

RESEARCH PAPER

New records of *Platynectes* (s. str.) diving beetles from South America with description of two new species (Coleoptera: Dytiscidae: Agabinae)

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Abstract. Diving beetles in the genus *Platynectes* (s. str.) in South America are relatively large and charismatically colored, yet relatively rare in museum collections. Recent fieldwork in northern and central South America has resulted in the collection of hundreds of new specimens that substantially expand our distributional knowledge of the genus. Here, we provide new distributional records for *Platynectes decemnotatus* (Aubé, 1838), *P. garciai* Gustafson, Short & Miller, 2016, *P. submaculatus* (Laporte, 1835), and *P. tafelbergensis* Gustafson, Short & Miller, 2016. In addition, two new species were identified and described herein: *Platynectes bicolor* sp. nov. of the *P. ornatifrons* species group from Brazil (Goiás and Mato Grosso do Sul), and *P. colombicus* sp. nov. of the *P. submaculatus* species group from the Guiana Shield region of eastern Colombia. These new records suggest that *Platynectes* (s. str.) is likely widespread across the Brazilian and Guiana Shield regions of the continent, and that some individual species have substantial range sizes of nearly 2000 km. An updated key to the species groups of Neotropical *Platynectes* (s. str.) and to the species of *P. submaculatus* species group are provided.

Key words. Coleoptera, Dytiscidae, *Platynectes*, taxonomy, new species, new records, key, Amazonia, Brazil, Colombia, Guiana Shield, Neotropical Region

Zoobank: <http://zoobank.org/urn:lsid:zoobank.org:pub:9D3BD503-9738-49FC-8580-87A09B54D4E0>

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Introduction

The genus *Platynectes* Régimbart, 1879, with more than 60 described species, occurs in the Neotropics as well as much of the Indomalayan and Australian Regions. The genus was very poorly known in South America both taxonomically and phylogenetically until just a few years ago. TOUSSAINT et al. (2017) conducted a large-scale phylogenetic analysis of the Platynectini that revealed that the Neotropical species were divided into two unrelated clades: ‘CII’ which contains those species occurring in the Guiana and Brazilian Shields, and ‘CV’ which contained species occurring in the Andes. GUSTAFSON et al. (2016) examined the taxonomy of species occurring in ‘CII’ clade, and created three species groups based primarily on the coloration and morphology of the venter (for further historical discussion of

the taxonomy of Neotropical *Platynectes*, see GUSTAFSON et al. 2016). Further, TOUSSAINT & SHORT (2016) examined the historical biogeography of ‘CII’, who concluded its widely disjunct distribution between the Guiana Shield and the Atlantic Shield was most likely due to dispersal, but noted the absence of any records from central Brazil was a mystery.

Recent fieldwork in South America across both the Guiana and Brazilian Shields has resulted in the discovery of two new species as well as greatly expanded the known distribution of the genus on the continent, including in the critical central Brazilian region that had remained a ‘black box’ for *Platynectes*. In this contribution, we describe these two new species and provide updated distributions to the previously described species in ‘CII’ sensu TOUSSAINT et al. (2017).



Material and methods

Depositories of examined material. The material examined is deposited in the following collections:

BMNH	Natural History Museum, London, United Kingdom (C. Taylor);
CBDG	Center for Biological Diversity, University of Guyana, Georgetown, Guyana;
INPA	Instituto Nacional de Pesquisas da Amazônia, Manaus, AM, Brazil (N. Hamada);
IvH	Instituto Alexander von Humboldt, Villa de Leyva, Colombia (J. Neita);
NHMW	Naturhistorisches Museum in Wien, Vienna, Austria (M. A. Jäch, A. Komarek);
NZCS	National Zoological Collection of Suriname, Paramaribo, Suriname (V. Kadosoe);
SEMC	Snow Entomological Collection, University of Kansas, Lawrence, KS, USA (A. Short).

Comparative type material examined (Figs 4–5).

Platynectes ornatifrons Sharp, 1882: SYNTYPE (BMNH): labelled: 'Type 828 / *Platynectes / ornatifrons / Brazil . n.sp.*' [white label, handwritten black ink, handwriting appears to be Sharp's] 'Sharp Coll. / 1905-313.' [white label, printed black ink] 'Brazil int. / 828' [white label, handwritten black ink].

Platynectes parananus Sharp, 1882: HOLOTYPE: ♂ (BMNH), labelled: 'Type 830. / a. parananus / Parana' [white label, handwritten black ink, handwriting appears to be Sharp's] 'Parana / 830.' [white label, handwritten black ink] 'Sharp Coll. / 1905-313.' [white label, typed black ink].

Morphology. Specimens were examined using an Olympus SZ61 microscope. Measurements were taken with a millimeter ruler and an ocular scale. Measurements taken follow LARSON et al. (2000) for WC/WS and HENDRICH & ŠŤASTNÝ (2014) for TL and TL-H.

Specimens for dissections and imaging were relaxed by placing them in lightly boiling water. The genitalia were then dissected and placed in warm 10% KOH for about five minutes. Following removal from KOH, the genitalia were placed in glacial acetic acid to neutralize the base, then washed in water. After dissection and/or illustration, genitalia were placed in microvials attached to the pin with the original specimens.

Images of the genitalia were taken on an Olympus SZX16 microscope with attached Olympus DP72 camera. Dorsal habitus was taken using a Visionary Digital BK+ light imaging. Images were edited using Adobe Photoshop to improve clarity and color. Distribution maps were generated using SimpleMapp (SHORTHOUSE 2010).

Molecular methods. Total genomic DNA was extracted using a DNeasy kit (Qiagen, Alameda, CA). We used the COI primers and PCR protocols as given in SHORT & FIKÁČEK (2013). DNA sequences were assembled and edited in Geneious R 8.0.5 (Biomatters, <http://www.geneious.com/>). New sequences were deposited in GenBank (accession #s MT623378–MT623392, Table 1). We used IQ-TREE 1.6.11 (NGUYEN et al. 2015) to infer phylogenetic relationships. The optimal model of substitution was selected using the Auto function in IQ-TREE 1.6.11. In order to assess nodal support, we performed 1000 ultrafast bootstrap replicates (MINH et al. 2013). We used the Australian *Platynectes decempunctatus* (Fabricius, 1775) to root the tree (GenBank accession #AY138767).

Table 1. List of specimens and GenBank accession numbers used in this study. Vouchers beginning with SLE are deposited in SEMC. Those beginning with MB are from TOUSSAINT et al. (2017). We found that the identities of two species given by TOUSSAINT et al. (2017) were inadvertently reversed: MB6299 is *P. decemnotatus* and MB6298 is *P. tafelbergensis*.

Taxon	Extraction	Country/State/Coordinates	NCBI Accession
<i>P. agallithoplotes</i>	MB6289	Venezuela	LN998304
<i>P. decemnotatus</i>	MB6299	Suriname	LN998307
<i>P. decemnotatus</i>	SLE1591	Brazil: Pará: 1.49292, -54.51566, BR18-0203-01F	MT623387
<i>P. decemnotatus</i>	SLE1595	Suriname: Sipaliwini: 2°00.342'N, 55°58.149'W (SR17-0331-01A)	MT623391
<i>P. decemnotatus</i>	SLE1597	Suriname: Sipaliwini: 4°42.48'N 56°13.15908'W (SR16-03-02A)	MT623392
<i>P. decemnotatus</i>	SLE1598	Suriname: Sipaliwini: 04°56.934'N, 55°10.825'W (SR17-0318-01B)	MT623389
<i>P. decemnotatus</i>	SLE1599	Suriname: Sipaliwini: Tafelberg (SR13-0319-05B)	MT623388
<i>P. decemnotatus</i>	SLE1809	Suriname: Sipaliwini: Kabalebo: 4.38302N, 57.21161W	MT623390
<i>P. garciai</i>	MB6288	Venezuela	LN998303
<i>P. garciai</i>	SLE1245	Suriname: Sipaliwini: 2°00.342'N, 55°58.149'W (SR17-0331-01F)	MT623384
<i>P. garciai</i>	SLE1590	Brazil: Roraima: 3°47.334'N, 61°42.570'W (BR18-0114-02A)	MT623386
<i>P. garciai</i>	SLE1592	Brazil: Pará: 1.49292, -54.51566 (BR18-0203-01F)	MT623385
<i>P. garciai</i>	SLE1594	Guyana: GY14-0316-01A	MT623383
<i>P. bicolor</i>	SLE1625	Brazil: Goiás: BR18-0221-01B	MT623378
<i>P. bicolor</i>	SLE1989	Brazil: Mato Grosso do Sul: BR18-0622-03D	MT623379
<i>P. submaculatus</i>	MB6301	Suriname	LN998308
<i>P. tafelbergensis</i>	MB6298	Suriname: Sipaliwini: Tafelberg	LN998306
<i>P. tafelbergensis</i>	SLE1562	Brazil: Rondonia: -10.91764, -62.377 (BR18-0710-02A)	MT623380
<i>P. tafelbergensis</i>	SLE1596	Suriname: Brokopondo: 04°56.934'N, 55°10.825'W (SR17-0317-01A)	MT623381
<i>P. tafelbergensis</i>	SLE1601	Suriname: Sipaliwini: Tafelberg (SR13-0818-03A)	MT623382

Results of molecular analysis

Amplifications for COI were successful except for specimens of *P. tafelbergensis* Gustafson, Short & Miller, 2016 from Manaus. The Maximum Likelihood analysis recovered the mostly newly sequenced specimens in well-supported clades corresponding to described species (Fig. 1). The maximum observed pairwise intraspecific distances were 0.2% (*P. garciai* Gustafson, Short & Miller, 2016), 0.3% (*P. decemnotatus* (Aubé, 1838)), and 2.1% (*P. tafelbergensis*). The specimens from the states of Goiás and Mato Grosso do Sul in central Brazil were confirmed as conspecific (only one bp difference between them) and represent a new species (Fig. 1).

Taxonomy

Platynectes (Platynectes) bicolor sp. nov.

(Figs 2, 6–7, 10–11, 15)

Type material. HOLOTYPE: ♂ (INPA), labelled: 'BRAZIL: Goiás State: Alto Paraíso County / -14.27741, -47.75075; 967 m / Rio dos Couros, nr. Alto Paraíso / small stream, roots & organic / matter on sand/rock; 21.ii.2018 / Benetti & team; BR18-0221-01B', 'DNA VOUCHER / Extraction #/ SLE-1625' (INPA). PARATYPES (2 exs): BRAZIL: GOIÁS STATE: Same data as holotype (1 ♀, SEMC). MATO GROSSO DO SUL STATE: c. 15 km E Aquidauana on plateau, -20.4509°, -55.6218°; 380 m,

22.vi.2018; leg. Hamada & team, Detritus and washing roots at margin of rock, BR18-0622-03D (1 ♂, SEMC, DNA Voucher SLE-1989).

Description. Body oval, evenly curved and continuous between pronotum and elytron, lateral margins slightly curved.

Coloration (Fig. 2). Head black, with yellow triangular shaped spot in the middle of head, between eyes; antenna and palpi dark reddish/orangish. Pronotum black with a yellow well-marked spot on anterolateral angles. Elytron black with two yellow spots, one small, slightly posterior of middle near lateral margin and one larger, subapical; epipleuron black with two orange spots near anterior inner margin. Prosternum and prosternal process dark reddish; metepisternum, metaventrite and metacoxal plates dark brown. Fore- and midlegs orangish; metalegs reddish. Abdominal ventrites orangish with a few, little darker area on ventrite II medially; posterior margin of last ventrite a little darker.

Head broad and short, anterior clypeal margin broadly rounded; entire dorsal surface of head with small irregular pentagonal cells, each cell with very fine punctures; clypeus with two short and deep impressed rows of punctures anteriorly; labrum anteriorly deep concave, with a row of setae.

Pronotum broad and short; lateral bead distinct and broad, evenly curved, about half width of antennomere V;

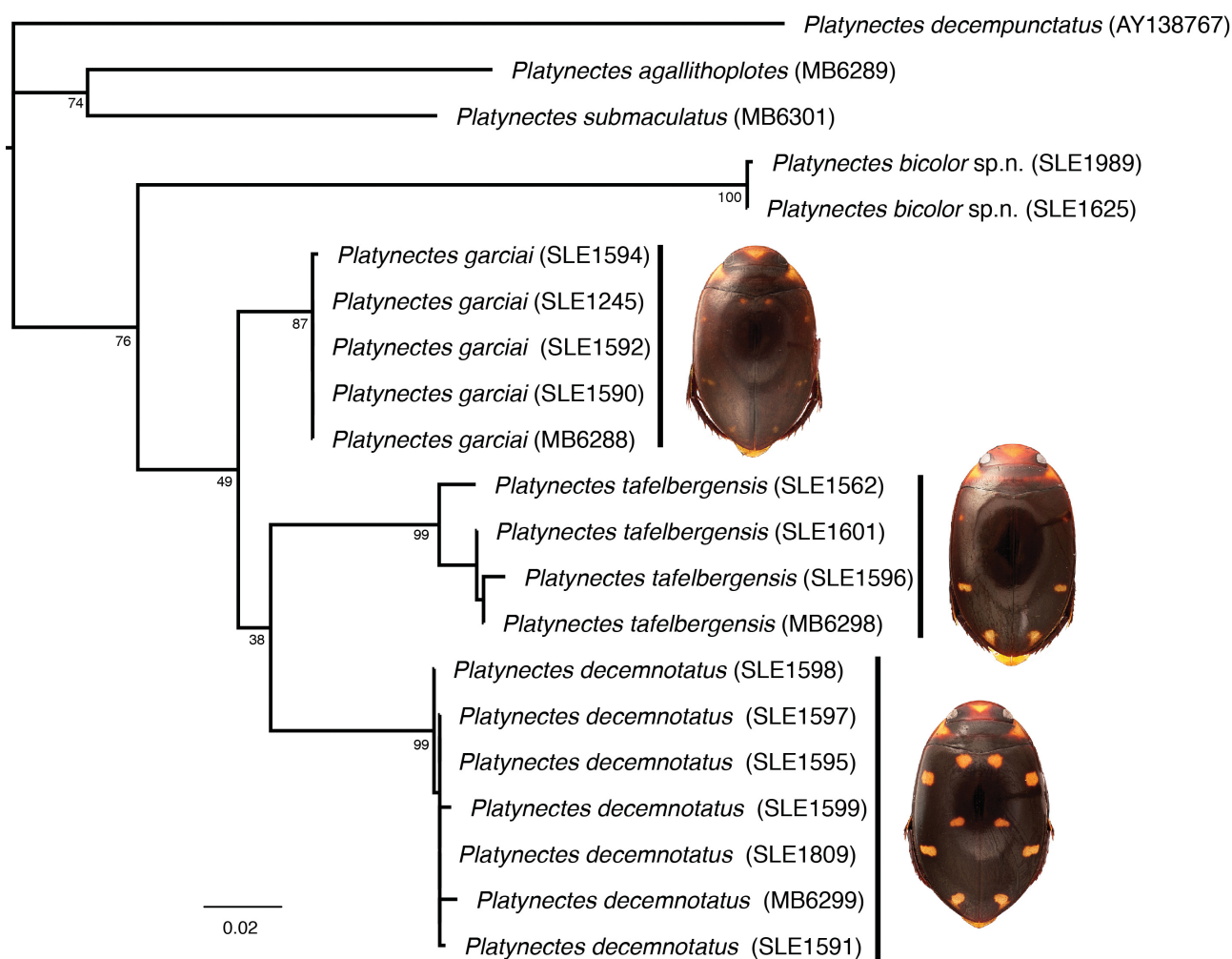


Fig. 1. Maximum Likelihood phylogeny of sequenced *Platynectes* (s. str.) specimens based on the gene COI.

posterior margin sinuous, medially produced; posterior angles rounded; surface shiny, covered with fine microreticulation of irregular rounded to pentagonal cells, cells with fine punctures.

Elytron with lateral margins mostly evenly curved to slightly angulate apex, lateral epipleural carina distinctly visible throughout length; surface covered with weakly impressed, but distinct microreticulation of large irregular cells, with fine punctures; elytral epipleuron with basally wide, suddenly narrowed on level of metacoxal and then evenly narrow, ending on level of ventrite IV.

Legs. Fore- and midlegs slender, surfaces finely punctate; protibial apices with largest spine longer than protarsomeres I+II; protarsal claws slender, evenly curved; mesotibial apices with longest spine about the length of mesotarsomeres I; mesotarsal claw elongate slender, slightly sinuate, with half the length of mesotarsomere I. Metatrochanter apically with anterior margin almost straight, with reticulation of transversal elongated cells; metafemur with fine well impressed reticulation composed of elongate cells, almost imperceptible weakly impressed punctation; metatibia with reticulation of transversal elongated cells; metatibial spurs slender, anterior slightly shorter than metatarsus I, posterior spur slightly longer than metatarsus I.

Ventral part. Prosternum medially moderately long, longitudinally swollen. Prosternal process broad, lateral margins curved to somewhat spatulate apex, slightly convex, and laterally margined; with fine punctures and weakly impressed reticulation. Metaventrite with anterior process broad, with broadly curved emargination for reception of prosternal process; lateral parts of metaventrite ('wings') narrow, WC/WS = 5; surface smooth, microreticulation well impressed, composed of elongate, irregular cells, punctation nearly imperceptible. Metaventral process with well impressed reticulation of transversal elongate cells. Metacoxae with microreticulation well impressed, composed of short, rectangular cells laterally and medially; punctation irregular, nearly imperceptible; metacoxal lines distinct, slightly divergent anteriorly. Abdominal ventrites broad, margined, smooth and unmodified, with fine weakly impressed reticulation, composed of irregular elongate transversal cells, punctation nearly imperceptible.

Male genitalia (Figs 6–7). Median lobe in left lateral (Fig. 6) view weakly curved, with nearly straight inner margin, apex rounded, weakly expanded, dorsal surface with small pores, nearly imperceptible; ventral groove in right lateral view (Fig. 7) narrow, even in width throughout its length.

Variation. The yellow spot on head is more triangular, with regular sides in females, more elongate shaped in male. Females also appear slightly wider and rounder in dorsal habitus than male. The yellow spots on the elytron are a little larger in the specimen from Mato Grosso do Sul.

Measurements. Male: TL = 6.0 mm, TL-h = 5.5 mm, TW = 3.5 mm; female: TL = 6 mm, TL-h = 5.5 mm, TW = 4.0 mm.

Differential diagnosis. Having venter primarily dark colored, but abdomen lightly colored, the new species is included in the *P. ornatifrons* species group. *Platynectes*

bicolor sp. nov. is most similar to *P. ornatifrons* having a darkly colored venter with orange abdomen, and elytra with four yellow maculae. However, it can readily be distinguished from *P. ornatifrons* by being smaller in size (6.0 mm compared to 7.25 mm) and having an evenly rounded habitus, compared to the more elongate oval appearance of *P. ornatifrons*. Additionally, the pronotal lateral margins of *P. bicolor* are straighter relatively to the more strongly arced and rounded appearing pronotal margins of *P. ornatifrons*. Finally, the elytral discal punctures forming a series of lines (serial punctures) that are present in *P. ornatifrons* are absent in *P. bicolor*, being obscured by denser elytral sculpturing. This latter character ('subserial punctures' easily distinguished) was used as a diagnostic feature by SHARP (1882) for *P. ornatifrons*.

Etymology. An adjective *bicolor* [= two-colored] referring to the contrasting coloration of the dorsal and ventral surfaces of the new species.

Habitat. Both series of specimens were collected from similar habitats: from small pools in rock with root mats near streams. The specimens from Goiás were not collected in the main river, but in a small side trickle over rock that also contained significant rootmat growth (Fig. 10). The specimen from Mato Grosso do Sul was collected by taking rootmat growing on rock in a side seepage and washing it in a pan of water (Fig. 11).

Distribution. This species is known from two distant localities (Fig. 15) but both situated on the Brazilian Shield.

Platynectes (Platynectes) colombicus sp. nov.

(Figs 3, 8–9, 14)

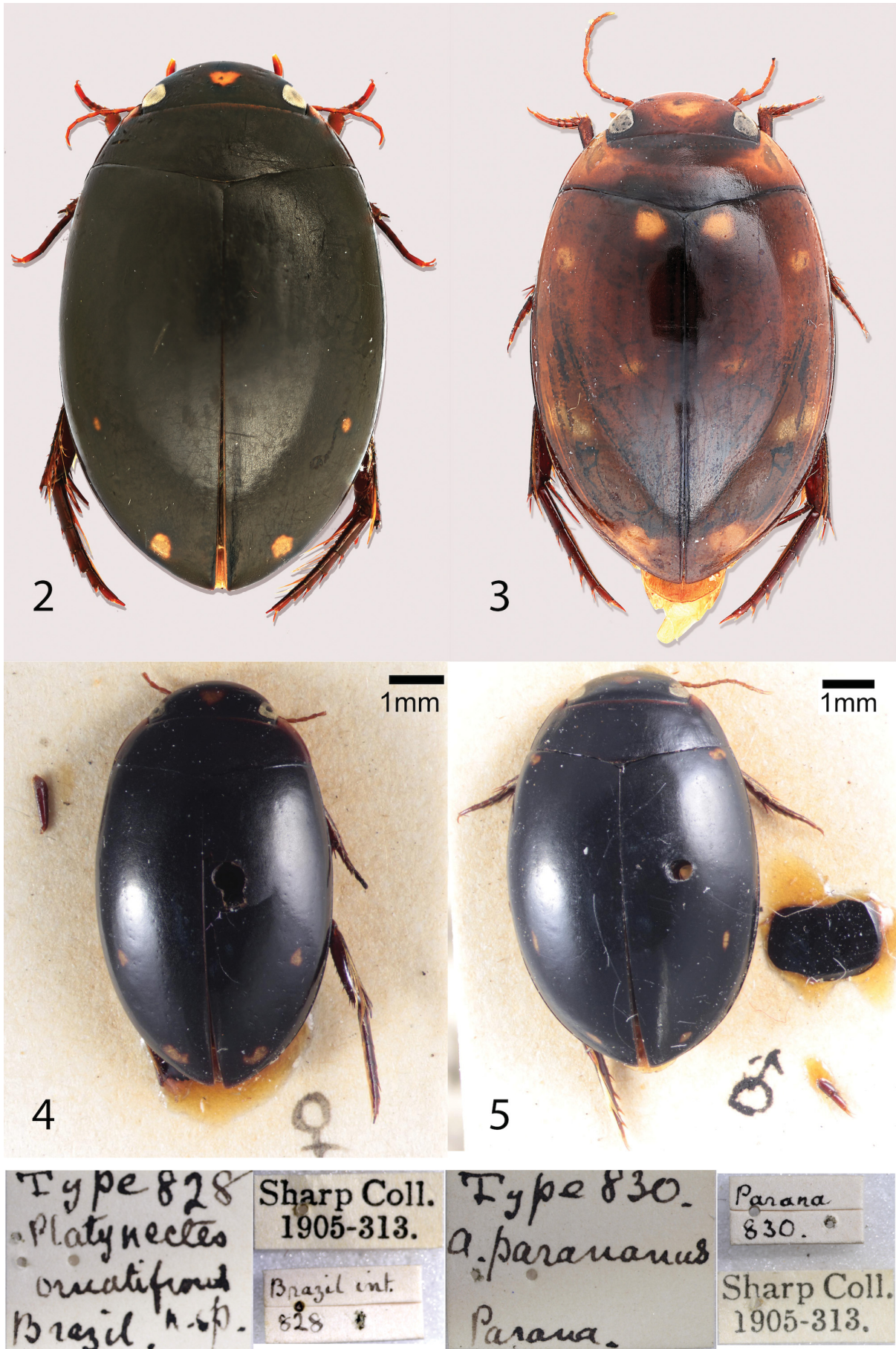
Type material: HOLOTYPE: ♂ (lvH), labelled: 'COLOMBIA: Meta / ca. 1.3km NE Jardin de las Peñas / 26.II.2015, leg. M.A. Jäch (CO9)', 'small stream / 740 m / 3°17'21.04"N 74°9'20.74"W'.

Description. Body evenly oval, lateral margins evenly curved and continuous between pronotum and elytron.

Coloration (Fig. 2). Head orange grading into diffuse, light yellow region medially on frons and testaceous to black medially and posteriad of eyes. Pronotum medially testaceous with two transverse darkly colored bands along anterior and posterior margins, posterolateral margins narrowly black, lateral surfaces yellow extending medially to dark region; scutellum testaceous. Elytron testaceous medially, more lightly colored laterally, with five yellow spots, one well-demarcated parascutellar spot, one posteriad of humeral region, one weakly-demarcated band-like spot slightly anterior of middle near suture, one slightly posterior of middle near lateral margin, and one large spot antepically. Appendages of head apically, propleuron, and epipleuron lighter orange in color, thoracic sterna and legs red in color; abdomen entirely orange in color.

Head broad and short, anterior clypeal margin weakly rounded; anterior surface of frons and clypeus with fine, dense punctation, posterior surface of head with fine microreticulation of irregular cells, most cells also with fine punctures.

Pronotum broad and short; lateral bead distinct and relatively narrow, weakly curved, similar in width to anterior epipleural carina; surface shiny, covered with fine



Figs 2–5. Dorsal habitus images of *Platynectes* spp. 2 – *P. bicolor* sp. nov.; 3 – *P. colombicus* sp. nov.; 4 – *P. ornatifrons* Sharp, 1882, syntype; 5 – *P. parananus* Sharp, 1882, holotype.



Figs 6–9. Median lobes of the aedeagus. 6–7 – *P. bicolor* sp. nov.: 6 – left lateral view; 7 – right lateral view. 8–9 – *P. colombicus* sp. nov.: 8 – left lateral view; 9 – right lateral view. Scale bars = 0.5 mm.

microreticulation of large, irregular cells, cells with fine punctures, additional punctation consisting of a row of large coarse punctures on anterior and posterior margins, punctures separated by ca. 1.0–2.0× diameter of a puncture anteriorly, ca. 1.5–4.0× diameter of a puncture posteriorly, absent medially.

Elytron broad, lateral margins evenly curved to apex, lateral epipleural carina distinctly visible throughout length, narrowing anterior to posteriorly; surface covered with weakly impressed, but distinct microreticulation of large irregular cells, most cells also with fine punctures; elytral epipleuron slender, evenly tapered to apex.

Legs. Fore- and midlegs slender, surfaces punctate, protibial apices with several spines about length of protarsomeres I+II; mesotibial apices with few spines shorter than length of mesotarsomeres I+II, mesotarsal spurs elongate slender, slightly sinuate, as long as mesotarsomeres I+II; metalegs slender, smooth, metafemur with fine reticulation composed of elongate cells, almost imperceptible, weakly impressed punctation, few setigerous punctures on anterior surface of metatibia and metatarsomere I, metatrochanter apically spinous, metatibial spurs slender, longer than metatarsus I.

Ventral part. Prosternum medially moderately long, longitudinally swollen; prosternal process broad, lateral margins broadly curved to broadly round apex, surface flat to slightly curved, smooth. Metaventricle with anterior process broad, with broadly curved emargination for reception of prosternal process; lateral parts of metaventricle (‘wings’) broad, WC/WS = 3; surface smooth, weakly impressed reticulation composed of elongate cells, fairly even covering of fine punctation. Metacoxae smooth, fine reticulation composed of round cells, fine and weakly impressed punctation present, metacoxal lines distinct, broadly divergent anteriorly. Abdominal ventrites broad, smooth and unmodified, with fine reticulation composed of elongate cells, fine weakly impressed punctation present.

Male genitalia (Figs 8–9). Median lobe in left lateral view (Fig. 8) weakly curved, apex rounded, weakly expanded, dorsal surface covered in pores in apical 2/3; ventral groove in right lateral view (Fig. 9) of even width basally to apically, abruptly narrowed in apical 1/8.

Variation. Only a single male specimen was available for study.

Measurements. TL = 7.0 mm, TL-h = 6.5 mm, TW = 4.5 mm.

Differential diagnosis. With venter not infuscate – reddish-orange throughout, the new species is included in the *P. submaculatus* species group. *Platynectes colombicus* sp. nov. is most similar to *P. decemnotatus* being larger in size with a body length greater than 6.6 mm and having 10 distinct yellow elytral maculae. However, it can readily be distinguished from *P. decemnotatus* by having a much narrower pronotal bead relative to the broad bead of *P. decemnotatus*. From the single specimen examined, *P. colombicus*, further differs in having a more evenly rounded dorsal habitus, relative to the broader and more anteriorly attenuated habitus of *P. decemnotatus*. Finally, the median lobe of the aedeagus will unambiguously distinguish the two species, being weakly curved in *P. colombicus* with a rounded apex, compared to the more strongly curved median lobe of *P. decemnotatus* which has a more acutely pointed apex.

Etymology. Named in honor of the country of Colombia, from which the unique type specimen was collected; the name is an adjective.

Distribution. This species is known from a single specimen from the Sierra de Macarena in Central Colombia (Fig. 14).

New records

Platynectes (Platynectes) decemnotatus (Aubé, 1838)

New material examined (98 exs). **BRAZIL**: **AMAZONAS**: Amazonas State, Manaus County, Reserva Ducke (02°55'51" S 059°58'59" W), 15.iii.2004, leg. L. Montel (1 ex., INPA); Presidente Figueiredo County, AM 240, ‘Igarapé Sr. José’ (02°01'07" S 059°49'28" W); 05.ix.2000; leg. A.M.O. Pes (7 exs., INPA). **PARÁ**: Alenquer, Vale do Paraíso, ca. 55 km N. Alenquer, -1.49292, -54.51566, 150 m, 3.ii.2018, leg. Short, pool with rock sand detritus, BR18-0203-01E (5 exs., SEMC); same data but isolated detrital pool, BR18-0203-01F (30 exs., INPA, SEMC, including DNA voucher SLE1591); same data but in margins along river at night, BR18-0203-01I (2 exs., SEMC). **RORAIMA**: Amajari County, Serra do Tepequém, igarapé do silêncio, 03°46'50.2" N 061°45'22.1" W, 14.i.2018,



Figs 10–11. Habitat of *Platynectes bicolor* sp. nov. 10 – Brazil: Goiás, collecting event BR18-0221-01B; 11 – Brazil: Mato Grosso do Sul, collecting event BR18-0622-03D. Arrows indicate rootmat microhabitat where specimens were collected. The water was clear in both stream-seepages; the pictures were taken after the water was muddied by collecting efforts.

leg. C.J. Benetti, L. Santana & A. Short (3 exs, INPA). **FRENCH GUIANA:** Mt. Chauve, 22.iv.1997, leg. R. Garrouste (1 ex., MNHN); Mitaraka, 25.iii.2001, leg. R. Garrouste (2 exs, MNHN, SEMC); same data but “03/01” (2 exs, MNHN, SEMC); Roura, “Montagne de Roura” (04°43'27"N 052°19'37"W), 23.xi.2007, leg. D. Lohez (7 exs, INPA). **SURINAME: BROKOPONDO DISTRICT:** Brownsberg Nature Park, near Capaci House, 04 56.934'N, 55 10.825'W, 460 m, 17.iii.2017, leg. A.E.Z. Short, various collections: small stream, SR17-0317-01A (2 exs, SEMC), small stream at night, SR17-0317-01C (7 exs, SEMC, NZCS, NMW); small stream, SR17-0317-01D (4 exs, SEMC); forested pool, SR17-0317-01E (3 exs, SEMC); same locality but 18.iii.2017; Same locality but Leo Val/Irene Val trail loop, leg. A.E.Z. Short & S. Baca, stream, SR17-0318-01A (1 ex., SEMC); same data but leg. S. Baca & B. Johnson, stream, SR17-0318-01B (1 ex., SEMC, DNA voucher SLE1598); same data but leg. S. Baca & class, stream at night, SR17-0318-01F (1 ex., SEMC); Same locality but Witt Kreek, small side stream, 21.iii.2017, leg. Short & Baca, SR17-0321-01D (2 exs, SEMC). **SIPALIWINI DISTRICT:** Central Suriname Nature Reserve: Tafelberg Summit, near Caiman Creek Camp, 19.viii.2013, leg. Short & Bloom, detrital pools in forest, SR13-0819-05B (1 ex., SEMC, DNA voucher SLE1599); Raleighvallen Nature Reserve, 4°42.48'N 56°13.15908'W, 250 m, 14.iii.2016, leg. E. Toussaint & J. Giron, pool in fallen tree, SR16-0314-02A (3 exs, SEMC, DNA Voucher SLE1597); Sipaliwini Savannah Nature Reserve, Four Brothers Mountains, 2 00.342'N, 55 58.149'W, 337 m, 31.iii.2017, leg. S. Baca, small rocky creek SR17-0331-01A (6 exs, SEMC, including DNA voucher SLE1595); Kabalebo Nature Resort, Charlie Falls, 4.38302N, 57.21161W, 174 m, 11.iii.2019, leg. Short & class, SR19-0311-01A (5 exs, SEMC, NZCS; including DNA Voucher SLE-1809).

Distribution. The species has a known range extending from the northeast coast of South America to the Amazon River. Originally described from French Guiana (‘Cayenne’), GUÉORGUIEV (1972) extended its range to Suriname and northern Brazil (Manaus). GUSTAFSON et al. (2016) and BENETTI et al. (2019) subsequently provided additional distribution records from Suriname and Brazil respectively. Here, we report five new localities from Suriname and French Guiana, as well as another locality in Pará State, Brazil (Fig. 13).

Remarks. The five sequenced populations (four from Suriname, one from Brazil) display almost no genetic divergence in COI, both affirming the broad distribution of this species and suggesting it has a high degree of population connectivity throughout its range.

Platynectes (Platynectes) garciai Gustafson, Short & Miller, 2016

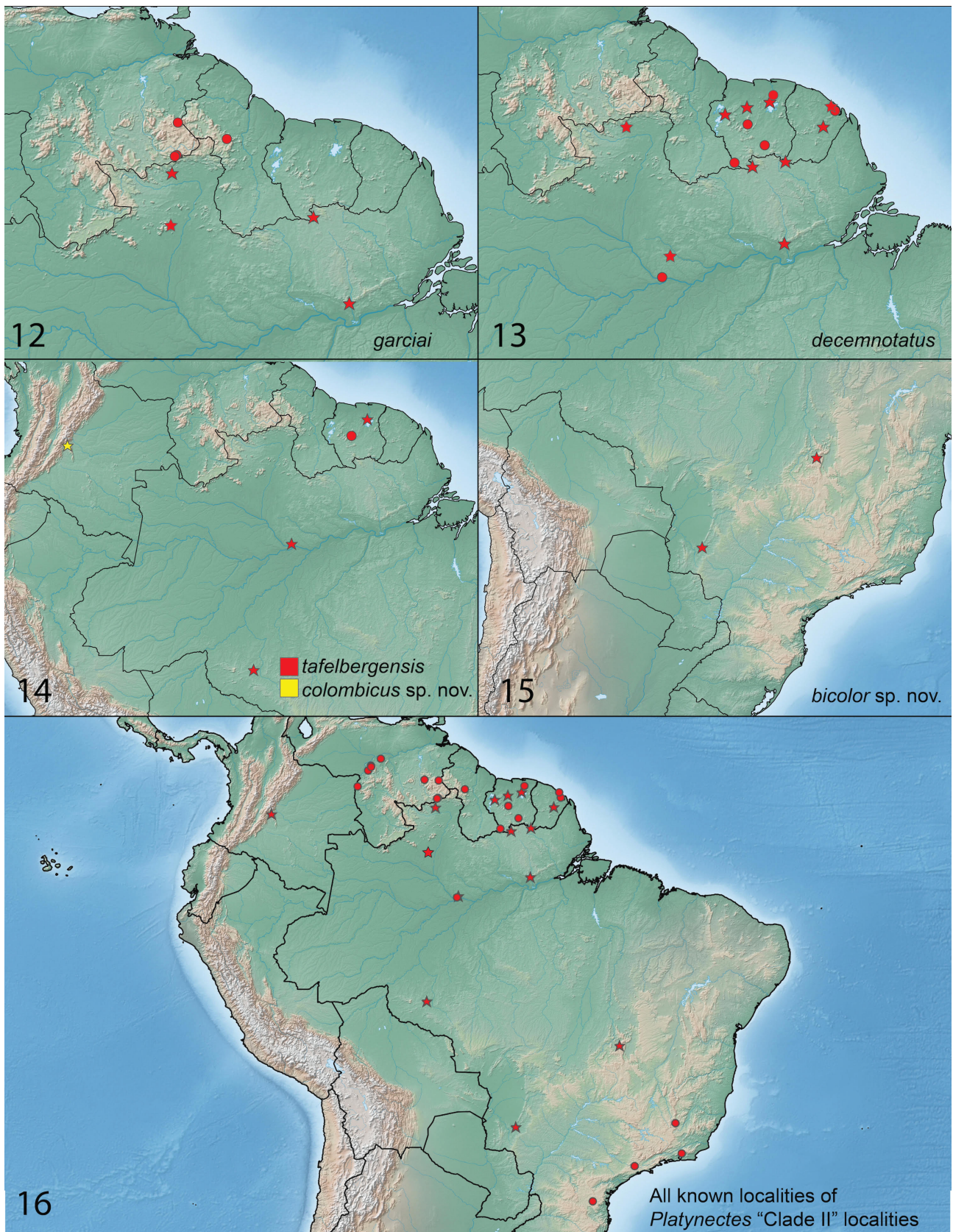
New material examined (23 exs). **BRAZIL: PARÁ:** Vale do Paraíso, ca. 55 km N. Alenquer, -1.49292, -54.51566, 150 m, 3.ii.2018, leg. Short & Benetti, pool with rock sand detritus, BR18-0203-01E (11 exs, INPA, SEMC, including DNA voucher SLE1592); same data but isolated detrital pool, BR18-0203-01F (1 ex., SEMC). **RORAIMA:** Amajari County, 3 47.334'N, 61 42.570'W, Serra do Tepequém, 14.i.2018, leg. A. Short, C. Benetti, & L. Santana, small forested stream, BR18-0114-02A (6 exs, INPA, SEMC, DNA voucher SLE1590); Caracará County, Serra da Moxidade, igarapé (stream), 1.60275 N 061.900044 W, 17.i.2016, leg. K.D. Silva (1 ex., INPA). **GUYANA:** GY14-0316-01A (1 ex., SEMC, DNA voucher SLE 1594). **SURINAME: SIPALIWINI DISTRICT:** Sipaliwini Savannah Nature Reserve, Four Brothers Mountains, 2 00.342'N, 55 58.149'W, 337 m, 31.iii.2017, leg. A.E.Z. Short, sandy bottom stream with emergent vegetation at night, SR17-0331-01F (3 exs, SEMC, including DNA voucher SLE1245).

Distribution. Described from a cluster of closely situated localities in southeastern Venezuela and western Guyana, we here extend the distribution south to the Amazon River (Fig. 12). We found one specimen on the summit of the Serra do Tepequem, a low Tepui formation in northern Brazil near the border with Venezuela; this locality is very close to its existing distribution. We were surprised, however, when we found specimens on an inselberg in the Sipaliwini Savannah along the southern border of Suriname, and even more surprised when we encountered it near in a rocky stream in the foothills to the Amazon River in Pará State, Brazil.

Remarks. Despite the large range from La Escalera region of Venezuela to the Amazon River, COI sequences for populations from Brazil, Guyana, Venezuela and Suriname are nearly identical (Fig. 1).

Platynectes (Platynectes) submaculatus (Laporte, 1835)

New material examined (23 exs). **SURINAME: BROKOPONDO DISTRICT:** Brownsberg Nature Park, near Capaci House, 04 56.934'N, 55 10.825'W, 460 m, 17.iii.2017, leg. A.E.Z. Short, various collections: small stream, SR17-0317-01A (1 ex., SEMC), small stream at night, SR17-0317-01C (15 exs, SEMC, NZCS); small stream, SR17-0317-01D



Figs 12–16. Distribution of *Platynectes* 'Clade II' sensu TOUSSAINT et al. (2017) in South America. Circles represent previously published localities; stars represent localities newly reported in this paper.

Table 2. Updated checklist of the Neotropical *Platynectes* sensu stricto species.

<i>Platynectes agallithoplotes</i> species group	
<i>Platynectes agallithoplotes</i> Gustafson, Short & Miller, 2016	Venezuela: Central
<i>Platynectes submaculatus</i> species group	
<i>Platynectes colombicus</i> sp. nov.	Colombia: Central
<i>Platynectes decemnotatus</i> (Aubé, 1838)	Brazil: Northern; French Guiana; Suriname
<i>Platynectes elaskanaima</i> Gustafson, Short & Miller, 2016	Venezuela: SE part: Ayuán-tepui
<i>Platynectes garciai</i> Gustafson, Short & Miller, 2016	Brazil: Northern; Guyana, Suriname; Venezuela
<i>Platynectes meru</i> Gustafson, Short & Miller, 2016	Venezuela: SW part
<i>Platynectes submaculatus</i> (Laporte, 1835)	French Guiana; Suriname
<i>Platynectes tafelbergensis</i> Gustafson, Short & Miller, 2016	Brazil: Northern, Central; Suriname
<i>Platynectes nigerrimus</i> species group	
<i>Platynectes nigerrimus</i> (Aubé, 1838)	Brazil: Minas Gerais
<i>Platynectes undecimguttatus</i> (Aubé, 1838)	Brazil: Sao Paulo
<i>Platynectes ornatifrons</i> species group	
<i>Platynectes bicolor</i> sp. nov.	Brazil: Goiás, Matto Grosso do Sul
<i>Platynectes ornatifrons</i> Sharp, 1882	Brazil: 'interior', Paraná
<i>Platynectes parananus</i> Sharp, 1882	Brazil: Paraná*, São Paulo

*) In the original description of *P. parananus*, SHARP (1882) lists the type locality simply as 'South America, (Parana)'. The name Parana could be associated with a variety of geographic and political entities in the 19th century. While GUSTAFSON et al. (2016) followed GUÉORGUIEV (1972) and BLACKWELDER (1944) in interpreting SHARP's (1882) locality as referring to Paraná, Entre Ríos, Argentina, however, we find it more likely this is actually in reference to Paraná State, Brazil (NILSSON & HÁJEK 2020), and have updated the checklist to the South American *Platynectes* species.

(1 ex., SEMC); forested pool, SR17-0317-01E (1 ex., SEMC); same locality but 18.iii.2017, leg. S. Baca & B. Johnson, Leo Val/Irene Val trail loop, stream, SR17-0318-01B (2 exs, SEMC); Kabalebo Nature Resort, Charlie Falls, 4.38302N, 57.21161W, 174 m, 11.iii.2019, leg. Short & class, SR19-0311-01A (3 exs, SEMC, NZCS).

Distribution. This species has been recorded across Guyana, Suriname, and French Guiana.

Remarks. The species was previously reported from Brownsberg Nature Park in Suriname. The Kabalebo specimens represent a new locality record in Suriname.

***Platynectes (Platynectes) tafelbergensis*
Gustafson, Short & Miller, 2016**

New material examined (73 exs). **BRAZIL:** AMAZONAS: Manaus County, Ducke Reserve, Igarapé Acará, 8.vi.2018, Forested pools and depressions with lots of detritus, leg. Short, BR18-0608-01A (4 exs, INPA, SEMC, including DNA Voucher SLE1999); Manaus County, Estrada da Praia Dourada, 3°01'40"S 060°04'43"W, 24.iv.2015, leg. C.J. Benetti (1 ex., INPA); Reserva Ducke, Igarapé Bolívia, 02°59'14"S 059°56'30"W, 07.vii.2002, leg. C.J. Benetti (1 ex., INPA). **RONDÔNIA:** Vale do Cachoeiras, -10.91764, -62.377, 359 m, 10.vii.2018, leg. Short, margin of small sandy-bottom stream, BR18-0710-02A (65 exs, including DNA voucher SLE1562; INPA, SEMC, NMW). **SURINAME:** BROKOPONDO **DISTRICT:** Brownsberg Nature Park, near Capaci House, 04 56.934'N, 55 10.825'W, 460 m, 17.iii.2017, leg. A.E.Z. Short, small stream, SR17-0317-01A (1 ex., SEMC; DNA voucher 1596). **SIPALIWINI DISTRICT:** Central Suriname Nature Reserve: Tafelberg Summit, near Caiman Creek Camp, leg. Short & Bloom, small stream, SR13-0818-03A (1 ex., SEMC, DNA Voucher SLE1601).

Distribution. This species was originally described from a series of specimens from the summit of Tafelberg Tepui in central Suriname. In 2016, we found one specimen in

a small creek at Brownsberg Nature Park in Suriname demonstrating the species was not an endemic to Tafelberg. We were however, tremendously surprised to find series of this species at the Ducke Reserve in Manaus, and in a stream in Rondônia State, Brazil (Fig. 14). The collecting event in Rondônia consisted of hundreds of specimens, and more could have been collected.

Remarks. Despite the more than 1,900 km distance between populations from Suriname and Rondônia, Brazil, the maximum genetic distance in COI is remarkably only 2.1% (Fig. 1).

**Key to the South American *Platynectes* (s. str.)
species groups**

- 1 Venter primarily pale colored, at most infuscate medially on metaventrite, metaventral wings, and abdomen. Northern South America. 2
- Venter primarily dark colored, mostly black to brown except on the prosternum and epipleura and in some species, the abdomen as well. Brazil. 3
- 2 Venter not infuscate, reddish-orange throughout.
..... ***P. submaculatus* species group**
- Venter distinctly infuscate, usually with metaventrite, metacoxal wing, and abdomen medially infuscate.
..... ***P. agallithoplotes* species group**
- 3 Abdomen darkly colored.
..... ***P. nigerrimus* species group**
- Abdomen lightly colored.
..... ***P. ornatifrons* species group**

Key to the species of the *P. submaculatus* species group

- 1 Elytra with 10 distinct yellow maculae. 2
- Elytra with fewer than 10 distinct yellow maculae. ... 6
- 2 Body length usually greater than 6.6 mm. 3
- Body length less than 6.6 mm, rarely more than 6.5 mm. 4
- 3 Pronotal lateral bead broad, anteriorly ca. 2× wider than anterior epipleural carina; median lobe with apex strongly pointed and triangular. Brazil, Suriname and French Guiana. *P. decemnotatus* (Aubé, 1838)
- Pronotal lateral bead narrow, similar in size to anterior epipleural carina throughout its length; median lobe with apex rounded, not triangular. Colombia.
..... *P. colombicus* sp. nov.
- 4 Total body length at most 5.0 mm, often smaller; WC/WS = 5. Venezuela (Amazonas State).
..... *P. meru* Gustafson, Short & Miller, 2016
- Total body length greater than 5.0 mm; WC/WS = 4. 5
- 5 Body form parallel-sided and elongate; larger, body length = 6.1–6.5 mm; antennae filiform. Venezuela (Bolívar State).
..... *P. elaskanaima* Gustafson, Short & Miller, 2016
- Body form more evenly rounded and not elongate; smaller, body length = 5.3–5.9 mm; antennae subserrate. Suriname and French Guiana.
..... *P. submaculatus* (Laporte, 1835)
- 6 Larger, body length = 6.6–6.7 mm; brown, usually with two distinct parascutellar maculae. Brazil, Suriname, and Venezuela.
..... *P. garciai* Gustafson, Short & Miller, 2016
- Smaller, body length = 5.8–6.5 mm; less brown, darker, never with parascutellar maculae. Suriname and Brazil.
..... *P. tafelbergensis* Gustafson, Short & Miller, 2016

Discussion

The discovery of a new species of *Platynectes* s. str. with a primarily dark colored venter but a lightly colored abdomen resulted in closer examination of the available descriptions for species GUSTAFSON et al. (2016) placed within the *P. nigerrimus* species group. SHARP's (1882) original descriptions of *P. ornatifrons*, *P. nigerrimus* (Aubé, 1838), and *P. parananus* only mention a reddish color of the anterior margins of the 'thorax', without indication to the color of the abdomen. GUÉORGUIEV (1972) describes both *P. ornatifrons* and *P. parananus* as having lightly colored abdomens (yellowish in the former, and reddish in the latter), however, GUÉORGUIEV (1972) does not indicate that any type material was examined. We received images of a syntype of *P. ornatifrons* and the holotype of *P. parananus*, but as these were both card-mounted we were unable to examine venter coloration. Given the currently available information, we here separate from the *P. nigerrimus* group those species with lightly colored abdomens into the newly designated *P. ornatifrons*

species group and provide an updated key to the South American *Platynectes* species groups. Examination of the type material of the aforementioned species groups, including ventral morphology and dissection of the male genitalia where relevant, would help to both revise the currently recognized species groups as well as confirm the identity of the species whose median lobes were illustrated by GUÉORGUIEV (1972: Figs 6–8). Until this can be done, we refrain from providing an identification key to the species within these groups.

The new collection records presented here provide insights into the range sizes of both individual species as well as the clade as a whole. In particular, the new data provides evidence that (1) some species of *Platynectes* Clade II have extremely broad ranges, in some cases spanning almost 2000 km, and (2) species of the clade are much more broadly distributed across the Guiana and Brazilian shields that was previously known.

Several species, previously thought to be regional or microendemics, are now known from substantially larger ranges. *Platynectes garciai* was previously known from a few closely situated localities along the Venezuela/Guiana border that were not more than 125 km apart (Fig. 12). Our new collections expand the distribution more than 500 km southwest, to the very edge of the Guiana Shield in the state of Pará, Brazil. Despite this seemingly large range expansion, the specimens are morphologically and genetically identical to the original populations (e.g. Fig 1). Even more unexpected was the dramatic range expansion of *P. tafelbergensis*. This species had been suspected to be a putative microendemic of Tafelberg tepui in central Suriname, from where it was originally described (GUSTAFSON et al. 2016). In 2017, we collected a single specimen from a stream in Brownsberg Nature Park in northern Suriname confirming that it was not a tepui endemic taxon. But in 2018, we collected additional specimens in Manaus, at the extreme edge of the Guiana Shield, as well as in the Brazilian state of Rondônia on the northern edge of the Brazilian Shield (Fig. 14). The assignment of the Rondônia populations to *P. tafelbergensis* is strongly supported by both morphology and genetic data (Fig. 1). This is the first species of the genus with a distribution that spans the Amazon, known from both the Brazilian and Guiana Shields.

Up to now, the distribution of *Platynectes* Clade II was restricted to the Guiana Shield and the extreme southern margin of the Atlantic Shield, creating two very disjunct regions of endemism for the lineage. Given the close and recent relationship (<20 mya) between taxa in these two regions, TOUSSAINT & SHORT (2016) commented that the absence of records from central Brazil was an enigmatic missing piece of the puzzle. Though records are still few, our data confirm that this distribution gap does not reflect true absence and was an artifact of sparse collecting effort in the region. Both the discovery of Clade II in central Brazil, as well as the extremely large range sizes of certain species support the hypothesis of TOUSSAINT & SHORT (2016) that the present distribution is primarily a product of widespread dispersal.

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