT-E 7471, 7472; leg. R.W. & B.L.P.: 10 December 2019); (CIPLT-E 7463, 7464, 7465, 7466, 7467, 7468, 7479, 7480; leg. R.W. & B.L.P.: 27 December 2019); (CIPLT-E 7482; leg. R.W. & B.L.P.: 01 January 2020); “Ciudad de Pilar” (CIPLT-E 7259; leg. B.L.P.: 16 December 2018); “Pilar Military Base” (CIPLT-E 7211; leg. B.L.P.: 21 March 2019); (CIPLT-E 7475; leg. R.W. & B.L.P.: 23 November 2019); (CIPLT-E 7473; leg. R.W. & B.L.P.: 10 December 2019); (CIPLT-E 7469, 7470, 7481; leg. R.W. & B.L.P.: 27 December 2019); “Pilar Military Base” (CIPLT-E 8791, 8792, 8793, 8794, 8795, 8796, 8798, 8799, 8800, 8801, 8802, 8803, 8804, 8805, 8805, 8806, 8807, 8808, 8809, 8810, 8811, 8812, 8813, 8814, 8815, 8816, 8817, 8818, 8819, 8820, 8821, 8822, 8823, 8824, 8825, 8826, 8827, 8828, 8829, 8830, 8831, 8832, 8833, 8834, 8835, 8836, 8837, 8838; R.W. & B. L. P.: 17 February 2020; SAN PEDRO “Rancho Laguna Blanca” (CIPLT-E 7131, 7132, 7133; leg. unknown: 17 February 2016).

Table 2 – Geographic co-ordinates of mentioned specimen collection localities.

| Locality | Department | Co ordinates |
|------------------------------|------------------|------------------------------|
| Agroindustrial Kanindeyú S.A | Alto Paraná | -24.38'11" S, -54. 53' 19" W |
| Fortín Toledo | Boquerón | -22.12'37"S -60.26'60"W |
| Parque Nacional Caaguazú | Caazapá | -26.04'79"S -55.44'42"W |
| Reserva Bosque Mbaracayú | Canindeyú | -24.05'86"S -55.27'06"W |
| Pro Cosara/ Nueva Gambach | Itapúa | -26.38'23"S -55.39'89"W |
| Ciudad de Encarnación | Itapúa | -27.20'43"S -55.50'81"W |
| Ciudad de Pilar | Ñeembucú | -26.50'95"S -58.18'29"W |
| Estancia Santa Ana | Ñeembucú | -26.51'38"S -58.03'44"W |
| Military Base, Pilar | Ñeembucú | -26.50'60"S -58.18'46"W |
| Laguna Capitán | Presidente Hayes | -22.32'00"S -59.40'83"W |
| Rancho Laguna Blanca | San Pedro | -23.48'53"S -56.17'36"W |

Fig. 1 – Dorsal habitus photos of new country records. **A**, *Cylindera eugeni*; **B**, *Brasiella misella misella*; **C**, *Cylindera obsoletesignata*. Scale bars = 5mm.



Distribution. Previously documented from Alto Paraguay, Boquerón and Presidente Hayes departments, in the Dry and Humid Chaco west of the Paraguay River (Sawada & Wiesner 2002). The species presence in Ñeembucú (also associated with the Humid Chaco ecoregion) is perhaps to be expected, but the San Pedro records extend the distribution to the Cerrado region. The specimens reported here are also the first Paraguayan reports from east of the Paraguay River.

Comments. The species was found predominantly at trapping-sites straddling the boundary between a dirt road and forest (56 specimens), with two specimens found at forest sites 20m away from said boundary, and a further seven specimens found at sites on the forest- grassland edge. This apparent affinity for open habitats is consistent with previous ecological findings for the *Tetracha* genus (Adis et al. 1998; Cividanes et al. 2010; 2017).

Tetracha brasiliensis brasiliensis (Kirby, 1818)

Material examined (15 specimens): ALTO PARANÁ “Agroindustrial Kanindeyú S.A.”, (CIPLT-E 7491, 7492; leg. Lorenzo Bertolla: 15-18 December 2019); **ÑEEMBUCÚ** “Caballero Paso” (CIPLT- E 7462; leg. Julio R. Contreras: 04 December 2013); “Estancia Santa Ana” (CIPLT-E 7497, 7498, 7499, 7500; leg. R.W.: 07 February 2020); “Ciudad de Pilar” (CIPLT- E 7455; leg. Julio R. Contreras: 04 January 2013); (CIPLT- E 7458; leg. Julio R. Contreras: 06 January 2013); (CIPLT- E 7460; leg. Julio R. Contreras: 12 February 2013); (CIPLT- E 7456; leg. Julio R. Contreras: 02 April 2013); (CIPLT- E 7459; leg. Julio R. Contreras: 03 December 2013); (CIPLT- E 7454, 7461; leg. Julio R. Contreras: 04 December 2013); (CIPLT- E 7457; leg. Julio R. Contreras: 12 December 2013).

Distribution. A fairly widespread species in eastern Paraguay with a generalist habitat association. Previous specimens have been collected in Amambay, Caazapá, Central, Concepción, Cordillera, Guairá, Itapúa, Misiones and San Pedro in the Cerrado, Atlantic Forest and Mesopotamian Grassland ecoregions; and a pair of specimens from the Dry Chaco of Boquerón (Sawada & Wiesner 2002). The specimens from Ñeembucú extend the distribution to the Humid Chaco ecoregion of Paraguay.

Comments. One of the treated specimens was collected in a pitfall trap, in a grassland site.

Tetracha lafertei Thomson, 1857

Material examined (4 specimens): ITAPÚA “Pro Cosara/Estancia Nueva Gambach” (CIPLT-E 7429, 7430, 7431, 7432; leg. R.W.: 07 January 2020).

Distribution. Previous records from Amambay, Concepción and Guairá in the Cerrado and Atlantic Forest ecoregions (Sawada & Wiesner 2002). The specimens reported here are also from the Atlantic Forest ecoregion.

Tetracha pseudodistinguenda Horn, 1905

Material examined (1 specimen): ITAPÚA “Isla Yacyretá” (MNHNP-HX 588; leg. B. Barrios & E. Ibarra: 17 January 1993).

Distribution. Sawada & Wiesner (2002) report specimens from Alto Paraguay, Boquerón, Central, Guairá and Presidente Hayes departments in Dry and Humid Chaco and Atlantic Forest ecoregions. The Itapúa specimen is from the Mesopotamian Grasslands ecoregion.

Comments. The specimen listed here was collected in open bushy grasslands with “Ñangapiri” (*Eugenia uniflora*).

Discussion

The three new country records reported here are not surprising based on the known distribution of these species in neighbouring countries and are reflective of the limited sampling effort for this group in Paraguay. *Brasiella misella misella* was previously known from specimen records in Formosa Province, Argentina (Wiesner & Bandinelli 2014), just across the Rio Paraguay from the ecologically similar areas from which we report them in Paraguay. Similarly, our new records of *Cylindera obsoletesignata* and *C. eugeni* in the Humid Chaco (Ñeembucú and Presidente Hayes departments respectively) match previous records in the ecologically similar Chaco Province, Argentina (Wiesner & Bandinelli 2014).[?]

Amongst the first departmental records of tiger beetles from Ñeembucú department in extreme south-western Paraguay, two new country records were added, indicating the importance of aiming for complete geographical coverage in inventory work. With 10 species now known to occur in this department, it currently represents one of the more species-rich Paraguayan departments for this taxonomic group. It is of note that the majority of the collections examined from Ñeembucú were made within 25 km of Ciudad de Pilar, and that greater coverage of the department will no doubt add several other species to the Ñeembucú fauna.

This research contributes to the knowledge of the distribution and ecology of Paraguayan Cicindelidae and we hope that this can be a platform for future researchers interested in this group. Without doubt, the sampling of the tiger beetle fauna of Paraguay is far from complete.

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