

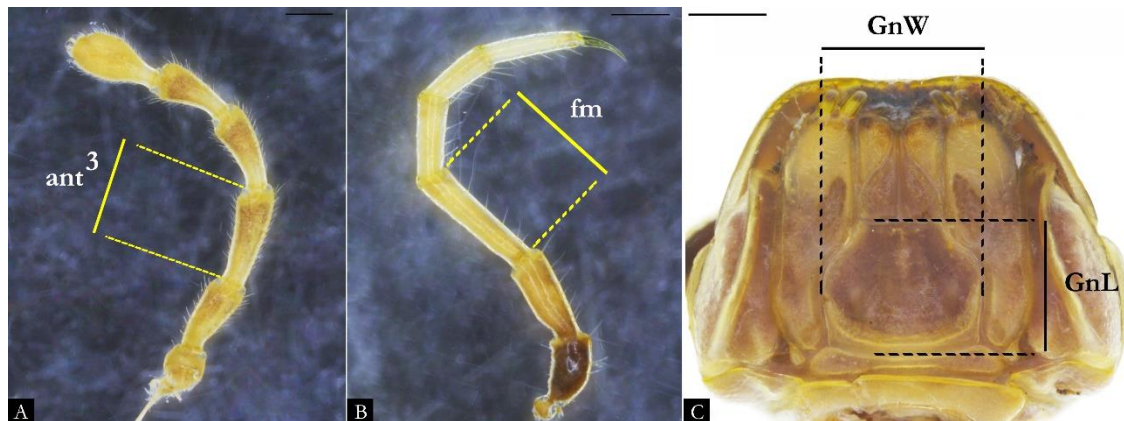
1 **Supp. file 4.**

**Figures for the cladistic analysis. <https://doi.org/10.5852/ejt.2023.867.2109.8875>**

3 The following Figures refer to the character descriptions shown in the supplementary file

4 1 for the cladistic analysis of *Pseudonannolene* Silvestri, 1895.

5



7 **Figure 192.** Continuous characters coded for the cladistic analysis of *Pseudonannolene*.

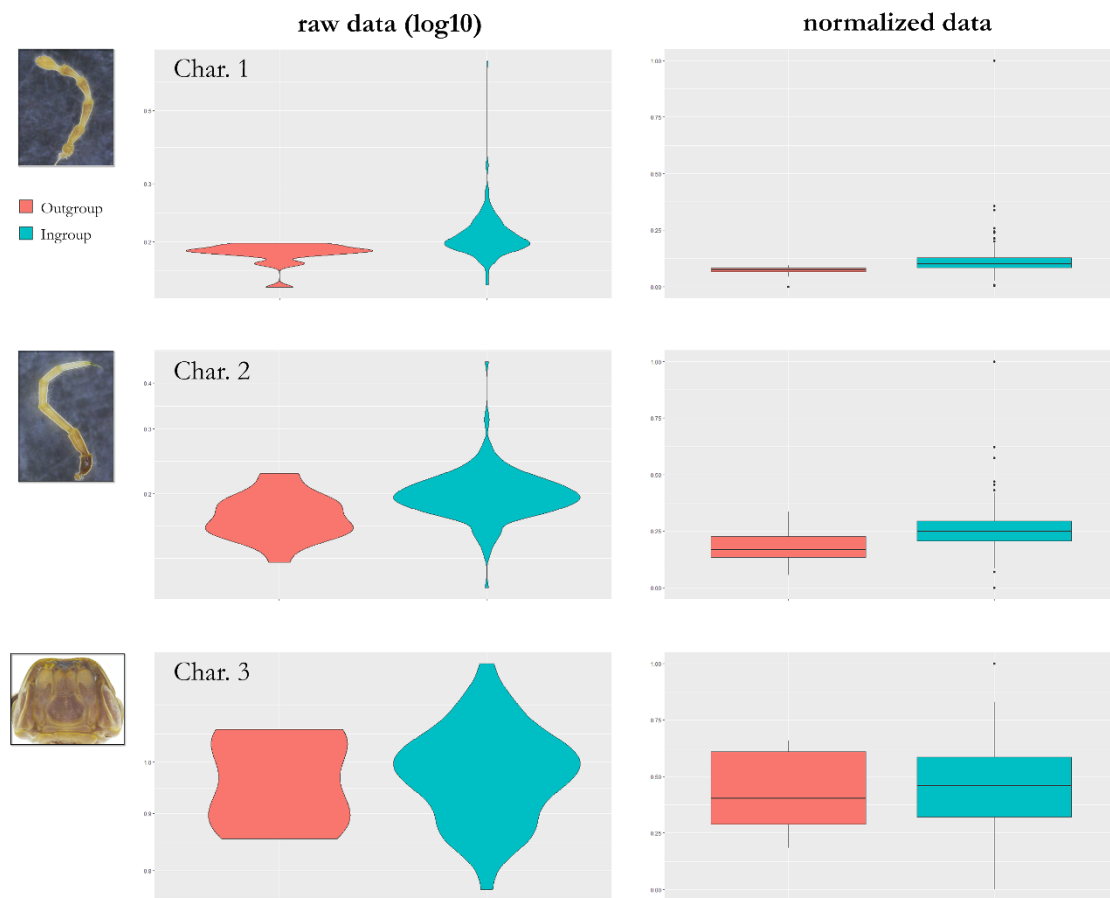
8 A) Antenna of *P. strinatii* (ISLA 20622); B) Midbody leg of *P. strinatii* (ISLA 20622);

9 C) Gnathochilarium of *P. erikae* (IBSP 3331). **Abbreviations:** ant<sup>3</sup>, antennomere 3; fm,

10 femur; GnW, gnathochilarium width; GnL, gnathochilarium length. **Scale bars:** A–C, 0.5

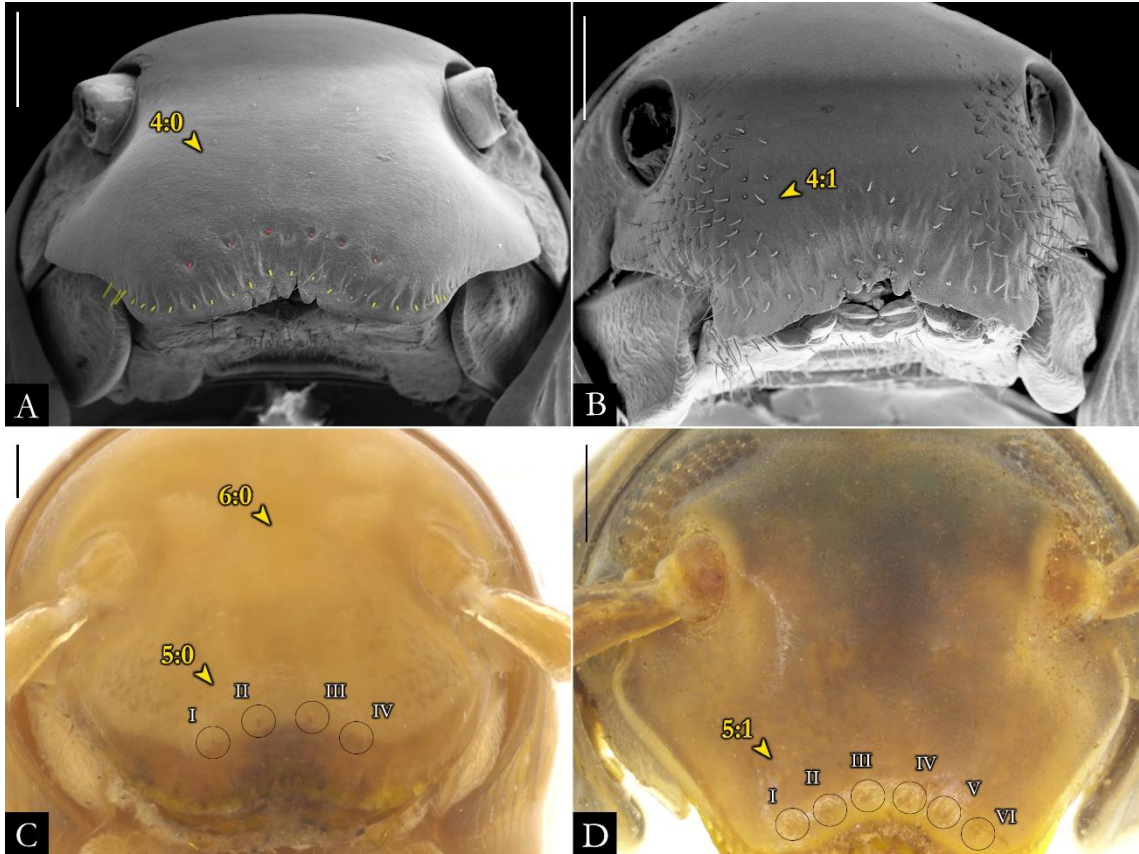
11 mm.

12



13

14 **Figure 193.** Violin and Box plots of measured values for the continuous characters (chars.  
 15 1–3) in the cladistic analysis of *Pseudonannolene*. The raw data were transformed into  
 16 log10 for better visualization. Horizontal lines and the points out of plots refer to the  
 17 median and outliers, respectively.



18

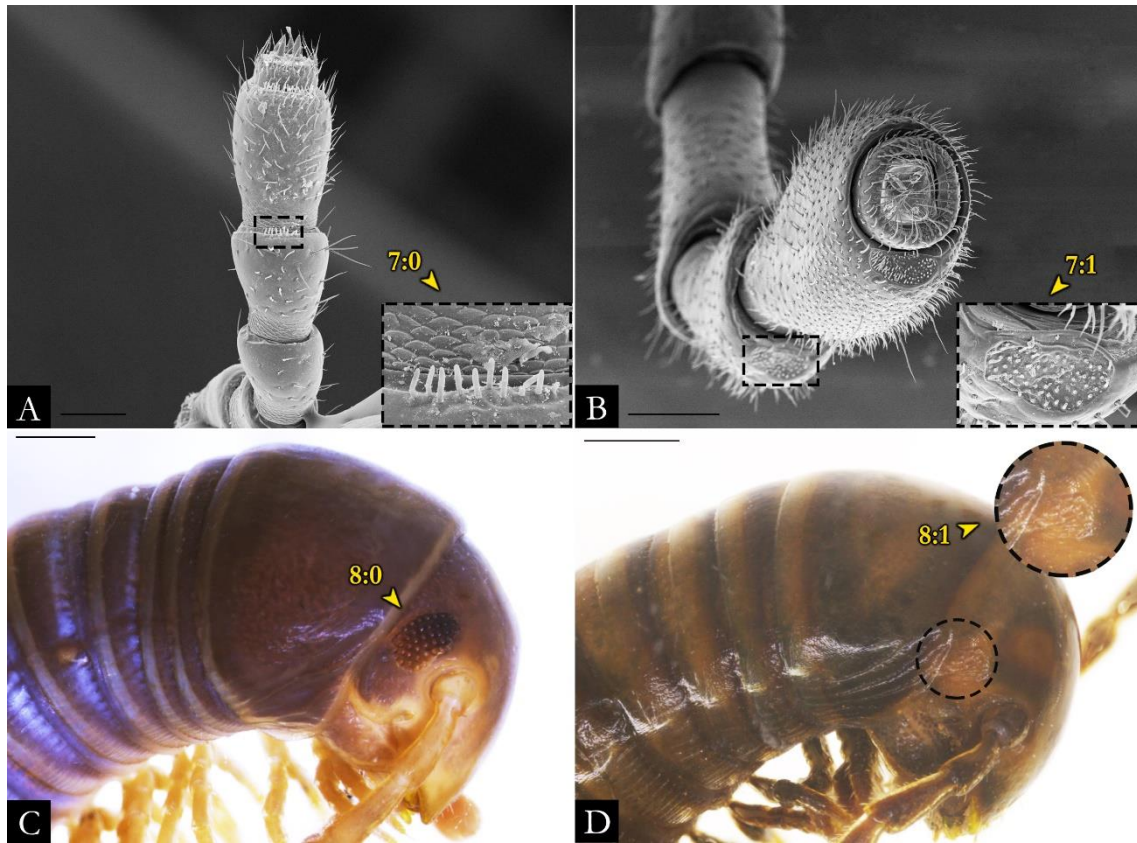
19 **Figure 194.** Characters 4–6 and their character states. Head in frontal view: A) *P. robsoni*

20 (IBSP 3526); B) *P. occidentalis* (IBSP 1998); C) *Holopodostreptus braueri* (MNRJ); D)

21 *P. microzoporus* (IBSP 5735). Labral setae highlighted in yellow and supralabral setae in

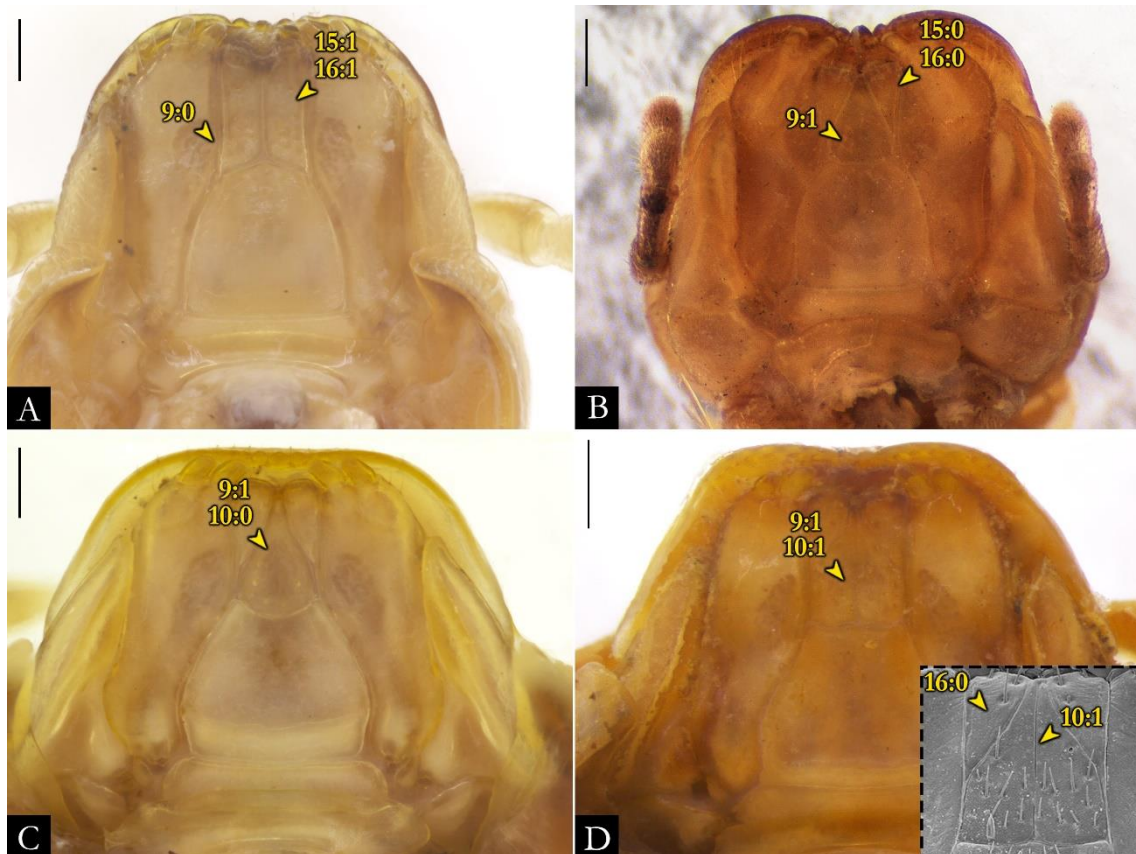
22 red. Roman numerals refer to the supralabral setae. **Scale bars:** A–B, D, 0.5 mm; C, 0.2

23 mm.



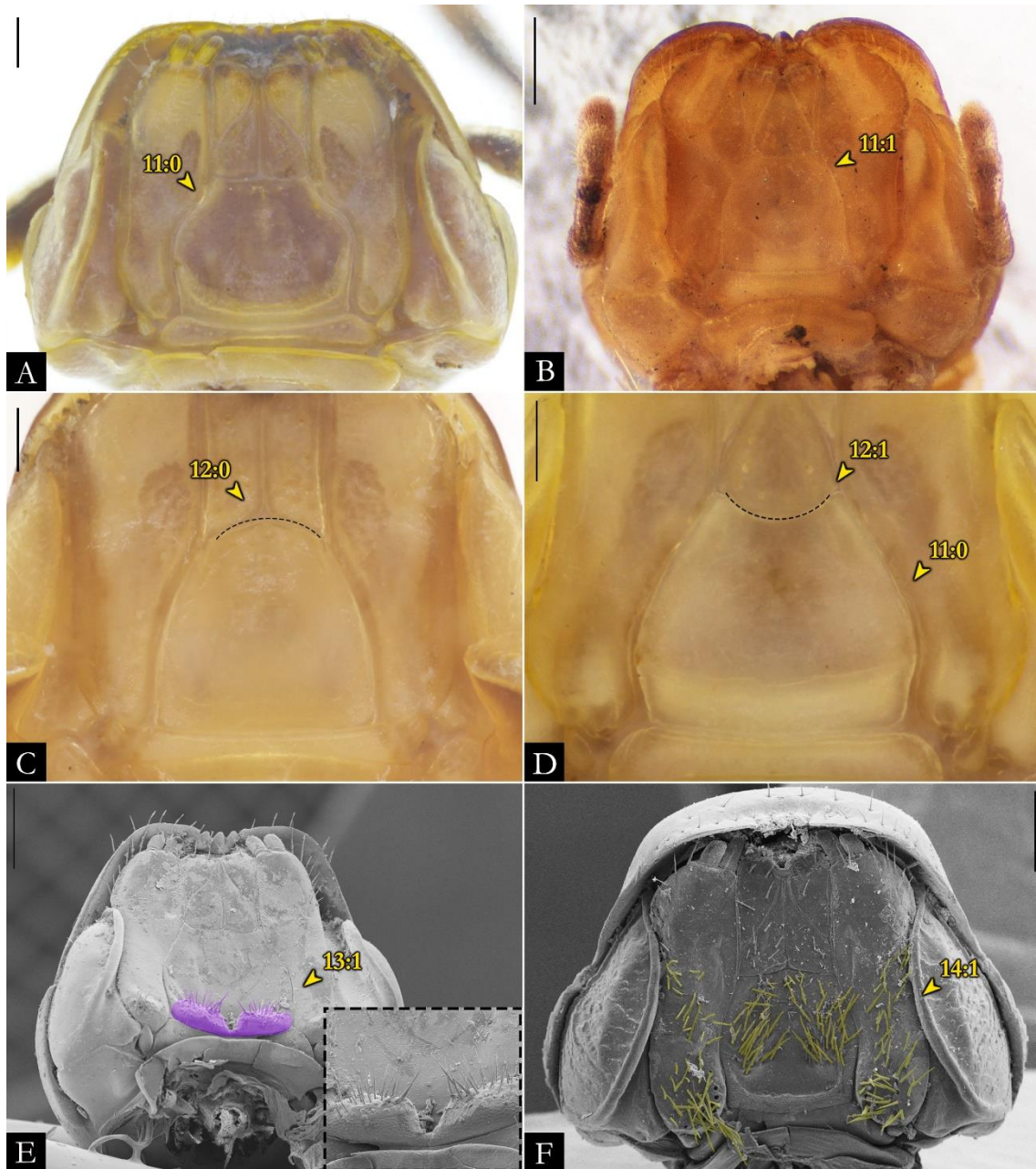
24

25 **Figure 195.** Characters 7–8 and their character states. Anterior region: A) Antenna of  
 26 *Epinannolene exilio* (INPA), baciliform setae on antennomere V in detail; B) Antenna of  
 27 *P. robsoni* (IBSP 3526), baciliform setae on antennomere V in detail; C) Head of  
 28 *P. halophila* (IBSP 1101), in lateral view; D) Head of *P. spelaea* (IBSP 5923), in lateral  
 29 view. Ocellar field in detail. **Scale bars:** A, 0.15 mm; B, 0.25 mm, C, 1 mm; D, 0.5 mm.



30

31 **Figure 196.** Characters 9–10, 15–16 and their character states. Gnathochilarium, ventral  
 32 view: A) *Holopodostreptus braueri* (MNRJ); B) *Choctella cumminsi* (MCZ); C)  
 33 *Epinannolene* sp. (ICN); D) *P. robsoni* (IBSP 3325). SEM image of promentum of *P.*  
 34 *robsoni* (IBSP 3506), in detail. **Scale bars:** A, C, 0.2 mm; B, D, 0.5 mm.



35

36 **Figure 197.** Characters 11–14 and their character states. Gnathochilarium, ventral view:

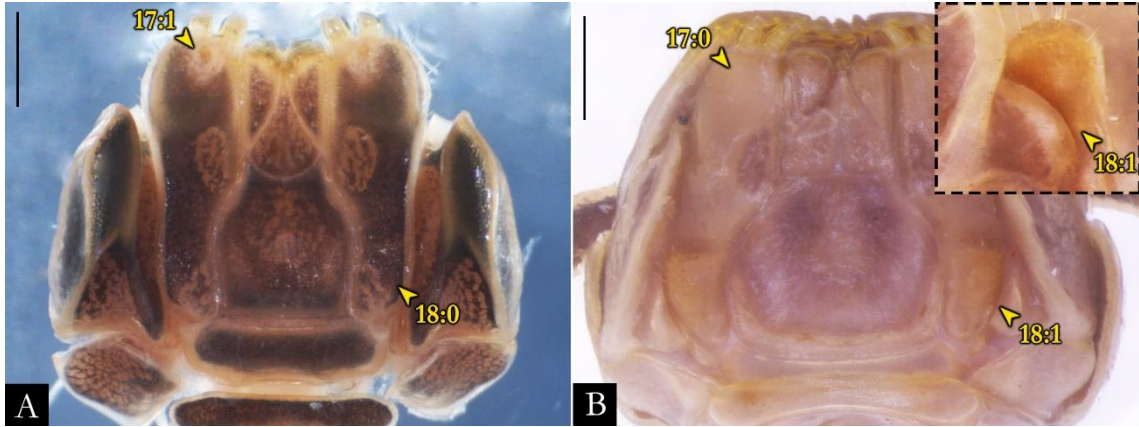
37 A) *P. erikae* (IBSP 3331); B) *Holopodostreptus braueri* (MNRJ); C) *Epinannolene* sp.

38 (ICN); D) *P. robsoni* (IBSP 3325); E) *P. bucculenta* sp. nov. (IBSP 3402), paired

39 projections highlighted in purple; F) *P. morettii* sp. nov. (IBSP 2459), long setae scattered

40 on the stipes and mentum highlighted in yellow. **Scale bars:** A–C, D, 0.2 mm; E–F, 0.5

41 mm.

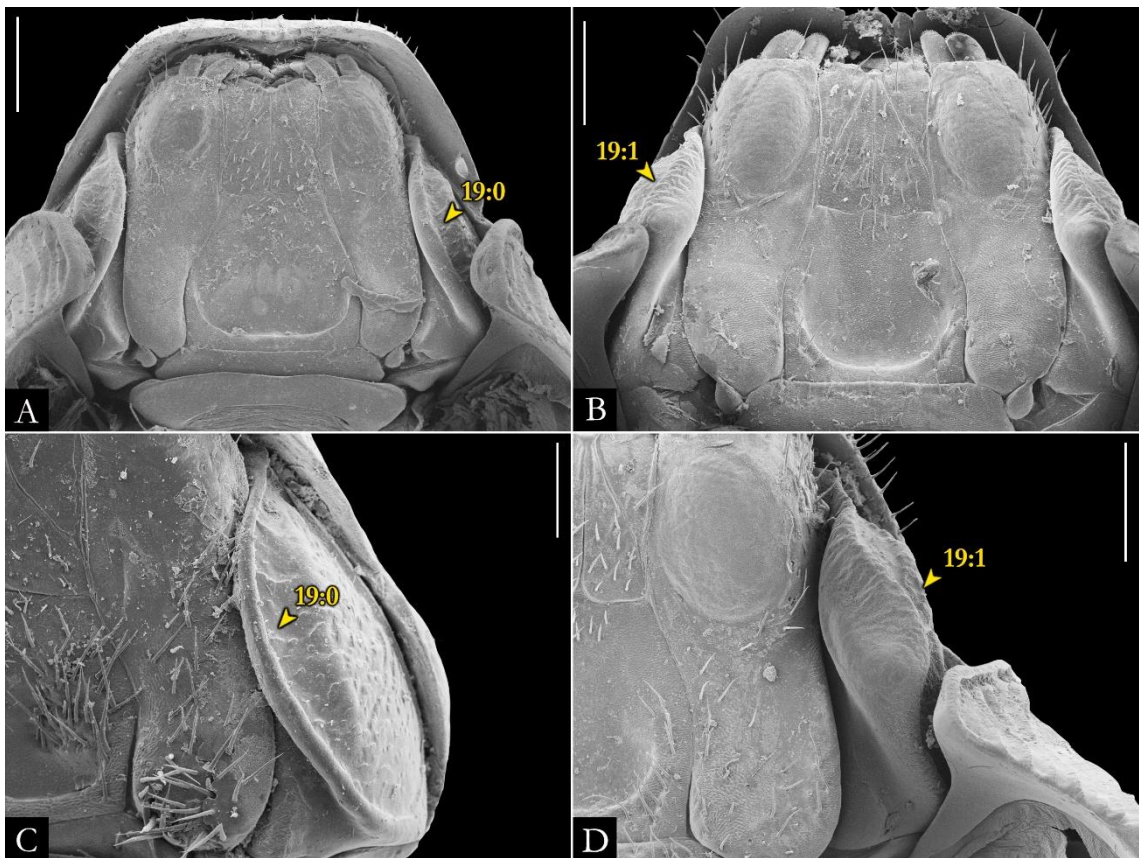


42

43 **Figure 198.** Characters 17–18 and their character states. Gnathochilarium, ventral view:

44 A) *Amastigogonus fossuliger* (NHMD); B) *P. granulata* sp. nov. (MNRJ), proximal

45 projections bearing setae on the stipes. **Scale bars:** A–B, 0.5 mm.

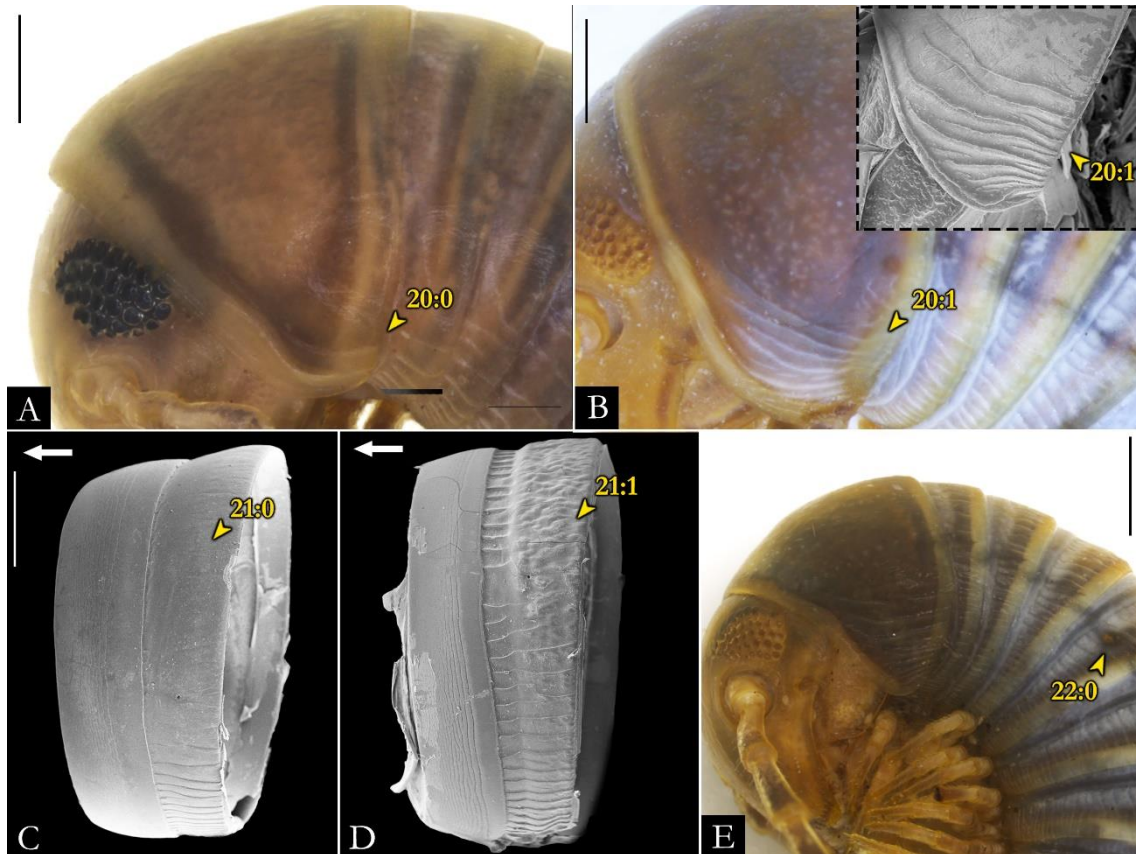


46

47 **Figure 199.** Character 19 and its character states. Gnathochilarium, ventral view A) *P.*

48 *robsoni* (IBSP 3440); B) *P. paulista* (IBSP 3402); C) *P. morettii* sp. nov. (IBSP 2459);

49 D) *P. occidentalis* (IBSP 1998). **Scale bars:** A–B, D, 0.5 mm; C, 0.2 mm.

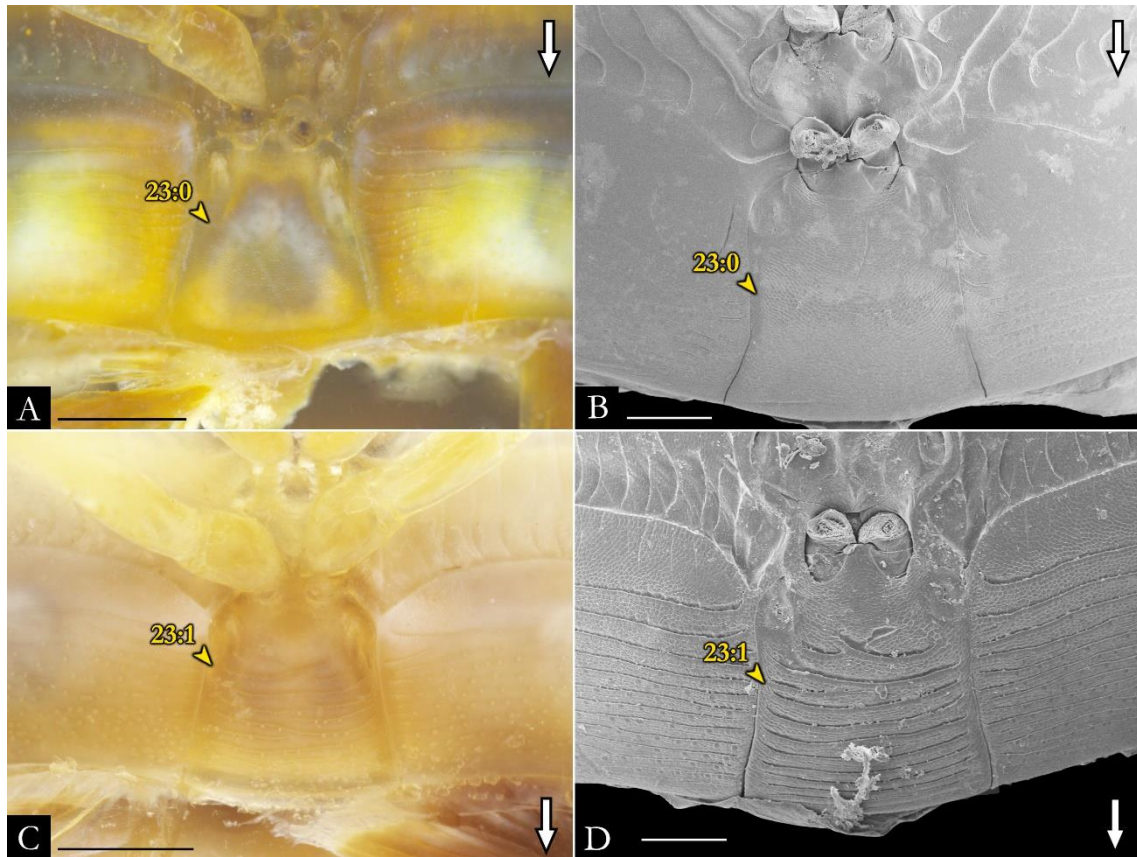


50

51 **Figure 200.** Characters 20–22 and their character states: A) Anterior region of  
 52 *Epinannolene* sp. (ICN); B) Anterior region of *P. robsoni* (IBSP 3441), collum of *P.*  
 53 *robsoni* (IBSP 3506), in detail; C) Midbody ring of *P. robsoni* (IBSP 3506); D) Midbody  
 54 ring of *P. granulata* sp. nov. (MNRJ); E) Anterior region of *P. buhrnheimi* (IBSP 2397).

55 **Scale bars:** A–B, 0.5 mm; C–D, 0.2 mm; E, 1 mm.



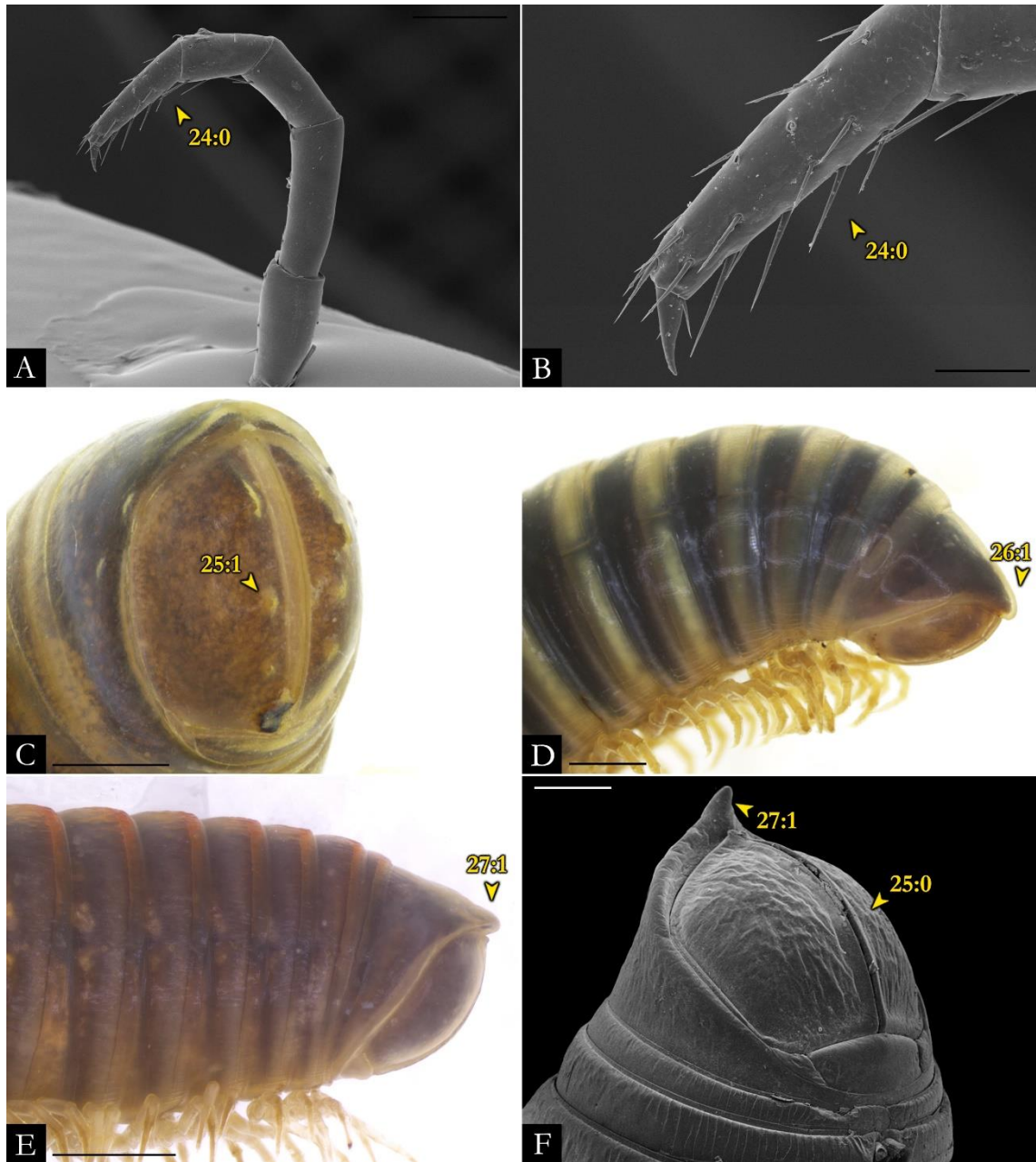


56

57 **Figure 201.** Character 23 and its character states. Anterior sternum: A) *P. fontanettiae*

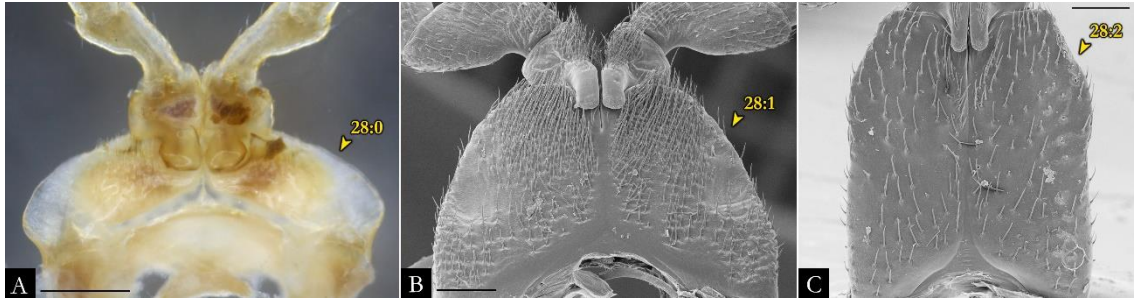
58 (IBSP 3759); B) *P. paulista* (IBSP 1908); C) *P. sebastianus* (IBSP 1390); D) *P. caatinga*

59 (IBSP 2180). **Scale bars:** A, C, 0.5 mm; B, D, 0.25 mm.



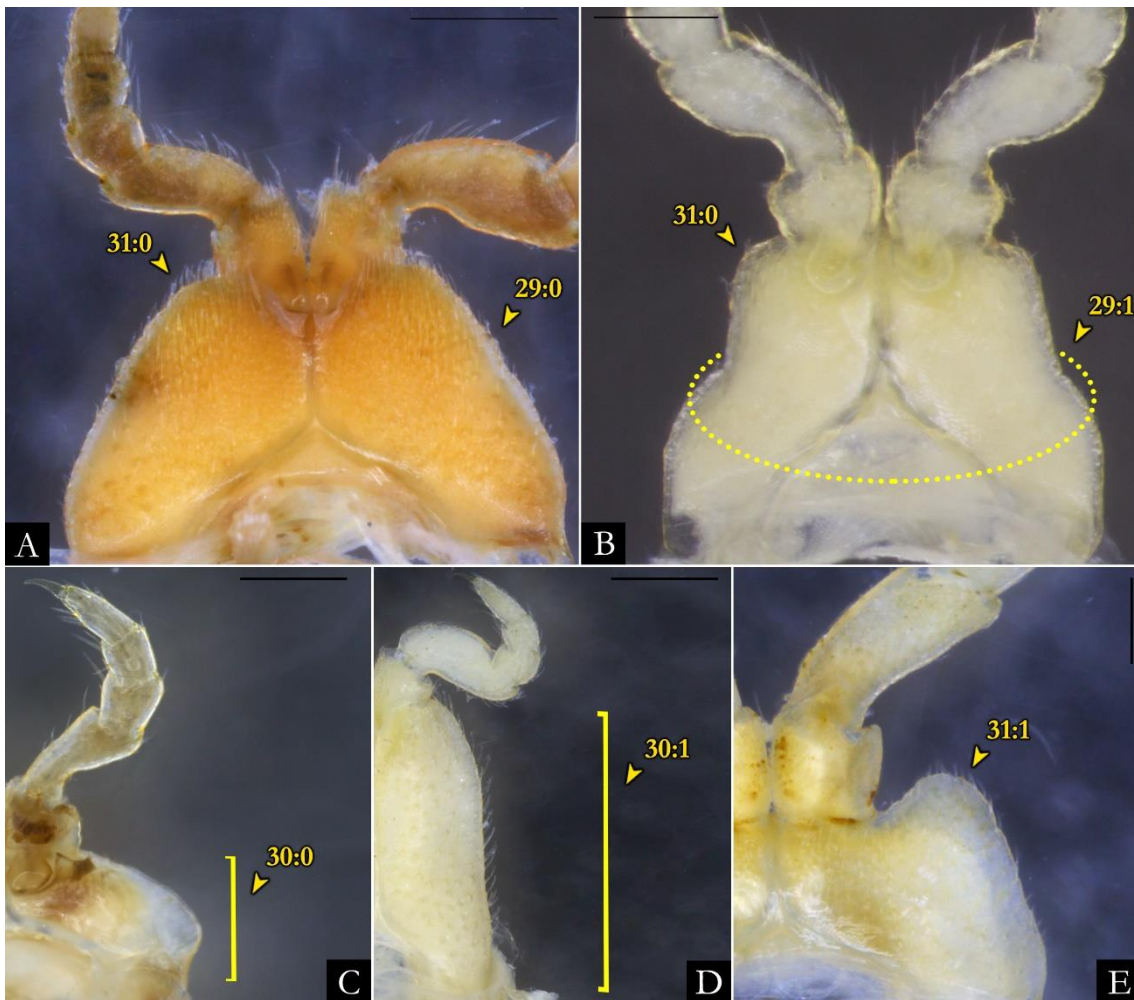
60

61 **Figure 202.** Characters 24–27 and their character states: A) Midbody leg of *P. halophila*  
 62 (IBSP 1101); B) Tarsus of midbody leg of *P. halophila* (IBSP 1101); C) Posterior region  
 63 of *P. alegrensis* (MCN626); D) Posterior region of *Epinannolene* sp. (ICN); E) Posterior  
 64 region of *P. granulata* sp. nov. (MNRJ); F) Posterior region of *P. buhrnheimi* (IBSP  
 65 2397). **Scale bars:** A, 0.25 mm; B, 0.1 mm; D–F, 0.5 mm.



66

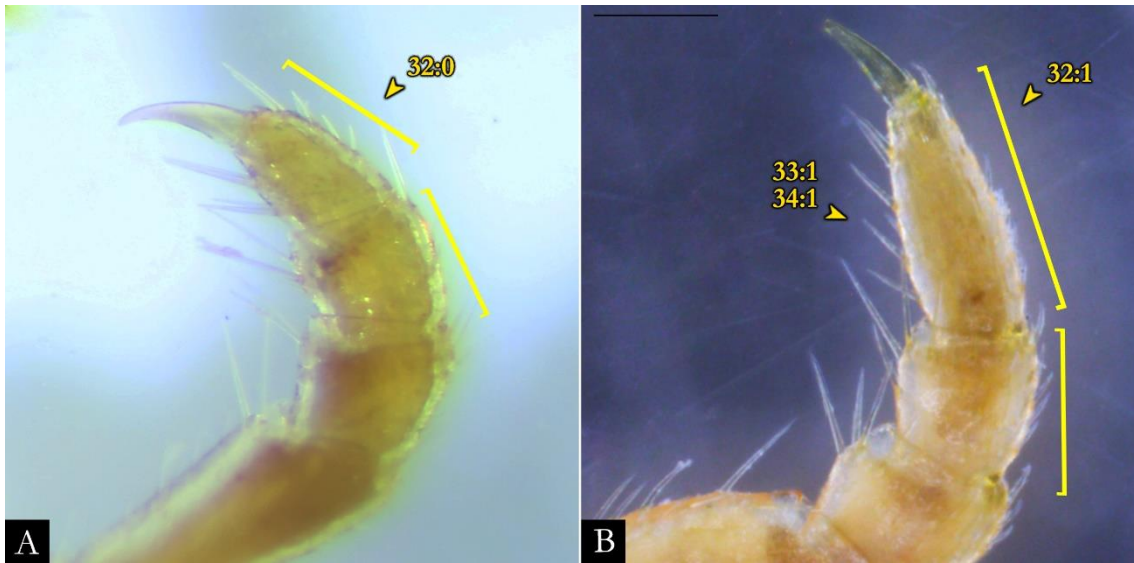
67 **Figure 203.** Character 28 and its character states. Coxae of first leg-pair of males: A)  
 68 *Epinannolene* sp. (ICN); B) *P. caatinga* (IBSP 2180); C) *P. halophila* (IBSP 1091). Scale  
 69 bars: A–B, 0.25 mm; C, 0.5 mm.



70

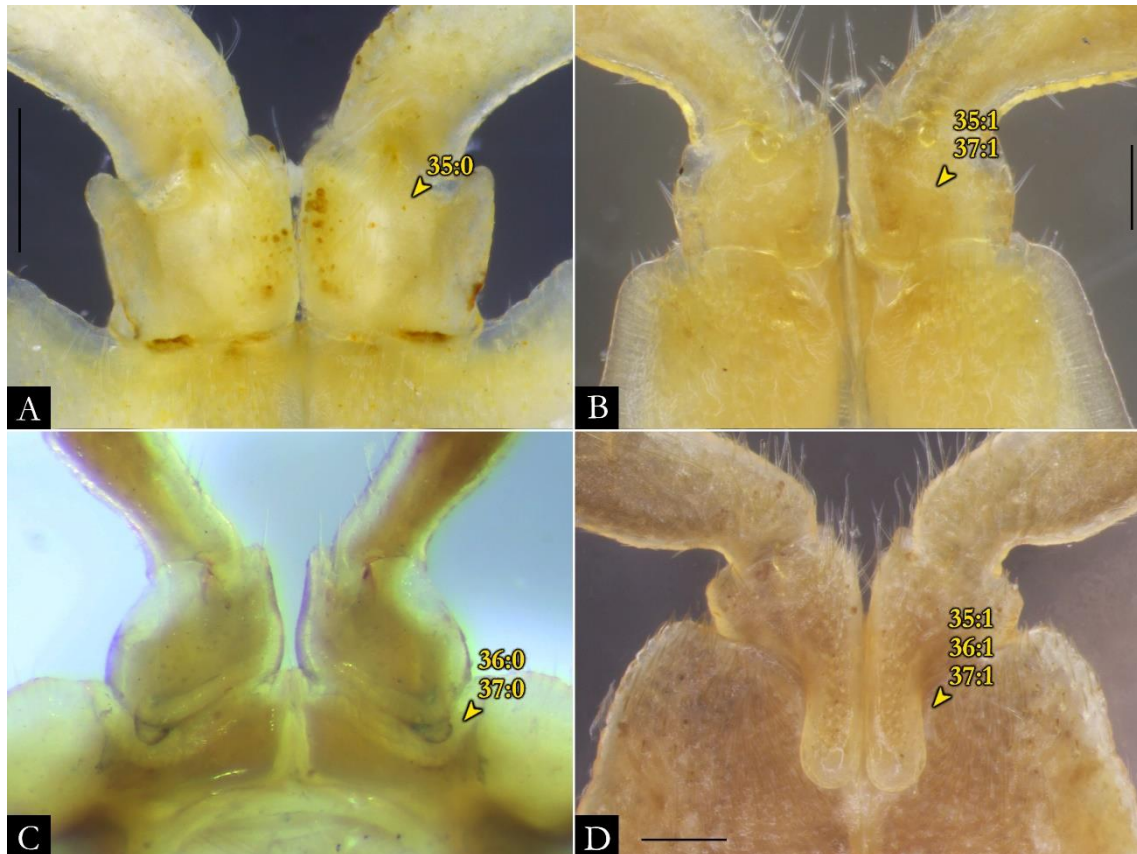
71 **Figure 204.** Characters 29–31 and their character states. Coxae of first leg-pair of males:  
 72 A) *P. caatinga* (IBSP 1389); B) *P. leucocephalus* (MZSP 1060); C) *Epinannolene* sp.

73 (ICN); D) *P. halophila* (IBSP 3297); E) *P. anapophysis* (IBSP 5209). Scale bars: A, D–  
74 E, 0.5 mm; B–C, 0.2 mm.



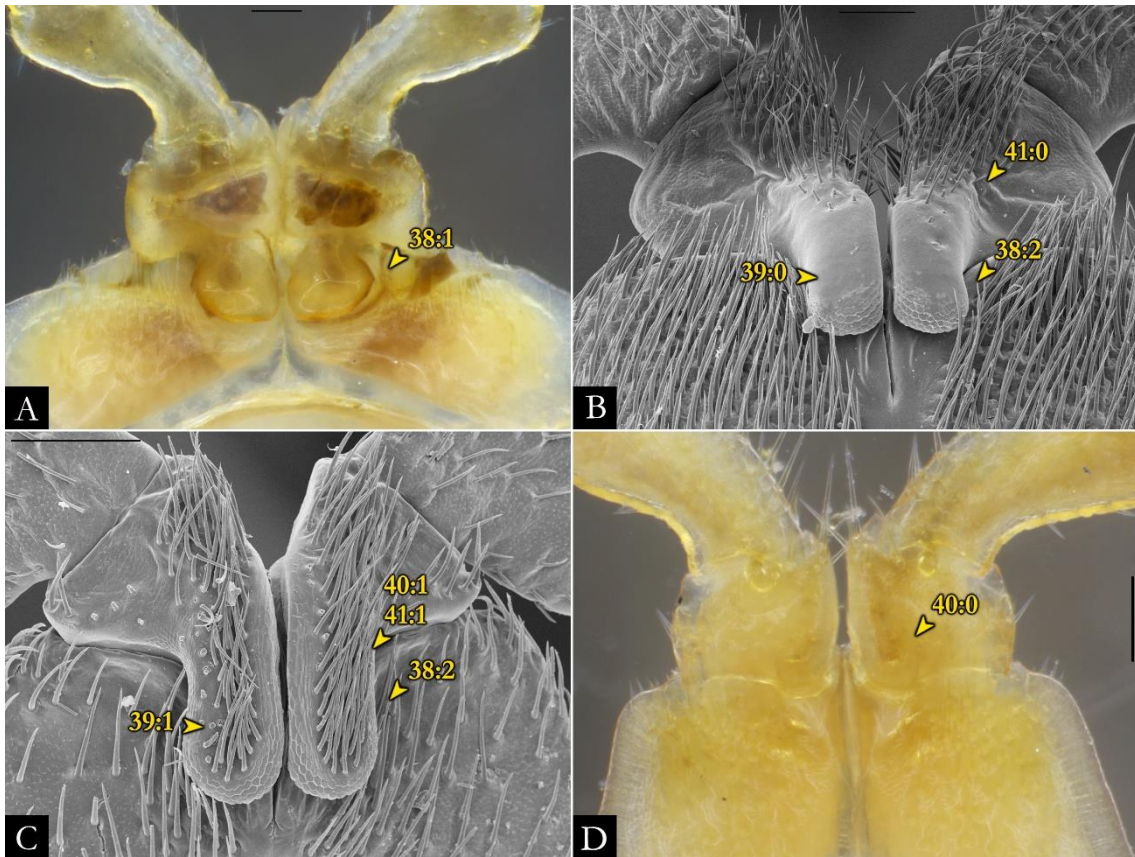
75 **A** **B**  
76 **Figure 205.** Characters 32–34 and their character states. Tarsus of first leg-pair of males:  
77 A) *Choctella hubrichti* (USNM); B) *P. caatinga* (IBSP 2166). Scale bars: B, 0.25 mm.

78



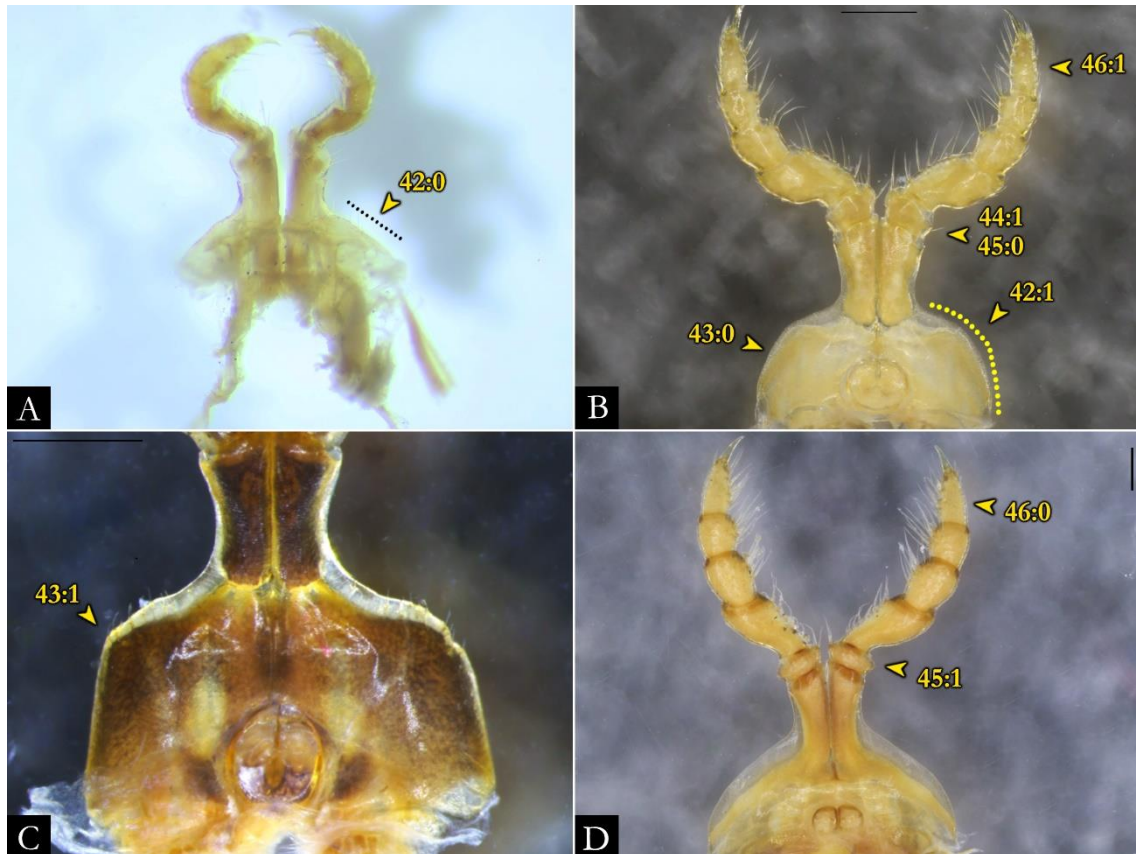
79

80 **Figure 206.** Characters 35–37 and their character states. Prefemur of first leg-pair of  
 81 males: A) *P. anapophysis* (IBSP 5209); B) *Holopodostreptus braueri* (MNRJ); C)  
 82 *Choctella hubrichti* (USNM); D) *P. magna* (MZSP 941). **Scale bars:** A, 0.5 mm; B, 0.1  
 83 mm; D, 0.2 mm.



84

85 **Figure 207.** Characters 38–41 and their character states. Prefemur and prefemoral process  
 86 of first leg-pair of males: A) *Epinannolene* sp. (ICN); B) *P. caatinga* (IBSP 2180); C) *P.*  
 87 *maritima* (IBSP 979); D) *Holopodostreptus braueri* (MNRJ). **Scale bars:** A, C, 0.2 mm;  
 88 B, D, 0.1 mm.



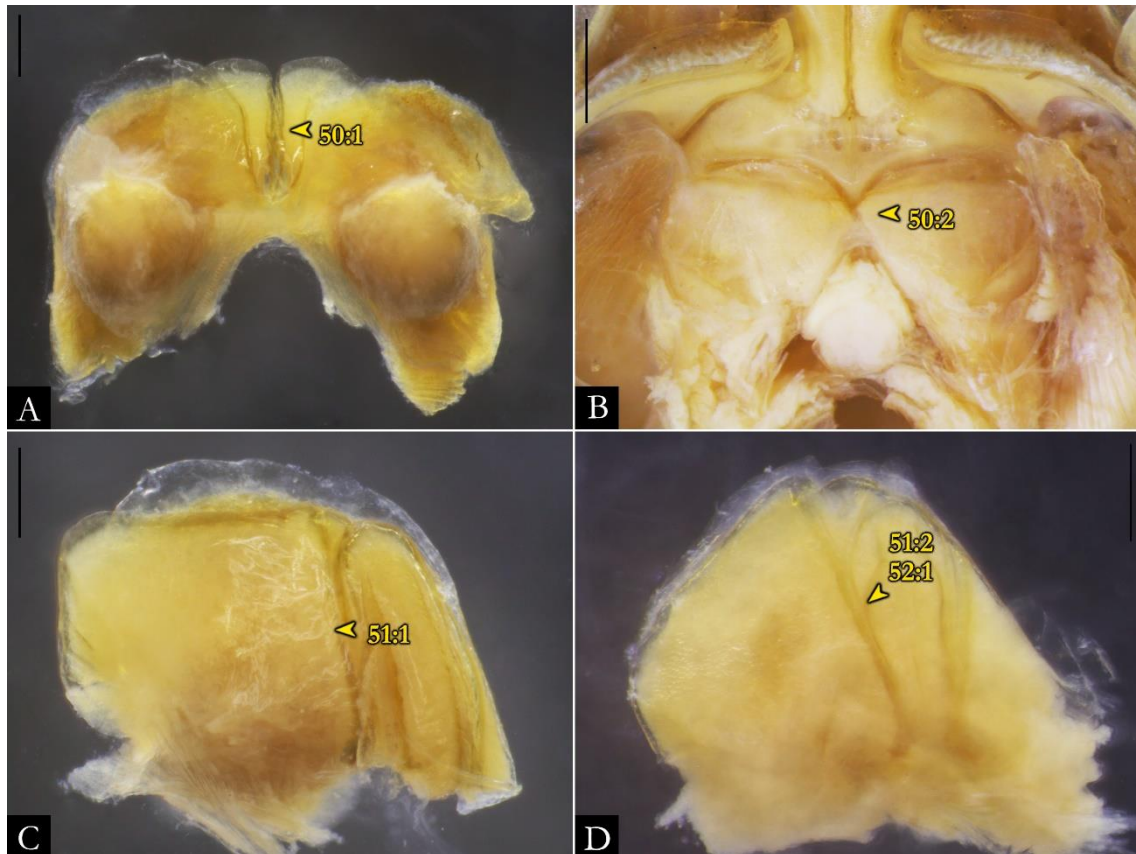
89

90 **Figure 208.** Characters 42–46 and their character states. Second leg-pair of males: A)  
 91 *Choctella hubrichti* (USNM); B) *Phallorthus colombianus* (FMNH); C) *P. occidentalis*  
 92 (IBSP 1998); D) *Holopodostreptus braueri* (MNRJ). **Scale bars:** B, D, 0.1 mm; C, 0.2  
 93 mm.



94

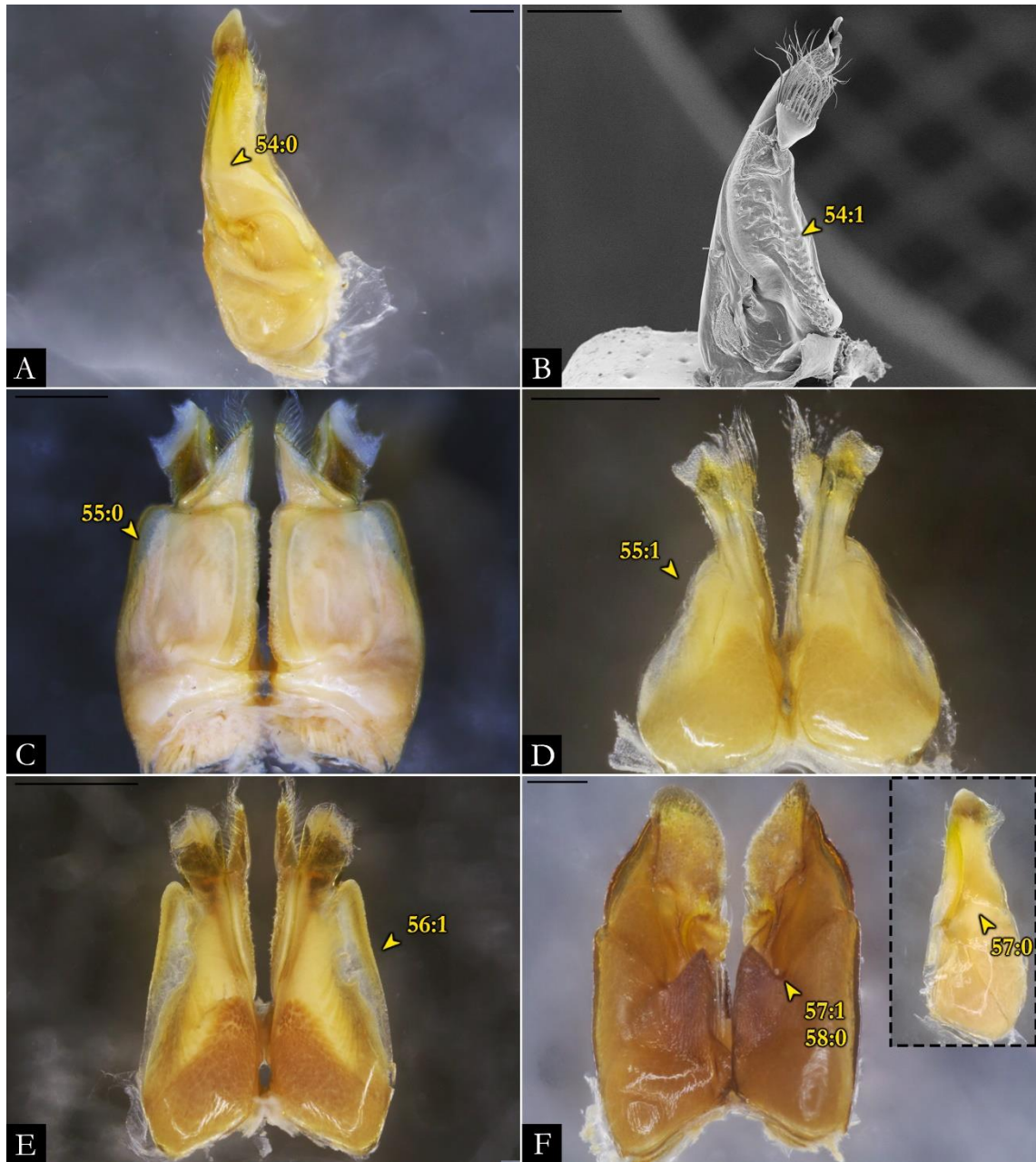
95 **Figure 209.** Characters 47–49 and their character states. Second leg-pair of males: A)  
 96 *Phallorthus colombianus* (FMNH). Penis of *Epinannolene* sp. (ICN), in detail; B) *P.*  
 97 *imbiensis* (MZSP 1035); C) *P. halophila* (IBSP 3671). **Scale bars:** A–C, 0.25 mm.



98

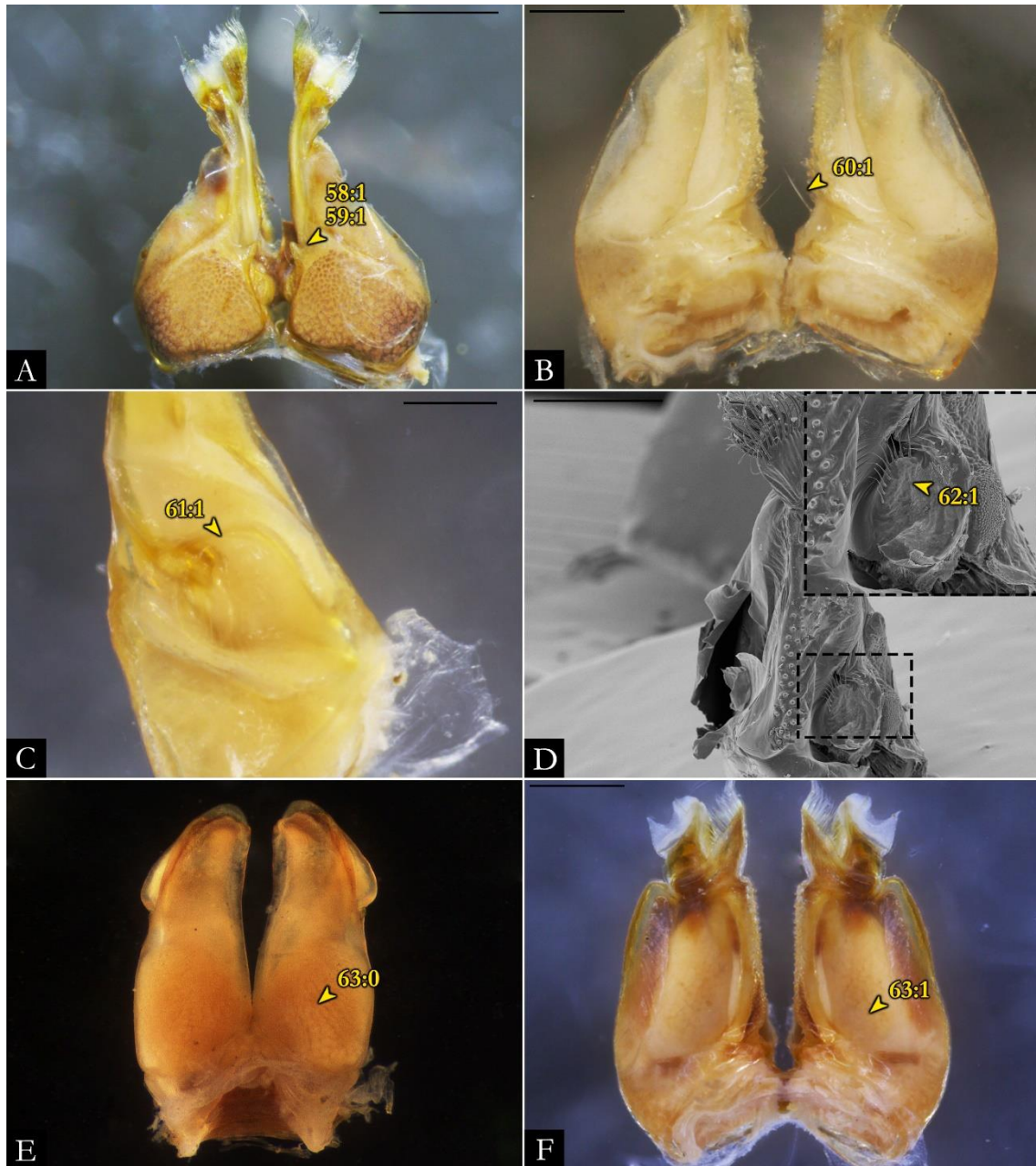
99 **Figure 210.** Characters 50–52 and their character states. Vulva: A) *Holopodostreptus*  
 100 *braueri* (MNRJ), in anal view; B) Vulvae adhered on second leg-pair of *P. microzoporus*  
 101 (IBSP), in anal view; C) Right vulva of *Holopodostreptus braueri* (MNRJ), in oral view;  
 102 D) Right vulva of *P. ophiulus* (MZSP), in anal view. **Scale bars:** A, C–D, 0.2 mm; B,  
 103 0.5 mm.





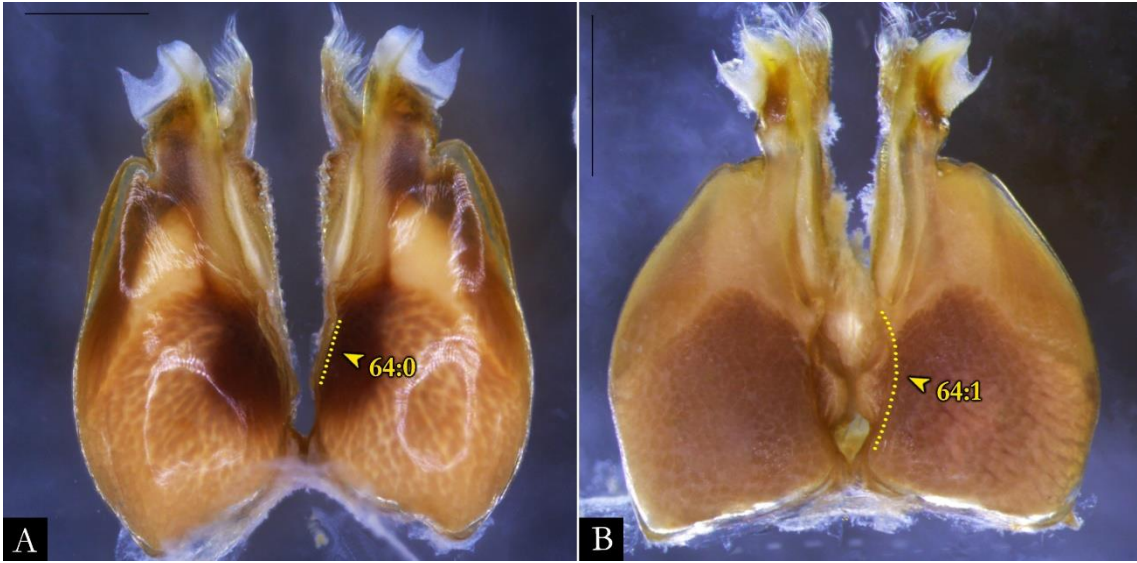
104

105 **Figure 211.** Characters 54–58 and their character states. Gonopods: A) Left gonopod of  
 106 *Holopodostreptus braueri* (MNRJ), in mesal view; B) Left gonopod of *P. maritima* (IBSP  
 107 979), in mesal view; C) *P. microzoporus* (IBSP 3427), in anal view; D) *P. strinatii* (ISLA  
 108 20622), in oral view; E) *P. tricolor* (IBSP 964), in oral view; F) *Phallortus colombianus*  
 109 (FMNH), in oral view. Detail of right gonopod of *Holopodostreptus braueri* (MNRJ), in  
 110 oral view. **Scale bars:** A, 0.2 mm; B, 0.25 mm; C–F, 0.5 mm.



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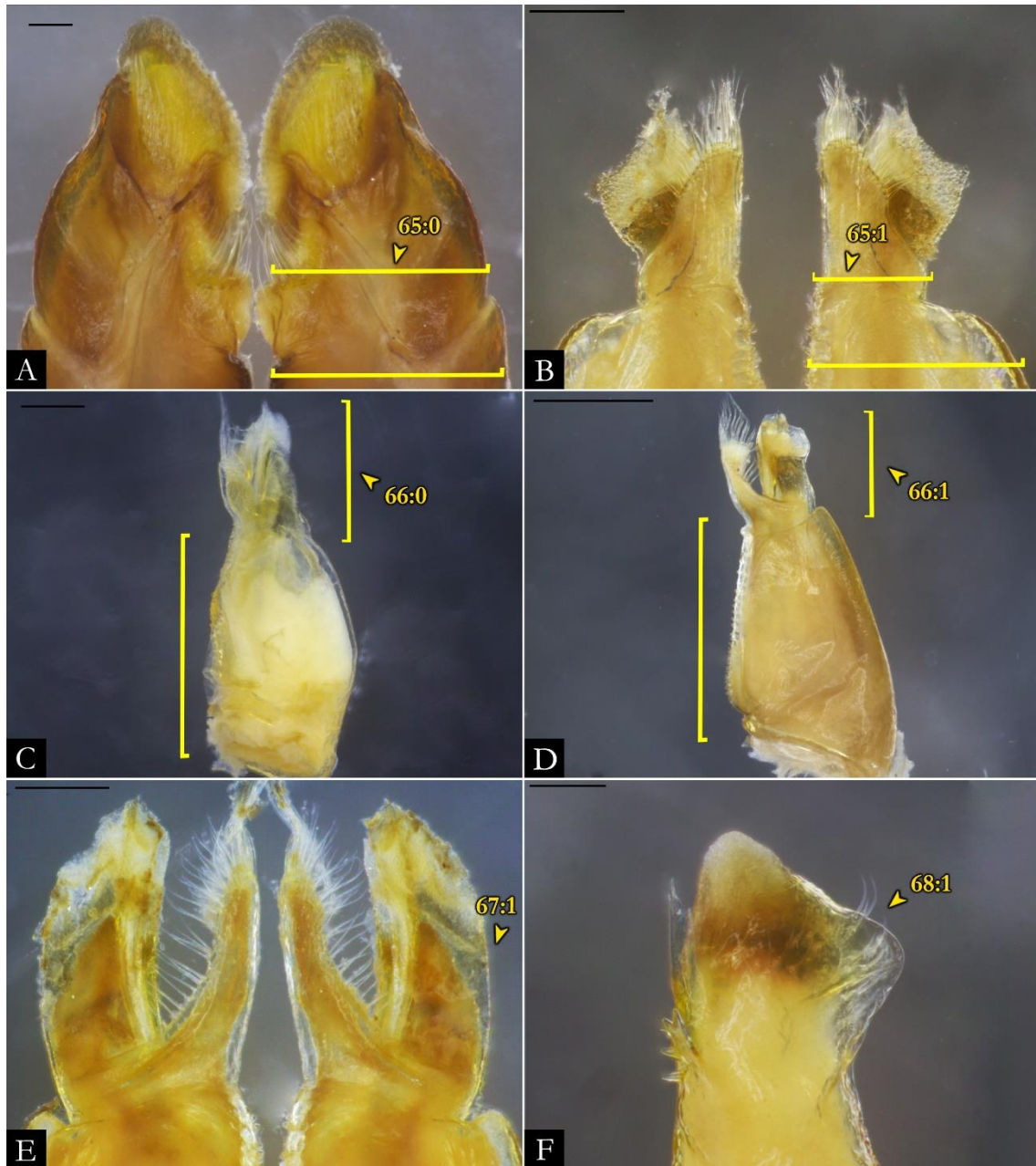
112 **Figure 212.** Characters 58–63 and their character states. Gonopods: A) *P. occidentalis*  
 113 (IBSP 1998), in oral view; B) Gonocoxae of *P. lundi* (ISLA 8685), in oral view; C) Mesal  
 114 cavity of *Holopodostreptus braueri* (MNRJ), in mesal view; D) *P. paulista* (IBSP 1908),  
 115 in mesal view. Globular projection bearing setae on mesal cavity, in detail; E) *Choctella*  
 116 *cumminsi* (USNM); F) *P. caatinga* (IBSP 2166). **Scale bars:** A, 0.5 mm; B–C, 0.2 mm;  
 117 D, F, 0.5 mm.



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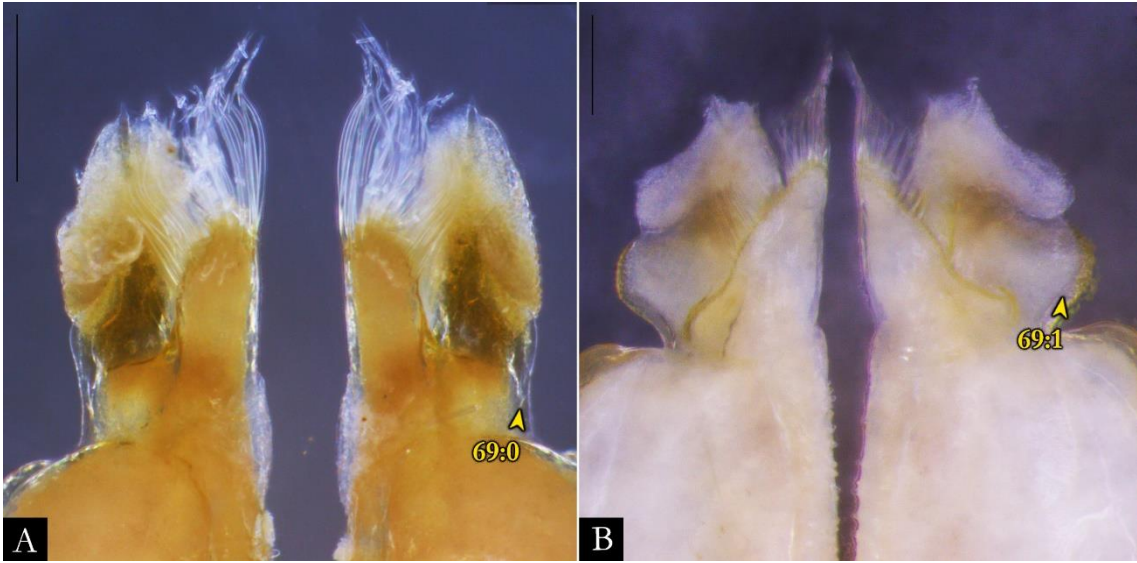
119 **Figure 213.** Character 64 and its character states. Gonopods in oral view: A) *P. caatinga*

120 (*IBSP 2166*); B) *P. paulista* (*IBSP 1908*). **Scale bars:** A, 0.5 mm; B, 0.25 mm.



121

122 **Figure 214.** Characters 65–68 and their character states. Gonopods: A) Distal region of  
 123 gonopods of *Phallorthis colombianus* (FMNH), in anal view; B) Distal region of  
 124 gonopods of *P. buhrnheimi* (IBSP 2397), in anal view; C) Left gonopod of *P. alegrensis*  
 125 (MCN 626), in anal view; D) Left gonopod of *P. typica* (MCSN), in anal view; E) Distal  
 126 region of gonopods of *P. erikae* (IBSP 3331), in anal view; F) Right gonopod of  
 127 *Holopodostreptus braueri* (MNRJ), in oral view. **Scale bars:** A, F, 0.1 mm; B–C, 0.2  
 128 mm; D–E, 0.5 mm.



129

130 **Figure 215.** Character 69 and its character states. Telopodites: A) *P. ambuatinga* (IBSP  
131 3442); B) *P. alata* sp. nov. (IBSP 7879). **Scale bars:** A–B, 0.2 mm.

132



133

134 **Figure 216.** Characters 70–73 and their character states. Gonopods: A) *Phallorthus*  
 135 *colombianus* (FMNH); B) *Holopodostreptus braueri* (MNRJ). Left telopodite, in anal  
 136 view: C) *P. imbirensis* (MZSP 1035); D) *P. nicolau* sp. nov. (ABAM); E) *P. occidentalis*  
 137 (IBSP 1998). **Scale bars:** A–C, 0.2 mm; D–E, 0.1 mm.

138

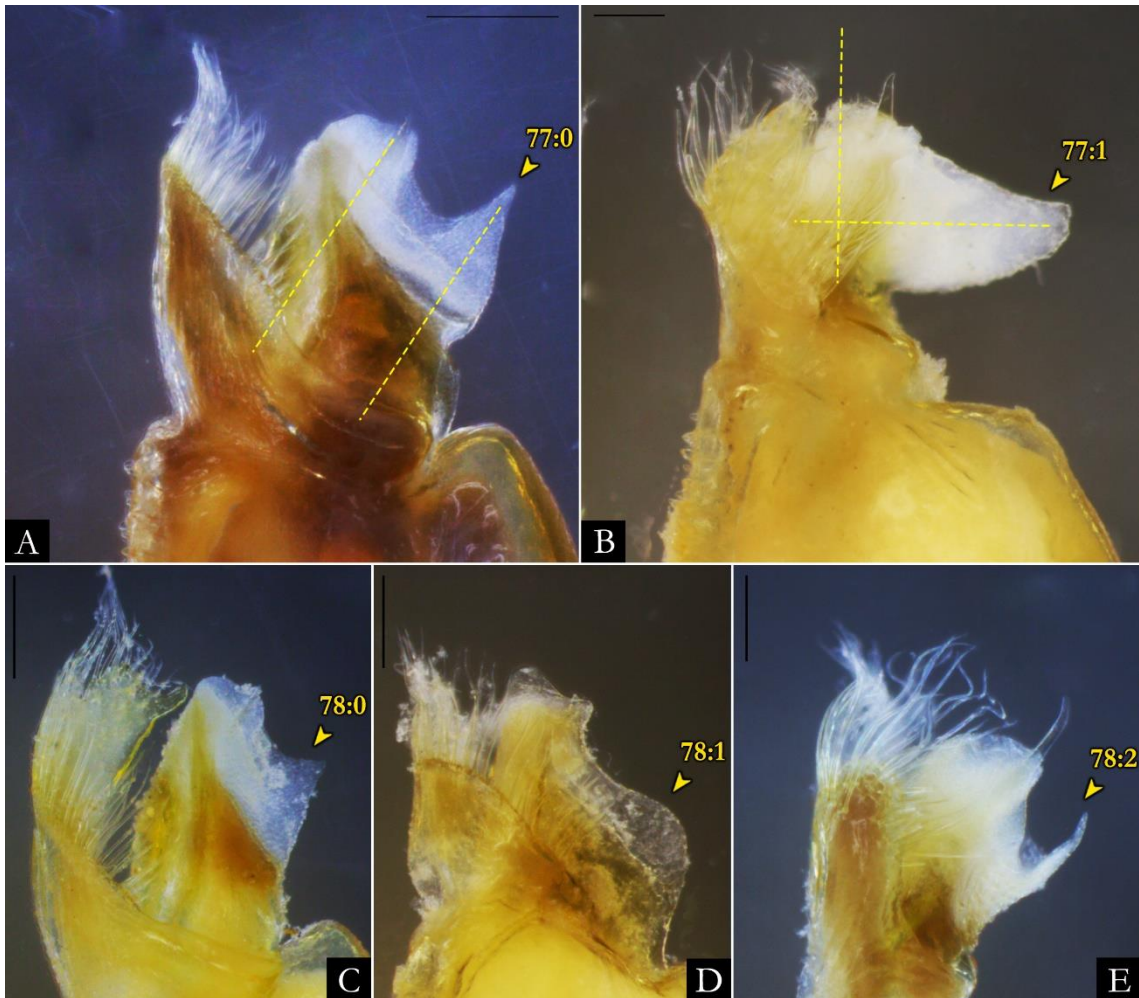
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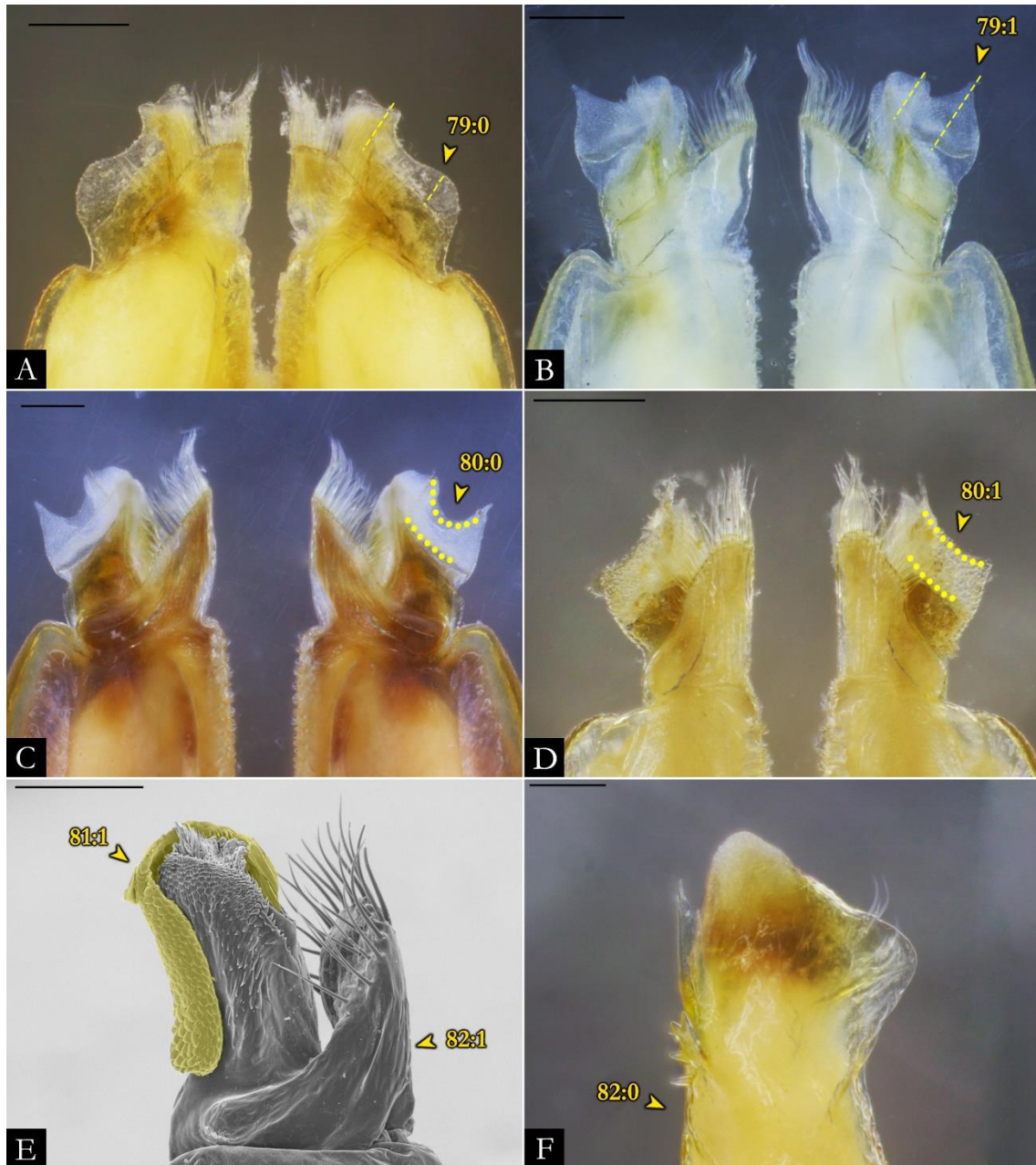
142 **Figure 217.** Characters 74–76 and their character states. Solenomere of left gonopod, in  
 143 anal view: A) *P. buhrnheimi* (IBSP 2397); B) *P. nicolau* sp. nov. (ABAM); C) *P.*  
 144 *rolamossa* (ISLA 1504). **Scale bars:** A, 0.2 mm; B–C, 0.1 mm.



145

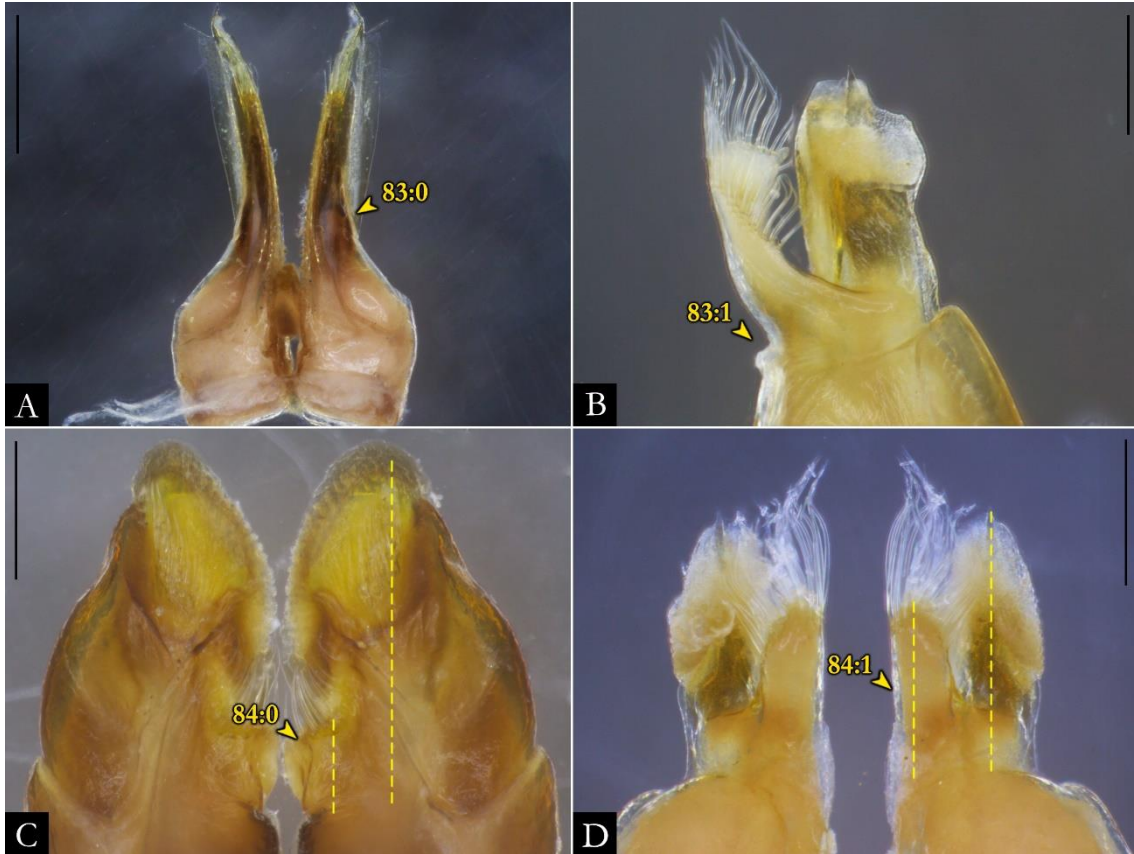
146 **Figure 218.** Characters 77–78 and their character states. Solenomere of left gonopod, in  
 147 anal view: A) *P. caatinga* (IBSP 2166); B) *P. inops* (IBSP 2559); C) *P. robsoni* (IBSP

148 3588); D) *P. albiventris* (MZSP 1007); E) *P. paulista* (IBSP 1908). Scale bars: A, C, 0.2  
 149 mm; B, D–F, 0.1 mm.



150  
 151 **Figure 219.** Characters 79–82 and their character states. Gonopods: A) *P. albiventris*  
 152 (MZSP 1007); B) *P. rolamossa* (IBSP); C) *P. caatinga* (IBSP 2166); D) *P. buhrnheimi*  
 153 (IBSP 2397); E) *P. spelaea* (IBSP 6071); F) *Holopodostreptus braueri* (MNRJ). Scale  
 154 bars: A–C, 0.2 mm; D, 0.5 mm; E–F, 0.1 mm.





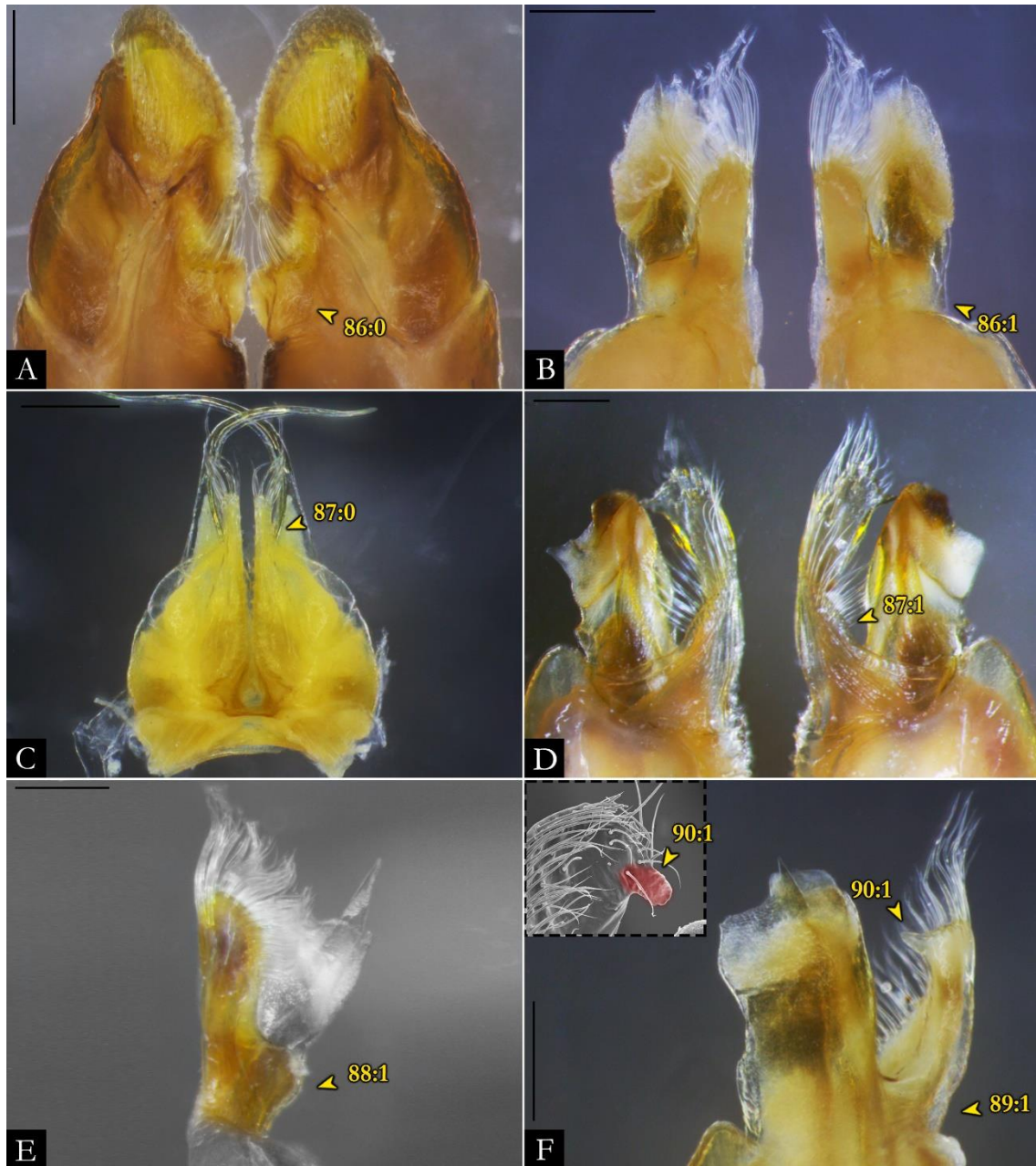
155

156 **Figure 220.** Characters 83–84 and their character states. Gonopods: A) *Epinannolene* sp.  
 157 (ICN); B) *P. typica* (MCSN); C) *Phallorthus colombianus* (FMNH); D) *P. ambuatinga*  
 158 (IBSP 3442). **Scale bars:** A, 0.5 mm; B, 0.1 mm; C–D, 0.2 mm.



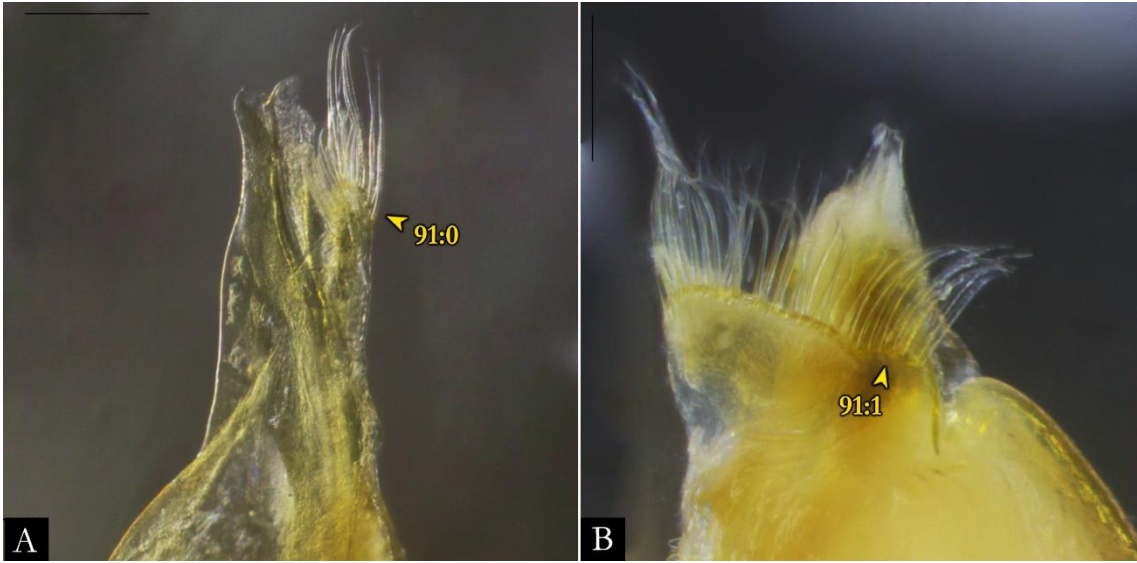
159

160 **Figure 221.** Character 85 and its character states. Internal branch: A) *Epinannolene exilio*  
 161 (INPA); B) *P. tricolor* (IBSP 964); C) *P. nicolau* sp. nov. (ABAM). **Scale bars:** A–B,  
 162 0.2 mm; C, 0.1 mm.



163

164 **Figure 222.** Characters 86–90 and their character states. Internal branch: A) *Phallorthis*  
 165 *colombianus* (FMNH); B) *P. ambuatinga* (IBSP 3442); C) *Epinannolene exilio* (INPA);  
 166 D) *P. robsoni* (IBSP 3441); E) *P. occidentalis* (IBSP 1998); F) *P. typica* (MCSN). SEM  
 167 image of distal region of the internal branch, *P. fontanettiae* (IBSP), in detail (distal  
 168 projection highlighted in red). **Scale bars:** A–F, 0.2 mm.



169

170 **Figure 223.** Character 91 and its character states. Internal branch: A) *P. scalaris* (MZSP);

171 B) *P. urbica* (IBSP 2007). **Scale bars:** A–B, 0.2 mm.

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