



## A new species of *Szelenyiopria* Fabritius (Hymenoptera: Diapriidae), larval parasitoid of *Acromyrmex subterraneus subterraneus* (Forel) (Hymenoptera: Formicidae) from Brazil

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### Abstract

*Szelenyiopria talitae* **sp. nov.** is described and illustrated. This species is shown to be a larval parasitoid of *Acromyrmex subterraneus subterraneus* (Forel).

**Key words:** Diapriids, ants, parasitoidism

### Introduction

Diapriids that develop as primary koinobionts parasitoids, solitary or gregarious, of mature larvae and pupae of Formicidae all belong to the tribe Diapriini of the Diapriinae. These ant parasitoids are abundant and diverse in the Neotropics. They can be very common in mature colonies of Formicidae like leaf-cutter and fungus-growing ants of genus *Acromyrmex* (Attini) from a variety of microhabitats. Loiácono *et al.* (2000) collected 1560 wasps (adults and immatures) from 430 parasitized larvae from three partial colonies of *Acromyrmex*, which shows how aggressive these wasps can be attacking the ants. The objective of this contribution is the study of diapriines parasitic on larvae of *Acromyrmex subterraneus subterraneus* workers in Brazil.

Leaf-cutter ants are considered major pests in Brazil, with only a few plant species that are not attacked. According to Hölldobler and Wilson (1990), leaf-cutter ants are the dominant herbivores of the Neotropics, and consume more vegetation than any other group of animals of comparable taxonomic diversity. The genus *Acromyrmex* is found from California in the United States to Patagonia in Argentina, including Cuba and Trinidad but there is no record for Chile (Della Lucia 2003). In Brazil they are represented by 20 species and nine subspecies in the following states: São Paulo, Amazonas, Ceará, Rio Grande do Norte, Minas Gerais, Mato Grosso, Paraná, Santa Catarina, Rio Grande do Sul and Rio de Janeiro (Gonçalves 1961; Mayhe-Nunes 1991). *Acromyrmex subterraneus subterraneus* is commonly known as "quenquém" or "caiapó". Its workers remove leaves to grow fungus which they feed. Below the mound are two or three chambers of diameter less than 80 cm, usually long and flat (Della Lucia & Moreira 1993). There are nests of 17 to 20m<sup>2</sup> of land area containing one or more queens. Workers of *Acromyrmex subterraneus subterraneus* cut leaves of various plants, including *Eucalyptus* spp., *Ligustrum lucidum* W.T. Aiton, *Acalypha wilkesiana* Müll. Arg., *Rosa* sp., *Cedrella* sp., causing great damage in agriculture and forestry in Brazil.

## Material and methods

Material studied was taken from two nests of *A. subterraneus subterraneus*, from Bom Jardim (Rio de Janeiro, Brazil), by one of us (D.D.O.M.) during May and September 2011. To obtain the formicid larvae, the ant nest was excavated from the outside inwards until the fungus cavities were reached. The ants' immature stages are found in internal chambers. The excavated nest structure was placed in 2L and 5L plastic containers (May and September respectively) and covered with a fine metallic mesh (Loiácono *et al.* 2000). Samples of late instar larvae with signs of parasitism and some workers of *A. subterraneus subterraneus* were stored in 70 % EtOH. The parasitised ant larvae were transferred from vials to Petri dishes and dissected in the laboratory under a Leica S8 Apo stereomicroscope. Measurements and photographs were taken with Leica DFC290 camera. Type material is deposited at Museu de Entomologia do Laboratório de Entomologia e Fitopatologia da Universidade Estadual do Norte Fluminense Darcy Ribeiro, Rio de Janeiro, Brazil (MLEF), Museu de Zoologia da Universidade de São Paulo, Brazil (MZUSP), Universidade Federal do Paraná (UFPR), Brazil; and División Entomología, Museo de La Plata, Argentina (MLP). Types of *S. lucens* Loiácono and *S. pampeana* Loiácono were studied.

## Genus *Szelenyiopria* Fabritius

According to Masner and García (2002) the genus is distributed from Argentina to Guatemala. There are nine species described of *Szelenyiopria*, two from Argentina, one from Uruguay and six from Brazil (Fabritius 1974; Loiácono 1987; Loiácono & Margaría 2000; Loiácono *et al.* 2000; Loiácono & Margaría 2009). Host records are available for two *Szelenyiopria* species: *S. lucens* is known as larval parasitoid of *Acromyrmex ambiguus* (Emery) in Uruguay (Loiácono 1987), and *S. pampeana* (Loiácono) was reared from *A. lobicornis* Emery in Argentina (Loiácono *et al.* 2000; Loiácono & Margaría 2009). These diapiiines are solitary or gregarious primary parasitoids of larvae and, as far as is known, all are endoparasitoids and presumably koinobionts.

Among the Diapriinae, Diapiiini is the only tribe that includes truly symphilic species, some of them remarkably adapted morphologically to life with ants (Lachaud & Pérez-Lachaud 2012). These adaptations include extensive mimicry of the host ants and may include convergences in sculpture, pilosity, color, behavior and biology. Members of the genus *Szelenyiopria* share no specialized structures known from other myrmecophilic Diapiiini, but there is evidence of setae with truncate apices which were considered by Masner and García (2002) to be specialized structures, possibly as outlets for chemical substances. Besides, the most important apomorphic feature of *Szelenyiopria* species is the presence of these specialized setae on the entire body.

### *Szelenyiopria talitae* Loiácono et Margaría sp. nov.

(Figs 1–3)

**Female** (Figs 1A, B). Holotype. Length 3.4 mm, color dark chestnut brown, except antenna, tegula and legs slightly light; body smooth and shiny.

**Head.** In dorsal view (Fig. 1A) subglobular, wider than long (1.30), frons unarmed, antennal shelf not margined posteriorly; temples behind eyes relatively long, gradually rounded, POL:LOL:OOL= 3.5:1.5:4; head in lateral view with torulus in upper half of eye (Figs 1B, 2A); eyes small, ovoid, higher than half head height (1.60), posterior margin rounded; ommatidia relatively small, not convex, ocellus distinctly larger than ommatidium (2.15); postgenal cushion well developed, occipital flange rudimentary; head in frontal view with mandible bidentate, lower tooth slightly longer than upper tooth; palpal formula 5-2; antenna (Fig. 2C) 11-segmented; clava strong with 4-clavomeres subrectangular and flattened ventrally, apical segment subconical, longer than preceding clavomere; A1 long and cylindrical, unarmed apically; antennomeres in proportions: (13:2.7), (2.6:1), (2:1.4), (1.85:0.7), (1.38:1), (0.75:0.3), (0.32:0.26), (0.5:0.42), (0.5:0.7), (0.4:1), (1.4:0.8).

**Mesosoma.** In dorsal view slightly longer than wide (1.15) (Fig. 1A), with massive hairy cushion anterodorsally; mesoscutum as long as wide; anterior scutellar pit large, rather deep, slightly transverse; scutellar disc moderately convex, axilla slightly smaller than scutellar pit; dorsellum well developed, with three keels; propodeum strongly developed, median keel only moderately produced anteriorly; posterolateral corners of propodeum strongly developed; posterior margin deeply excavated medially; mesopleuron in lateral view

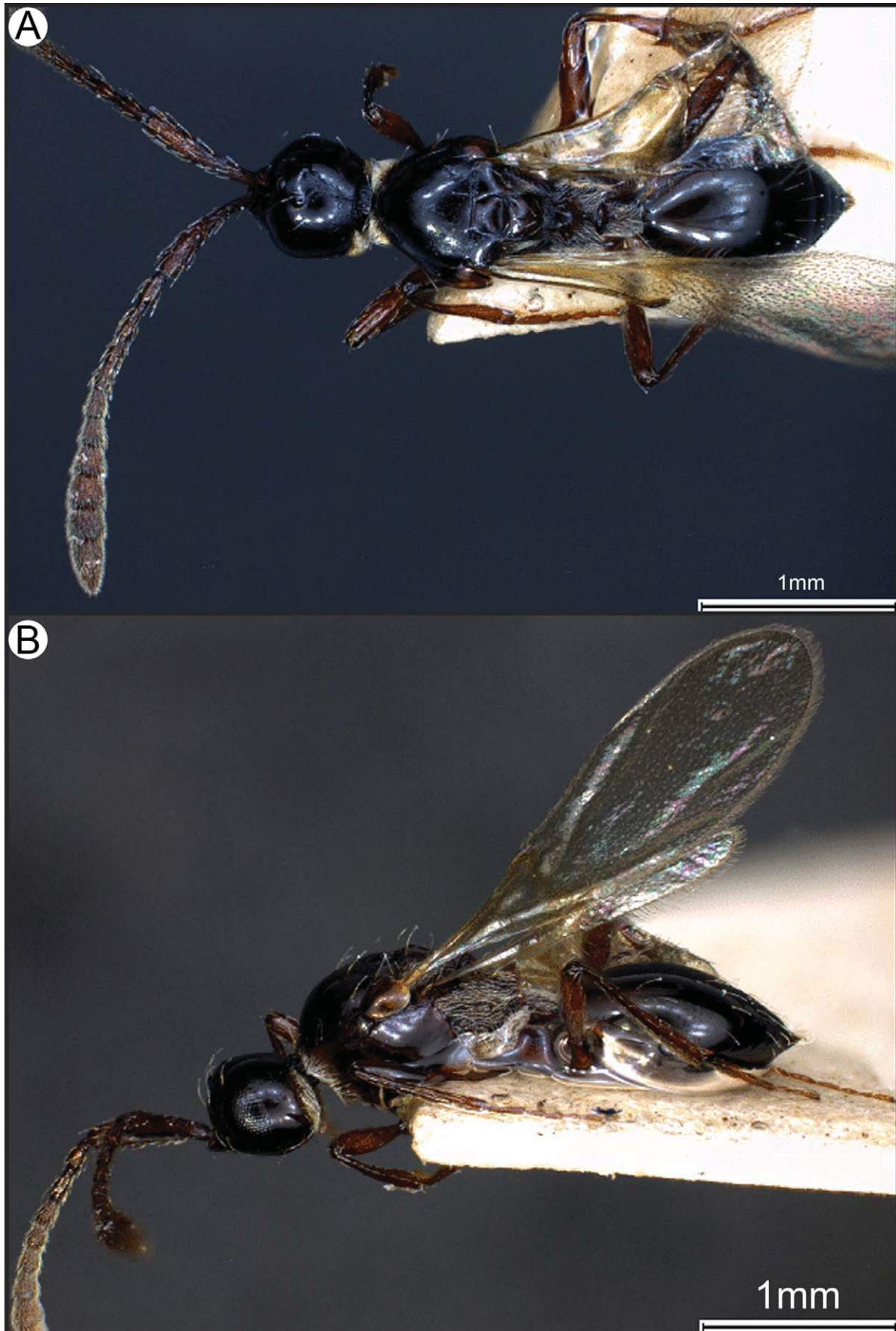
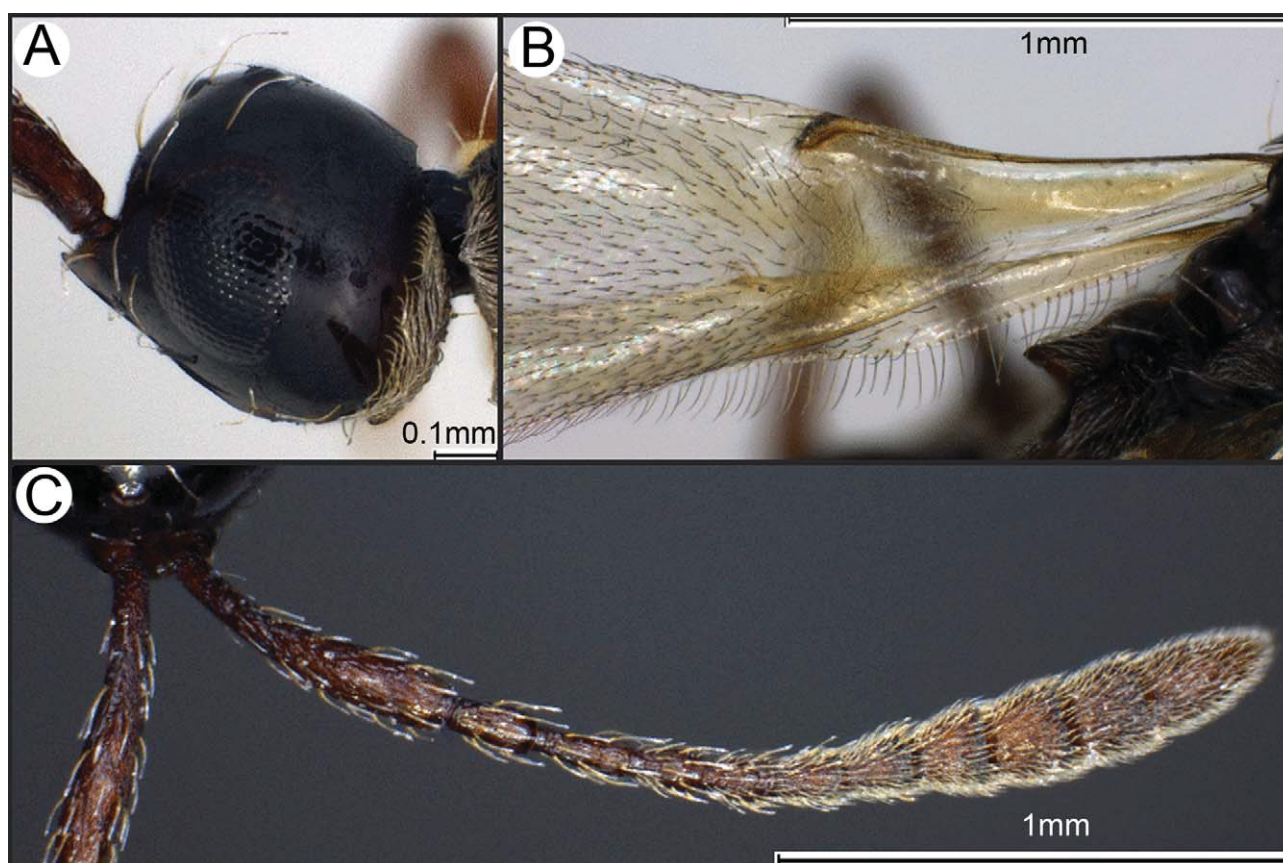


FIGURE 1. *Szelenyiopria talitae* sp. nov. Female. A. Body in dorsal view; B. Body in lateral view.





**FIGURE 2.** *Szelenyiopria talitae* sp. nov. Female. A. Head in lateral view; B. Fore wing; C. Antenna.

moderately convex, metapleuron densely hairy (Fig. 1B). Wings slightly glassy (Fig. 2B); fore wings 3.6 times longer than wide, submarginal vein reaching proximal third of wing length, stigmal vein moderately developed; hind wings narrow, 10.5 times longer than wide. Legs slender, with long and straight sparse light setae (Figs 1A, B).

**Metasoma** (Fig. 1A). Petiole 1.5 times longer than wide, completely covered by long whitish hairs; metasoma post petiole in dorsal view about 1.6 times longer than wide, with sparse specialized setae.

**Male** (Fig. 3A). Body color slightly lighter than female. Antenna (Fig. 3B) 14-segmented, relatively short and strong, A4–A13 distally knotted with row of verticillate bristles, antennomeres in proportions: (7.3:1.6), (1.7:0.9), (1.9:0.7), (2:0.7), (2:0.7), (2:0.7), (2:0.5), (0.7:0.4), (0.7:0.4), (0.5:0.4), (0.4:0.4), (0.4:0.4), (1.7:0.4).

**Material examined:** Holotype, female (MZUSP); paratypes, female and male (MLEF); paratypes, female and male (UFPR); 4 females and 18 males (MLP): Bom Jardim (22° 09 07'S e 42° 25' 10" W), Rio de Janeiro, Brazil, V-2011, Moreira coll.

**Diagnosis.** This species differs from other *Szelenyiopria* species by the combination of the following characters: clava strong, anterior scutellar pit rather deep, and median keel only moderately produced anteriorly. *Szelenyiopria talitae* is similar to the species of [*S. pilosa*-*S. coriacea*-*S. lucens*-*S. pampeana*] clade (Loiácono & Margaria 2000) by head ratio; POL>LOL (*S. lucens* and *S. pampeana*); hind wing proportions (*S. coriacea*); gaster short, keel sculpture of propodeum (*S. pilosa*).

**Etymology.** The new species is named in honor of Mrs. Talita de Oliveira Moreira, mother of one of the authors (D.D.O.M.).

**Biology.** In this study, we found that *Szelenyiopria talitae* attacks mature larvae of *A. subterraneus*. *subterraneus*. All larvae parasitoidized belong to worker forms of the ants and were easily recognized by the dark coloration through the cuticle where the wasps were developing (Fig. 4A). *Szelenyiopria talitae* is predominantly a solitary parasitoid, but can be gregarious with two to 10 wasps per larva (Fig. 4B). Each larva contains wasps of one sex. The September nest was 100% parasitized (510 ant larvae) but the percentage of parasitoidism of the other nest could not be established. Inside the fungus chamber it was possible to see worker ants taking care of larvae attacked (Fig. 4D) as if they were healthy larvae (Fig. 4C).

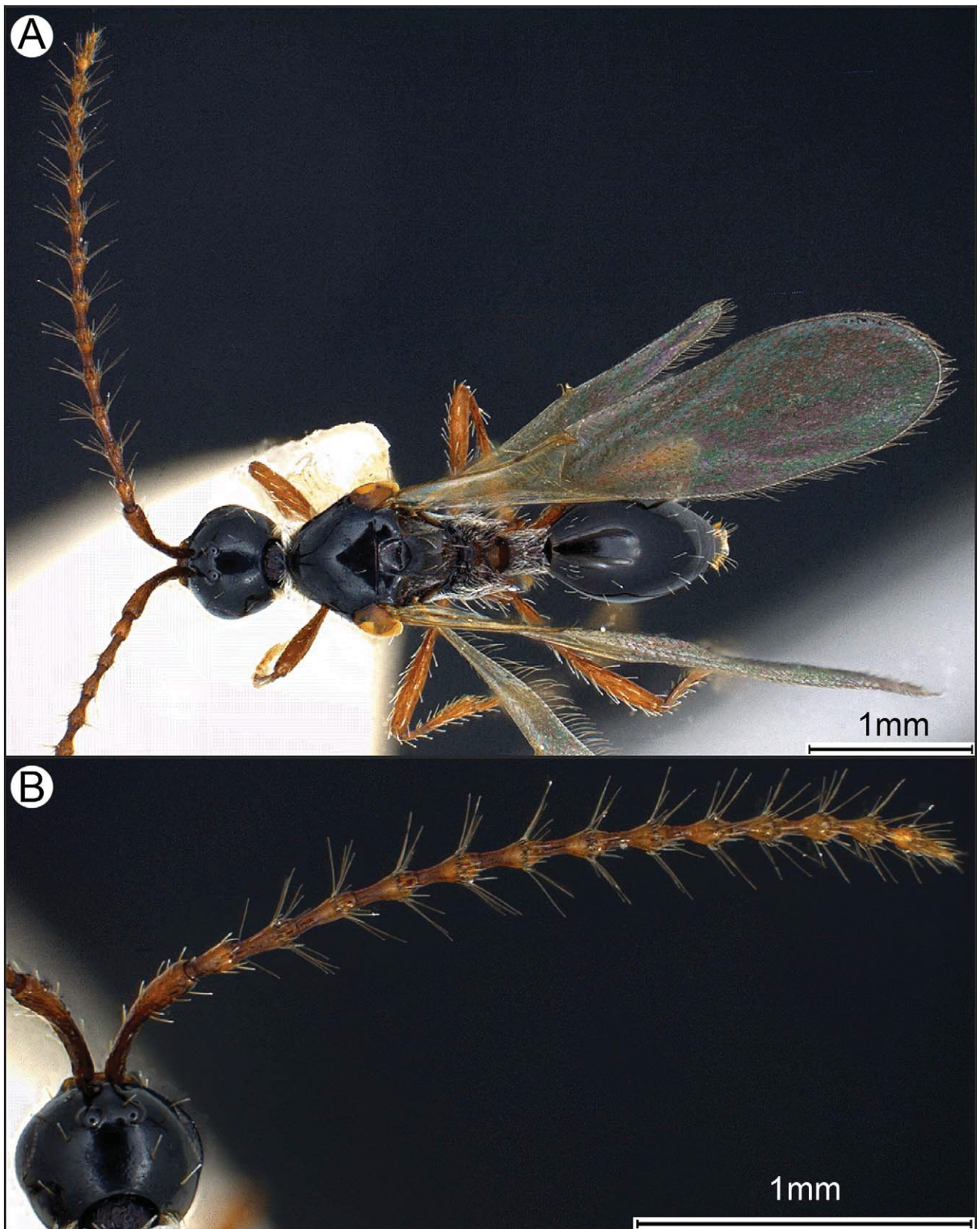
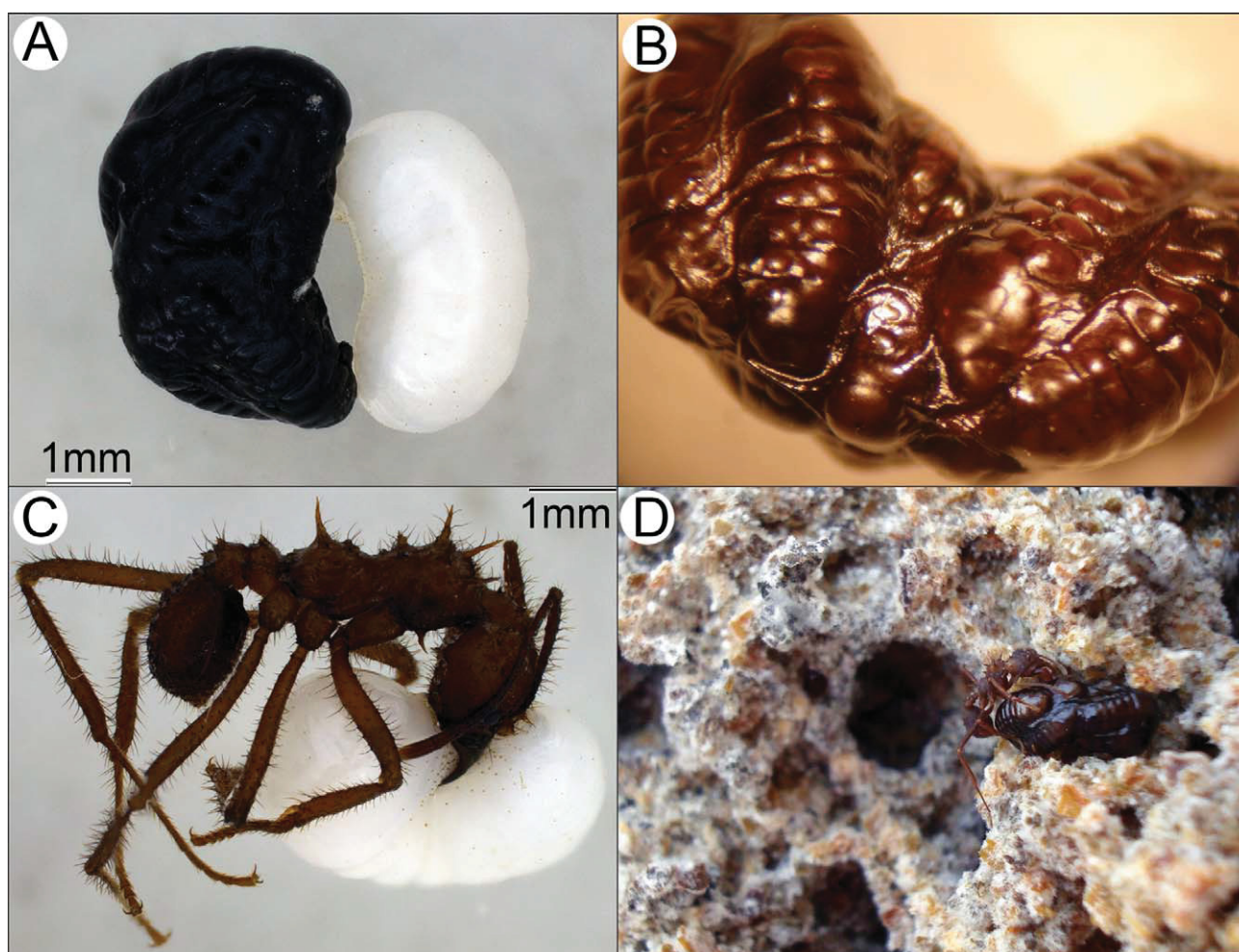


FIGURE 3. *Szelenyiopria talitae* sp. nov. Male. A. Body in dorsal view; B. Antenna.





**FIGURE 4.** *Acromyrmex subterraneus subterraneus*. A. Healthy larva and parasitized larva; B. Ant larvae showing gregarious parasitoidism; C. Ant worker taking care of a healthy larva; D. Ant worker taking care of a larva attacked.

## Discussion

Diapriinae wasps studied here behave as koinobiont parasitoids of *A. subterraneus subterraneus* larvae. This finding provides further evidence that diapriid wasps are associated with fungus growing ants. From the September nest, all of the 510 larvae were parasitized, suggesting that these wasps inflict a heavy cost on the ants, roughly comparable to parasitism rates by Diapriinae that attack *Cyphomyrmex* (Fernandez Marin *et al.* 2006). *A. subterraneus subterraneus* ants seem to not discriminate between brood infested with *Szelenyiopria* parasitoids versus uninfested brood, as reported by Ramos-Lacau *et al.* (2007) for *Cyphomyrmex* ants parasitized by *Acanthopria* wasps.

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