

Euplocania Enderlein: description of the female of *E. quinquedivisa* Silva-Neto, García Aldrete & Rafael (Psocodea, 'Psocoptera', Ptiloneuridae), with a checklist of *Euplocania* species in Brazil

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Abstract. The unknown female of *Euplocania quinquedivisa* Silva-Neto, García Aldrete & Rafael, is described and illustrated. Information on sexes known and distribution in Brazilian states is included for the known species of Brazilian *Euplocania*.

Key-Words. Taxonomy; Neotropics; Epipsocetae.

INTRODUCTION

Euplocania Enderlein (1910) is one of 12 recent genera in the psocopteran family Ptiloneuridae. It presently includes forty-seven described species, with twenty-six species known only from males, four species known only from females, and seventeen species known from both sexes; these species occur in Nicaragua, Colombia, Peru, Brazil, Ecuador and Paraguay (Silva-Neto *et al.*, 2019). Brazil is the second-most rich country for *Euplocania* species, with fifteen species distributed in five Brazilian States. Only two of these species have the female described (Table 1). *Euplocania quinquedivisa* Silva-Neto, García Aldrete & Rafael was described on basis of a male specimen collected in a Malaise trap set 18 meters from the ground, in a tower located in Reserva ZF2, inside the Amazonian forest in the Brazilian state of Amazonas. This species could not be assigned in any of the species-groups proposed by García Aldrete *et al.* (2013), so Silva-Neto *et al.* (2019) created the species-group *quinquedivisa* to include it. One of us (KAB) recently found in a miscellany of insects preserved in 80% ethanol, at the Instituto Nacional de Pesquisas da Amazônia, in Manaus, Amazonas, Brazil (INPA), a male specimen of *E. quinquedivisa* (Fig. 1) and a female specimen (Fig. 2) associated with it, which

was assigned as the unknown female of this species. The purpose of this paper is to describe and illustrate the female of *E. quinquedivisa*, to present an update of the diagnosis this species, including female characters, and to provide a checklist of *Euplocania* species in Brazil.

MATERIAL AND METHODS

1 male and 1 female were available for study. All specimens were collected through Malaise traps in five different heights (ground level, 8 m above ground level, 16 m, 24 m and 32 m) on a tower located in the Amazonian forest, in an area owned by the *Reserva Biológica do Cueiras* (ZF-2). They were dissected in 80% ethanol, and their parts were mounted on permanent slides in Canada balsam. Standard measurements (in μm), were taken with a filar micrometer. Abbreviations of parts measured are as follows: FW and HW: right fore- and hindwing lengths; F, T, t1, t2 and t3: lengths of femur, tibia and tarsomeres 1, 2 and 3 of right hind leg; f1...fn: lengths of flagellomeres 1...n of right antenna; Mx4: length of fourth segment of right maxillary palpus; IO: minimum distance between compound eyes in dorsal view of head; D and d: antero-posterior and transverse

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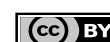


Table 1. Brazilian species of *Euplocania*, sexes known, species group, general distribution and distribution in Brazilian States (between parentheses).

Species	Sexes known	Species group	Distribution
<i>E. ariasi</i> Vinasco-Mondragón, González & García Aldrete	Male	<i>amabilis</i>	Brazil (Goiás)
<i>E. badonneli</i> New & Thornton	Both	<i>amabilis</i>	Brazil (Rondônia), Colombia, Peru
<i>E. bujariensis</i> Silva-Neto, García Aldrete & Rafael	Male	<i>amabilis</i>	Brazil (Acre)
<i>E. cearensis</i> Silva-Neto, García Aldrete & Rafael	Male	<i>amabilis</i>	Brazil (Ceará)
<i>E. cerata</i> New	Both	<i>cerata</i>	Brazil (Amazonas), Peru
<i>E. equorum</i> Vinasco-Mondragón, González & García Aldrete	Male	<i>amabilis</i>	Brazil (Pará)
<i>E. hutchingsi</i> Silva-Neto, García Aldrete & Rafael	Male	<i>amabilis</i>	Brazil (Acre)
<i>E. manusensis</i> Vinasco-Mondragón, González & García Aldrete	Male	<i>amabilis</i>	Brazil (Amazonas)
<i>E. picta</i> New	Male	<i>amabilis</i>	Brazil (Amazonas)
<i>E. pseudopictaoides</i> Silva-Neto, García Aldrete & Rafael	Male	<i>amabilis</i>	Brazil (Acre)
<i>E. quinquedivisa</i> Silva-Neto, García Aldrete & Rafael	Both	<i>quinquedivisa</i>	Brazil (Amazonas)
<i>E. rafaali</i> Vinasco-Mondragón, González & García Aldrete	Male	<i>amabilis</i>	Brazil (Paraná)
<i>E. tocantina</i> Mondragón, González & García Aldrete	Male	<i>amabilis</i>	Brazil (Pará)
<i>E. uariniensis</i> Silva-Neto, García Aldrete & Rafael	Male	<i>marginata</i>	Brazil (Amazonas)
<i>E. xavieri</i> Silva-Neto, García Aldrete & Rafael	Male	<i>amabilis</i>	Brazil (Amazonas)

diameter, respectively, of right compound eye in dorsal view of head; PO: d/D. The specimens were stored in “CD boxes” as described by Silva-Neto *et al.* (2016).

Photographs of parts of the specimens were taken with a Leica DFC500 digital camera attached to a Leica M205C stereomicroscope, connected to a computer with the Leica Application Suite LAS V3.6 software, which includes an Auto-Montage module (Syncrosopy software). The distribution map was generated on the website SimpleMapp.

The specimens studied are deposited in the Invertebrate Collection of the Instituto Nacional de Pesquisas da Amazônia, Manaus, Amazonas, Brazil (INPA).

RESULTS

Euplocania quinquedivisa Silva-Neto, García Aldrete & Rafael (Figs. 1-10)

Euplocania quinquedivisa Silva-Neto, García Aldrete & Rafael, 2019: 383, Figs. 31-38.

Updated diagnosis: Hypandrium of five sclerites; forewings with a slender, pigmented marginal band, from pterostigma to A_2 , with two hyaline areas, almost triangular, from R_{2+3} to CuP, on each side of the vein ends at wing margin. Ninth sternum broad, trapeziform, with three distinct areas, posteriorly with sides converging towards a membranous apex. Gonapophyses with v1 long, slender, heavily sclerotized; v2+3 stout, with short, blunt ended heel, with six setae on v3.

Description

Male: As described by Silva-Neto *et al.* (2019).

Female: Color: Compound eyes black, ocelli hyaline, with ochre centripetal crescents, head pattern (Fig. 3).

Scape proximally pale yellow, distally dark brown, pedicel yellow with a V-shaped spot dark brown, f1 proximally pale brown and then pale yellow, f2 pale yellow. Legs with coxae brown, trochanters dark brown, femora proximally dark brown, then brown; tibiae brown with apex dark brown; tarsomere 1 brown, distally dark brown, tarsomeres 2-3 yellow. Forewings veins brown, with a pigmented marginal band, from pterostigma to A_2 , with two hyaline areas, almost triangular, from R_{2+3} to CuP, on each side of the vein ends at wing margin Rs and crossvein Rs-M dark brown. Pterostigma dark brown with small irregular brown areas (Fig. 4). Hindwings (Fig. 5), almost hyaline, with a dark brown spot, between CuP and wing margin, a dark brown spot between A_1 and wing margin, veins brown, each with a brown spot distally at wing margin on R_{4+5} and M.

Morphology: Compound eyes without interommatidial setae (Fig. 3). Outer cusp of lacinial tips broad, with six denticles (Fig. 6). Forewing pterostigma triangular, wider in the middle, narrow basally, areola postica tall, wide, with round apex, triangular, M stem slightly concave proximally, then almost straight, with four primary branches (Fig. 4). Hindwing Rs and R_{2+3} straight, R_{4+5} almost straight, M sinuous (Fig. 5). Subgenital plate broad, wide basally, with sides converging towards a straight posterior border, pigmented area wide, V-shaped, setae as illustrated (Fig. 7). Ninth sternum (Fig. 8) broad, trapeziform, with three distinct areas, an anterior area narrow, with sinuous margins, a mesal area with two V-shaped subareas on each side, a posterior area anteriorly wide, posteriorly with sides converging towards a membranous apex, with two pairs of sub-areas: a lateral pair, wide in the middle, narrowing towards apex, longitudinally strongly sclerotized at anterior half; each pair connected horizontally by a narrow concave bridge; a mesal pair, small, lanceolate; underneath the mesal pair is located the gonopore, formed by a pair of arched sutures. Gonapophyses with v1 long, slender, heavily sclerotized; v2+3 stout, wide proximally, with short, blunt

ended heel; six setae on v3 as illustrated, distal process slender, acuminate, with a field of microsetae (Fig. 9). Epiproct triangular, with three mesal setae, other setae as illustrated (Fig. 10). Paraprocts almost triangular, broad, sensory fields with 27 trichobothria on basal settes; setae as illustrated (Fig. 10).

Measurements (in microns): FW: 5040, HW: 3274, F: 1329, T: 2197, t1: 914, t2: 93, t3: 126, f1: 1172, Mx4: 342, IO: 542, D: 467, d: 339, PO: 0.73.

Material examined: 1 male (INPA). BRAZIL. Amazonas. Reserva ZF2, km 14, Torre. 02°35'21"S, 60°06'55"W. 14.vi.-03.vii.2018. Malaise trap, 16 m at the tower. Collection bottle in the west position. J.A. Rafael. 1 female (INPA). Same data as the male, except 19. ix.-03.x. 2017. Malaise trap, 8 m at the tower.

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Figure 1. *Euplocania quinquedivisa*. Male. Scale in mm.

DISCUSSION

Brazil is divided in 26 states and a Federal District. *Euplocania* species occur in only seven of these Brazilian states (Table 1) and these species range from the south (Paraná: São José dos Pinhais) to the north (Amazonas: Uarini) of Brazil, with a distance between those extremes of some 3.042 km (Fig. 11). The Northern region is the most diverse for *Euplocania* (twelve species) with the state of Amazonas including six species (Fig. 11).

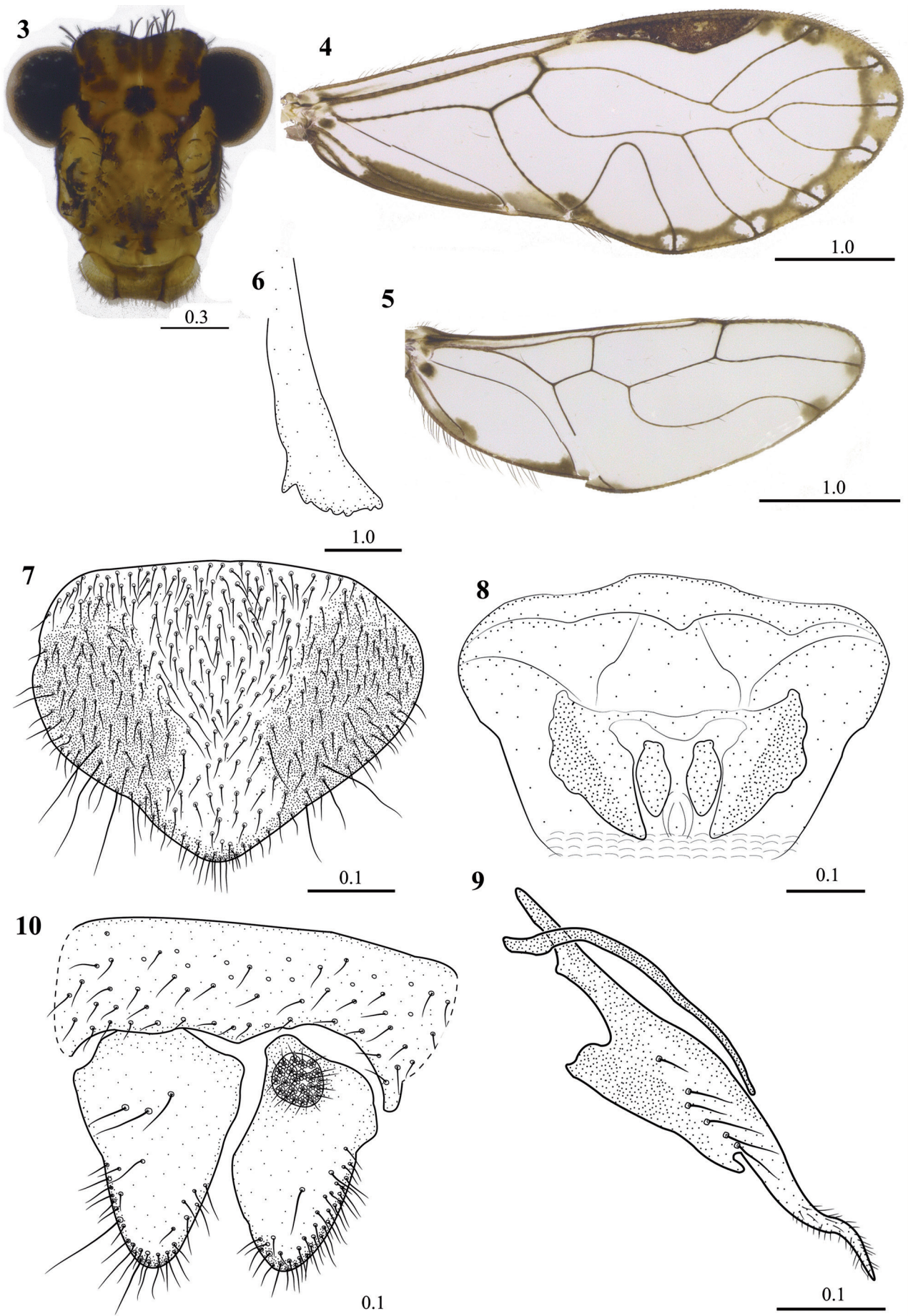
Among the fifteen Brazilian species of *Euplocania* only *E. badonneli* New & Thornton and *E. cerata* New have known females; with the description of the female of *E. quinquedivisa* this number is raised to three species.

Euplocania quinquedivisa is unique among the 47 known species of *Euplocania*, having a distinct slender, pigmented marginal band in the forewing, from pterostigma to A_2 , with two almost triangular hyaline areas from R_{2+3} to Cup, on each side of the vein ends at wing margin. Other *Euplocania* species have these hyaline areas in the pigmented marginal band (mentioned above), but in elliptical (*E. andinoamazonica* García Aldrete, Carrejo & Panche; *E. vallecaucana* González, García Aldrete & Carrejo; *E. chami* González, García Aldrete & Carrejo; *E. darwini* Carrejo, García Aldrete & González; *E. enderleini* García Aldrete, Panche & González; *E. gallegoi* González, García Aldrete & Carrejo; *E. mockfordi* González, Carrejo & García Aldrete; *E. pati-*

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Figure 2. *Euplocania quinquedivisa*. Female. Scale in mm.



Figures 3-10. *Euplocania quinquedivisa*. Female. (3) Front view of head. (4) Forewing. (5) Hindwing. (6) Lacinial tip. (7) Subgenital plate. (8) Ninth sternum. (9) Right gonapophyses. (10) Clunium, right paraproct and epiproct. Scales in mm.

noi González, Carrejo & Panche and *E. rojasae* González, Carrejo & García Aldrete) or half-moon shapes (*E. amabilis* Enderlein; *E. ariasi* Vinasco-Mondragón, González & García Aldrete; *E. badonneli* New & Thornton; *E. caldasi* Vinasco-Mondragón, González & García Aldrete; *E. ecuatoriana* Vinasco-Mondragón, González & García Aldrete; *E. equorum* Vinasco-Mondragón, González & García Aldrete; *E. gaitanae* González, García Aldrete & Carrejo; *E. katiis* Vinasco-Mondragón, González & García Aldrete; *E. lasdelicias* Vinasco-Mondragón, González & García Aldrete; *E. manausensis* Vinasco-Mondragón, González & García Aldrete; *E. metensis* Vinasco-Mondragón, González & García Aldrete; *E. pictaoides* García Aldrete; *E. tocantina* Mondragón, González & García Aldrete and *E. vaupesiana* Vinasco-Mondragón, González & García Aldrete). In addition to the distinctive pigmentation pattern of the forewing, the female of *E. quinquedivisa* differs from the females of the known species of *Euplocania*, in details of the ninth sternum (broad, trapeziform, with three distinct areas, posteriorly with sides converging towards a membranous apex) and gonapophyses (with v1 long,

slender, heavily sclerotized; v2+3 stout, with short, blunt ended heel, with six setae on v3).

All specimens of *E. quinquedivisa* were collected through the *Rede Bionorte: Biodiversidade de insetos na Amazônia* project, which was active from August/2017 to October/2018. During this period, five Malaise traps were set in five different heights (ground level, 8 m above ground level, 16 m, 24 m and 32 m) on a tower located in the Amazonian forest, in an area owned by the *Reserva Biológica do Cueiras (ZF-2)*. Interestingly, two male specimens were collected at 16 m high whilst the female specimen was collected at 8 m high. Probably, the 8-16 m range is the ideal height to collect more specimens of *E. quinquedivisa*, therefore revealing that the traditional ground-level Malaise is inefficient to target this species.

The only known specimen of *Euplocania xavieri* Silva-Neto, García Aldrete & Rafael was also collected in this tower, at 16 m high and no other specimen of this species was found during the collection period mentioned above.

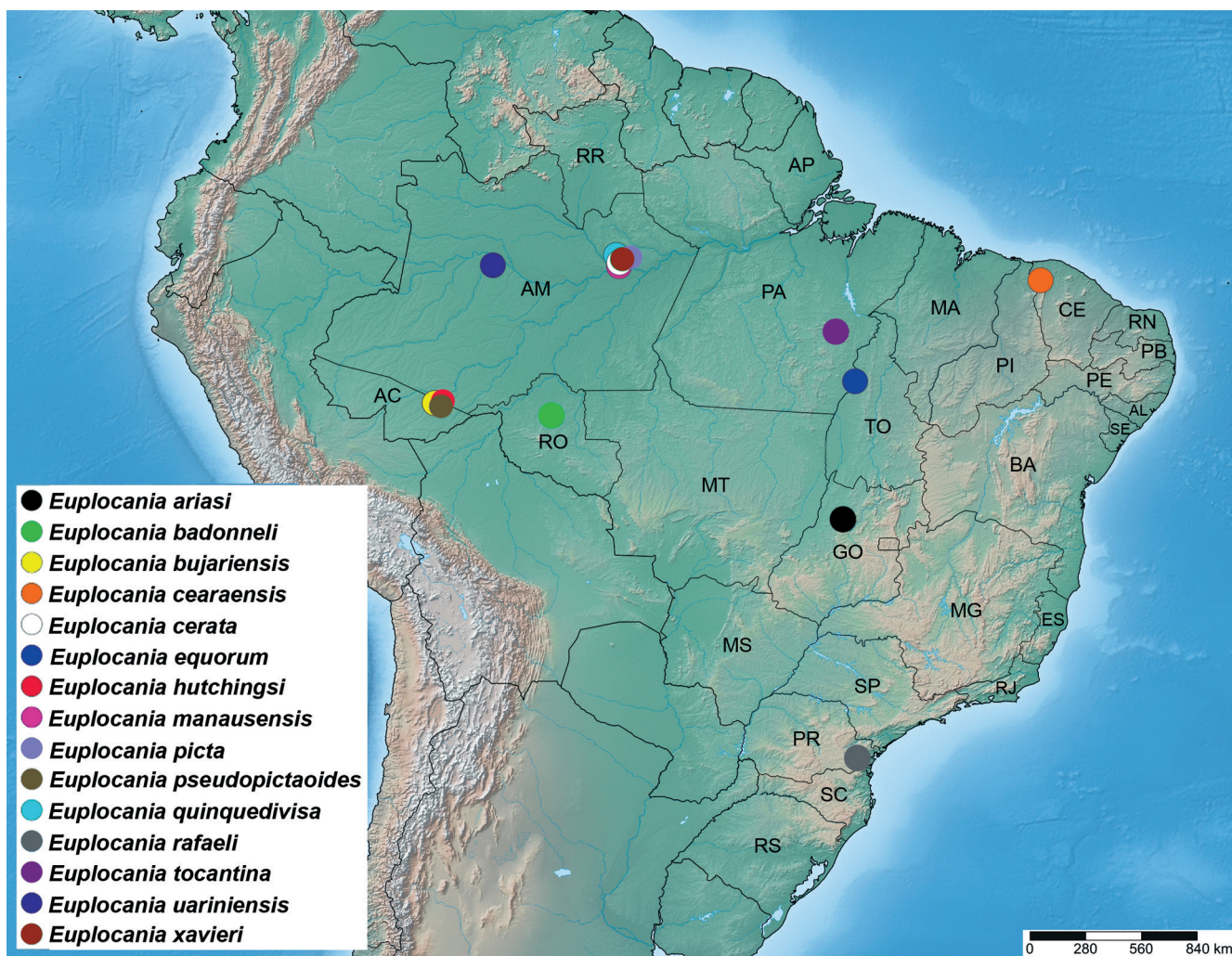


Figure 11. Distribution of Brazilian species of *Euplocania* in Brazilian states. Abbreviations: AC = Acre, AM = Amazonas, RR = Roraima, RO = Rondônia, AP = Amapá, PA = Pará, MT = Mato Grosso, MS = Mato Grosso do Sul, TO = Tocantins, MA = Maranhão, GO = Goiás, PI = Piauí, CE = Ceará, RN = Rio Grande do Norte, PB = Paraíba, PE = Pernambuco, AL = Alagoas, SE = Sergipe, BA = Bahia, MG = Minas Gerais, ES = Espírito Santo, RJ = Rio de Janeiro, SP = São Paulo, PR = Paraná, SC = Santa Catarina and RS = Rio Grande do Sul.

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