



The bee genus *Ruizantheda* (Hymenoptera: Halictidae), its scope and description of a new species

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Abstract

The South American caenohalictine genus *Ruizantheda* is understood to comprise *Halictus proximus* Spinola, *Halictus divaricatus* Vachal, and the new species *Ruizantheda centralis* from Argentina. The new species is intermediate between the first two, bridging the gap in morphology observed in these rather different species. Diagnostic characteristics for the genus are indicated; a key and a comparative table of characters for the three species are given. The new species, which occurs in the provinces of Santa Fe, Santiago del Estero and Chaco, in Argentina, is described and illustrated.

Key words: Caenohalictina, Argentina, Brazil, Chile, taxonomy

Introduction

The genus *Ruizantheda* was proposed by Moure (1964) for three species described from Chile by Spinola (1851) under the genus *Halictus*: *H. proximus* Spinola, *H. mutabilis* Spinola, and *H. nigrocaeruleus* Spinola. These species also occur in southern Argentina. Also, Moure proposed two subgenera: *Ruizantheda s. str.* for *H. proximus* and *Ruizanthedella* for the last two species, as they markedly differed from *R. proxima*. Moure characterized *Ruizantheda s. str.* by the dull, micro-sculptured integument, particularly in the female, and by several characters of the male, such as the truncate labrum, the medially projected fourth sternum, the basally expanded, simple mandible, and the deeply emarginate pygidial plate. *Ruizanthedella* was characterized by the metallic color of the head and mesosoma, and in the male, by the apically angulate labrum, the medially emarginate fourth sternum, the bidentate, not basally expanded mandible, and the shallowly emarginate pygidial plate. Moure (1964) also indicated some characters in common between *Ruizantheda* and *Pseudagapostemon*, such as the wing venation, and the structure of the inner hind tibial spur of the female.

Moure and Hurd (1987) followed the same classification with two subgenera in their catalog. Roberts and Brooks (1987), under the name “Agapostemonine group” of genera, listed and commented the genera of the subtribe Caenohalictina, and considered that *Ruizanthedella* had uncertain affinities within the group.

In 1989, Cure raised *Ruizanthedella* to the genus level, considering it related to *Pseudagapostemon*, particularly to the subgenus *Brasilagapostemon*. He considered *Ruizantheda* as related to a new genus described in that paper, *Oragapostemon*, based on *Halictus divaricatus* Vachal, a species known from the states of Paraná, Santa Catarina and Rio Grande do Sul, in Brazil, and from the province of Buenos Aires in Argentina. Cure illustrated the genital capsule, the fourth sternum and the pygidial plate of the male, pointing out the similarity of these structures to those of *R. proxima*. According to Cure (1989), both genera share an obtuse epistomal suture, more than eight hamuli in the hind wing, metasoma with basilateral bands of short, appressed hairs on the terga, and a basal projection on the retrorse lobe of the male genitalia.

Michener (2000) synonymized *Oragapostemon* and *Ruizanthedella* under *Ruizantheda*, and considered unnecessary the recognition of subgenera, since there was only one species in each subgenus, maybe two in

Ruizanthedella, depending on the recognition of *R. nigrocaerulea* as a valid species or a synonym of *R. mutabilis*. Michener (2000, 2007) considered that all these species, although rather morphologically distinct, were clearly related.

Rojas (2001) described a new species of *Ruizantheda* (*Ruizanthedella*) from Chile, providing illustrations of the sterna and genitalia of the male, labrum and inner hind tibial spur of the female, as well as of the seventh and eighth metasomal sterna of the males of *R. proxima*, *R. mutabilis*, and *R. nigrocaerulea*, supplying a key to the Chilean species. The labrum and the hind tibial spur of the illustrated female *R. cerdai* Rojas are strikingly different from those of the other species.

Danforth *et al.* (2004) and Brady *et al.* (2006) used molecular data to analyze the higher-level phylogeny of halictid lineages. They found that *Ruizantheda* in the broad sense was paraphyletic relative to *Pseudagapostemon*. In their results, *R. mutabilis* was placed as the sister group of the clade formed by *R. proxima* and the two species of *Pseudagapostemon* sampled for those studies.

Moure (2007), in the Catalogue of Neotropical bees, considered *Ruizanthedella*, *Ruizantheda*, and *Oragapostemon* as three different genera, the latter two being monotypic.

The purpose of this contribution is to redefine the genus *Ruizantheda* as a monophyletic group. *Ruizantheda* is understood to comprise *Halictus proximus* Spinola, *Halictus divaricatus* Vachal, and one new species, *Ruizantheda centralis*, from Argentina. The new species is intermediate between the first two, bridging the gap in morphology observed in these rather different species. *Ruizanthedella* is recognized as a separate valid genus, in agreement with the phylogeny presented by Danforth *et al.* (2004), which indicates the parphyly of *Ruizantheda* (*sensu* Moure 1964) in respect to *Pseudagapostemon*.

Material and methods

The specimens examined belong to the collection of the Museo Argentino de Ciencias Naturales “Bernardino Rivadavia” (MACN), Buenos Aires, Argentina. Higher-level classification of Halictidae and terminology for structures follows Michener (2007), except that metapostnotum is used instead of basal area of propodeum (Brothers 1976). The abbreviation MOD stands for median ocellar diameter, and it is used to give a relative measure of hair length. Individual metasomal terga and sterna are referred to by the letters T and S, respectively, followed by the appropriate number. Measurements were made following Michener (2007, Fig. 10-3 b). Ratios based on measurements of body parts were taken from all specimens when possible, and given between parentheses after those of the holotype.

Ruizantheda Moure

Ruizantheda Moure, 1964: 265. Type species: *Halictus proximus* Spinola, 1851, by original designation.

Oragapostemon Cure, 1989: 312. Type species: *Halictus divaricatus* Vachal, 1903, by original designation.

Synonymized under *Ruizantheda* by Michener 2000: 372.

The genus *Ruizantheda* is supported by three putative synapomorphies of the male. The apical margin of the labrum is truncate, without an apical process. The labrum of the male has a developed apical process in species of other genera of Caenohalictina, although it is small in *Rhinotula* and some *Agapostemon* (Janjic & Packer 2003).

The apical margin of S4 in *Ruizantheda* is medially projected, bearing a row of six specialized setae with their apices bent down, forming a rake-like structure. In males of other Caenohalictina the apical margin of S4 is medially concave. The presence of modified setae on S4 is frequent in males of *Pseudagapostemon* (Cure 1989), *Dinagapostemon*, *Rhinotula*, and *Agapostemon* (*Agapostemonoides*) (Roberts & Brooks 1987), but their shape and distribution are different from those of *Ruizantheda*.

Species of *Ruizantheda* present a basal projection on the retrorse lobe of the gonocoxite. The genital capsule of all males of Caenohalictina bears a retrorse lobe, variously modified, but no species presents a basal projection similar in shape and position to that of *Ruizantheda*. The basal projection is rather weak in *R. divaricata*, as pointed out by Cure (1989: Fig. 13A), but it is strong in *R. centralis* **n. sp.** (Fig. 6) and in *R. proxima* (Moure 1964: Fig. 3, erroneously labeled as *Callochlora chloris*).

Ruizantheda has in common with species of *Pseudagapostemon* the simple mandible of the male, and the labrum with the verrucose basal elevation of the female. In *Ruizanthedella* the mandible of the male is bidentate, and the basal elevation of the female labrum is smooth. Species of *Ruizanthedella* do not share any of the putative synapomorphies mentioned above for *Ruizantheda*, although both genera share the same distribution of hair patches on the metasomal terga. *Ruizanthedella* could be a separate lineage, pending a phylogenetic study including all the genera of Caenohalictina.

Males of the new species have a strongly modified venter of the mesothorax, which is longitudinally concave, and bears an anterior and a posterior tubercle at each side; this area is shiny and devoid of hairs. *Ruizantheda proxima* has a similar structure of the venter of the mesothorax, but this feature has gone unnoticed, probably due to the long pilosity of this species. Besides the unusual modification of the male mesothorax, both species also share the strong basal projection of the retrorse lobe. These features, unique to these two species, suggest their close relationship.

TABLE 1. Comparative table of characters for the three species of *Ruizantheda*.

	<i>R. proxima</i>	<i>R. centralis</i> n. sp.	<i>R. divaricata</i>
Forewing length (mm)	7.2–7.9	5.5–5.8	5.8–6.3
Depression on anterior margin of mesoscutum	deep	shallow	shallow
Central lobes of mesoscutal lip	with angled margins	with rounded margins	with rounded margins
Dorsal surface of metapostnotum, female	evenly microareolate	rugose-striate, with posterior margin microareolate	strongly rugose-reticulate
Dorsal surface of metapostnotum, male	medially ruguloso-striolate; anterior and posterior margins microareolate	rugose-reticulate, with posterior margin microareolate	strongly rugose-reticulate
Posterior surface of propodeum	sparsely punctate	sparsely punctate	rugose-reticulate
Ventral surface of male mesothorax	with median longitudinal depression, bearing anterior and posterior tubercle at each side	with median longitudinal depression, bearing anterior and posterior tubercle at each side	without depression, nor tubercles
Mandible of male	expanded basally	normal	normal
Eyes	hairy, but areas near face bare	glabrous	hairs short, scattered, areas near face bare
Pygidial plate of male T7	bilobed	truncate	bilobed
Basal projection of retrorse lobe of gonocoxite	strong	strong	weak
Inner brush of retrorse lobe	strong	weak	strong
Distribution	Chile and western Patagonia in Argentina	central Argentina, provinces of Chaco, Santiago del Estero, and Santa Fe.	Brazil, states of Paraná to Rio Grande do Sul, and Argentina, province of Buenos Aires

The presence of hairs on the eyes is variable in *Ruizantheda*, as it is here understood, similarly to the variation present in *Pseudagapostemon*. Hairs are conspicuous in *R. proxima*, weak in *R. divaricata*, and *R. centralis* has no distinct hairs. Table 1 provides for an easier comparison of the three species of the genus.

Key to the species of *Ruizantheda*

- 1 Central lobes of mesoscutal lip with angled margins; forewing length 7.2–7.9 mm; dorsal surface of metapostnotum of female microsculptured; mandible of male basally expanded..... *R. proxima*
- Central lobes of mesoscutal lip with rounded margins; forewing length 5.5–6.3 mm; dorsal surface of metapostnotum of female sculptured, with rugae at least basally; mandible of male not basally expanded 2
- 2 Posterior surface of propodeum sparsely punctate; dorsal surface of metapostnotum of female rugose-striate basally and microareolate apically; pygidial plate of male T7 truncate..... *R. centralis*
- Posterior surface of propodeum rugose-reticulate; entire dorsal surface of metapostnotum of female strongly rugose-reticulate; pygidial plate of male T7 bilobed *R. divaricata*

Ruizantheda centralis n. sp.

(Figs. 1–7)

Diagnosis. This species is closely allied to *R. proxima*, from which it is distinguished by its smaller size, the stronger sculpture of the integument, the shorter vestiture, the mandible of the male, not expanded basally, and the glabrous ventral side of the male mesothorax. It is distinguished from *R. divaricata* by its weaker sculpture of the integument, the modified venter of the male mesothorax, and the stronger basal projection of the retrorse lobe of the male genitalia. It is distinguished from both species by the bare eyes, and the truncate pygidial plate of the male.

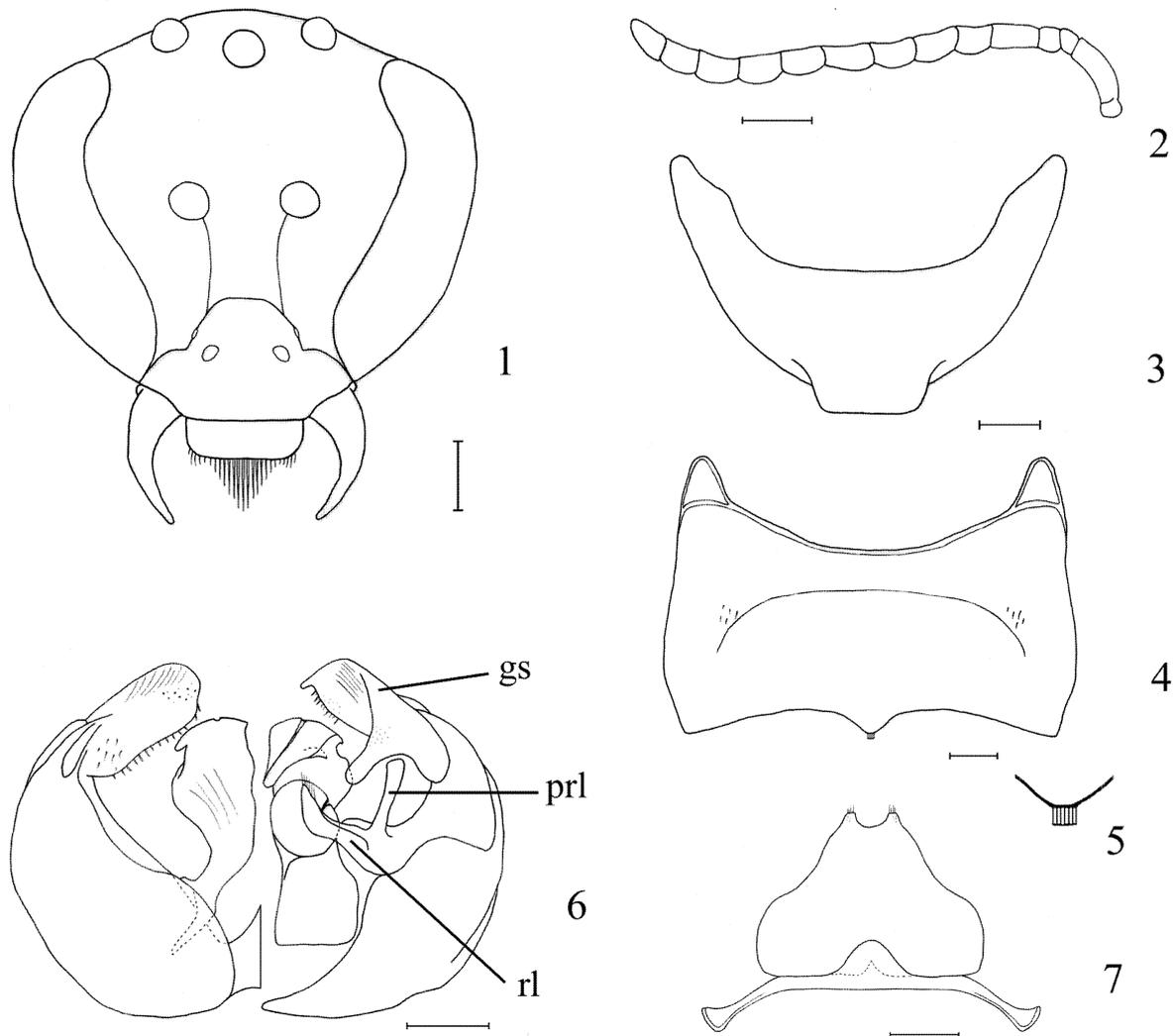
Description. Male (holotype). Length, 7.1 mm; forewing length, 5.7 mm (paratype, length, 7.0 mm; forewing length, 5.5 mm).

Color: Head and mesosoma black with a metallic bluish tint, more evident on head and on dorsal and lateral parts of thorax, scutellum with a purplish tint; hypostomal area dark reddish brown. Following parts yellow: clypeus, labrum, mandible except reddish apex, small spot on hypostomal area close to mandible, anterior surface of scape and pedicel, small spot on translucent tegula, anterior leg beyond coxa, small spot on ventral surface of mid coxa as well as rest of mid leg, except basal brown stripe on upper two thirds of mid tibia, ventral surface of hind coxa, and rest of hind leg, except basal and median brown spots on upper surface of tibia. Disc of second to sixth sterna of paratypes yellowish and S1 with small lateral and apical yellowish spots, brownish in holotype probably due to preservation of specimen. Following parts brownish: rest of antenna, two small spots on clypeus, pronotal lobe, and metasomal terga with translucent apices. Wings light amber with brown veins and pterostigma.

Pubescence: Whitish. Head with dense, appressed, short, plumose hairs on lower part of paraocular area and gena; those hairs on paraocular area interspersed with longer hairs as long as 1.7 times MOD; erect hairs on genal area as long as 1.1 times MOD; hairs on vertex as long as 1.3 times MOD. Clypeus and scape with sparse erect hairs, 0.6–1 times MOD. Thorax with dense, short, simple hairs on scutum, scutellum, and metanotum, as long as 0.3 times MOD; those on pleura short, plumose, as long as MOD; scutellum with sparse, plumose hairs, 0.7 times MOD; metanotum and lateral side of propodeum with denser, plumose hairs, 1.1–1.3 times MOD on metanotum, 0.4–0.8 times MOD on lateral side of propodeum. Lateral part of pronotal collar and base of metanotum with dense areas of appressed, very short hairs. Vestiture sparse on legs. Metasoma with basilateral bands of short appressed hairs on T2–T3; terga without apical bands; disc of terga with very short erect hairs, as long as 0.2 times MOD; T2–T7 with some longer hairs on lateral apical part, with their apices directed latero-posteriorly. S1–S5 glabrous, S6 with sparse hairs laterally and apically.

Sculpture: Labrum impunctate. Clypeus with punctures denser at sides, separated by 0.5 puncture

diameter; punctures sparser apically and medially, leaving median longitudinal smooth upper band. Face with punctation finer and denser than on clypeus, on supraclypeal area separated by 0.3–0.5 their diameter. Punctures deep, dense on scutum and metanotum, separated by half puncture diameter. Disc of scutellum with impunctate areas as large as 2–3 puncture diameter; remainder of scutellum with punctures similar to those on scutum. Mesepisternum with strong, coalescent punctures; metapleuron punctate-striate. Metapostnotum with strong punctures, rugose-reticulate, posterior margin smooth. Propodeum with punctures separated by 1–1.5 times their diameter. Metasoma with fine, dense punctuation. Surface between punctures smooth.



FIGURES 1–7. *Ruizantheda centralis* n. sp. male: 1, head, frontal view; 2, antenna; 3, T7, dorsal view; 4, S4, ventral view; 5, detail of median apical projection of S4, showing row of specialized setae; 6, genital capsule, ventral view (right), dorsal view (left): prl, basal projection of the retrorse lobe of the gonocoxite, rl, retrorse lobe of the gonocoxite, gs, gonostylus; 7, S7 and S8 fused, ventral view. Scale lines: Fig. 1, 0.3 mm; Fig. 2, 0.5 mm; Figs. 3–7, 0.2 mm.

Structure: Head broader than long, 1.15:1 (paratype, 1.13:1). Proportion of lower to upper interocular distance 0.68:1. Labrum broader than long, 2.3:1, truncate, bearing a row of approximately 30 flattened setae (Fig. 1). Clypeus broader than long, 1.52:1 (paratype, 1.54:1). Proportion of interantennal to antennocular distance, 1.6:1 (paratype, 1.7:1). Proportion of posterior interocelar to oculo-ocular distance, 1.9:1 (paratype, 2:1). Proportion of length of scape, pedicel and first three flagellomeres 1.64:0.50:0.57:1.14:1. Second flagellomere 1.77 times as long as its apical width (Fig. 2). Venter of mesothorax longitudinally concave, with anterior and posterior tubercle at each side. Pygidial plate with strong marginal carina, truncate (Fig. 3). S1

convex. Apical margin of S4 medially projected, bearing row of six flattened, juxtaposed setae, with their apices bent down (Figs. 4–5). S7–S8 as in figure 7. Genital capsule with basal projection on retrorse lobe of gonocoxite (Fig. 6).

Female. Length, 7.2 mm; forewing length, 5.8 mm.

Color: Head and mesosoma as in male, but following parts brownish: clypeus, labrum, mandible, hypostomal area of head, antenna, tegula, legs and metasoma. Wings as in male.

Pubescence: Whitish. Head with erect, plumose hairs; those on paraocular area and vertex as long as 1.3–1.5 times MOD; hairs on lower part of genal area twice MOD; upper part of genal area with appressed, plumose hairs, as long as 0.5–1.2 times MOD. Thorax with dense, short, simple hairs on scutum, scutellum, and metanotum similar to those of male, but longer on pleura (1.5–1.8 times MOD), sides of scutum (up to 1.6 times MOD), metanotum and lateral side of propodeum (1.4–1.7 times MOD). Lateral part of pronotal collar and base of metanotum with dense areas of appressed, very short hairs, as in male. Vestiture dense on legs. Metasoma with basilateral bands of short appressed hairs on T2–T3; terga without apical bands; disc of terga with sparse, very short erect hairs; anterior part of T1 with erect, plumose hairs, as long as 0.75 times MOD, directed latero-anteriorly; T4–T5 laterally with some longer hairs, with their apices directed latero-posteriorly. S2–S5 with long, short-barbed hairs, with their apices curved, directed posteriorly.

Sculpture: Labrum with verrucose, median, basal elevation. Clypeus with punctures separated by 0.5–0.7 puncture diameter; rest of face with punctation finer and denser than on clypeus. Punctures on scutum, scutellum, metanotum and pleura similar to those of male. Dorsal surface of metapostnotum rugose-striate, with posterior margin microareolate. Metasoma with fine, dense punctation. Surface between punctures smooth, but microreticulate on metasoma.

Structure: Head broader than long, 1.2:1. Proportion of lower to upper interocular distance 0.75:1. Labrum broader than long, 1.8:1. Clypeus broader than long, 1.87:1. Proportion of interantennal to antennocular distance, 0.6:1. Proportion of posterior interocular to oculo-ocular distance, 1.9:1. Proportion of length of scape, pedicel and first three flagellomeres 7.33:1:1:0.83:1. Inner hind tibial spur pectinate, with three teeth. Pygidial plate rounded, with strong margin. S1 convex.

Distribution. Argentina: provinces of Chaco, Santiago del Estero, and Santa Fe.

Specimens examined. ARGENTINA, HOLOTYPE male: Santiago del Estero, number 23.120, XI/1927, M. Gómez (MACN); PARATYPE: 1 male, Santa Fe, Rosario, 12/I/1911, *Moya spinosa*, “133”; OTHER SPECIMENS: 1 male, Santiago del Estero, number 23.234, Dep. Matará, Desvío 511, XI/1928, M. Gómez; Santa Fe, number 11.942, cerca de Rosario, J. Lazarte; 1 female, Chaco, number 6.879, 30/VIII/1904, Lynch Arriabalzaga. All specimens in MACN.

Etymology. This species is named for the distribution of the species, between the known geographical records of *R. divaricata* and *R. proxima*.

Comments. Two males are not designated as paratypes, because they are in poor condition, although there is no doubt that they belong to the species. The studied female agrees with the males in sculpture of the integument, color and vestiture, but since it comes from a far locality where the males were collected, it is tentatively associated. One male was collected on *Moya spinosa* Grisebach (Celastraceae), a small tree that grows along the Paraná River.

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