

**The Neotropical species of *Atractodes* (Hymenoptera, Ichneumonidae, Cryptinae),
II: the *A. pleuripunctatus* species-group**

SANTIAGO BORDERA^{1,4}, MARINA MAZÓN^{1,2} & ILARI E. SÄÄKSJÄRVI³

¹ Departamento de Ciencias Ambientales y Recursos Naturales / Instituto de Investigación de Biodiversidad CIBIO (Centro Iberoamericano de Biodiversidad). Universidad de Alicante. Apdo. Corr. 99, 03080. Alicante, Spain. E-mail: s.bordera@ua.es

² Biodiversity and Ecosystem Services Research Program, Universidad Nacional de Loja, Ciudadela Universitaria, sector La Argelia, EC 110101 Loja, Ecuador. E-mail: marinamazonmor@gmail.com

³ Zoological Museum, Department of Biology, University of Turku, FIN-20014 Finland.

⁴ Corresponding author. E-mail: s.bordera@ua.es

Abstract

We describe three new species of parasitoid wasps of the genus *Atractodes* (Ichneumonidae: Cryptinae) from South America: *A. colchaguensis* sp. nov. from Chile, and *A. pleuripunctatus* sp. nov. and *A. saragurensis* sp. nov. from Ecuador. These species are all characterized by a densely and strongly punctate mesopleuron. The *Atractodes pleuripunctatus* species-group is defined to accommodate the new species. In addition, the second part of the key to species of the Neotropical *Atractodes* including this species-group is given.

Key words: Parasitoid wasp, Stilpnina, taxonomy, identification key, new species, koinobiont, tropical, Chile, Ecuador, South America.

Running header: The Neotropical *Atractodes pleuripunctatus* species-group (Hymenoptera, Ichneumonidae, Cryptinae)

Introduction

Stilpnina is a relatively species-rich subtribe of Phygadeuontini (Ichneumonidae: Cryptinae) including three genera: *Atractodes* Gravenhorst, *Mesoleptus* Gravenhorst and *Stilpnus* Gravenhorst (Townes 1970; Bordera *et al.* 2016).

During the last few years we have studied a large number of Central and South American specimens of Stilpnina deposited in various collections. As a result of this work we found a plethora of new Neotropical Stilpnina species. In the first part of the study (Bordera *et al.* 2016), we started with the genus *Atractodes*, establishing four Neotropical species-groups. In that paper, we defined two of these species-groups and described four new species found in Central and South America.

The aim of the current work is to continue the revision of the Neotropical species of *Atractodes*, defining the *Atractodes pleuripunctatus* species-group and describing three new species found in Chile and Ecuador.

Material and Methods

A large amount of material of Neotropical *Atractodes* deposited in various entomological collections has been studied. All institutions are listed in Bordera *et al.*

(2016). Material included in the current paper is deposited in the American Entomological Institute, Gainesville, USA (AEIC).

Morphological terminology follows that of Jussila (1979) and Gauld (1991). Terms used for describing sculpture are based on Eady (1968). Measurements of head, flagellomeres and pterostigma are as in Figs 1A-C in Bordera *et al.* (2016).

Layer photos were taken in the Zoological Museum of the University of Turku, Turku, Finland (ZMUT) using an Olympus SZX16 stereomicroscope attached to a Canon EOS7D digital camera. Digital photographs were combined using Deep Focus 3.1 and QuickPhoto Camera 2.3 programmes.

Taxonomy

The *Atractodes pleuripunctatus* species-group (*Atractodes* species-group A, in Bordera *et al.* (2016)).

Diagnosis. Propodeum convex and uniformly sloped downwards posteriorly (Figs 1A–C, 2A–B). Area basalis not conspicuously raised posteriorly. Apex of scutellum smooth. Junction of posterior transverse carina and lateral longitudinal carina not forming a strong angulate crest (Figs 2C–E). Flagellum thicker distally than proximally (Figs 3A–C). Mesopleuron densely and strongly punctate (Figs 2A–B). Median area of propodeum coarsely and strongly punctate or transversally strigose (Figs 2C–E). Hind femur about $6.3\text{--}7.7 \times$ as long as deep.

Remarks. The species are distributed in Andean areas of Ecuador and Chile at an altitude between 1500 and 3200 m.a.s.l.

Key to females of *Atractodes pleuripunctatus* species-group.

(Males are unknown)

1. Median area of propodeum transversally strigose (Fig. 2C). Postpetiole short, square (Fig. 2C). Hind femur $6.3 \times$ longer than deep. Sensillae of flagellum not conspicuously apparent (Fig. 4A). **Chile**.....*A. colchaguensis* sp. nov.
- . Median area of propodeum strongly punctate (Figs. 2D–E). Postpetiole long, rectangular (Fig. 2E). Hind femur more than $6.7 \times$ longer than deep. Flagellum with more or less conspicuous white long linear sensillae (Figs 4B–C)..... 2
2. Tarsal claws with a relatively broad base, moderately long and abruptly curved at distal 0.4 (Fig. 4E). Fore and mid coxae light orange, posterior coxa brown (Fig. 1B). **Ecuador**.....*A. pleuripunctatus* sp. nov.
- . Tarsal claws with a thin base, very narrow and long, apically as if stretched, evenly curved (Fig. 4F). All coxae brown (Fig. 1C). **Ecuador***A. saragurensis* sp. nov.

***Atractodes colchaguensis* sp. nov.**

(Figs 1A, 2C, 3A, 4A, 4D)

Diagnosis. *Atractodes colchaguensis* can be distinguished from all other species of the *A. pleuripunctatus* species-group by the combination of the following characters: median area of propodeum transversally strigose (Fig. 2C); postpetiole short, square (Fig. 2C); hind femur $6.3 \times$ longer than deep; sensillae of flagellum not apparent (Fig. 4A).

Description. Female: Body length 5.7 mm. Fore wing length 4.3 mm.

Head (Figs 3A, 4A). Transverse, about $0.6\text{--}0.7 \times$ as wide as long, not narrowed behind compound eyes, rounded (viewed from above); gena about $0.5 \times$ as long as eye, smooth and shiny with sparse setiferous punctures, setae relatively short. Frons and

vertex granulate with dense shallow setiferous punctures, setae relatively short. Genal carina straight, occipital carina rounded in middle part. Posterior ocellus separated from eye by $1.4 \times$ its own maximum diameter; distance between posterior ocelli $0.8 \times$ its own maximum diameter. Face finely and very densely punctate on a granulate background. Clypeus weakly convex, $2.2 \times$ as wide as long, densely punctate on a smooth and shiny background, apex slightly upturned medially, setae conspicuously longer than in face. Lower tooth of mandible $0.6\text{--}0.7 \times$ the length of upper tooth. Eye with relatively long and more or less dense setae. Malar space about $1.2\text{--}1.3 \times$ basal mandibular width, conspicuously granulate behind the mandible base, vanishing towards compound eye. Antenna with 17 flagellomeres; first flagellomere, seventh and penultimate 5.1, 2.3 and $1.6 \times$ as long as wide, respectively; antenna slightly widened towards apex, width of penultimate about $1.4 \times$ the width of first flagellomere (Fig. 3A); sensillae of flagellum not apparent (Fig. 4A).

Mesosoma (Figs 2C, 4D). Pronotum finely and densely punctate, denser in the anterior lateral part; epomia shallow and short, only reaching the anterior submarginal depression. Mesoscutum fine and densely punctate on a smooth and shiny background; notauli distinct and short, reaching about $0.4 \times$ the length of mesoscutum; prescutellar groove deep, smooth, without longitudinal striae; scutellum with dense fine and shallow setiferous punctures, not delimited by a lateral carina. Mesopleuron shiny, with fine and dense setiferous punctures; sternaulus deep, almost reaching the hind rim of mesopleuron. Metapleuron strongly punctate and granulate; juxtacoxal carina absent. Propodeum mostly strongly punctate and rugose, setae long and dense; area basalis not well defined; median area clearly defined, transversally strigose, with parallel sides, about $2.3 \times$ as long as its maximum width (Fig. 2C); spiracle small, rounded, separated from pleural carina $3.3 \times$ its diameter. Legs long and slender; length of hind femur

about $6.3 \times$ its width. Hind tarsal claws thin and very long, forming an obtuse angle, clearly longer than arolium (Fig. 4D).

Wings. Very densely setose. Fore wing with pterostigma long, about $3.3 \times$ wider than high, vein $Rs+2r$ about $2.0 \times$ longer than its height; areolet pentagonal, open, about $0.8 \times$ higher than wide; $2m-cu$ with one bullae; first abscissa of $Cu1a$ $1.2 \times$ $Cu1b$. Hind wing with $cu-a$ slightly angulated, intercepted at its lower 0.3 , straight; distal abscissa of $Cu1$ only pigmented at base.

Metasoma (Figs 1A, 2C). Tergite I with sparse setiferous punctures on a finely granulate background, $2.8 \times$ longer than posteriorly broad, in lateral view, dorsal part strongly curved (Fig. 1A), cross section of petiole on the mid part more or less rectangular, upper side flat; postpetiole short, quadrate (Fig. 2C); tergite II polished, about $1.6 \times$ longer than basally broad; lateral crease separating tergite II from epipleuron present at basal third; other tergites smooth and shiny, with sparse setae.

Colouration (Fig. 1A). Black; flagellum dark brown, lighter towards the apex. Legs dark brown. Metasoma from tergite II to the apex, reddish; tergite I black.

Male: unknown.

Etymology. The name of the species refers to Colchagua Valley in Chile, where the holotype was collected.

Type material. Holotype 1 ♀: **Chile**, Rio Tinguiririca, Valle Colchagua, 1550 m, 2.II.1978, leg. Luis Peña (AEIC).

***Atractodes pleuripunctatus* sp. nov.**

(Figs 1B, 2A, 2D, 3B, 4B, 4E)

Diagnosis. *Atractodes pleuripunctatus* can be distinguished from all other species of the *A. pleuripunctatus* species-group by the combination of the following characters: median area of propodeum strongly punctate (Fig. 2D); postpetiole long, rectangular; hind femur $6.7 \times$ longer than deep; tarsal claws with relatively broad base, moderately long and abruptly curved at distal 0.4 (Fig. 4E); fore and mid coxa light orange, posterior coxa brown (Fig. 1B); flagellum with conspicuous white long linear sensillae (Fig. 4B).

Description. Female: Body length 5.1–5.9 mm. Fore wing length 4.3–4.5 mm.

Head (Figs 3B, 4B). Transverse, about $0.5\text{--}0.6 \times$ as wide as long, narrowed behind compound eyes, straight (viewed from above); gena about $0.5 \times$ as long as eye, smooth and shiny with very sparse shallow setiferous punctures, setae relatively short. Frons and vertex smooth and shiny with shallow setiferous punctures, setae relatively short. Occipital carina rounded in middle part. Posterior ocellus separated from eye by $1.5 \times$ its own maximum diameter; distance between posterior ocelli $0.5\text{--}0.6 \times$ its own maximum diameter. Face finely and very densely punctate on a granulate background. Clypeus weakly convex, $2.0 \times$ as wide as long, densely punctate on a smooth and shiny background, apex slightly upturned medially, setae conspicuously longer than in face. Lower tooth of mandible $0.7\text{--}0.8 \times$ the length of upper tooth. Eye with very short sparse setae. Malar space about $1.1\text{--}1.2 \times$ basal mandibular width, conspicuously granulate behind the mandible base, vanishing towards compound eye. Antenna with 17 flagellomeres; first flagellomere, seventh and penultimate 5.9 , $3.7\text{--}3.9$ and $1.6\text{--}1.7 \times$ as long as wide, respectively; antenna slightly widened towards apex, width of penultimate $1.6\text{--}1.7 \times$ the width of first flagellomere (Fig. 3B); flagellum with conspicuous white long linear sensillae (Fig. 4B).

Mesosoma (Figs 2A, 2D, 4E). Pronotum finely and densely punctate, stronger and denser in the anterior lateral part; epomia shallow and short, only reaching the anterior submarginal depression. Mesoscutum fine and densely punctate on a smooth and shiny background; notauli shallow and short, reaching about $0.1\text{--}0.2 \times$ the length of mesoscutum; prescutellar groove deep, smooth, with longitudinal striae; scutellum with dense fine and shallow setiferous punctures, not delimited by a lateral carina. Mesopleuron shiny, with fine and dense setiferous punctures; sternaulus deep, almost reaching the hind rim of mesopleuron (Fig. 2A). Metapleuron strongly punctate and granulate; juxtacoxal carina absent. Propodeum more or less convex and uniformly sloped downwards posteriorly (Fig. 2A); mostly strongly granulate, setae long and dense; area basalis not well defined; longitudinal carinae shallow and irregular, median area slightly defined, strongly granulate, more or less broader in the central part, about $2.5\text{--}3.5 \times$ as long as its maximum width (Fig. 2D); spiracle small, rounded, separated from pleural carina $1.8\text{--}2.0 \times$ its diameter. Legs long and slender; length of hind femur about $6.7 \times$ its width; tarsal claws with relatively broad base, moderately long and abruptly curved at distal 0.4, clearly longer than arolium (Fig. 4E).

Wings. Very densely setose. Fore wing with pterostigma about $2.4\text{--}2.6 \times$ wider than high, vein R_{s+2r} about $1.0\text{--}1.1 \times$ longer than its height; areolet pentagonal, open, about $0.7\text{--}0.8 \times$ higher than wide; $2m\text{-}cu$ with one or two close bullae; first abscissa of $Cu1a$ $1.1\text{--}1.5 \times$ $Cu1b$. Hind wing with $cu\text{-}a$ angulated, intercepted at its lower 0.3, slightly reclivous; distal abscissa of $Cu1$ not pigmented.

Metasoma. Tergite I finely granulate, with few long lateral setae, $4.3\text{--}4.5 \times$ longer than posteriorly broad, in lateral view dorsal part strongly curved; cross section of petiole on the mid part circular, upper side slightly convex; postpetiole long, rectangular; tergite II polished, finely granulate only on basal third, about $2.9\text{--}3.1 \times$

longer than basally broad; lateral crease separating tergite II from epipleuron more or less present at basal third; other tergites smooth and shiny, with only very few sparse setae.

Colouration (Fig. 1B). Black to dark brown; apex of postannellus and mandibles somewhat lighter. Legs brown; fore and mid coxae, trochanters and trochantelli, light orange. Metasoma from tergite II to the apex, reddish; tergite I black.

Male: unknown.

Etymology. The specific name refers to the strongly punctate sculpture of the mesopleuron.

Type material. Holotype 1 ♀: **Ecuador**, Pimo, Cañar, 3200 m, 10–12.XII.1970, leg. Luis Peña (AEIC). **Paratype:** Same data, 1 ♀ (AEIC).

***Atractodes saragurensis* sp. nov.**

(Figs 1C, 2B, 2E, 3C, 4C, 4F)

Diagnosis. *Atractodes saragurensis* can be distinguished from all other species of the *A. pleuripunctatus* species-group by the combination of the following characters: median area of propodeum strongly punctate (Fig. 2E); postpetiole long, rectangular (Fig. 2E); hind femur $6.7 - 7.7 \times$ longer than deep; tarsal claws with a thin base, very narrow and long, apically as if stretched, evenly curved (Fig. 4F); all coxae brown (Fig. 1C); sensillae of flagellum more or less conspicuously apparent (Fig. 4C).

Description. Female: Body length 5.7 mm. Fore wing length 4.5–4.8 mm.

Head (Figs 3C, 4C). Transverse, about $0.6\text{--}0.7 \times$ as wide as long, slightly narrowed behind compound eyes, rounded (viewed from above); gena about $0.6 \times$ as long as eye, smooth and shiny with sparse setiferous punctures, setae relatively short. Frons and vertex mostly smooth and shiny with dense shallow setiferous punctures, frons rugose behind the antennal sockets, setae relatively short. Occipital carina rounded in middle part. Posterior ocellus separated from eye by $1.7\text{--}1.8 \times$ its own maximum diameter; distance between posterior ocelli $0.6 \times$ its own maximum diameter. Face finely and very densely punctate on a smooth and shiny background. Clypeus weakly convex, $2.2 \times$ as wide as long, densely punctate on a smooth and shiny background, apex slightly upturned medially, setae conspicuously longer than in face. Lower tooth of mandible $0.6 \times$ the length of upper tooth. Eye with relatively long sparse setae. Malar space about $1.1\text{--}1.2 \times$ basal mandibular width, conspicuously granulate behind the mandible base, vanishing towards compound eye. Antenna with 17 flagellomeres; first flagellomere, seventh and penultimate $4.8\text{--}5.2$, 2.9 and $2.1 \times$ as long as wide, respectively; antenna slightly widened towards apex, width of penultimate about $1.3 \times$ the width of first flagellomere (Figs 3C); whitish sensillae of flagellum more or less conspicuously apparent (Fig. 4C).

Mesosoma (Figs 2B, 2E, 4F). Pronotum finely and densely punctate, slightly denser in the anterior lateral part; epomia shallow and short, only reaching the anterior submarginal depression. Mesoscutum fine and densely punctate on a smooth and shiny background; notauli shallow and short, reaching about $0.3 \times$ the length of mesoscutum; prescutellar groove deep, smooth, without longitudinal striae; scutellum with dense fine and shallow setiferous punctures, not delimited by a lateral carina. Mesopleuron shiny, with fine and dense setiferous punctures; sternaulus deep, almost reaching the hind rim of mesopleuron (Fig. 2B). Metapleuron strongly punctate and granulate; juxtacoxal

carina absent. Propodeum mostly strongly punctate and granulate, setae long and dense; area basalis not well defined; longitudinal carinae shallow and irregular, median area slightly defined, strongly punctate, about 2.1–3.0 × as long as its maximum width (Fig. 2E); spiracle small, rounded, separated from pleural carina 2.4–3.4 × its diameter. Legs long and slender; length of hind femur about 6.7–7.7 × its width. Hind tarsal claws with thin base, very narrow and long, apically as if stretched, evenly curved (Fig. 4F).

Wings. Very densely setose. Fore wing with pterostigma long, about 2.6–3.0 × wider than high, vein R_{s+2r} about 1.4–1.6 × longer than its height; areolet pentagonal, open, about 0.8 × higher than wide; $2m-cu$ with one bullae; first abscissa of $Cu1a$ 1.3–1.5 × $Cu1b$. Hind wing with $cu-a$ angulated, intercepted at its lower 0.2–0.3, straight; distal abscissa of $Cu1$ not pigmented.

Metasoma (Figs 1C, 2E). Tergite I with setiferous punctures on a shiny background, 4.3–4.8 × longer than posteriorly broad, in lateral view dorsal part strongly curved (Fig. 1C); cross section of petiole on the mid part circular, upper side slightly convex; postpetiole long, rectangular (Fig. 2E); tergite II polished, about 2.7–3.1 × longer than basally broad; lateral crease separating tergite II from epipleuron present at basal third or less; other tergites smooth and shiny, with sparse setae.

Colouration (Fig. 1C). Black to dark brown. Legs dark brown. Metasoma from tergite II to the apex, reddish; tergite I black.

Male: unknown.

Etymology. The name of the species refers to Saraguro, locality where the holotype was collected. Saraguro is a village in the Ecuadorian province of Loja and is inhabited by the indigenous ethnic group Saraguros, belonging to the Kichwa indigenous nationality of the Ecuadorian Sierra.

Type material. Holotype 1 ♀: **Ecuador**, S. Saraguro, 2900 m, 29.XI.1970. leg. Luis E. Peña (AEIC). **Paratype: Ecuador**, Pimo, Cañar, 3200m, 10–12.XII.1970, 1 ♀, leg. Luis Peña (AEIC).

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FIGURES:

Figure 1. Habitus of *A. pleuripunctatus* species-group. A – *A. colchaguensis* (holotype); B – *A. pleuripunctatus* (holotype); C – *A. saragurensis* (holotype);

Figure 2. Mesosoma and tergite I of *A. pleuripunctatus* species-group. A—B, mesosoma, lateral view: A – *A. pleuripunctatus* (holotype); B – *A. saragurensis* (holotype). C—E, propodeum and tergite I, dorsal view: C – *A. colchaguensis* (holotype); D – *A. pleuripunctatus* (holotype); E – *A. saragurensis* (holotype).

Figure 3. Morphology of antenna. A – *A. colchaguensis* (holotype); B – *A. pleuripunctatus* (holotype); C – *A. saragurensis* (holotype).

Figure 4. Basal part of antenna and tarsal claws of *A. pleuripunctatus* species-group. A—C, basal part of antenna, lateral view (white long linear sensillae, arrows): A – *A. colchaguensis* (holotype); B – *A. pleuripunctatus* (paratype, ♀); C – *A. saragurensis* (paratype, ♀); D—F, tarsal claws, lateral view: D – *A. colchaguensis* (holotype); E – *A. pleuripunctatus* (holotype); F – *A. saragurensis* (paratype, ♀).

FIGURES

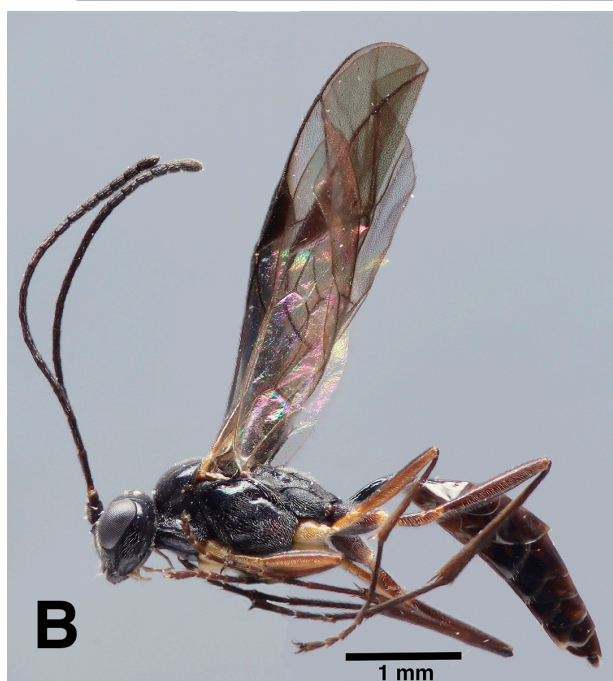


Figure 1. Habitus of *A. pleuripunctatus* species-group. A – *A. colchaguensis* (holotype);
B – *A. pleuripunctatus* (holotype); C – *A. saragurensis* (holotype);

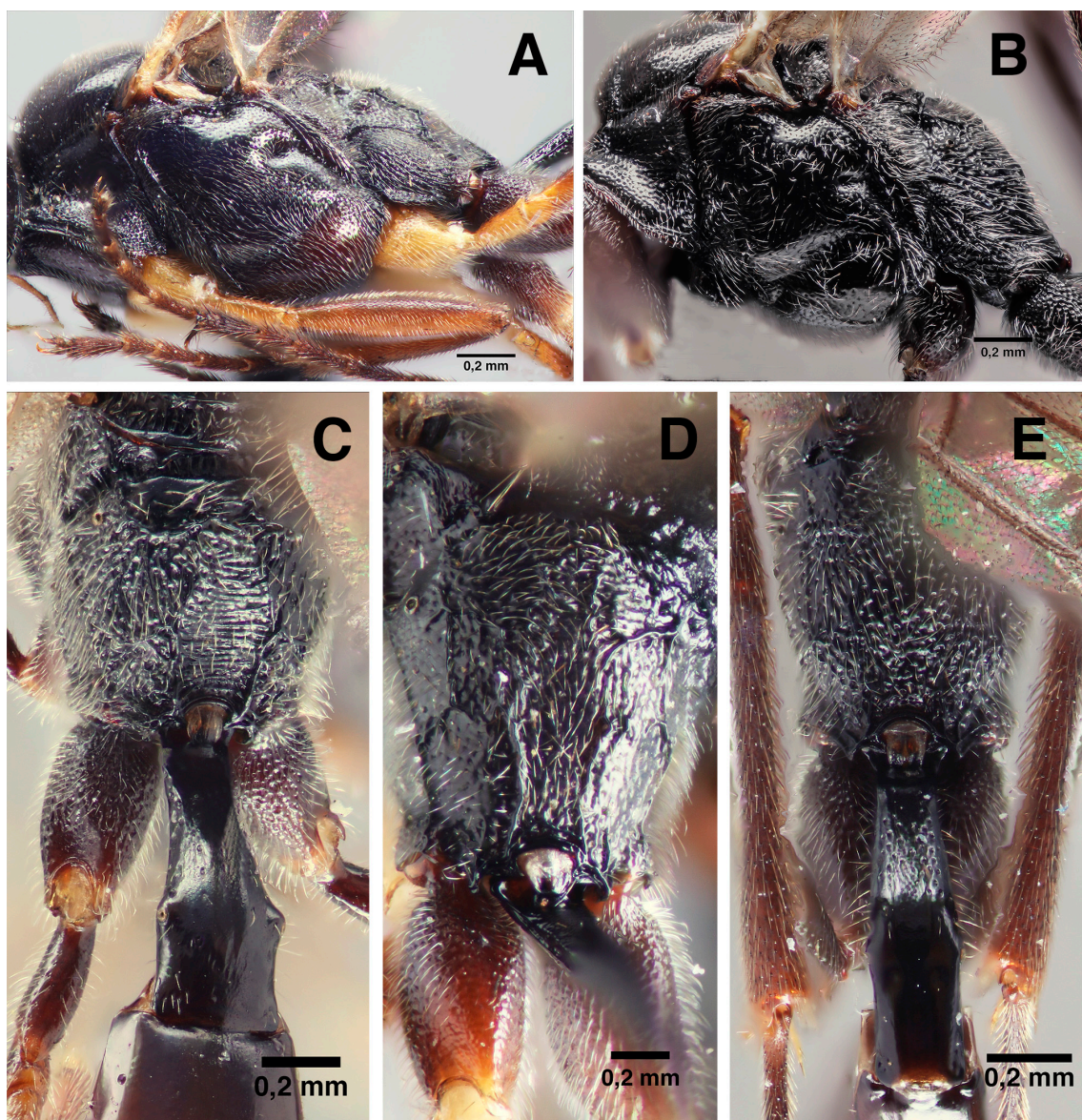


Figure 2. Mesosoma and tergite I of *A. pleuripunctatus* species-group. A—B, mesosoma, lateral view: A – *A. pleuripunctatus* (holotype); B – *A. saragurensis* (holotype). C—E, propodeum and tergite I, dorsal view: C – *A. colchaguensis* (holotype); D – *A. pleuripunctatus* (holotype); E – *A. saragurensis* (holotype).

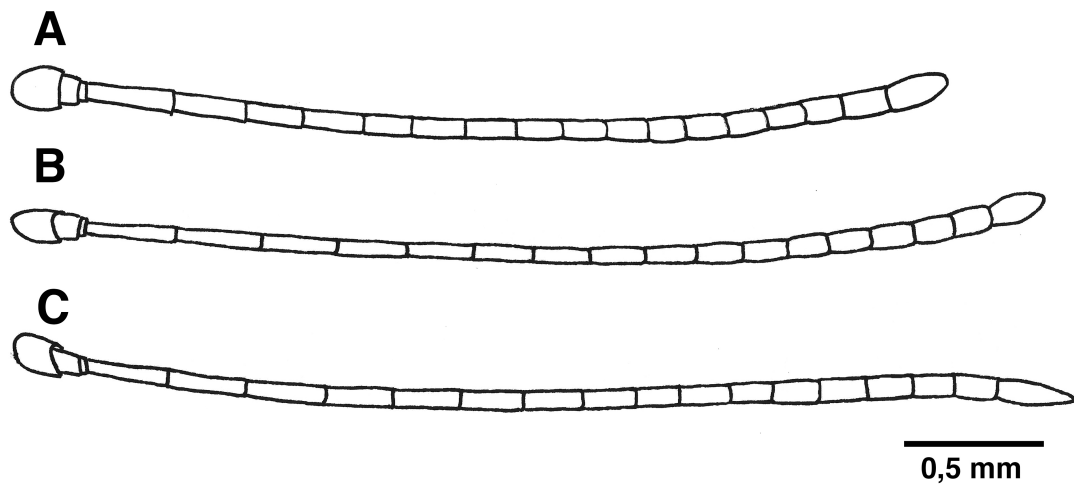


Figure 3. Morphology of antennae. A – *A. colchaguensis* (holotype); B – *A. pleuripunctatus* (holotype); C – *A. saragurensis* (holotype).



Figure 4. Basal part of antennae and tarsal claws of *A. pleuripunctatus* species-group. A—C, basal part of antennae, lateral view (white long linear sensillae, arrows): A – *A. colchaguensis* (holotype); B – *A. pleuripunctatus* (paratype, ♀); C – *A. saragurensis* (paratype, ♀); D—F, tarsal claws, lateral view: D – *A. colchaguensis* (holotype); E – *A. pleuripunctatus* (holotype); F – *A. saragurensis* (paratype, ♀).