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ARTICLE

Studies on Neotropical Phasmatodea XXVII: a new endemic stick insect genus with two species from the Atlantic Forest of Brazil (Phasmatodea: Pseudophasmatidae: Pseudophasmatinae: Pseudophasmatini)

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Abstract. We describe a new genus, *Atlantopteryx* **gen. nov.,** containing two new species, *Atlantopteryx parva* **gen. et sp. nov.** and *Atlantopteryx scotina* **gen. et sp. nov.,** from the states of Espírito Santo and Minas Gerais, Brazil, based on males, females, and eggs. The distinctive features of this new genus are described and illustrated, as well as its internal male genitalia. The new genus is most similar to *Urucumania* Zompro, 2004, but can easily be distinguished from it by the lack of tegmina, the reticulate venation of the remigium area of the alae, and the small, discrete poculum of the male terminalia. The two new species are likely restricted and endemic to the extreme north of the Serra do Mar mountain range, in the Atlantic Forest. Furthermore, we present a brief discussion on the relationship of the new genus with other Pseudophasmatinae.

Keywords. Phasmida; Insecta; *Atlantopteryx;* Occidophasmata; Neotropical.

INTRODUCTION

Stick-insects are not only remarkable in the fact that most species excel in camouflage, but that a significant portion of representatives further engage in colorful, often aposematic or deimatic displays as means of defense, be that directly, always showing their colors to the environment, or secondarily, showing structures and colors only after they are disturbed (Bedford, 1978). In the Neotropics, some lineages present vibrant coloration and can exhibit this behavior or even discharge an irritating substance from their prothoracic glands (Eisner *et al.,* 1997), especially in the family Pseudophasmatidae including many representatives with these traits (Chiquetto-Machado *et al.,* 2022; Ghirotto *et al.,* 2024; Niekampf *et al.,* 2024). The family is currently divided into three subfamilies, Pseudophasmatinae Rehn, 1904, Stratocleinae Günther, 1953, and Xerosomatinae Bradley & Galil, 1977. Pseudophasmatinae is the most species-rich, currently comprising 17 genera and 152 valid species (Brock *et al.,* 2025), although its composition seems to warrant significant changes as it is apparently non-monophyletic (Chiquetto-Machado & Cancello, 2021; Bank & Bradler, 2022). In the southeastern Atlantic Forest of Brazil, one of the hotspots of global biodiversity

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(Ribeiro *et al.,* 2011), Pseudophasmatinae are so far represented by the genera *Tithonophasma* Zompro, 2004, *Urucumania* Zompro, 2004, and *Pseudophasma* Kirby, 1896. As the 27th part of an ongoing study of the New World Phasmatodea, we describe a remarkable, likely endemic new genus and two new species from the Atlantic Forest of the states of Espírito Santo and Minas Gerais, Brazil, in the extreme North of the Serra do Mar mountain range. The new genus is placed in the Anisomorphini Redtenbacher, 1906 and it is similar to *Urucumania* (Zompro, 2004; Ghirotto *et al.,* 2024).

MATERIAL AND METHODS

Analyzed material is housed in the entomological collection of the Museu de Zoologia da Universidade de São Paulo, São Paulo, Brazil (MZUSP), Museu de Entomologia, Universidade Federal de Viçosa, Minas Gerais, Brazil (UFVB), Zoologische Staatssammlung München, Munich, Germany (ZSMC), and the Museum National d'Histoire Naturelle, Paris, France (MNHN).

Some of the analyzed specimens were collected during fieldwork carried out in Caparaó National Park (Parque Nacional do Caparaó) between 30 November and 4 December 2015. Caparaó National Park is located on the border between the Brazilian states of Minas Gerais and Espírito Santo, encompassing altitudes from 997 m to 2,892 m. The park covers approximately 31,800 ha of the Serra do Caparaó mountain range and protects a mosaic of Atlantic Forest ecosystems, including montane forests, cloud forests and *campos de altitude (*high-altitude grasslands*)*. Specimens were collected at two localities within Caparaó National Park, both located in the state of Minas Gerais: Núcleo Pedra Menina (20°30′05″S, 41°49′09″W; ~1,450 m a.s.l.) and Núcleo Alto Caparaó (20°25′10″S, 41°50′53″W; ~1,300 m a.s.l.). Stick insects were searched for in the vegetation along trails and roads, and were collected manually.

Specimens were examined and photographed in detail under a Leica M205 C stereomicroscope or with a Canon EOS 70D camera equipped with a Canon 100 mm Macro lens. Genitalia dissection and treatment followed Ghirotto (2021). Measurements were taken with a digital Mitutoyo calliper. Average measurements are given for eggs. All eggs examined were already laid and hence are fully developed. The terminology used for the descriptions of external and internal egg structures follows Sellick (1997), and that of the genitalia follows Chiquetto-Machado & Cancello (2021) and Ghirotto (2021). The hindwings are divided into remigium and anal area, the remigium being all the area anterior to the anal veins, and the anal area the posterior-most, bearing anal veins (Bradler, 2009). Descriptions of coloration are mostly based on live specimens. When comparing lengths in the description, abdomen and thorax refer to abdominal segments II-X and to prothorax, mesothorax, metathorax and median segment, respectively. Label data are reproduced exactly as on the labels, and complementary notes are given in brackets. Figures were edited with Adobe Photoshop 2022.

We traced and reviewed images of live specimens on the online citizen-science platform iNaturalist (https://www.inaturalist.org) as a complement distribution records of the new genus. All observations gathered are presented as a supplementary material to this paper.

Figure 1. Holotype male of *Atlantopteryx parva* **gen. et sp. nov.,** MZUSP0517, from Parque Nacional do Caparaó, Minas Gerais, Brazil, habitus in lateral (A) and ventral (B) views.

RESULTS

Phasmatodea
Family Pseudophasmatidae Rehn, 1904
Tribe Anisomorphini Redtenbacher, 1906
Genus *Atlantopteryx* gen. nov.
(Figs. 1-18)

Type-species: *Atlantopteryx parva* **gen. et sp. nov.,** by present designation.

Composition: *Atlantopteryx parva* **gen. et sp. nov.** and *Atlantopteryx scotina* **gen. et sp. nov.**

Etymology: The name of the new genus, *Atlantopteryx,* is derived from two roots: "Atlanto-," which refers to the Atlantic Forest, where it is found, and *"-pteryx"* from the Greek word for "wing", referring to the very striking and peculiar hindwings in this genus. The combination of these terms highlights both the geographic occurrence of the genus and its defining characteristic of possessing small, colorful wings. The gender is feminine.

Differential diagnosis: Both sexes of this genus can be separated from all other Pseudophasmatinae by the following combination of characters: absence of ocelli (Figs. 2B, 4C), absence of tegmina, presence of hindwings with simple to reticulate venation in the remigium, and vividly, homogeneously colored anal area (Figs. 2A, C, 4C, 6G, 12A, D).

The absence of tegmina and presence of hindwings in Pseudophasmatinae is a unique character that is shared with the Colombian species *Atratomorpha bispinosa* Conle, Hennemann & Gutiérrez, 2011, but the new genus can be differentiated from it by the absence of ocelli (present in *A. bispinosa*) and the smaller poculum (bulgy and round in *A. bispinosa*).

Furthermore, some characteristics in combination with the above can help differentiate the new genus from other Pseudophasmatinae: small and dorsoventrally flattened poculum (Figs. 2E, 6D, 9C-D), enlarged and wide tergum IX and X that are wider than long and wider than preceding segments (Figs. 2A, 6C, 9B, 13E), thorn pads spread along almost the entire posterior edge of tergum X (Fig. 2J) and bearing very small, short, almost inconspicuous teeth in males (Fig. 2K); and the short gonapophyses in females (Figs. 4E, 12G).

Specimens of the new genus are superficially similar to *Urucumania* Zompro, 2004, but can be safely differentiated by several characteristics: the complete absence of tegmina (small and scale-like, but present in *Urucumania*) and thicker width at the apex of femora in both sexes, posterior to anterior tapering aspect of the mesonotum (not or only very slightly tapering in *Urucumania*), well-developed, wide praeopercular organ (small and poorly protruding in *Urucumania*) and narrower subgenital plate in females, and the wider, swollen apex of cerci, wider tergum X, wider apex of the vomer, the straight posterior edge of tergum X (overall round and emarginating centrally in *Urucumania*), absence of finger-like projections on sternum IX (present in *Urucumania*), thornpads spread along posterior edge of tergum X and bearing small teeth forming rows (limited by the round emarginations and bearing larger teeth in a round disposition in *Urucumania*), and the small poculum (bulgy and round in *Urucumania*) in males. Furthermore, its eggs can be differentiated to those of *Urucumania* and other Pseudophasmatinae by the high concentration of mushroom-like structures (more than 60 counted in a straight line from the anterior to the posterior pole), and the small micropylar plate (around one fifth to one fourth of the length of the egg).

Comments: This new genus is among the smallest known Pseudophasmatinae to date, along with *Monticomorpha* Conle & Hennemann, 2002. However, *Monticomorpha* inhabits high altitudes, even in Páramo habitats (> 3,000 m) in the Andes mountain range, where reduced oxygen levels, lower temperatures, and limited resources likely contribute to their diminutive size. In contrast, *Atlantopteryx* **gen. nov.** is found in low mountain ranges, with peaks barely exceeding 1,000 m in altitude, within the Bahia coastal forests ecoregion characterized by moist broadleaf forests.

Description

General characterization: Both species of the genus are very similar, and the only significant differences are those observed in the diagnosis for each species. Small-sized Pseudophasmatini (female body length 33-42 mm, male 17-23 mm), characterized by small hindwings with simple to reticulate venation in the remigium and vividly, homogeneously yellow colored anal area, but lacking tegmina (Fig. 12A). Males exhibit a very slender body (Fig. 9B), while females are notably robust (Fig. 11A), especially when gravid (Fig. 4A). Sexual dimorphism is highly pronounced, with males being much slenderer than females, typically measuring around half their length (Figs. 16-18). **Coloration (Figs. 2, 6, 7, 9, 12, 14, 15, 16-18):** Overall body coloration ranging from straw brown to dark chestnut brown, occasionally appearing almost black, with small circular specks of light beige. Head and thorax typically with a wide cream-colored median band, sometimes accompanied by a thin black paramedian line, particularly noticeable on the head and pronotum. Antennae generally dark brown, nearly black, with some segments partially cream-colored and some whitish, around the middle of the antennae in females or near the tip of antennae in males. Anal area of the hindwings uniformly lemon yellow, remigium black, featuring reddish, orange or yellowish venation that can be reduced to a single, incomplete vein or be reticulated and complete across the whole remigium. Leg coloration varying from chestnut brown to nearly black, speckled with small oval patches of light beige. Distal third of the femora often blackish, joint between the femur and tibia usually light beige. Tibiae sometimes with black bands. **Head:** Globose with a slightly flattened vertex, slight-

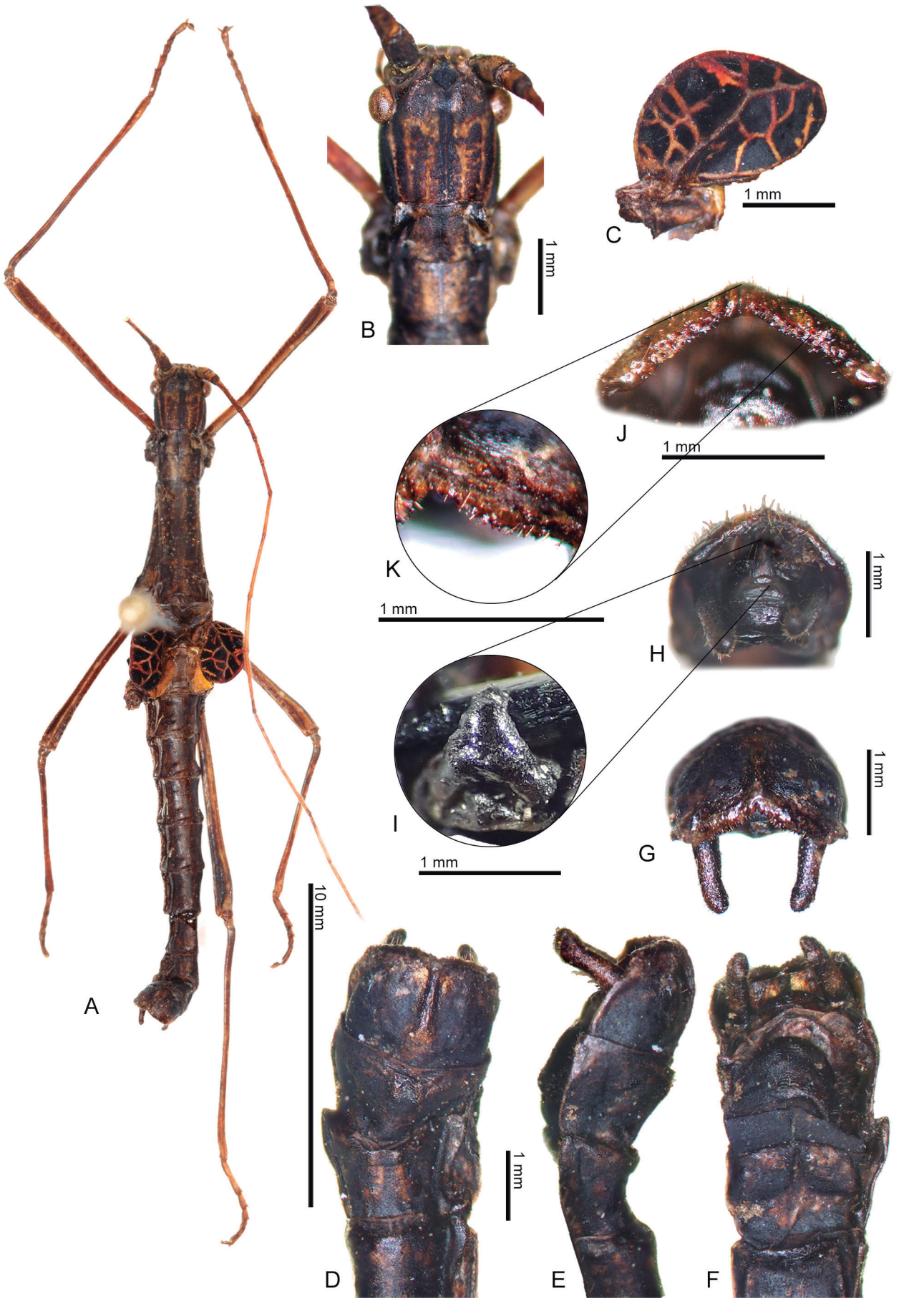

Figure 2. Holotype male of *Atlantopteryx parva* **gen. et sp. nov.,** MZUSP0517, from Parque Nacional do Caparaó, Minas Gerais, Brazil. Habitus (A), head (B) and hindwing (C) in dorsal views. Terminalia in dorsal (D), lateral (E), and ventral (F) views. (G) Cercus in posterior view. (J, K) thorn pads in detail, postero-dorsal view. (H, I) vomer in detail, ventral view.

ly longer than wide, devoid of ornamentation or ocelli (Figs. 2B, 7D). Antennae filiform and longer than the body (Figs. 7B, 8, 11, 14). Labrum small. **Thorax:** Slender in males (Fig. 2A) and widening towards the metathorax in females (Fig. 4C); in both sexes, approximately circular in cross-section. Pronotum slightly shorter than the head, the mesonotum slightly more than twice the length of the pronotum. Metathorax marginally shorter than mesothorax. Tegmina absent (Fig. 12A). Rudimentary alae present; anal area uniformly colored in a striking tone; remigium black with raised reticulate venation (Figs. 12D, 13C). Wings typically extending to the posterior margin of the median segment but not exceeding the posterior margin of abdominal tergum II. **Legs:** Long and slender, without ornamentation or raised ridges (Figs. 1, 8, 9, 11). Profemora very weakly curved, almost straight. Femora and tibiae thicker apically. Fore and mid legs slightly longer than the combined length of the head and thorax, respectively. Hind legs exceeding the entire length of the abdomen. Tibiae of approximately the same length as the corresponding femora. Carinae of legs weakly developed, antero- and posteroventral carinae of femora of both sexes, and carinae of the female protibiae slightly more developed. Carinae of male tibiae inconspicuous. Tarsi slightly less than half the length of the tibiae. Basitarsus as long as to slightly longer than the following three tarsomeres combined (Fig. 4A, B). Tarsomeres I-III with a dorso-posterior round projection covering the succeeding tarsomere. **Abdomen:** Smooth and slightly longer than the combined length of the head and thorax (Figs. 2A, 4A); slender in males, while in gravid females, it can widen to twice the width

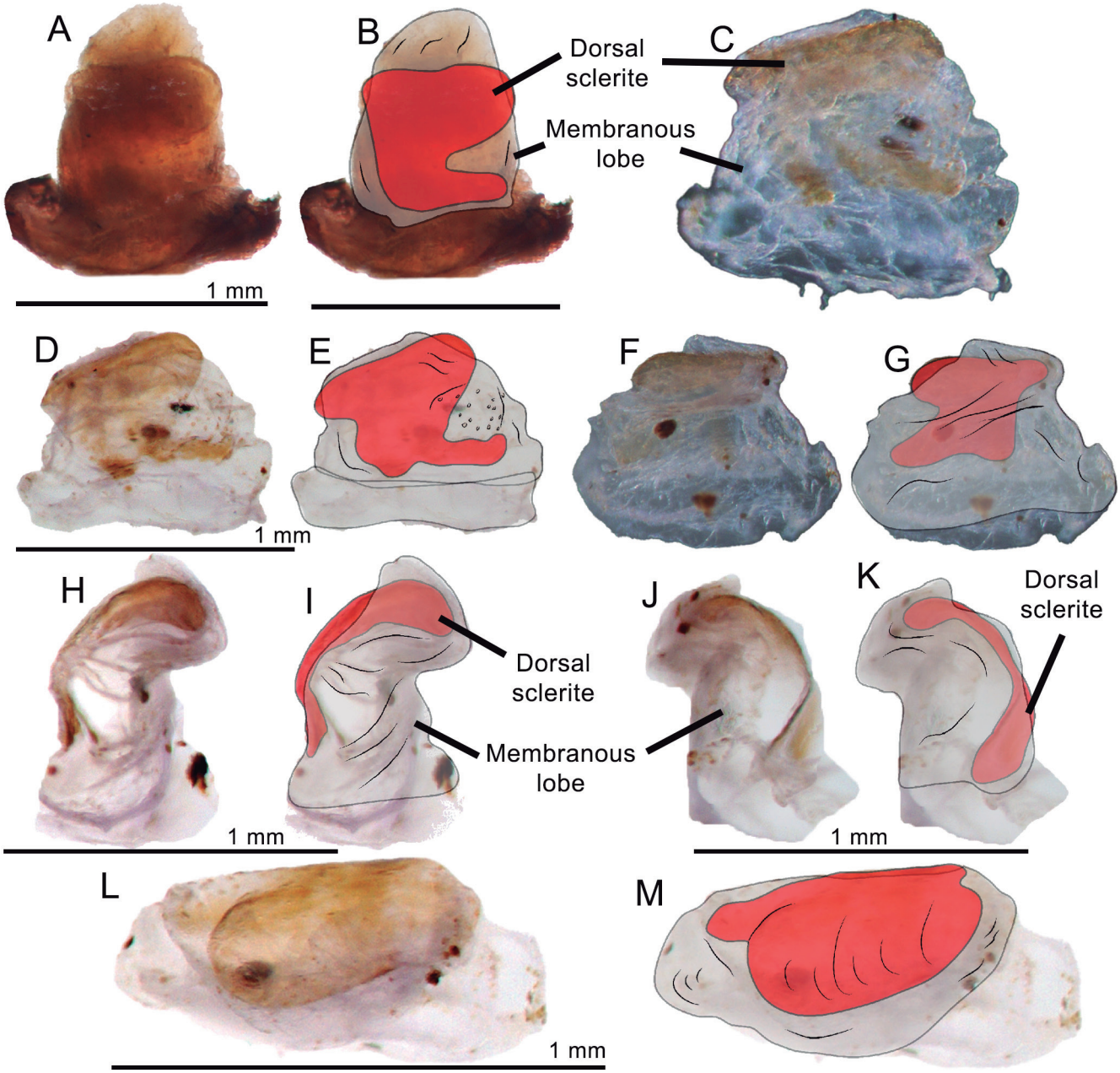

Figure 3. Paratype male of *Atlantopteryx parva* **gen. et sp. nov.,** MZUSP0858, from Parque Nacional do Caparaó, Minas Gerais, Brazil, genitalia in dorsal (A-E), ventral (F, G), left side (H, I), right side (J, K), and posterior (L, M) views. Genitalia dissected and untreated (A-B), dissected and treated with KOH (C-M). Drawings on top of a figure are shown illustrating previous picture, in B, E, G, I, K and M; dorsal sclerite is in red and membranous lobe is in gray.

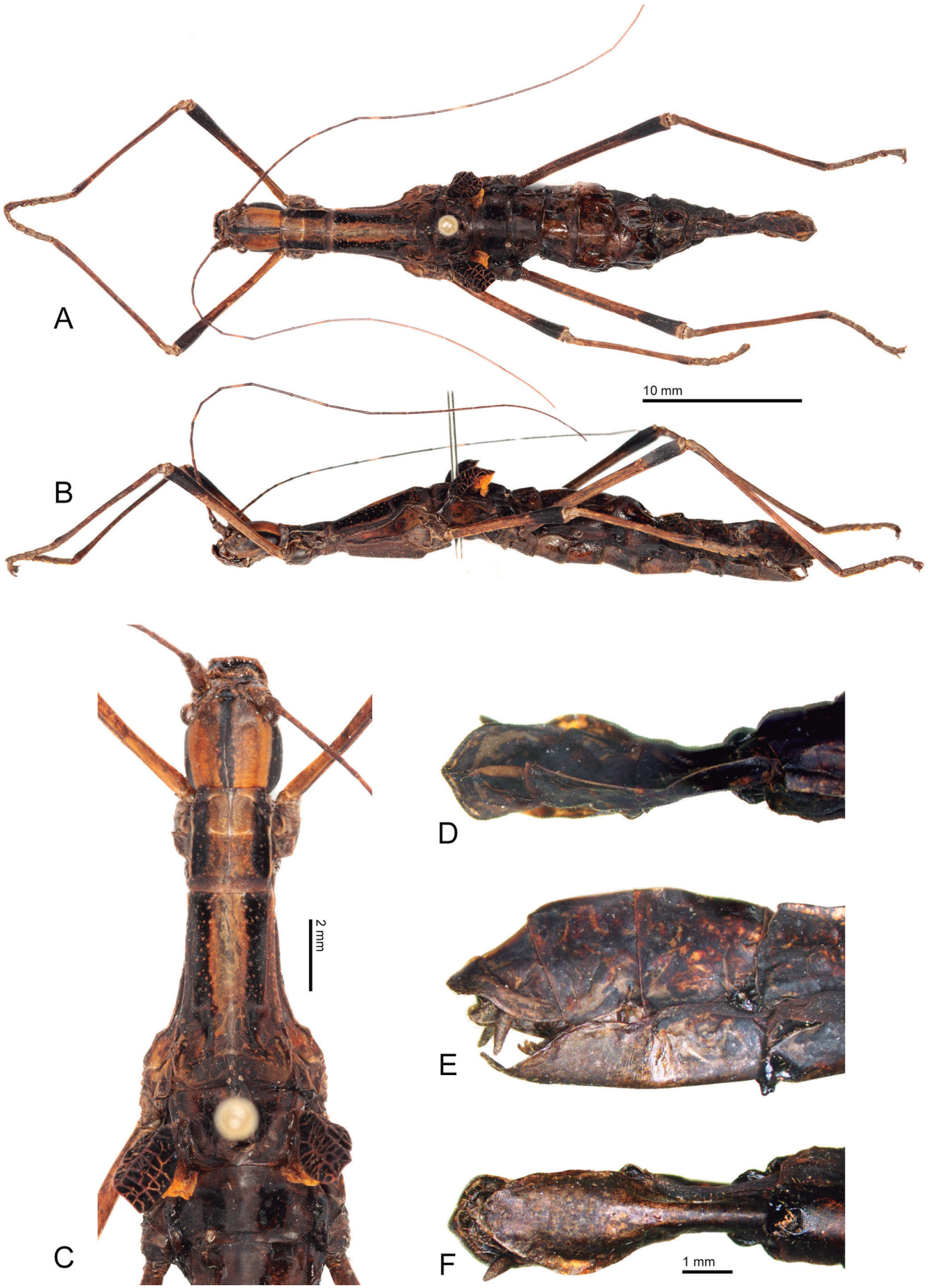

Figure 4. Paratype female of *Atlantopteryx parva* **gen. et sp. nov.,** MZUSP0522, from Parque Nacional do Caparaó, Minas Gerais, Brazil, habitus in dorsal (A) and lateral (B) views. (C) detail of head and thorax in dorsal view. (D-F) terminalia in dorsal (D), lateral (E) and ventral (F) views.

of the metathorax. Posterior margin of tergum X dorsally keeled, straight to rounded in males, and slightly pointed in females. Subgenital plate of female shovel-shaped, with its apex almost reaching the posterior margin of the anal segment (Figs. 4F, 7G, 12H). Male poculum spoon-shaped with a rounded posterior margin (Fig. 10C-E). Vomer simple, strongly curved upwards, shaped almost like an equilateral triangle (Fig. 2H-I). Thorn pads bearing very small, minute short teeth spread along the posterior edge of tergum X (Figs. 2J-K, 13D). Cerci small in females, barely extending past the posterior margin of the anal segment, circular in cross-section, and tapering towards the apex (Fig. 4E). Male cerci longer, extending clearly beyond the posterior margin of the anal segment, roughly cylindrical, slightly curved inwards and slightly widened at the apex (Figs. 2G, E, 10, 13D). **Male genitalia (Fig. 3):** Small, consisting of a simple dorsal sclerite and a unique short and inconspicuous membranous lobe.

Eggs (Fig. 5): Irregularly brownish to beige, capsule rounded, barrel-shaped. Micropylar plate small, round to ovate (Fig. 5A). Capsule covered by a somewhat dense net of irregular, poorly connected thin ridges, which are less dense on the operculum. Ridges further bearing minute mushroom-like structures, also on the operculum. Micropylar cup distinct. Median line thick and very short.

Figure 5. Eggs of *Atlantopteryx parva* **gen. et sp. nov.,** from female paratypes from Parque Nacional do Caparaó, Minas Gerais, Brazil, in dorsal (A, D, F), lateral (B, E), and anterior (C, G) showing the operculum) views. (H) several eggs in different views.

Distribution (Fig. 20): Currently, this genus is only known from the Brazilian states of Minas Gerais and Espírito Santo, in the Atlantic Forest. It is apparently restricted to that area, as no other material of the genus was traced in collections with extensive representation of the Brazilian Atlantic Forest such as the MZUSP, and iNaturalist only gathers around 30 records of the new genus, all restricted to that area, amidst 905 records of stick insects for Espírito Santo and Minas Gerais.

Biology: In Caparaó National Park (Parque Nacional do Caparaó), specimens of *Atlantopteryx parva* **gen. et sp. nov.** were found in both preserved forest areas and open grassy areas surrounding the park facilities. The following notes are based on observation of live specimens.

Specimens of both new species were found on low vegetation (*i.e.,* no more than 1 m above the ground) or directly on the ground and were active during both day and night. All females, including subadults, were found with a male on their dorsum, and couples remained attached for several days, some even until death. Natural food plants could not be traced. In captivity, specimens were successfully fed on leaves of *Plantago* sp. (Plantaginaceae).

In captivity, specimens of *Atlantopteryx parva* **gen. et sp. nov.** exhibited markedly aggressive behavior, with males frequently biting each other when kept together. Males and females of both species, when disturbed or handled, displayed a characteristic defensive behavior, raising the abdomen and opening the hindwings to reveal the bright yellow region of the wings, and then usually ran away (see, for example, Figs. 16E, 17). A few nymphs of *Atlantopteryx parva* **gen. et sp. nov.** hatched from eggs laid by the females. These nymphs accepted *Plantago* sp. and *Tecoma stans* (Bignoniaceae) as food plants but died before molting to the second instar.

One couple of *Atlantopteryx parva* **gen. et sp. nov.** from another locality (Parque Estadual da Serra do Brigadeiro) was kept in captivity for a few days, accepted leaves of *Plantago* sp. as well, also performed the display of wings when handled, and additionally released a minty, slightly irritating substance from its prothoracic glands.

The genus *Atlantopteryx* has been observed by citizen scientists who uploaded pictures of specimens with basic data, such as locality, date, and time of the observation on the iNaturalist.org platform (Fig. 17). Based on this photographic evidence, the genus was mainly found in five different localities. Also, a few insights concerning biological and ecological aspects could arise. Observations on iNaturalist on both species of *Atlantopteryx* revealed that, until the moment of this manuscript's submission, most specimens were registered between October and February, with a peak in November and a single observation in April (Fig. 19). The peak of specimens compiled from iNaturalist records matches with specimens deposited in the museums and investigated in this study. Still, it is important to point out that photographic evidence based on voluntary and citizen collaboration via an online platform does not pose as a judicious methodology to understand the natural life cycle of *Atlantopteryx,* as observations can vary depending on personal interests, and tend to be overestimated by enthusiasts and underestimated by casual observers during a local visit whose attention is directed towards something else. Nevertheless, considering that some habitats are confined within the limits of National and State Parks with a high tourist turnover during the year, and that the few available specimens were collected on limited field trip expeditions, iNaturalist observations could provide further insights into *Atlantopteryx* dynamics in addition to the evidence currently available in scientific observations.

Among collected specimens and also on iNaturalist records, 30 sightings of mounted pairs were recorded, and it is noteworthy that in 38% of these cases the male was mounted on a subadult female (Figs. 16A-C, 18A). This indicates strong mate guarding in this species, similar to the reports on other Pseudophasmatidae such as *Anisomorpha buprestoides* (Maginnis & Redmond, 2009), and *Tithonophasma tithonus* (Lima *et al.,* 2013).

The aforementioned *Atlantopteryx* behavior, with specimens exhibiting both diurnal and nocturnal activity without the highly camouflaged strategy typical of most Phasmatodea, in addition to the deimatic response of flashing the yellow hindwings when disturbed, suggest an actual aposematic defensive strategy, if by any means the prothoracic gland secretions or a putative toxicity poses a threat to predators.

Atlantopteryx parva gen. et sp. nov. (Figs. 1-12, 16-17)

Type material: holotype: male (MZUSP 0517), Brasil, Minas Gerais, Parque Nacional do Caparaó, Núcleo Pedra Menina, 20°30′05″S, 41°49′09″W. P.I. Chiquetto-Machado, A.Z. Ramin & J.P. Constantini col., 04.xii.2015

Paratypes: 5 males (MZUSP 0512-0516), 5 females [including eggs] (MZUSP 0518-0522), Brasil, Minas Gerais, Parque Nacional do Caparaó, Núcleo Pedra Menina, 20°30′05″S, 41°49′09″W. P.I. Chiquetto-Machado, A.Z. Ramin & J.P. Constantini col., 04.xii.2015; 3 males (MZUSP 0483-0485), 3 females (MZUSP 0486-0488), Brasil, Minas Gerais, Parque Nacional do Caparaó, Núcleo Alto Caparaó, 20°25′10″S, 41°50′53″W. P.I. Chiquetto-Machado, A.Z. Ramin & J.P. Constantini col., 30.xi.-01.xii.2015; 1 male (MZUSP 0858), 1 female (MZUSP 0859), Brasil, Minas Gerais, Parque Nacional do Caparaó, Núcleo Alto Caparaó, Vale Verde, 20°25′18″S, 41°51′51″W. H.M. Rodrigues col., 06.iv.2017; 2 males, 1 female (UFVB), Brasil, [Espírito Santo], Venda Nova [do Imigrante], FZ Vaz de Melo, 16.i.2000; 1 male (MNHN), Brésil; PÉRE A; DAVID DEDIT.; 1 male (ZSMC), Brasil, en compta.

Additional material examined: 1 male (MZUSP 3022), 1 female (MZUSP 3023), Brasil, Minas Gerais, Araponga, Parque Estadual Serra do Brigadeiro, F. Salles & F. Jabeen col., xi.2023, raised in captivity by V.M. Ghirotto.

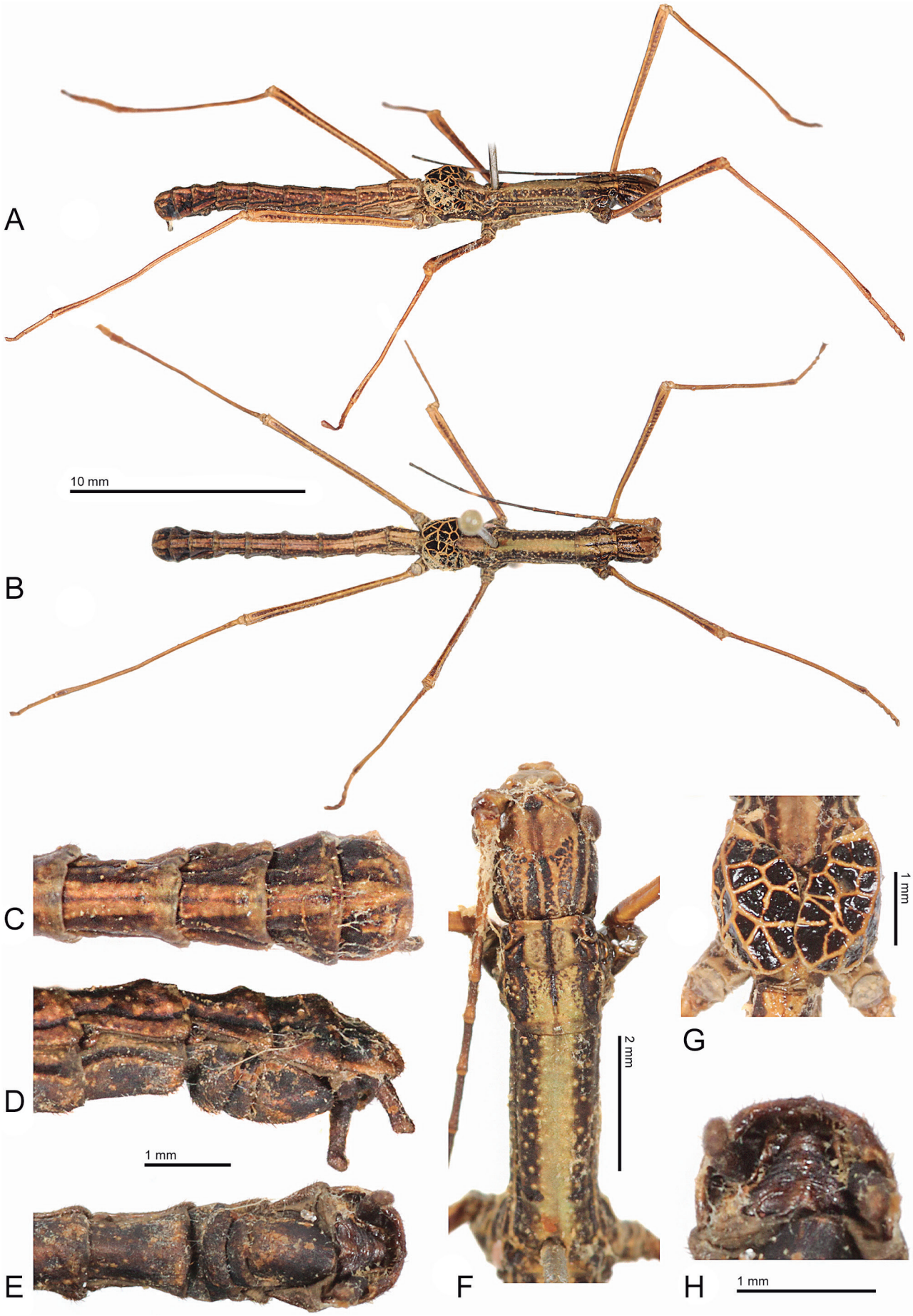

Figure 6. Paratype male of *Atlantopteryx parva* **gen. et sp. nov.,** UFVB, from Venda Nova do Imigrante, Espírito Santo, Brazil, habitus in lateral (A) and dorsal (B) views. (C-E, H) detail of terminalia in dorsal (C), lateral (D), ventral (E) and caudal (H) views. (F) detail of head and thorax in dorsal view. (G) wings in dorsal view.

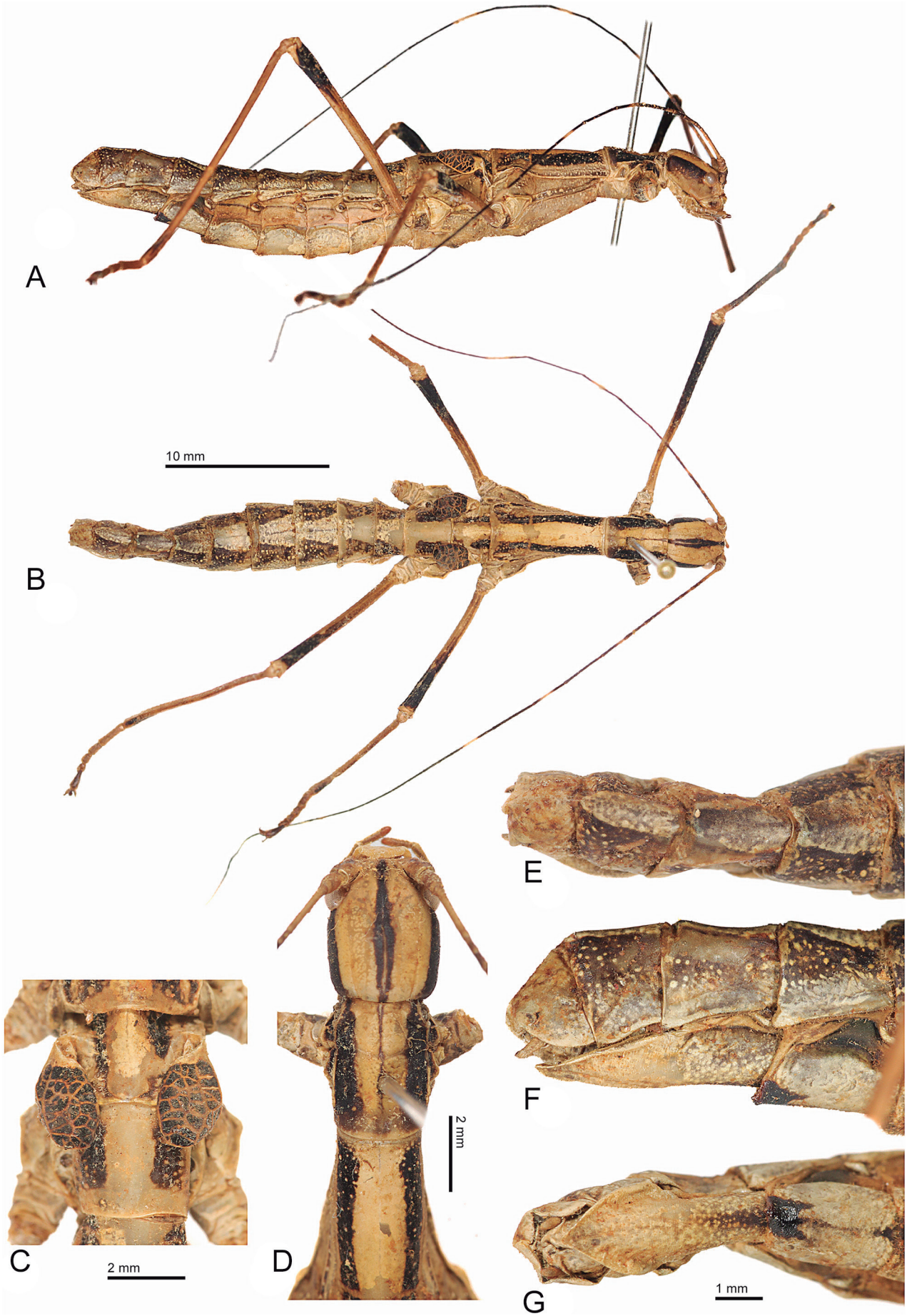

Figure 7. Paratype female of *Atlantopteryx parva* **gen. et sp. nov.,** UFVB, from Venda Nova do Imigrante, Espírito Santo, Brazil, habitus in lateral (A) and dorsal (B) views. (C) wings in dorsal view. (D) detail of head and thorax in dorsal view. (E-G) detail of terminalia in dorsal (E), lateral (F), and ventral (G) views.

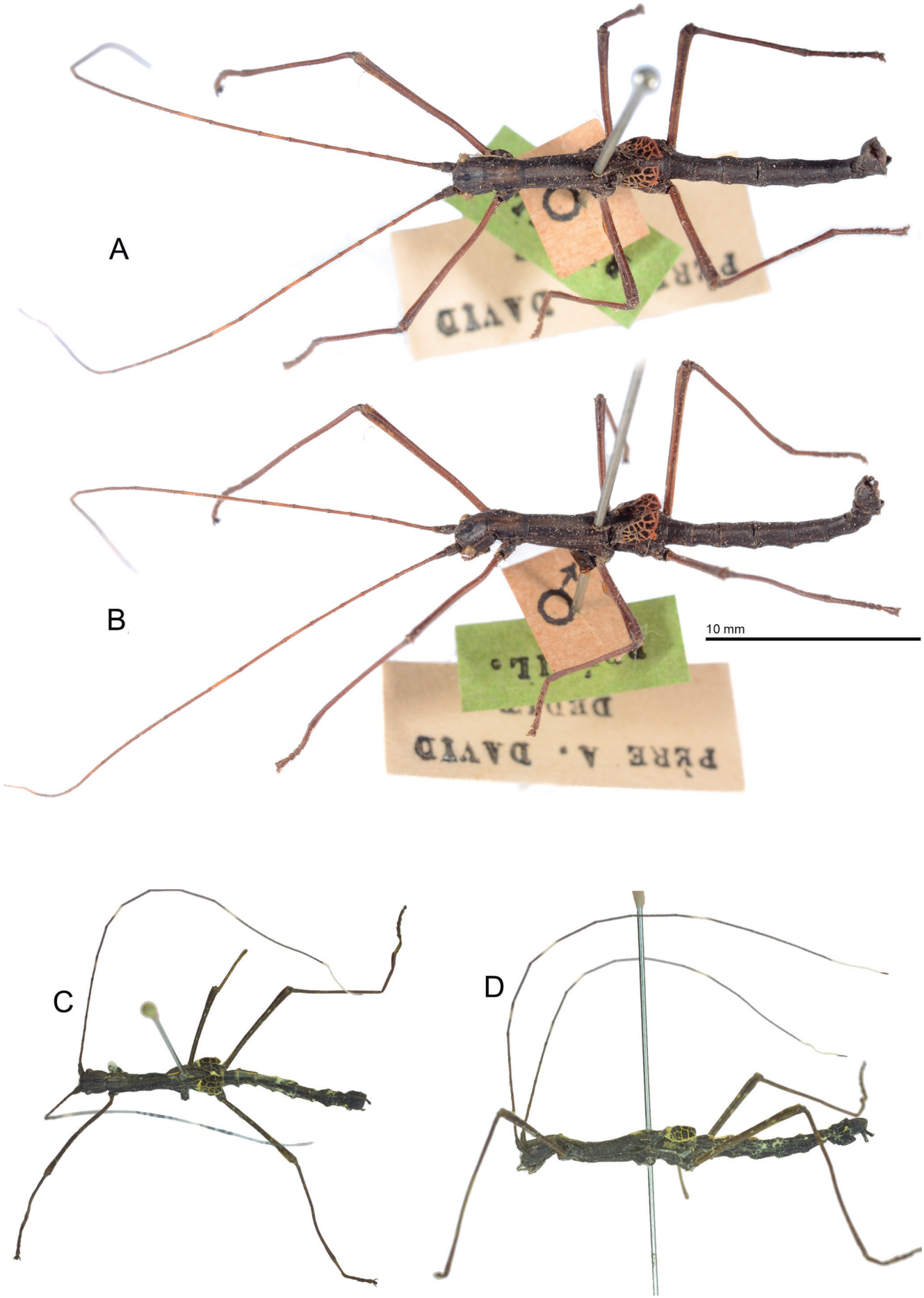

Figure 8. Paratypes of *Atlantopteryx parva* **gen. et sp. nov.,** habitus in dorsal (A, C) and lateral (B, D) views. (A-B) male from MNHN. (C-D) male from ZSMC.

Etymology: The epithet *parva* is derived from the Latin term *parvus,* meaning "small", and refers both to the characteristic diminutive size of the genus and to the size of this species in comparison with the other known species of the genus, which on average is slightly larger.

Differential diagnosis: This species can be differentiated from *A. scotina* **gen. et sp. nov.** by its thicker and shorter legs in relation to body size, and by the different hindwings, which are larger (reaching the posterior edge of the median segment) and present a developed,

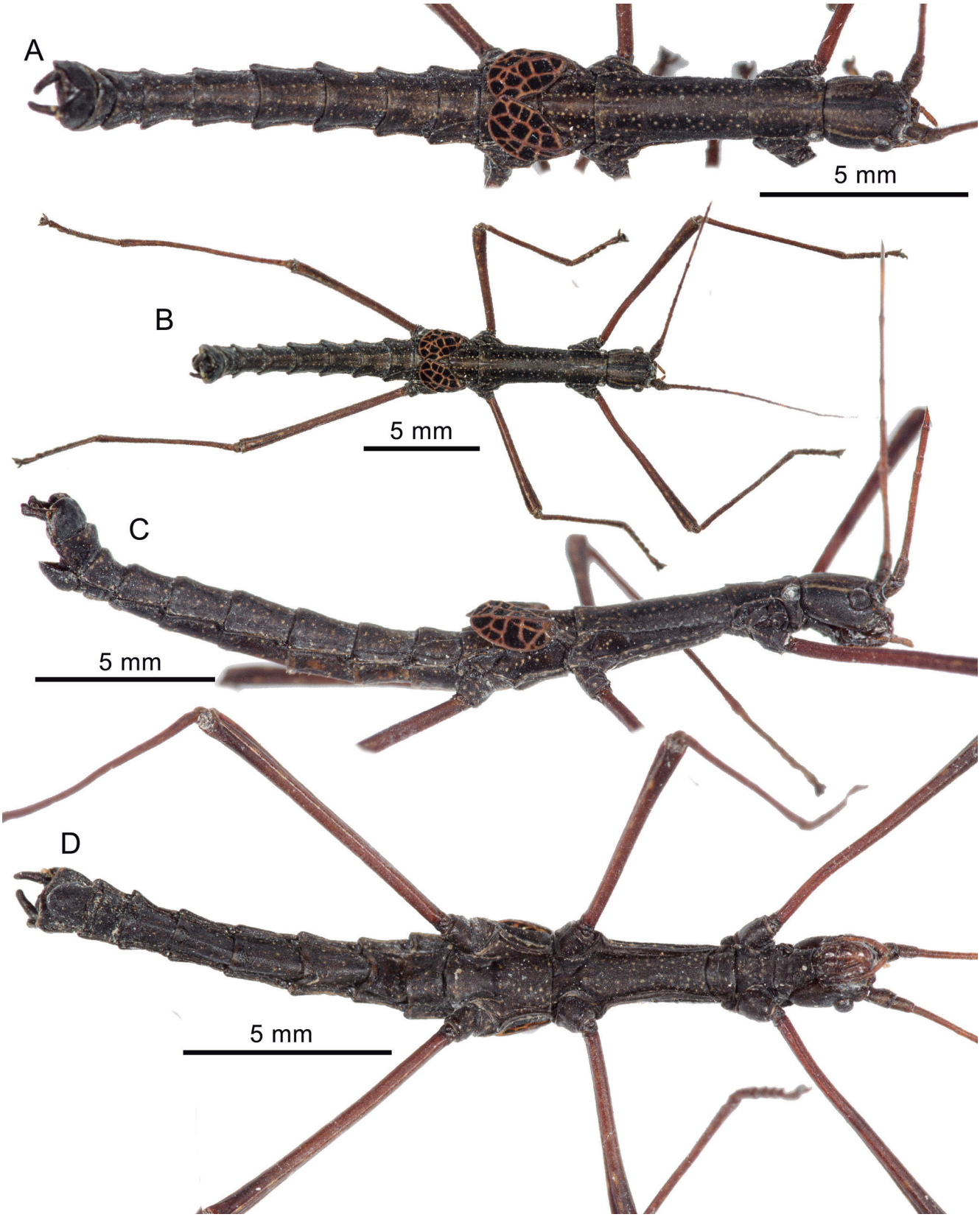

Figure 9. Male of *Atlantopteryx parva* **gen. et sp. nov.,** MZUSP3022, from Parque Estadual da Serra do Brigadeiro, Minas Gerais, Brazil, habitus in dorsal (A, B), lateral (C) and ventral (D) views.

reticulate wing venation of bright yellowish, orange or reddish, thus making the remigium of the wing colorful with a striking contrast of yellowish to reddish with black cells (Fig. 12D). For a better comparison, we present the following range of body proportions, presented with the value for female and male, respectively:

— Foreleg length divided by head plus thorax length: 1.37-1.54; 1.60-1.74;
— Foreleg length divided by body length: 0.68-0.78; 0.79-0.83;
— Profemur length divided by the profemur's greatest width (at tip): 9.4-11.8; 11.6-13.2;
— Profemur length divided by the profemur's greatest height (at tip): 9.8-12.1; 10.7-12.8;
— Metafemur length divided by the metafemur's greatest width (at tip): 9.7-11.9; 10.9-13.5;
— Metafemur length divided by the metafemur's greatest height (at tip): 10.5-11.7; 9.1-11.6;
— Protibia plus profemur length divided by protarsus length: 4.8-5.2; 4.7-5.4;
— Mesotibia plus mesofemur length divided by mesotarsus length: 4.0-4.5; 4.2-5.0;
— Metatibia plus metafemur length divided by metatarsus length: 4.3-5.4; 4.4-4.9;
— Wing length divided by pronotum plus mesonotum length: 0.27-0.30; 0.40-0.44.

Description

Female

Coloration (Figs. 4, 7, 11, 12, 16A-D, 17): Based on photographs of live specimens and dry material from museums. Overall body coloration ranging from straw brown to dark chestnut brown, occasionally appearing almost black, with small circular specks of light beige. Head

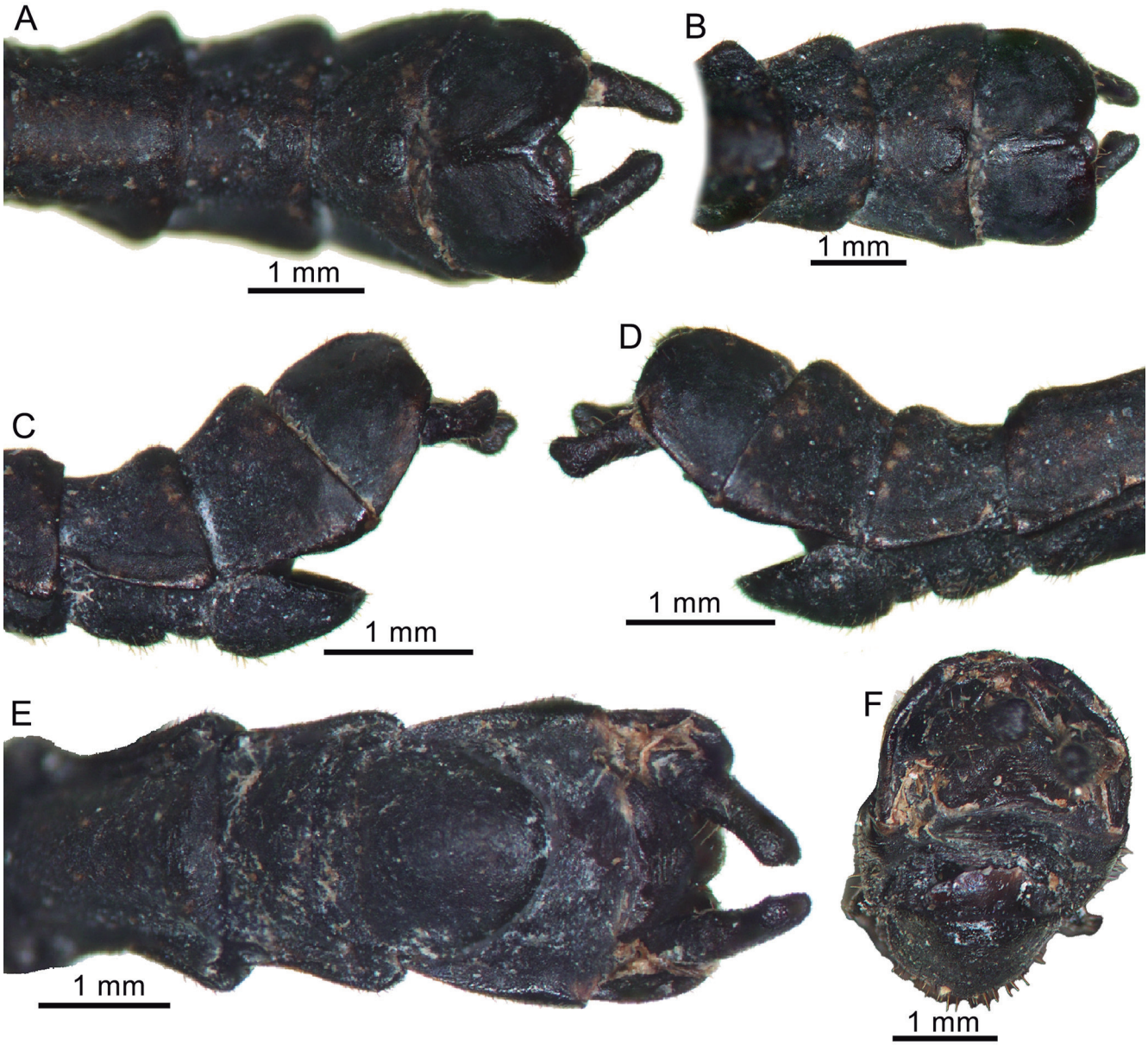

Figure 10. Male of *Atlantopteryx parva* **gen. et sp. nov.,** MZUSP3022, from Parque Estadual da Serra do Brigadeiro, Minas Gerais, Brazil, terminalia in posterodorsal (A), dorsal (B), lateral (C, D), ventral (E) and posterior (F) views.

and thorax typically with a wide cream-colored median band, sometimes accompanied by a thin black paramedian line, particularly noticeable on the head and pronotum. Antennae generally dark brown, nearly black, with some segments partially cream-colored. Anal area of the hindwings uniformly lemon yellow, remigium black, featuring reticulated reddish, orange or yellowish venation. Leg coloration varying from chestnut brown to nearly black, speckled with small oval patches of light beige. Distal third of the femora often blackish, joint between the femur and tibia usually light beige. Tibiae sometimes with black bands. **Head (Figs. 4C, 7D, 12C):** Oval, ap-

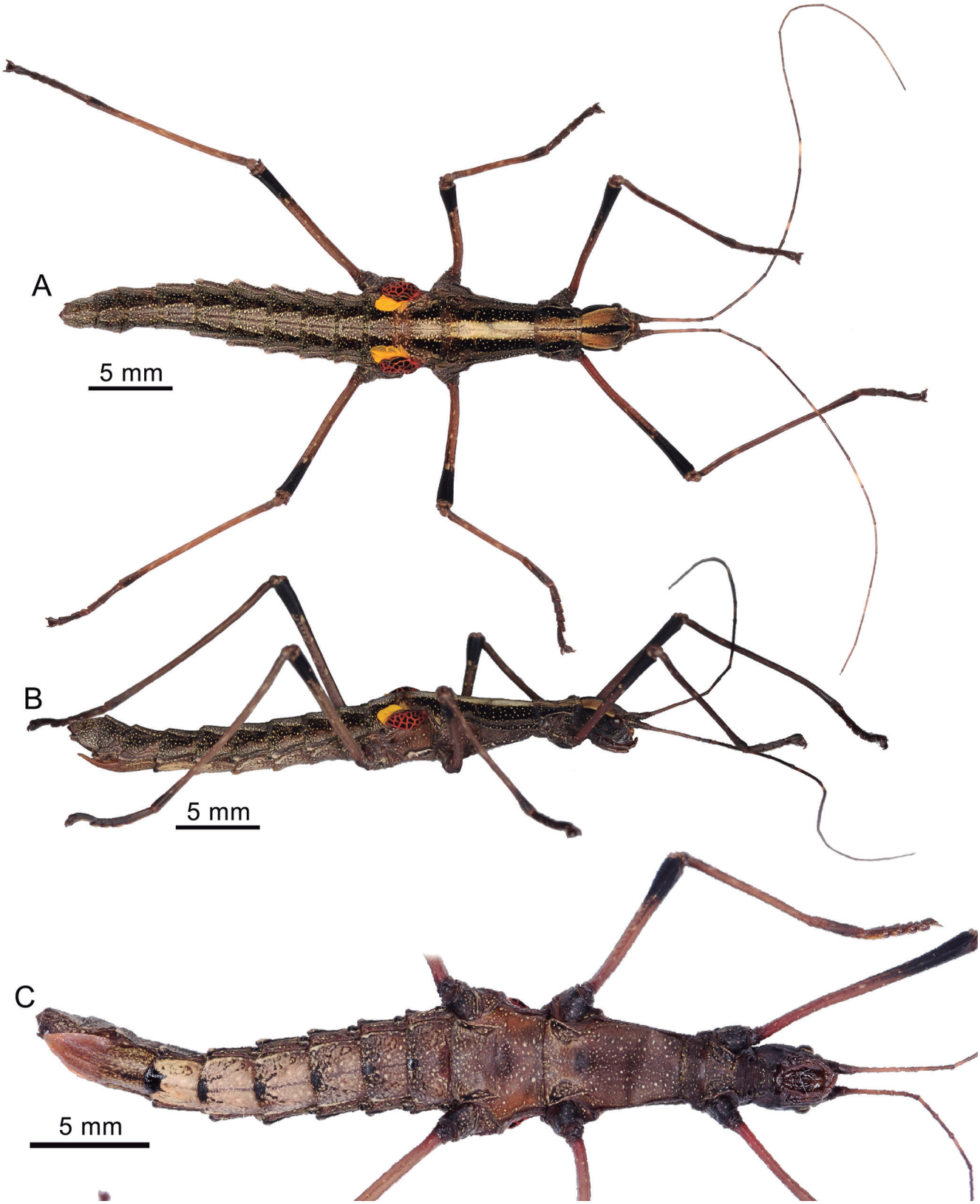

Figure 11. Female of *Atlantopteryx parva* **gen. et sp. nov.,** MZUSP3023, from Parque Estadual da Serra do Brigadeiro, Minas Gerais, Brazil, habitus in dorsal (A), lateral (B), and ventral (C) views.

proximately 1.3 times as long as wide, devoid of ocelli or ornamentation. Antennae filiform, slightly longer than the entire body. **Thorax (Figs. 4C, 7A-D, 11, 12A):** Pronotum roughly 1.2 times as long as wide and about 0.6 times the length of the head. Mesonotum approximately 2.1 times the length of the pronotum, widening towards the posterior margin (posterior margin 1.6 times as wide as anterior margin). Combined length of the metanotum and median segment slightly shorter than that of the mesonotum. The rudimentary, rounded wings barely extending to the posterior margin of the median segment. **Legs:** Elongated and slender, lacking any adornments

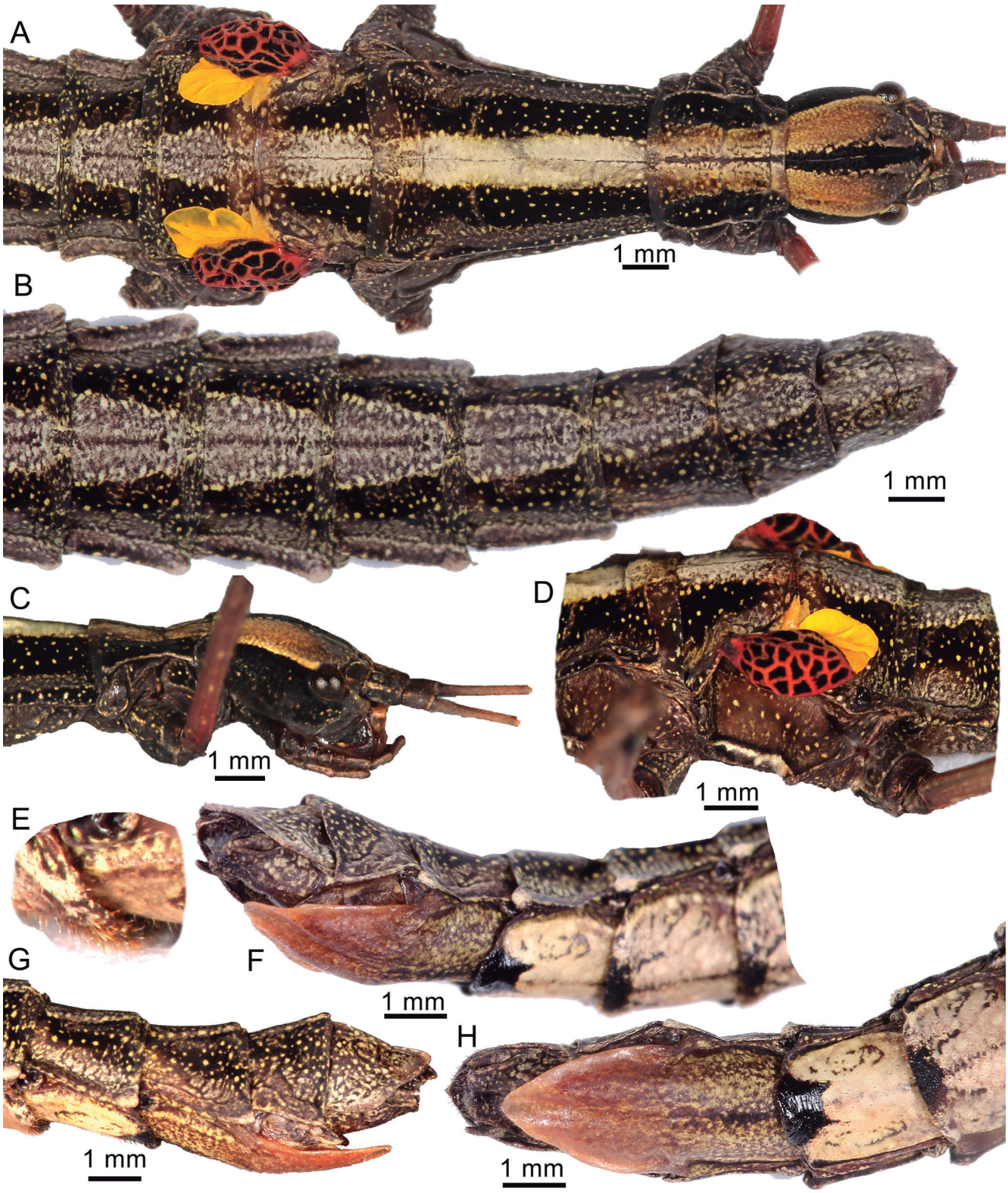

Figure 12. Female of *Atlantopteryx parva* **gen. et sp. nov.,** MZUSP3023, from Parque Estadual da Serra do Brigadeiro, Minas Gerais, Brazil. Head and thorax in dorsal view (A), abdomen in dorsal view (B), head in lateral view (C), wings in laterodorsal view (D), posterior edge of tergum VI, lateral view, showing dense tufts of setae (E); terminalia in ventrolateral (F), lateral (G) and ventral (H) views.

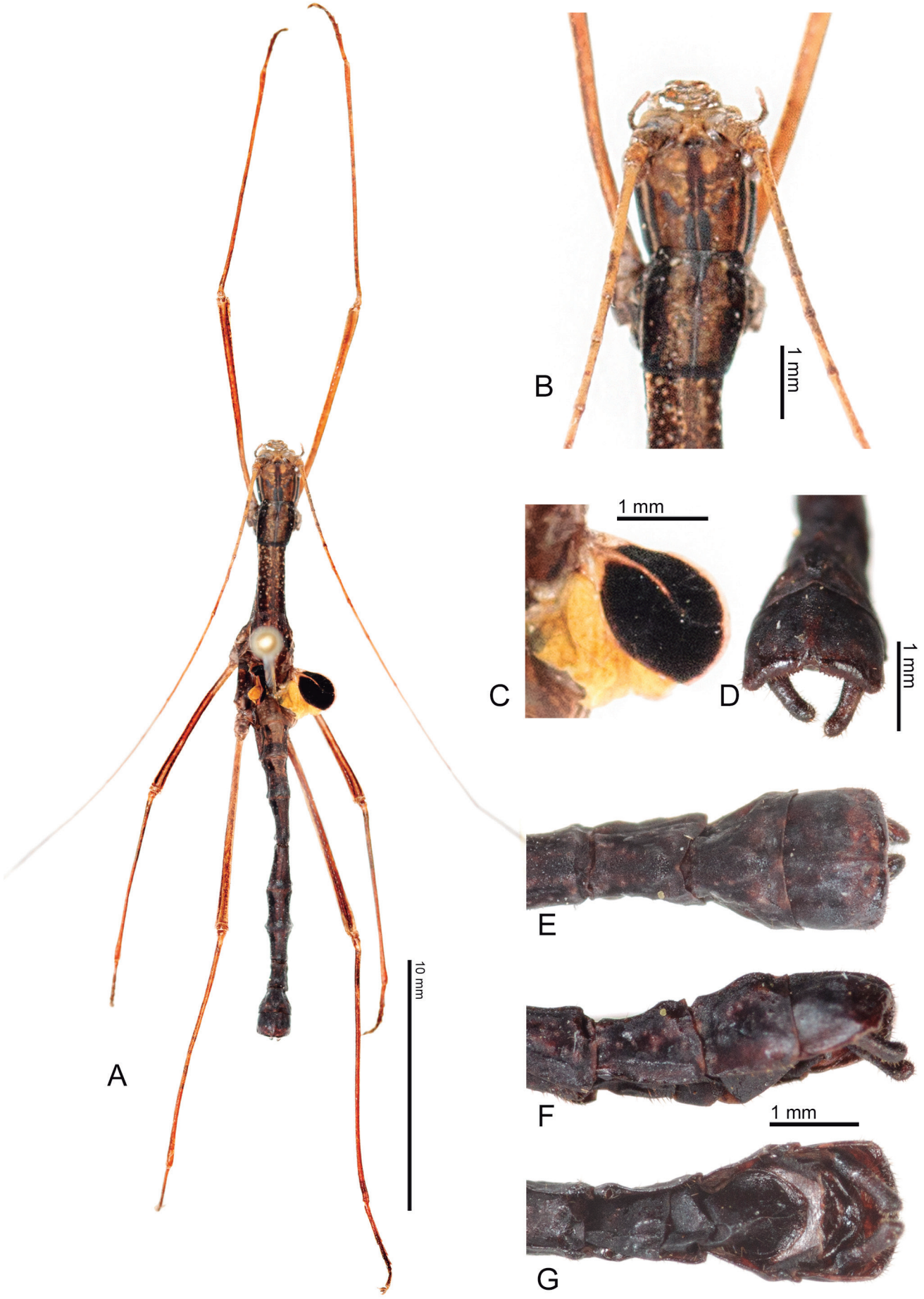

Figure 13. Holotype male of *Atlantopteryx scotina* **gen. et sp. nov.,** MZUSP0712, from Reserva Biológica Augusto Ruschi, Santa Teresa, Espírito Santo, Brazil, habitus (A), head (B) and wing (C) in dorsal view, and terminalia in posterior (D), dorsal (E), lateral (F) and ventral (G) views.

or prominent ridges. Fore and mid legs a little longer than the combined length of the head and thorax. Hind legs surpassing the total length of the abdomen. Tibiae roughly equal in length to their corresponding femora. Tarsi just under half the length of the tibiae, with the basitarsus being about half the length of the remaining tarsal segments taken together. **Abdomen:** Slightly longer than thorax, with variations depending on its gravid state. Width fluctuating further due to gravidity, females in an advanced state exhibiting a width more than double that of young adults. Terga IV-VI bearing dense tufts of setae near posterior margin (Fig. 12E). Anal segment approximately of same length to slightly longer than tergum IX, with a slightly pointed and medially keeled posterior margin (Figs. 4D-E, 7E-F, 12G-H). Cerci half as long as anal segment, barely extending beyond its posterior margin (Figs. 4E, 7F). Subgenital plate tapering towards the posterior margin, almost reaching the anal segment's rear end (Figs. 4F, 7G). Praeopercular organ appearing as a small, rounded, black, roundly sharp protrusion (Figs. 4E, 7F-G, 12F-H).

Measurements of paratypes (mm): body 33.6-39.8, antennae 32.8-37.8, head 4-4.4, pronotum 2.8-3.6, mesonotum 5.9-6.7, metanotum 2.1-2.6, wing 2.3-3, median segment 2.1-2.6, abdomen (excluding cercus) 16.4-20.2, profemur 10.1-11.9, protibia 10.5-12, mesofemur 8-9.7, mesotibia 8.3-9.1, metafemur 11.3-13, metatibia 12.4-13.9, protarsi 4.2-5, mesotarsi 3.6-4.5, metatarsi 4.8-5.9.

Male

Coloration (Figs. 1-2, 6, 8-10): Male color matching that of the females (see above), except for the legs, both femora and tibiae exhibiting a uniform base color speckled with light beige spots but without black bands on the tibiae or at the apical ends of the femora. **Head (Figs. 2B, 6F, 9C):** Same proportions as in females, lacking ocelli or ornamentation. Antennae similar to those of females but longer in proportion to the body. **Thorax (Figs. 2A, C, 6A-B, F-G, 9):** Pronotum approximately 1.3 times as long as wide and 0.8 times the length of the head. Mesonotum about 2.2 times as long as pronotum

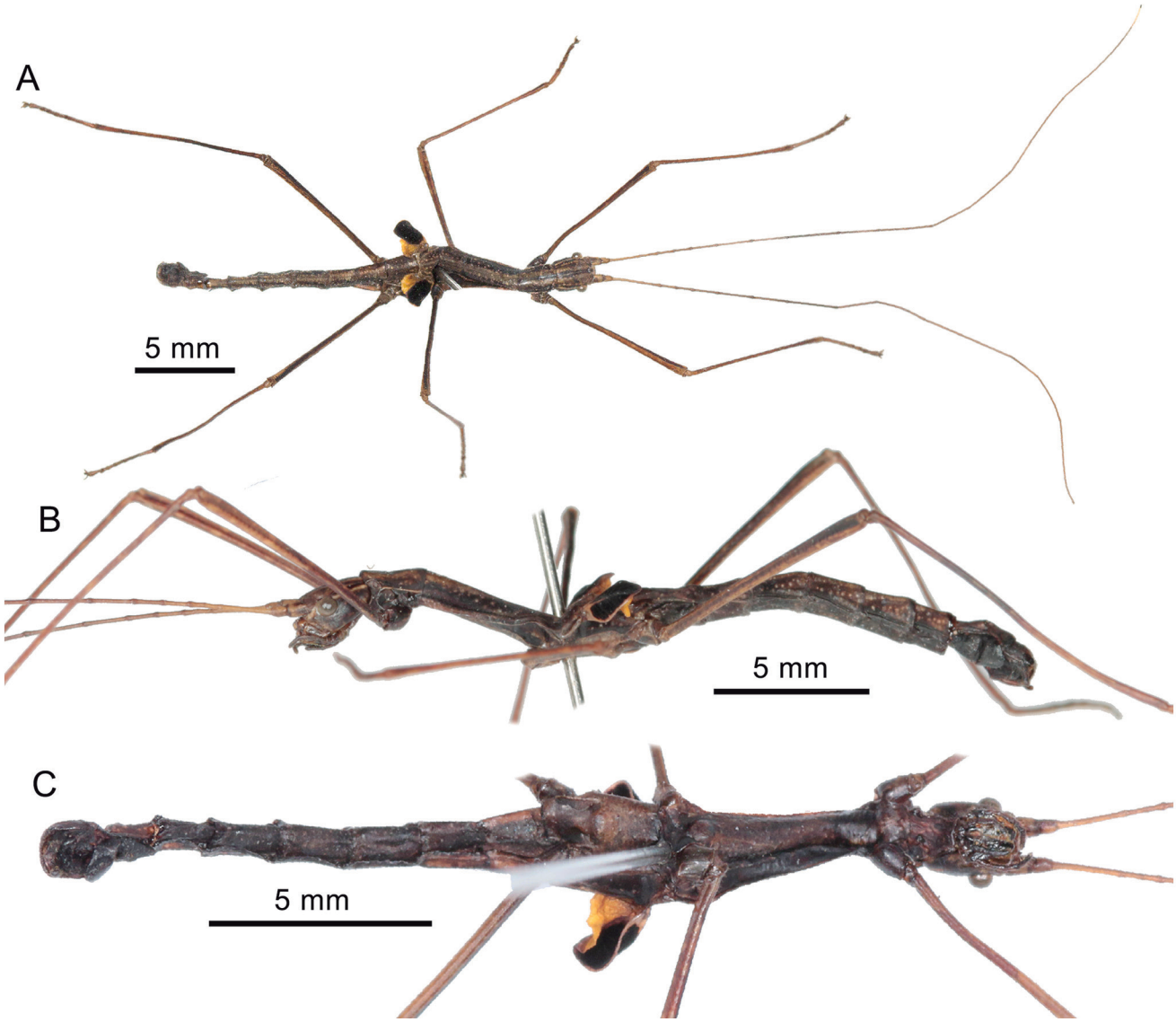

Figure 14. Paratype male of *Atlantopteryx scotina* **gen. et sp. nov.,** MZUSP0305, from Reserva Biológica Augusto Ruschi, Santa Teresa, Espírito Santo, Brazil, habitus in dorsal (A), lateral (B), and ventral (C) views.

Figure 15. Paratype subadult female of *Atlantopteryx scotina* **gen. et sp. nov.,** MZUSP0306, from Reserva Biológica Augusto Ruschi, Santa Teresa, Espírito Santo, Brazil, habitus in dorsal (A) and lateral (B) views.

and approximately 1.3 times as long as the combined length of the metanotum and median segment. Minimal widening of meso- and metathorax compared to the prothorax. Alae rudimentary, reaching tergum II but not extending to its posterior margin. **Legs:** As in the female. **Abdomen:** Slender, with a length roughly equiv-

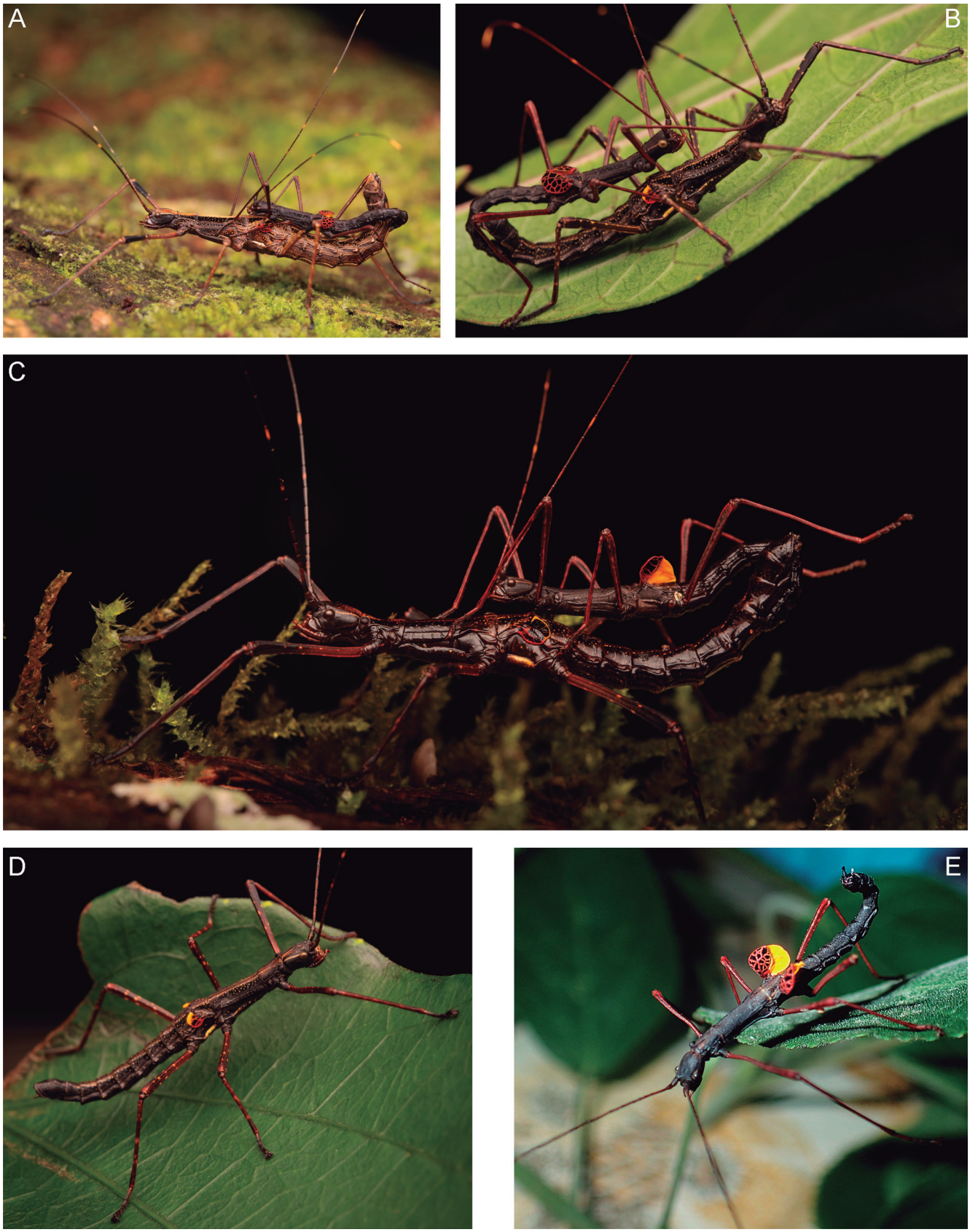

Figure 16. Live specimens of *Atlantopteryx parva* **gen. et sp. nov.** Couple (adult male and subadult female) from Parque Estadual da Serra do Brigadeiro, Minas Gerais, Brazil (A), couples (adult male and subadult female) from Parque Nacional do Caparaó, Minas Gerais, Brazil (B, C), subadult female from Parque Nacional do Caparaó, Minas Gerais, Brazil (D), adult male from Parque Nacional do Caparaó, Minas Gerais, Brazil exhibiting the defensive display (E). A-D, photo courtesy of Frederico F Salles.

alent to that of the head and thorax combined. Anal segment approximately 1.2 times as long as tergum IX, featuring a rounded posterior margin that is slightly medially keeled (Figs. 2D, 6C, 10B). Thorn pads bearing very small, minute short teeth spread along the posterior edge of tergum X (Fig. 2J-K). Cerci about the same length as the anal segment, extending beyond its posterior margin, slightly laterally flattened, gently curved inwards, and truncate and slightly widened at the apex (Figs. 2E, G, 6D, 10). Poculum spoon-shaped, with a rounded posterior margin slightly protruding beyond the posterior margin of tergum IX (Figs. 2D-F, 10C-F). Vomer simple, strongly curved upwards (Figs. 2H-I, 6H). **Genitalia:** (Fig. 3) Small, consisting of an R-shaped dorsal sclerite (Fig. 3E), with the apical edge bending inwards (Fig. 3H-J), and a unique short and inconspicuous membranous lobe (Fig. 3A, C-D, F-G). The area of the dorsal surface that is not covered by the dorsal sclerite shows a set of small granules (Fig. 3E).

Measurements of holotype (mm): body 21.1, antennae 25.0, head 1.9, pronotum 2, mesonotum 3.8, metanotum 1, wing 1.9, median segment 1.2, abdomen (excluding cercus) 11.2, profemur 6.8, protibia 7.3, mesofemur 4.9, mesotibia 5.1, metafemur 6.7, metatibia 7.6, protarsus 2.7, mesotarsus 2, metatarsus 2.7.

Measurements of paratypes (mm): body 17.5-22.3, antennae 18.2-28.3, head 1.9-2.4, pronotum 1.5-2, mesonotum 3.2-3.9, metanotum 0.9-1.5, wing 1.9-2.4, median segment 1.3-1.7, abdomen (excluding cercus) 8.3-11.4, profemur 6.4-7.1, protibia 7.4-8, mesofemur 4.5-5.5, mesotibia 4.6-5.7, metafemur 5.7-7.2, metatibia 6.4-8, protarsi 2.5-3.1, mesotarsi 2-2.4, metatarsi 2.5-3.3.

Egg (Fig. 5): Irregularly brownish to beige, micropylar plate light beige with dark brown edges. Capsule rounded, barrel-shaped, higher than wide, longer than wide in variable ratios (Fig. 5H), oval in cross section; polar area flat, round or sloping from inferior to superior in lateral view. Capsule covered by a somewhat dense net of irregular, poorly connected thin ridges, which are less dense on the operculum (Fig. 5A-C). Ridges further bearing minute mushroom-like structures also on the operculum (Fig. 5A-C). Micropylar plate small, round to ovate, rugose, with elevated edges; at about the center bearing a round rugose hump connected to the micropylar cup (Fig. 5A, D, F, H). Micropylar cup distinct. Median line thick and very short. Operculum perpendicular to the axis of capsule, oval and flat (Fig. 5C, G).

Measurements (N = 13): length 2.6-2.8, width 1.9-2.1, height 2.2-2.4, micropylar plate length 0.6-0.7, operculum maximum diameter 1.2-1.4.

Distribution (Fig. 20): Material examined: BRAZIL: Espirito Santo: Venda Nova do Imigrante (UFVB); Minas Gerais: Parque Nacional do Caparaó (Núcleo Alto Caparaó, Núcleo Pedra Menina, Vale Verde); Araponga, Parque Estadual Serra do Brigadeiro (MZUSP).

iNaturalist: BRAZIL: Espirito Santo: São José de Fruteiras; Castelo (Limoeiro, Reserva Kaetés); Vargem Alta; Colatina; Domingos Martins. Minas Gerais: Parque Nacional do Caparaó, Vale Verde; Alto Caparaó; Araponga (Parque Estadual Serra do Brigadeiro, Estêvão de Araújo).

Atlantopteryx scotina Ghirotto, Conle, Valero & Hennemann gen. et sp. nov. (Figs. 13-15, 18)

Type material: holotype: male (MZUSP 0712), Brasil, Espírito Santo, Santa Teresa, Reserva Biológica Augusto Ruschi, 19°54′51″S 40°32′43″W. P.I.C. Machado, J.P. Constantini & N.C.C.P. Barbosa col., 23.xi.2016.

Paratypes: 1 subadult female (MZUSP 0306), 2 males (MZUSP 0304, 0305): Brasil, Espírito Santo, Santa Teresa, Reserva Biológica Augusto Ruschi, 19°54′32″S, 40°32′42″W. P.I.C. Machado, T.F. Carrijo & R.G. Santos col., 27.xi.2014.

Etymology: The epithet *scotina* is derived from the Greek "σκοτεινός", meaning "dark, obscure, dim", and refers to the distinctive black remigium area of the hindwings, with reduced venation except for the weak and incomplete R vein.

Differential diagnosis: This species can be differentiated from *A. parva* **gen. et sp. nov.** by its thinner and longer legs in relation to body size, and by the different hindwings, which are smaller (not extending to the posterior edge of the median segment) and present a reduced venation of only the R vein not reaching the edge of the wing, thus making the remigium darker (Fig. 13C). For a better comparison, we present the following range of body proportions, presented with the value for female and male, respectively (note that the only female available is subadult):

— Foreleg length divided by head plus thorax length: 1.86; 1.83-1.96;
— Foreleg length divided by body length: 0.85; 0.89-0.90;
— Profemur length divided by the profemur's greatest width (at tip): 13.9; 15.8-16.4;
— Profemur length divided by the profemur's greatest height (at tip): 13.9; 15.8-16.5;
— Metafemur length divided by the metafemur's greatest width (at tip): 13.2; 16.6-16.8;
— Metafemur length divided by the metafemur's greatest height (at tip): 12.7; 16.6-16.8;
— Protibia plus profemur length divided by protarsus length: 4.8; 5.6-5.8;
— Mesotibia plus mesofemur length divided by mesotarsus length: 4.3; 5.1-5.3;
— Metatibia plus metafemur length divided by metatarsus length: 4.4; 5.3-5.8;
— Wing length divided by pronotum plus mesonotum length: -*; 0.34-0.35.

* wings not comparable in the subadult female

Comments: The only female available in the collection is subadult (Figs. 15, 18A). However, this specimen already shows the diagnostic characters of the species, such as the elongate legs, and the overall black remigium of hindwing buds with few veins. The adult female of this species, also from Santa Teresa, Espírito Santo, was recorded by photographs (Fig. 18B), including records on iNaturalist, and presents these diagnostic features. For this reason, we keep the description of the female short and concise and present it as it would be in an adult, which was possible by comparison with the other species of the genus as well as with the pictures of live specimens.

Female

Coloration (Figs. 15, 18A, B): Based on photographs of live specimens and dry material from museums. Overall body coloration ranging from straw brown to dark chestnut brown, occasionally appearing almost black, with small circular specks of light beige. Head and thorax typically with a wide cream-colored median band, sometimes accompanied by a thin black paramedian line, particularly noticeable on the head and pronotum. Antennae generally dark brown, nearly black, with some segments partially cream-colored. Anal area of the hindwings uniformly lemon yellow, remigium with yellowish to orangish color near the base, at anterior border, and the incomplete R vein that does not reach the posterior margin; further devoid of veins and overall black. Leg coloration varying from chestnut brown to nearly black, speckled with small oval patches of light beige. Distal third of the femora often blackish, joint between the femur and tibia usually light beige. Tibiae sometimes with black bands. **Head (Figs. 15, 18B):** Oval, approximately 1.4 times as long as wide, devoid of ocelli or ornamentation. Antennae filiform, slightly longer than the entire body. **Thorax (Figs. 15, 18B):** Pronotum roughly 1.2 times as long as wide and about 0.6 times the length of the head. Mesonotum approximately two times the length of the pronotum, widening towards the posterior margin (posterior margin 1.4 times as wide as anterior margin). Combined length of the metanotum and median segment shorter than that of the mesonotum. The rudimentary, rounded wings barely extending to the posterior margin of the metanotum. **Legs (Figs. 15, 18B):** Elongated and slender, lacking any adornments or prominent ridges. Fore and mid legs a little longer than the combined length of the head and thorax. Hind legs surpassing the total length of the abdomen. Tibiae roughly equal in length to their corresponding femora. Tarsi just under half the length of the tibiae, with the basitarsus being about half the length of the remaining tarsal segments taken together. **Abdomen (Figs. 15, 18B):** Slightly longer than thorax. Anal segment approximately of same length as tergum IX, with a slightly pointed and medially keeled posterior margin. Cerci half as long as anal segment, barely extending beyond its posterior margin. Subgenital plate tapering towards the posterior margin, almost reaching the anal segment's rear end. Praeopercular organ appearing as a small, rounded, black, roundly sharp protrusion.

Measurements of paratype, subadult (mm): body 32.9, antennae (broken) at least 10.5, head 4.1, pronotum 2.6, mesonotum 5.3, metanotum 1.5, wing bud (subadult) 1.0, median segment 1.6, abdomen (excluding cercus) 17.8, profemur 11.1, protibia 12.2, mesofemur 8.6, mesotibia 9.5, metafemur 11.1, metatibia 13.3, protarsus 4.8, mesotarsus 4.2, metatarsus 5.5.

Male

Coloration (Figs. 13-14, 18A, C): Male color matching that of the females (see above), with the exception of the

Figure 17. Live specimens of *Atlantopteryx parva* **gen. et sp. nov.** recorded on the iNaturalist platform, photographed by Gabriel Leite. Adult couple from Espírito Santo, Brazil.

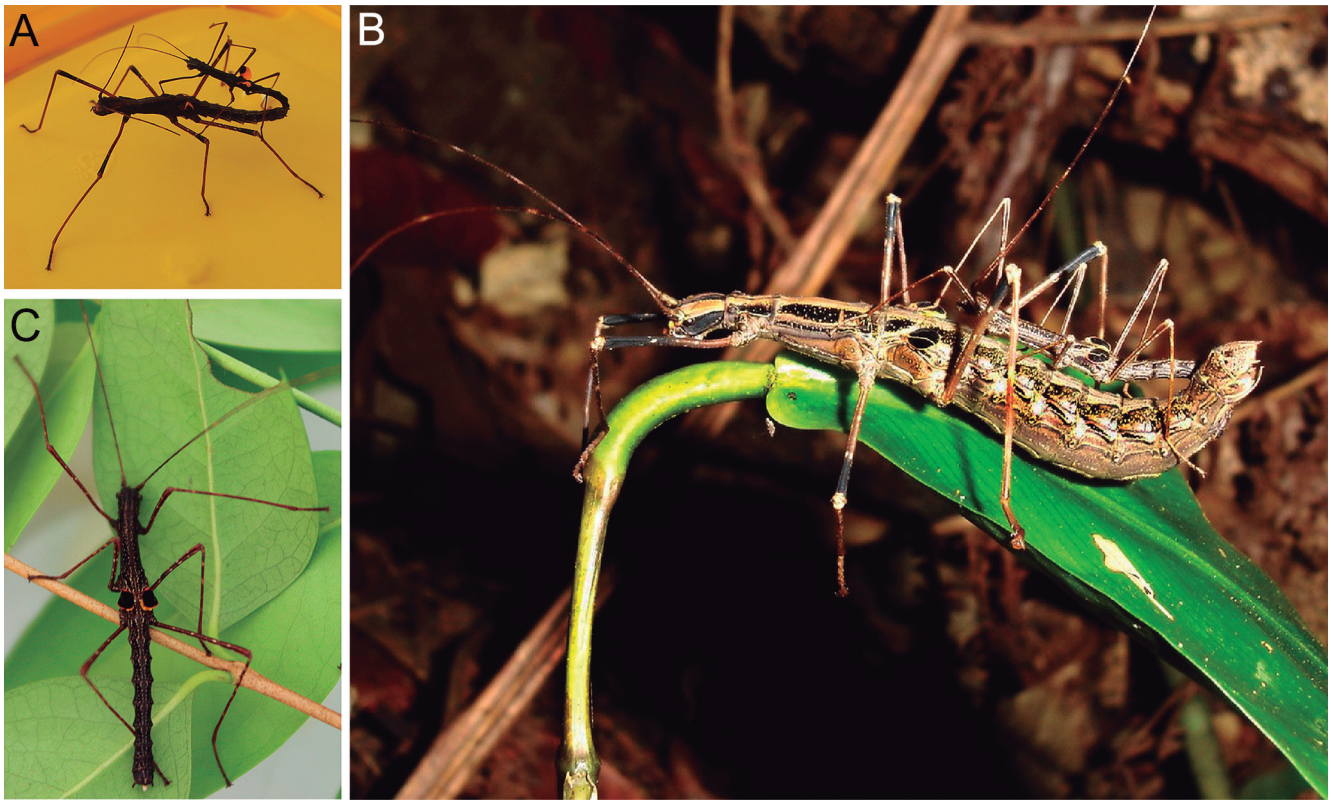

Figure 18. Live specimens of *Atlantopteryx scotina* **gen. et sp. nov.** from Reserva Biológica Augusto Ruschi, Santa Teresa, Espírito Santo, Brazil. Paratypes (A, C), couple (adult male, MZUSP0305, and subadult female, MZUSP0306) (A) and adult male MZUSP0305 (C). Adult couple, not collected, photographed in 2008 by Frederico Pereira (B).

legs, both femora and tibiae exhibiting a uniform base color speckled with light beige spots, but without black bands on the tibiae or at the apical ends of the femora. **Head (Fig. 13B):** Same proportions as in females, lacking ocelli or ornamentation. Antennae like those of females but longer in proportion to the body. **Thorax (Figs. 13A, 14):** Pronotum approximately 1.3 times as long as wide and 0.7 times the length of the head. Mesonotum about 2.4 times as long as pronotum and approximately 1.4 times as long as the combined length of the metanotum and median segment. Minimal widening of meso- and metathorax compared to the prothorax. Alae rudimentary, reaching median segment but not or barely reaching its posterior margin. **Legs (Fig. 14):** As in the female. **Abdomen (Figs. 13A, D-G, 14):** Slender, with a length roughly equivalent to that of the head and thorax combined. Anal segment approximately 0.9 times as long as tergum IX, featuring a gently rounded, almost straight posterior margin that is slightly medially keeled (Fig. 13E). Thorn pads bearing very small, minute short teeth spread through the posterior edge of tergum X (Fig. 13D). Cerci about the same length as the anal segment, extending beyond its posterior margin, slightly laterally flattened, gently curved inwards, and truncate and slightly widened at the apex (Fig. 13D, F, G). Poculum spoon-shaped, with a rounded posterior margin slightly protruding beyond the posterior margin of tergum IX (Fig. 13F, G). Vomer simple, strongly curved upwards.

Measurements of holotype (mm): body 23.1, antennae 31.1, head 2.1, pronotum 1.5, mesonotum 4, metanotum 1.5, wing 1.9, median segment 1.4, abdomen (excluding cercus) 12.6, profemur 8.2, protibia 9.3, mesofemur 6, mesotibia 7.5, metafemur 8.4, metatibia 10.2, protarsus 3.1, mesotarsus 2.7, metatarsus 3.5.

Measurements of paratypes (mm): body 21-22.8, antennae 30-31.7, head 2.1-2.4, pronotum 1.4-1.7, mesonotum 3.8-4, metanotum 1.3-1.4, wing 1.9-2.0, median segment 1.3, abdomen (excluding cercus) 11.1-11.6, profemur 7.9-8.3, protibia 8.8-9, mesofemur 5.9-6.2, mesotibia 6.9-7.5, metafemur 8.3-8.5, metatibia 9.7-10.1, protarsi 2.9-3.1, mesotarsi 2.4-2.6, metatarsi 3.1-3.3.

Egg: Unknown.

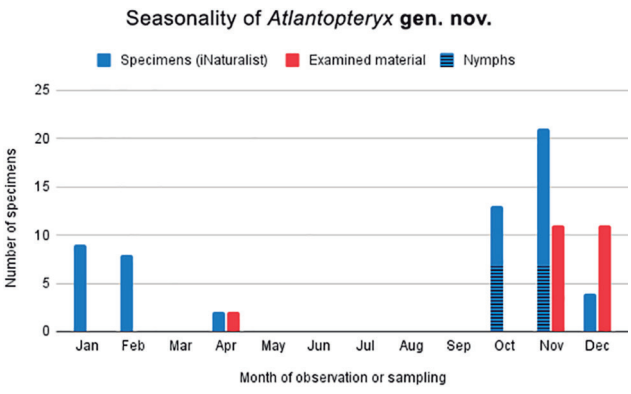

Figure 19. Seasonality of collected and recorded *Atlantopteryx* **gen. nov.,** including both examined material (red columns) and iNaturalist online platform (blue columns) records. Full fills represent adults, while striped fills represent nymphs.

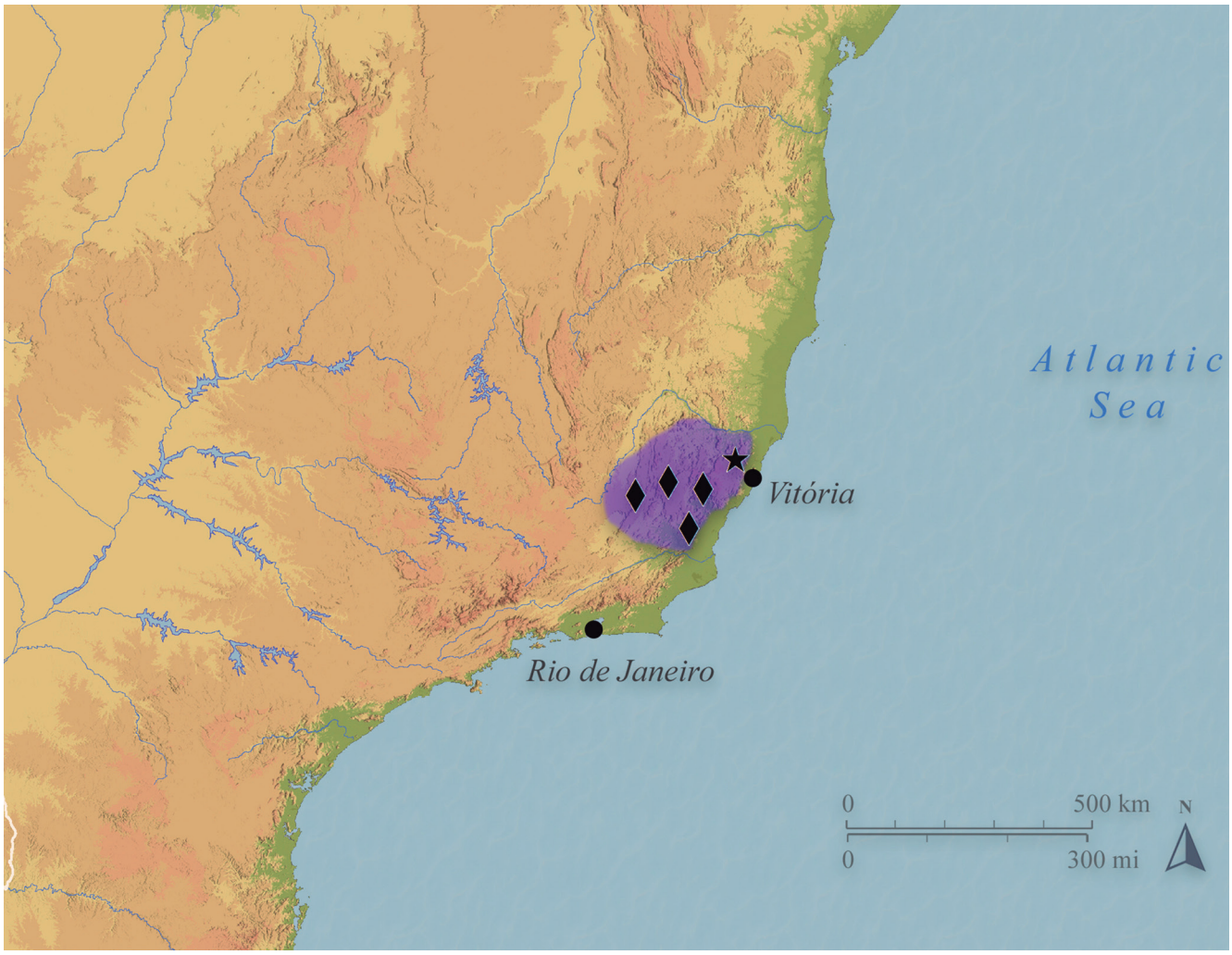

Figure 20. Approximate distribution of *Atlantopteryx* **gen. nov.** in Espírito Santo and Minas Gerais, in Southeastern Brazil, shown in purple. Symbols represent specific records. Diamond = *Atlantopteryx parva* **gen. et sp. nov.** Star = *Atlantopteryx scotina* **gen. et sp. nov.**

Distribution (Fig. 20): Only known from Santa Teresa, Espírito Santo, Brazil, from examined material and iNaturalist records.

DISCUSSION

This is a contribution to the taxonomy of Neotropical phasmids, especially the Pseudophasmatinae, which appears to be a complex group. The new genus shares a notable feature with some species of *Pseudophasma* and the genus *Urucumania:* the presence of mushroom-like structures on the surface of the egg (Chiquetto-Machado, 2018: Fig. 6; Ghirotto *et al.,* 2024), which are notably different from the mushroom-like structures found in Phylliidae by Büscher *et al.* (2023). Such structures are absent in other Pseudophasmatidae, such as *Tithonophasma* (currently in Pseudophasmatini (Lima *et al.,* 2013)), the Stratocleinae *Paraphasma,* which was recovered in close relationship to *Pseudophasma* in a phylogenetic analysis (Chiquetto-Machado & Cancello, 2021; Chiquetto-Machado *et al.,* 2022), as well as in the Anisomorphini type genus *Anisomorpha* Gray, 1835 (Sellick, 1976; Büscher *et al.,* 2024). Surprisingly, this structure is also absent from other species of *Pseudophasma* (Büscher *et al.,* 2024). This shared character could prove valuable for future phylogenetic analyses or taxonomic rearrangements in the Pseudophasmatidae, especially the genus *Pseudophasma.*

The genitalia of the new genus are also interesting because they are strikingly reduced, simple, consisting of a single unbranched lobe and a single sclerite, whereas other Pseudophasmatidae usually have genitalia with more than one sclerite and more than one lobe, bearing lobes that are frequently branched (Chiquetto-Machado & Cancello, 2021). Chiquetto-Machado & Cancello (2021) analyzed several Pseudophasmatinae genera and Ghirotto *et al.* (2024) analyzed several *Urucumania* species showing that most Pseudophasmatinae present more complex male genitalia. Even if simplified, the genitalia of *Atlantopteryx* present a widened, short dorsal sclerite that is also seen in *Pseudophasma* and *Urucumania* (Chiquetto-Machado & Cancello, 2021; Ghirotto *et al.,* 2024). The apparent simplification of the genitalia of the new genus could be related to the small size of the male, which is notably smaller than males of these other related genera, and/or point to a low level of species-specificity because of reduced or absent sympatry.

AUTHORS' CONTRIBUTIONS: OC: Project administration; OC, PV, VMG: Conceptualization; OC, FH, PV, VMG, CJS: Investigation, Visualization; OC, FH, PV, VM, CJS, PWE, PICM, PABAN: Formal analysis, Methodology, Data curation, Writing – original draft; Writing – review & editing; PICM: Funding acquisition. All authors actively participated in the discussion of the results, reviewed, and approved the final version of the paper.

CONFLICTS OF INTEREST: Authors declare there are no conflicts of interest.

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