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## Revision of the species of the bee genus *Caenohalictus* (Hymenoptera: Halictidae) occurring in Argentinean Patagonia

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### Abstract

The species of the halictid bee genus *Caenohalictus* Cameron occurring in Argentinean Patagonia are revised. Eight species are recognized, one of them here described as new: *Caenohalictus flammeus* n. sp. The female of *C. turquesa* Rojas & Toro 2000 is described for the first time. *Pseudagapostemon babuarus* Jörgensen 1912, based on the male holotype, is synonymized under *Augochlora* (*Pseudaugochloropsis*) *thamyris* Jörgensen 1912, based on the female lectotype. Lectotypes are designated for *Augochlora* (*Pseudaugochloropsis*) *thamyris* Jörgensen 1912 and *Halictomorpha autumnalis* Jörgensen 1912. *Caenohalictus cyanopygus* Rojas & Toro 2000, *C. galletue* Rojas & Toro 2000, *C. iodurus* (Vachal 1903), *C. opaciceps* (Friese 1916), and *C. turquesa* Rojas & Toro 2000, all known from Chile, are cited for Argentina for the first time. Notes on the variation observed within species, images of diagnostic structures, a key to the species and distributional data are provided. In addition, DNA barcoding results for four species are briefly discussed.

**Key words:** Caenohalictina, Argentina, Chile, taxonomy, DNA barcoding

### Introduction

The worldwide bee tribe Halictini comprises four subtribes: Thrinchostomina, Caenohalictina, Sphecodina and Halictina (Michener 2007). Caenohalictina is the only subtribe represented exclusively in the New World. These bees have been called “Agapostemonines” in early morphological studies of the group (Eickwort 1969; Roberts & Brooks 1987). Molecular (Danforth *et al.* 2004) and morphological (Gonçalves & Melo 2009) phylogenies support the monophyly of the subtribe, although the topologies obtained are different regarding the position of *Caenohalictus* Cameron. The group comprised of *Habralictus* Moure and *Caenohalictus* (Engel 2000) was recovered as a clade in the topology of Danforth *et al.* (2004), but this group was not recovered in the morphological study of Gonçalves and Melo (2009) where *Habralictus*, and then *Caenohalictus*, are successive sisters to the remaining genera of Caenohalictina.

The species of the genus *Caenohalictus* are slender, usually bright-green bees. They are characterized from other genera of Caenohalictina by the even, granulose sculpture of the body and the hairy compound eyes, the hairs of which can be as long as three times the diameter of the median ocellus. The clypeus is considerably produced in some of the larger species, while in others it is very short and the head is almost round. The genus occurs from the north of Mexico to the south of Argentina and Chile, being more abundant and diverse along the Andes. *Caenohalictus* is the most species-rich genus of Caenohalictina, with approximately 55 described species (Michener 2007, Moure 2007).

The only revision of the genus was by Rojas and Toro (2000) for the 15 species present in Chile. They revised the type material of the already described species, described seven new species and provided a key. They focused mainly on features of the genital capsule of the male, as several species are difficult to tell apart by external morphology. They distinguished four species groups based mostly on the extent of yellow markings of the male, the degree to which the clypeus is produced, the shape of the epistomal lobe and the length of the malar area.

The aim of this contribution is to revise the species of *Caenohalictus* that occur in Argentinean Patagonia (an area found south from latitude 37° to 51° S). Our study strongly relies on the revision of Rojas and Toro (2000),

since most of the Patagonian species are also present in Chile. Notes on the variation observed within species, images of diagnostic structures, a key to the species and distributional data are provided, as well as DNA barcoding results obtained for four species.

## Material and methods

Higher-level classification of Halictidae and terminology for structures follow Michener (2007), except that *metapostnotum* is used instead of *basal area of propodeum* (Brothers 1976) and the features of the genital capsule of the male follow Rojas and Toro (2000). Terminology for surface sculpture follows Harris (1979). The abbreviation MOD stands for median ocellar diameter, and it is used to give a relative measure of hair length. The abbreviation PD stands for puncture diameter, and it is used to give a relative measure of puncture density. Individual flagellomeres, and metasomal terga and sterna are referred to by the letters F, T and S, respectively, followed by the appropriate number. Males and females are referred to by the letters M and F in the lists of examined material. Measurements were made following Michener (2007: figure 10–3 b). Ratios based on measurements of body parts were taken from five specimens from distant localities when possible, and given between parentheses after those of the holotype in the description of *C. flammeus* **n. sp.**

Synonymies are restricted to original citations and those of relevance to Patagonia. For complete synonymic lists refer to Rojas and Toro (2000) and Moure (2007). We examined 1095 specimens, which belong to the following collections, acronyms following Arnett *et al.* (1993) when possible: Natural History Museum, London, England (BMNH); Cátedra de Botánica, Facultad de Agronomía, Universidad de Buenos Aires, Buenos Aires, Argentina (FAUBA); Instituto Argentino de Investigaciones de las Zonas Áridas, Mendoza, Argentina (IADIZA), Museo Argentino de Ciencias Naturales “Bernardino Rivadavia”, Buenos Aires, Argentina (MACN); Museo de La Plata, La Plata, Argentina (MLPA); Museo Municipal de Ciencias Naturales “Lorenzo Scaglia”, Mar del Plata, Argentina (MLS); Museo Nacional de Historia Natural, Santiago, Chile (MNNC); Laurence Packer Collection, York University, Toronto, Canada (PCYU). Additional material from Chile of the following species was studied: *Caenohalictus azarae* Cockerell, *C. monilicornis* Alfken, *C. pygosinuatum* Rojas & Toro, and *C. rostraticeps* (Friese).

Distribution maps were performed in DIVA-GIS 7.5 ([www.diva-gis.org](http://www.diva-gis.org)), taking into consideration only localities from Argentinean Patagonia from the labels of the specimens examined, although material from localities outside Patagonia are mentioned when applicable. We considered the species of *Caenohalictus* inhabiting the area south of the Colorado River, in the Argentinean provinces of Neuquén, Río Negro, Chubut and Santa Cruz. Patagonia has been considered by biogeographers as a composite area (Cabrera & Willink 1973; Morrone 1999; Morrone & Roig Juárez 1995) and three biogeographic regions are considered herein (Cabrera & Willink 1973). The oriental region is the largest part, and occupies the xeric steppe which extends from central Neuquén to northern Tierra del Fuego, and reaches Aysén and Magallanes in Chile. The occidental region is humid, characterized by temperate *Nothofagus* forests. The northern part is occupied by *Larrea* desert, which extend north of the Colorado River beyond the study area. The De Martonne aridity index (De Martonne 1927) is shown on the maps, providing an idea of the different environments the species inhabit.

We obtained DNA sequences from the standard animal DNA barcoding locus (cytochrome c oxidase I) from four species (*C. cyanopygus*, *C. flammeus* **n. sp.**, *C. galletue* and *C. opaciceps*). DNA extraction, amplification and sequencing for these specimens were carried out at the Canadian Centre for DNA Barcoding at University of Guelph (Ontario, Canada) using standard protocols described in Hebert *et al.* (2003) and available online at <http://www.dnabarcoding.ca/pa/ge/research/protocols>. The sequences are deposited in GenBank (Table 1) and are also available in the project file “*Caenohalictus* Argentina” (CAEAR project) of the Barcode of Life Data Systems (BOLD; [www.barcodinglife.org](http://www.barcodinglife.org); Ratnasingham & Hebert 2007). The analytical system within BOLD was used to assess species boundaries and gender associations based on a Kimura-2 parameter model of base substitution (Kimura 1980).

**TABLE 1.** *Caenohalictus* species included in this study with BOLD process ID and GenBank accession numbers.

Species	Museum ID	BOLD process ID	GenBank accession number	Length (pb)	Sex	Province and department of Argentina
<i>C. cyanopygus</i>	MACN-En 8255	HALIC182–11	KC250741	658	M	Río Negro: Bariloche
<i>C. cyanopygus</i>	MACN-En 8252	HALIC190–11	KC250743	658	M	Río Negro: Bariloche
<i>C. cyanopygus</i>	MACN-En 9771	HALIC266–12	KC617766	658	M	Neuquén: Lácar
<i>C. cyanopygus</i>	MACN-En 9770	HALIC265–12	KC617768	658	M	Neuquén: Aluminé
<i>C. cyanopygus</i>	MACN-En 9769	HALIC264–12	KC617769	658	M	Neuquén: Aluminé
<i>C. cyanopygus</i>	MACN-En 9768	HALIC263–12	KC617770	658	M	Neuquén: Aluminé
<i>C. cyanopygus</i>	MACN-En 9772	HALIC267–12	KC617767	658	M	Neuquén: Lácar
<i>C. cyanopygus</i>	MACN-En 8286	HALIC184–11	KC250740	658	F	Neuquén: Los Lagos
<i>C. cyanopygus</i>	MACN-En 8284	HALIC185–11	KC250739	658	F	Neuquén: Lácar
<i>C. cyanopygus</i>	MACN-En 8285	HALIC183–11	KC250742	635	F	Río Negro: Bariloche
<i>C. cyanopygus</i>	MACN-En 9767	HALIC262–12	KC617765	658	F	Neuquén: Lácar
<i>C. flammeus</i> n. sp.	MACN-En 8254	HALIC181–11	KC250736	658	M	Río Negro: Bariloche
<i>C. flammeus</i> n. sp.	MACN-En 9766	HALIC261–12	KC617772	658	M	Neuquén: Aluminé
<i>C. flammeus</i> n. sp.	MACN-En 9765	HALIC260–12	KC617773	658	M	Neuquén: Aluminé
<i>C. flammeus</i> n. sp.	MACN-En 9764	HALIC259–12	KC617771	658	M	Neuquén: Aluminé
<i>C. flammeus</i> n. sp.	MACN-En 9763	HALIC258–12	KC617777	658	M	Neuquén: Aluminé
<i>C. flammeus</i> n. sp.	MACN-En 9762	HALIC257–12	KC617776	658	M	Neuquén: Lácar
<i>C. flammeus</i> n. sp.	MACN-En 9761	HALIC256–12	KC617774	658	F	Neuquén: Lácar
<i>C. flammeus</i> n. sp.	MACN-En 9760	HALIC255–12	KC617775	658	F	Neuquén: Lácar
<i>C. flammeus</i> n. sp.	MACN-En 8292	HALIC187–11	KC250738	658	F	Neuquén: Huiliches
<i>C. flammeus</i> n. sp.	MACN-En 8256	HALIC186–11	KC250737	658	M	Río Negro: Bariloche
<i>C. galletue</i>	MACN-En 9753	HALIC248–12	KC617783	658	M	Neuquén: Aluminé
<i>C. galletue</i>	MACN-En 9759	HALIC254–12	KC617778	646	M	Neuquén: Aluminé
<i>C. galletue</i>	MACN-En 9758	HALIC253–12	KC617784	658	M	Neuquén: Aluminé
<i>C. galletue</i>	MACN-En 9756	HALIC251–12	KC617780	658	M	Neuquén: Aluminé
<i>C. galletue</i>	MACN-En 9755	HALIC250–12	KC617781	658	M	Neuquén: Aluminé
<i>C. opaciceps</i>	MACN-En 9746	HALIC241–12	KC617787	658	M	Neuquén: Aluminé
<i>C. opaciceps</i>	MACN-En 9747	HALIC242–12	KC617788	658	M	Neuquén: Aluminé
<i>C. opaciceps</i>	MACN-En 9749	HALIC244–12	KC617790	658	M	Neuquén: Lácar
<i>C. opaciceps</i>	MACN-En 9750	HALIC245–12	KC617791	658	M	Neuquén: Lácar
<i>C. opaciceps</i>	MACN-En 9752	HALIC247–12	KC617785	658	M	Neuquén: Lácar
<i>C. opaciceps</i>	MACN-En 8289	HALIC188–11	KC250733	658	F	Neuquén: Los Lagos
<i>C. opaciceps</i>	MACN-En 8260	HALIC180–11	KC250735	658	M	Río Negro: Bariloche
<i>C. opaciceps</i>	MACN-En 8275	HALIC189–11	KC250734	658	F	Neuquén: Los Lagos

## Systematics

### *Caenohalictus* Cameron

*Caenohalictus* Cameron 1903: 231. Type species: *Caenohalictus trichiothalmus* Cameron 1903, monobasic.

*Caenohalictus* is defined among the genera of Caenohalictina by the following combination of characters: Body metallic dark green or blue, sometimes with a reddish tint, rarely black; compound eyes with conspicuous hairs; mesoscutum reticulate (Fig. 1); dorsal surface of metapostnotum microareolate, finely striate in some species; compound eyes emarginate, inner orbits converging below; female with dark apical band of clypeus extending along the inner orbits, with very inconspicuous punctures, usually reaching the level of the antennal sockets; female with inner hind tibial spur pectinate; male with pygidial plate surrounded by a carina; male genital capsule ventrally concave, gonostylus developed into several processes, directed ventrally.

Gonçalves and Melo (2009) recovered two synapomorphies for the genus: T1 and T2 with lateral carinae present (Fig. 2), also on T3 in some species, and the male metapostnotum medially depressed. The lateral carinae, probably better described as sulci with slightly elevated margins (Fig. 2), are present on T1 and T2 in *Agapostemon chapadensis*, *A. nasutus*, *A. tyleri*, *Pseudagapostemon citricornis* and *P. pampeanus*, species that were studied by Gonçalves and Melo (2009), although they reported that the lateral carinae are restricted to T1 in these species. Gonçalves and Melo (2009) mentioned an S8 as long as wide as a synapomorphy of Caenohalictina. All the species examined herein had the S8 much broader than long, in contrast to the species of *Caenohalictus* they included. In this light, a revision including all the species of the genus and further studies about the genera related to *Caenohalictus* are needed to set new synapomorphies for this genus.

Rojas and Toro (2000) provided detailed descriptions for the species of *Caenohalictus* from Chile, as well as descriptions of the main features of the genital capsule of the male. Despite this, the illustrations of the capsules are difficult to interpret, and some steps in the key to the species for the females are hard to follow.

### Morphology of the genital capsule and hidden sterna

The species can be easily separated by several features of the genital capsule (Figs. 11–22, 39–50). Even though the capsule tends to distort slightly when clarified (even under low concentrations of potassium hydroxide), separating the gonocoxites, the structures can still be easily recognized. The gonocoxite is smooth in *C. opaciceps*, *C. galletue* and *C. autumnalis*, but it is longitudinally striate towards the sides in the remaining species studied. Its dorsal margin is smoothly angulate, but it forms a conspicuous tooth in *C. thamyris* (Fig. 45).

According to Michener (2007), the gonostylus in the Halictini is composed of two main structures, the dorsal and the ventral gonostylus. The correspondence of the structures recognized by Rojas and Toro (2000) with Michener's interpretation are as follows: the dorsal gonostylus is formed ventrally by the **main gonostylar lobe** (*mgl*), dorsally by the **outer gonostylar plate** (*ogp*), and mesially by the **inner gonostylar plate** (*igp*); the ventral gonostylus is formed by the **ventral plate** (*vp*) from which the **ventral apophysis** (*va*) arises basally.

The *igp* is a mesial structure that can bear short, specialized, flattened setae. It is barely developed in *C. galletue*, but when well developed, it can be easily seen both in dorsal and ventral views, as in *C. opaciceps* (Figs. 11–12) and *C. autumnalis* (Figs. 48–49). In most species the *igp* has a dorsal process. This process touches the penis valve, and even in some species it appears to clasp the valve, from which it can be easily separated (Figs. 42). This process is slender and it can end in either a rounded or an acute apex. *Caenohalictus thamyris* is the only species with two such processes (Fig. 45). The penis valve dorsally broadens, with an outer basal tooth in some species such as *C. flammeus* n. sp. and *C. iodurus* (Fig. 39).

The *mgl* is a swollen lobe usually bearing short setae (Fig. 12). This structure is typically half-moon shaped, rounded in *C. galletue* (Fig. 15) and strongly concave in *C. cyanopygus* (Fig. 18).

The *ogp* covers the main gonostylar lobe dorsally, usually bearing setae on its outer margin (Fig. 11) sometimes arranged in a row (Figs. 17–19, 39–41). This plate is poorly developed dorsally in *C. galletue* (Fig. 14) but it can be greatly expanded, with an inner preapical angle in *C. cyanopygus* (Fig. 17) and *C. thamyris* (Fig. 45). The setae on the outer margin are finely plumose apically, and can be from short, directed caudally, to fairly long, intersecting the ones of the opposite gonostylus, as sometimes occurs in *C. cyanopygus* and *C. iodurus*.

The *vp* is similarly produced in all species but slightly displaced laterally in *C. cyanopygus* (Fig. 18).

The *va* is a process that differs greatly in length and shape among the species, from a slender, short structure in *C. opaciceps* (Fig. 13), rather flattened and very prolonged in *C. autumnalis* (Fig. 50), to flattened with its apical half tapering in *C. turquesa* (Fig. 44).



S7 and S8 can be detached, and do not differ greatly among most species examined herein. S7 consist in a broad, curved structure, with a median short process, usually rounded but slightly acute in *C. autumnalis*. S8 is rather short. In *C. opaciceps* S8 is five times broader than long (approximately three times broader than long in other species). S8 in *C. thamyris* differs from other species in the acute, lateral, apical processes. Rojas and Toro (2000) provided illustrations of these structures for some species. The S8 of most species distributed in Argentina matches either figure 32 or 33 of Rojas and Toro, *C. opaciceps* figure 34 and *C. thamyris* figure 38 (Rojas & Toro 2000).

## Distribution

In Argentinean Patagonia the species of *Caenohalictus* show three patterns of distribution (Figs. 63–64). Four species (*C. opaciceps*, *C. galletue*, *C. cyanopygus*, and *C. flammeus n. sp.*) occur only in the humid to perhumid regions of southwestern Neuquén, western Río Negro and northwestern Chubut. *Caenohalictus opaciceps* and *C. cyanopygus* were collected very frequently in field trips to the Argentinean National Parks Lanín and Nahuel Huapi, as well as in a field study carried out near Parque Nacional Los Alerces in Chubut (Gravel 2010). Two other species (*C. iodurus* and *C. turquesa*) inhabit mainly arid to semiarid regions of Río Negro, Chubut and Santa Cruz, with a few records for the Andean forests of northwestern Santa Cruz. This group of species of the Patagonian steppe can also be found in high Andean areas of Mendoza. A third group is formed by species found in the *Larrea* deserts, with a broader distribution in central and western Argentina (*C. thamyris*, and *C. autumnalis*).

## DNA barcoding results

We obtained 34 DNA barcode sequences of lengths 635–658bp, with no ambiguous base pair in any sequence, for males and females of *C. cyanopygus*, *C. flammeus n. sp.* and *C. opaciceps*, and for males of *C. galletue* (Table I). All sequences had a similar GC% (26.31, SE = 0.08, min = 25.38, max = 26.77) with a high AT-bias in the third codon position (89.71, SE = 0.19, min = 88.6, max = 91.79). The base composition had values similar to those of the *Lasioglossum tegulare* species group (Gibbs 2009), although the distances within the genus were considerably higher in *Caenohalictus* (6.8–11.5%). The maximum intraspecific sequence diversity was 0.8% in *C. cyanopygus*, 0.2% in *C. flammeus n. sp.*, 0% in *C. galletue*, and 0.6% in *C. opaciceps*. The distance to the nearest neighbor was 6.8% in *C. cyanopygus* and *C. flammeus n. sp.*, 10.0% in *C. galletue*, and 9.5% in *C. opaciceps*. These species could then be separated by DNA barcode sequences as there is a clear distinction between intra and interspecific variation.

## Key to the species

### Males

1. Clypeus without creamy-yellow transverse apical band (Fig. 55). Labrum dark brown. Mandible without pre-apical tooth. S5 with a deep apical median notch (Fig. 4). Body length 7.5–8.0 mm ..... *C. thamyris*
- Clypeus with creamy-yellow transverse apical band. Labrum creamy-yellow. Mandible with pre-apical tooth. S5 unmodified (Fig. 3). Body length 5.0–6.5 mm ..... 2
2. Clypeus produced below the lower orbital tangent by at most 2/3 of its total length. Epistomal suture sometimes not well defined on lateral sides of clypeus and not forming a lobe ..... 3
- Clypeus produced under the lower orbital tangent by more than 2/3 of its total length. Epistomal suture forming distinct epistomal lobe producing into the clypeus ..... 7
3. Tarsi yellow. Compound eyes with whitish hairs ..... 4
- Tarsi brown. Compound eyes with brown hairs ..... 6
4. Scape creamy-yellow anteriorly (Fig. 57). Creamy yellow apical band occupying more than half length of clypeus ..... *C. autumnalis*
- Scape entirely brown. Creamy yellow apical band occupying less than half length of clypeus ..... 5
5. T1–T3 with scattered fine punctures, separated by more than 2PD, not easily seen (Fig. 5). Apical half of the mandible yellow. *Igp* well developed, with flattened setae (Fig. 12); *mgl* half-moon shaped (Fig. 12) ..... *C. opaciceps*

- T1–T3 with strong punctures, separated by 1–2 PD, easily seen (Fig. 6). Mandible with apex brown or yellow. *Igp* barely developed (Fig. 15); *mgl* globose (Fig. 15) ..... *C. galletue*
- 6. F2 as long as F1 and pedicel together, flagellum not crenulate. Mesoscutum usually red, with whitish hairs. Metapostnotum green ..... *C. flammeus n. sp.*
- F2 longer than F1 and pedicel together, flagellum crenulate. Mesoscutum green, with dark brown hairs. Metapostnotum bluish-green ..... *C. cyanopygus*
- 7. Malar area at most 1/3 as long as basal mandibular width (Fig. 53). Margin of *ogp* bearing 2–3 short setae (Figs. 42–44); *va* broad basally, distal half tapering (Fig. 44) ..... *C. turquesa*
- Malar area more than 1/3 as long as basal mandibular width (Fig. 51). Margin of *ogp* bearing 5–6 long, conspicuous setae (Figs. 39–41); *va* slender (Fig. 41) ..... *C. iodurus*

#### Females (Females of *C. galletue* not studied)

- 1. Body length 7.5–8.0 mm. Clypeus with apical setae crowded in middle, lateral lobes large (Fig. 30). Metapostnotum finely striate (Fig. 7) ..... *C. thamyris*
- Body length 5.0–7.0 mm. Clypeus with apical setae evenly distributed (Fig. 31), if crowded in the middle then lateral lobes small. Metapostnotum imbricate (Fig. 8) ..... 2
- 2. T3–T4 with marginal zones glabrous, at most a few hairs scattered on the sides (Fig. 9). Compound eyes and mesoscutum with dark brown hairs ..... 3
- T3–T4 with hairy marginal zones hairy (Fig. 10). Compound eyes and mesoscutum with light brown to whitish hairs ..... 4
- 3. Hind tibial spur with 2–4 long teeth (Fig. 34). Mesoscutum always red. Metapostnotum green ..... *C. flammeus n. sp.*
- Hind tibial spur with 3–4 very short teeth (Fig. 33). Mesoscutum green. Metapostnotum blue or bluish-green ... *C. cyanopygus*
- 4. Clypeus with brown apical transverse band. Legs light brown, inner side of tibia I yellowish brown. Compound eyes with hairs shorter than 1/3 MOD ..... *C. autumnalis*
- Clypeus with black apical transverse band. Legs black to dark brown, tibia I brown to dark brown. Compound eyes with hairs longer than 1/3 MOD ..... 5
- 5. Lower paracocular area with fine punctures, separated by 3–4 PD. Mesoscutum green. Compound eyes with hairs shorter than MOD ..... *C. opaciceps*
- Lower paracocular area with strong punctures, separated by 0.5–1 PD. Mesoscutum red. Compound eyes with hairs equal or longer than MOD ..... 6
- 6. Malar area 1/3 as long as basal mandibular width. Mid and hind basitarsi entirely brown to dark brown. Metasomal terga usually with no more than the apical quarter of the marginal zone translucent ..... *C. iodurus*
- Malar area at most 1/4 as long as basal mandibular width. Mid and hind basitarsi light brown or yellow with a dark brown spot in the center of the outer side. Metasomal terga with apical half of the apical band translucent ..... *C. turquesa*

#### *Caenohalictus opaciceps* (Friese)

(Figs. 2, 3, 5, 10, 11–13, 23–24, 31–32)

*Halictus* (*Paragapostemon*) *scitulus* Vachal 1903: 99, 124. Lectotype: female, Chile. Muséum National d'Histoire Naturelle, Paris [Junior primary homonym of *Halictus scitulus* Smith 1873]. Designated by Moure & Hurd, 1987: 182.

*Halictus opaciceps* Friese 1916: 560. Syntypes: male, female. Chile, Concepción. Museum für Naturkunde der Humboldt Universität, Berlin.

*Caenohalictus opaciceps*: Alfken 1932: 656, 658, 659.

**Diagnosis.** *Caenohalictus opaciceps* can be distinguished by the following combination of features: male with clypeus clearly produced under the lower orbital tangent by 0.55 to 0.66 of its total length; tarsus and apical half of the mandible yellow and scape brown; S8 five times broader than long. Male genital capsule (Figs. 11–13): *igp* wide, reaching the penis valve dorsally, entirely covered by short, flattened, truncate, specialized setae; penis valve without outer basal tooth; *ogp* with short, simple setae; *mgl* half-moon shaped; *va* slender, short. Female T3–T4 with hairy marginal zone and compound eyes with whitish hairs as long as 1/2 MOD.

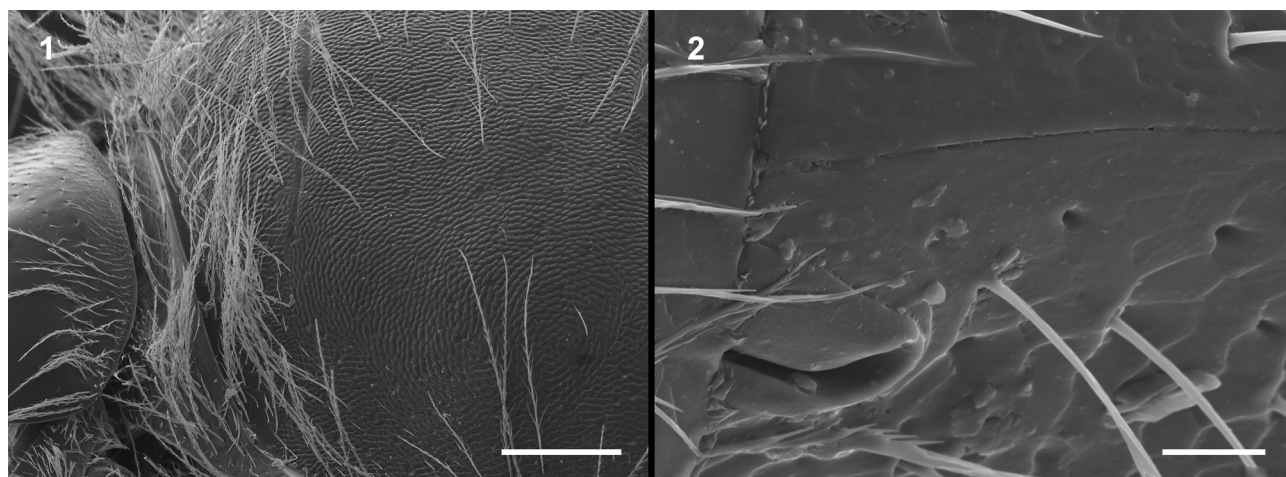
**Variation.** There is variation in color in the pygidial plate of the male, from dark to light brown, also reported by Rojas and Toro (2000). A few male specimens had a weakly striate metapostnotum. None of the female specimens examined had yellow on the mandibles, labrum, tegulae or legs, as would be expected based upon the identification key of Rojas and Toro (2000); all these structures were brown. One of us (RAGV) has studied a specimen from Valparaíso identified by F. Rojas as *C. opaciceps*, housed at PCYU. This specimen has the same color pattern as the ones from Argentina included in the present study, suggesting a possible mistake in the key.

**Comments.** This species, along with *C. cyanopygus*, represents the most frequently collected species of the genus in the field trips performed. Within a few minutes 103 male specimens were collected near Lago Lolog; they were on

flowers of *Matricaria inodora* among several specimens of *Sphecodes* sp. (Halictini: Sphecodina) (7–Feb–2012). Other plants visited by this species: Anacardiaceae: *Lithraea caustica*; Apiaceae: *Eryngium* sp.; Asteraceae: *Baccharis rhetinodes*, *Chrysanthemum* sp., *Hypochaeris* sp., *Taraxacum officinale*; Buddlejaceae: *Buddleja* sp.; Ericaceae: *Gaultheria* sp.; Escalloniaceae: *Escallonia virgata*, *Escallonia* sp.; Fabaceae: *Adesmia* sp., *Trifolium repens*; Loasaceae: *Blumenbachia* sp.; Onagraceae: *Oenothera* sp.; Rhamnaceae: *Discaria articulata*, *D. chacaye*, *D. trinervis*.

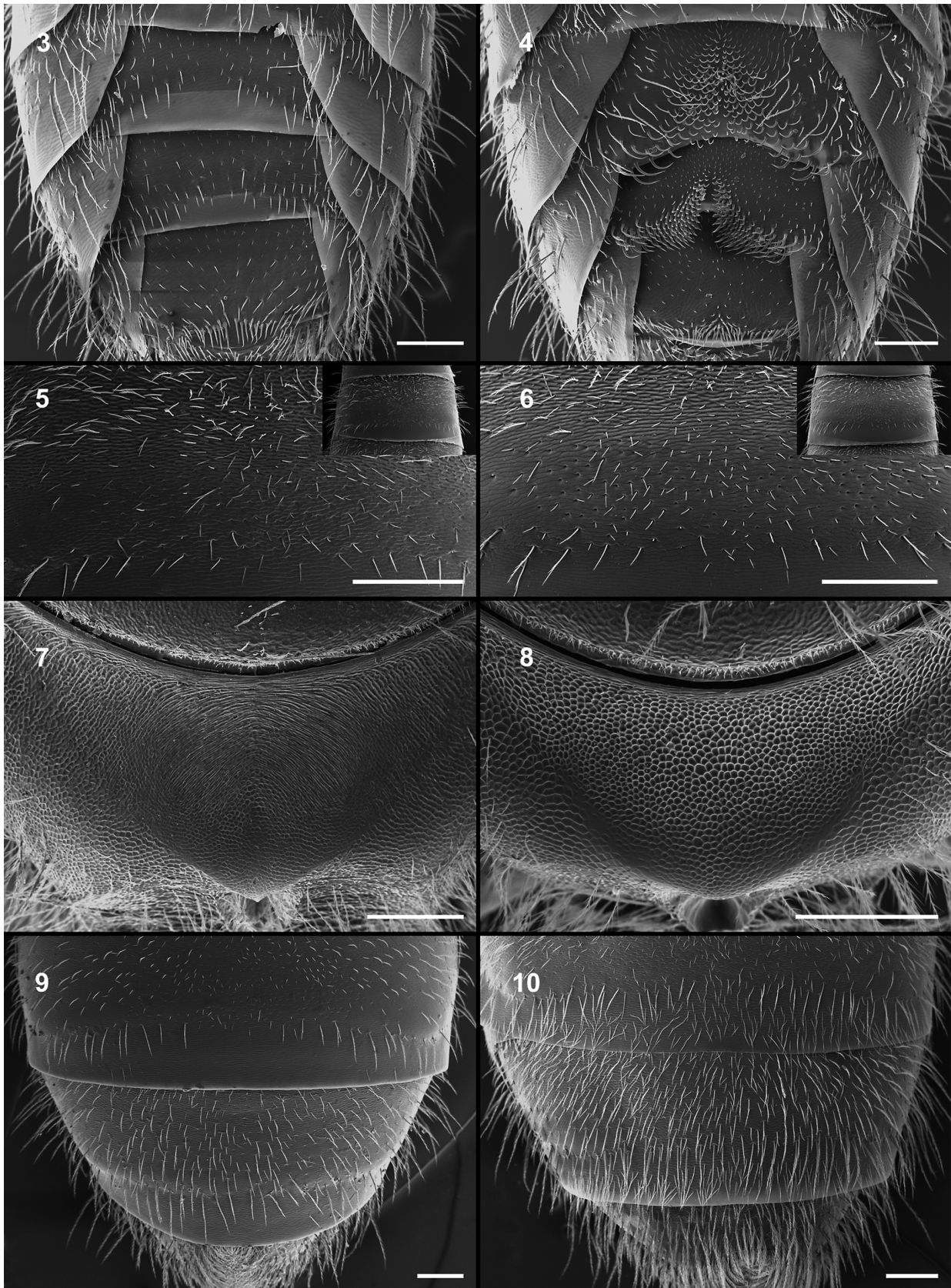
**Distribution in Argentinean Patagonia.** Humid regions of southwestern Neuquén and Río Negro. Also found in Chile: from Atacama to Bío Bío.

**Examined material. ARGENTINA: Neuquén:** 3M 1F, Villa Pehuenia, 27–I–2012, R. González Vaquero (MACN). 1M, Junín de los Andes, 2–II–2012, R. González Vaquero (MACN). 1M, Junín de los Andes, 16–II–2007, L. Compagnucci (MACN). 1M, Lanín: Camping Nonthué, 3–II–2012, R. González Vaquero (MACN). 3M, Lanín: Lago Lácar, 2–II–2012, R. González Vaquero (MACN). 102M, Camino Lagos Lolog-Curruhué, 7–II–2012, R. González Vaquero (MACN). 1M, Camino Lagos Lolog-Curruhué, 7–II–2012, R. González Vaquero (IADIZA). 2M, Cabecera E Lago Lolog, 6–II–2012, R. González Vaquero (MACN). 1M, San Martín de los Andes, 20–III–1964 (MACN). 2M, San Martín de los Andes, 8–III–1955, A. Ogloblin (MLPA). 2F, 8k N San Martín de los Andes 1000m, 16/22–XI–1997, Malaise trap, C. & M. Vardy (MACN). 1F, 8k N San Martín de los Andes 1000m, 16/22–XI–1997, Malaise trap, C. & M. Vardy (BMNH). 1F, 8k N San Martín de los Andes 900–1000m, 16/22–XI–1997, C. & M. Vardy (BMNH). 1F, 2k S San Martín de los Andes Quitrahue 820m, 17–XI–1997, C. & M. Vardy (BMNH). 8F, Nahuel Huapi: Cuyín Manzano, 19/21–XII–2010, Compagnucci & González Vaquero (MACN). 3F, Nahuel Huapi: Confluencia, 22–XII–2010, Compagnucci & González Vaquero (MACN). 3F, Nahuel Huapi: Confluencia, 14–XII–2001, Medán, Montaldo & Devoto (FAUBA). 2F, Nahuel Huapi: Cabecera E Lago Huechulafquen, 15–XII–2010, Compagnucci & González Vaquero (MACN). 1F, Nahuel Huapi: Cabecera E Lago Huechulafquen, 16–XII–2003, Medán, Devoto & Torretta (FAUBA). 7F, Nahuel Huapi: Cabecera E Lago Huechulafquen, XII–1997, D. Medán (FAUBA). 5F, Nahuel Huapi: La Lipela, 9/12–XII–2000, Medán, Montaldo & Devoto (FAUBA). 2F, Nahuel Huapi: Villa Trafal, 10–XII–2001, Medán, Montaldo & Devoto (FAUBA). 1M, Nahuel Huapi: Isla Victoria, I–1943 (MLPA). 6F, Near Nahuel Huapi –41.02984 –71.312778, 927m, 24–I–2007, vane trap, L. Packer (PCYU). **Río Negro:** 1M, Nahuel Huapi: Valle del Challhuaco, 2–II–2011, R. González Vaquero (MACN). 1M, Nahuel Huapi: NO Lago Gutiérrez, 25–I–2011, R. González Vaquero (MACN). 5F, Bariloche, XII–1964, A. Giai (MACN). 2F, Bariloche Ñireco, III–1953, A. Ogloblin (MLPA). 1F, Pichileufú 30 km E Bariloche, XI–1964, A. Giai (MACN). 2M, El Bolsón, 1–II–2011, R. González Vaquero (MACN). 1M, Cholila, I–1965, A. Giai (MACN). 3M, Ñorquinco, 5–II–1994, A. Roig Alsina (MACN). **Chubut:** 2M, 6km NO El Maitén, 4–II–1994, A. Roig Alsina (MACN). 1F, INTA Trevelin, 2–XI–2006, A–I. Gravel (MACN). 2F, INTA Trevelin, 1–XI–2005/12–XII–2005, A–I. Gravel (PCYU). 1F, INTA Trevelin, 13–XII–2006, A–I. Gravel (PCYU). 1M 4F, INTA Trevelin, 1–XI–2005/16–II–2006, M.E. Hollmann (PCYU). **CHILE: Coquimbo:** 1F, Chañar, –30.2865 –70.6338, 11–X–2009, J. Gibbs (PCYU). 1F, Chañar, Los Lavadores, –30.2963 –70.62728, 10–IX–2010, L. Packer (PCYU). **Santiago Metropolitan Region:** 1M, Cerro El Roble, 28–XI–2011, González Vaquero & Mondaca (MACN). **Bío Bío:** 1M, Concepción Isla Quiriquina, M.R. Espinosa (MACN).



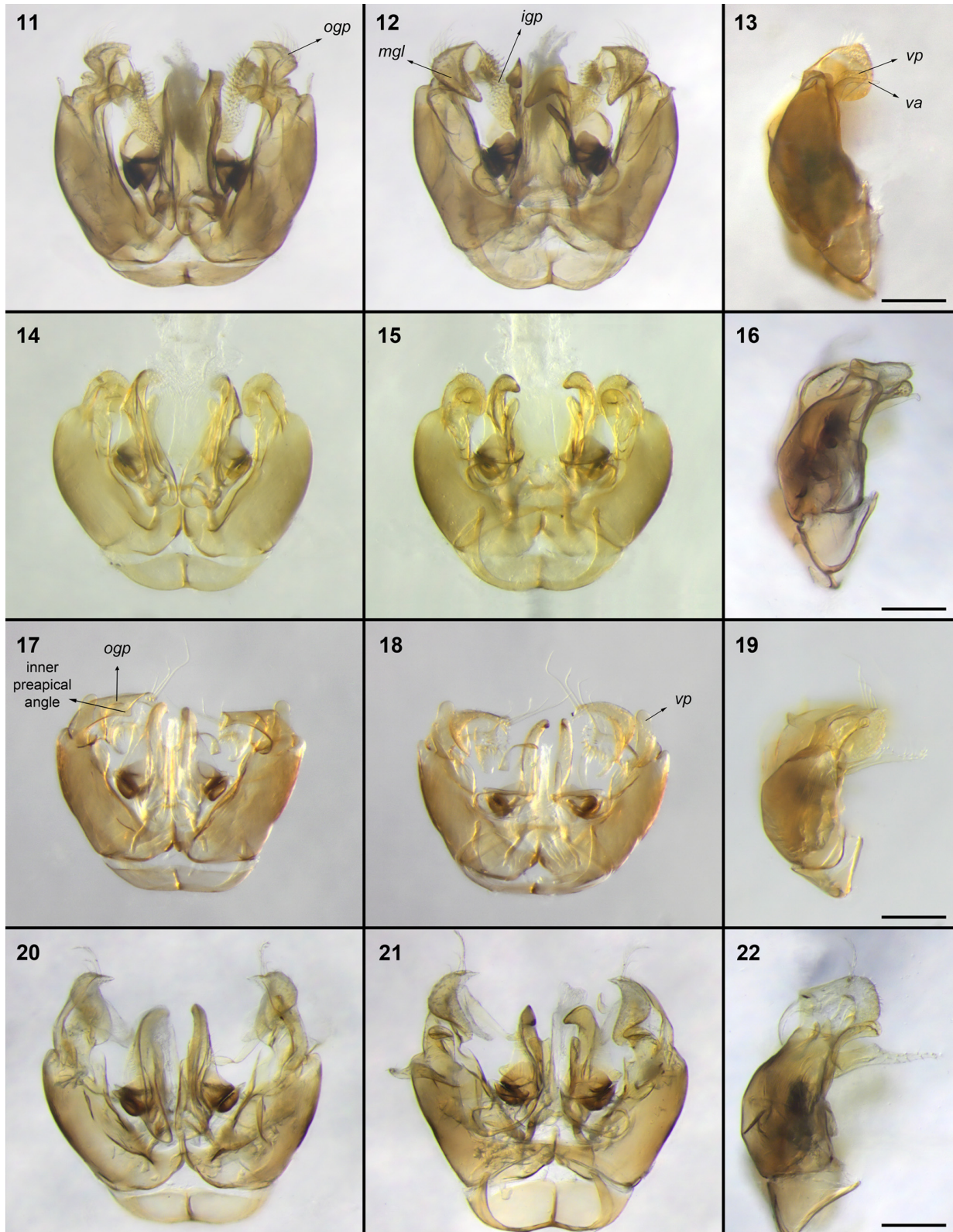
**FIGURES 1–2.** 1, mesoscutum of *C. thamyris*, male. 2, lateral sulcus of T2 of *C. opaciceps*, male. Scale 1, 200  $\mu\text{m}$ ; 2, 20  $\mu\text{m}$ .





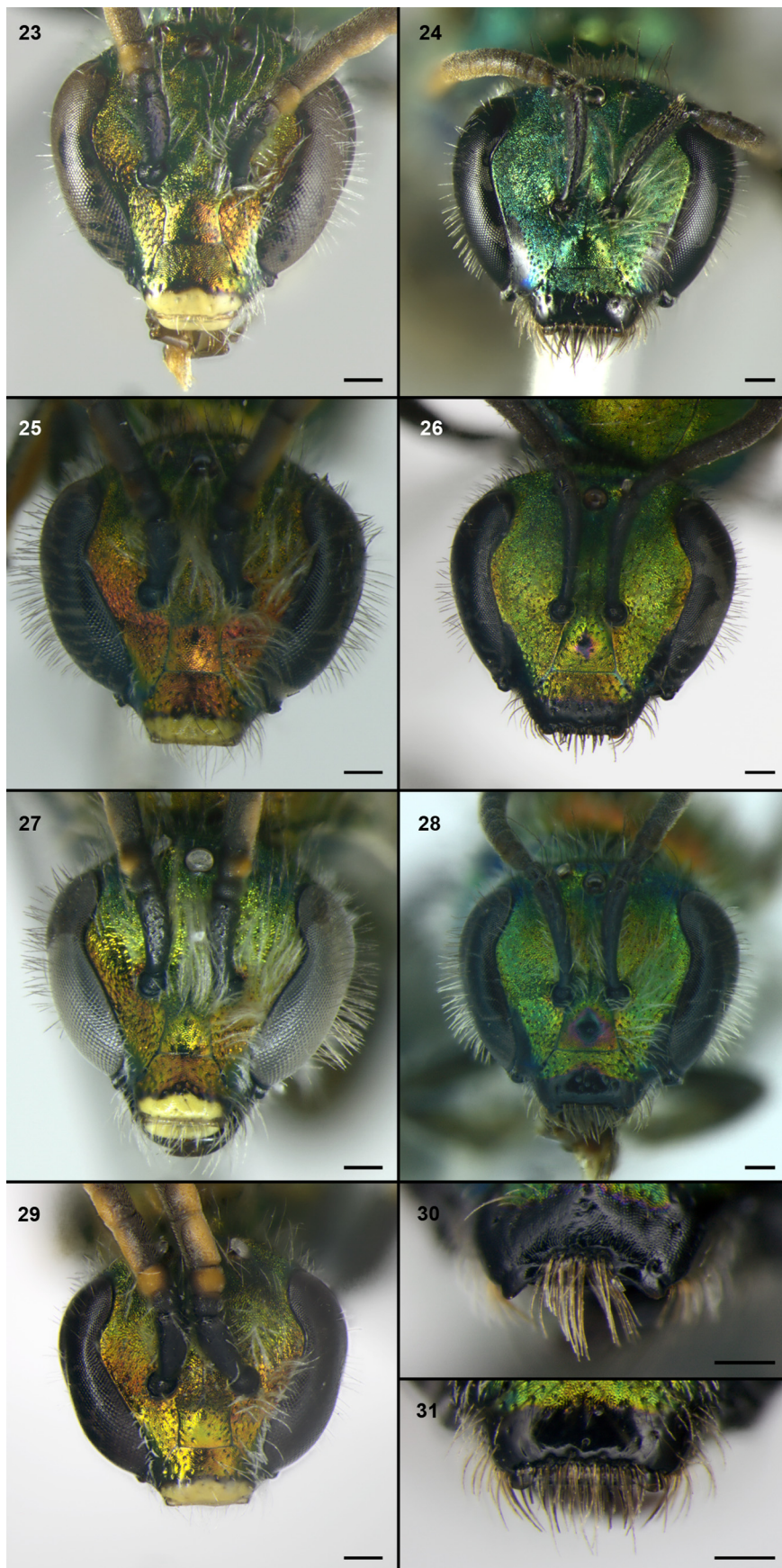
**FIGURES 3–10.** 3–4, S4–6, male: 3, *C. opaciceps*; 4, *C. thamyris*. 5–6, disc of T2, male: 5, *C. opaciceps*; 6, *C. galletue*. 7–8, metapostnotum, female: 7, *C. thamyris*; 8, *C. flammeus* n. sp. 9–10, marginal zones of T3–4, female: 9, *C. cyanopygus*; 10, *C. opaciceps*. Scale 200  $\mu$ m.



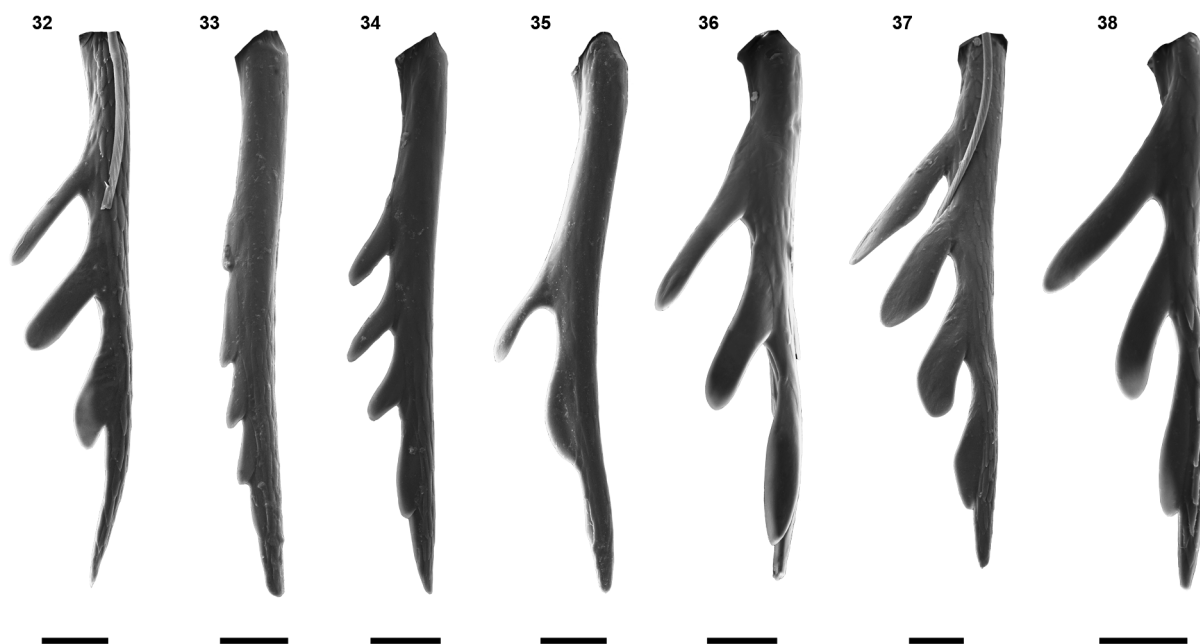


**FIGURES 11–22.** Genital capsule of the male. 11, 14, 17, 20 dorsal view. 12, 15, 18, 21 ventral view. 13, 16, 19, 22 lateral view. 11–13, *C. opaciceps*. 14–16, *C. galletue*. 17–19, *C. cyanopygus*. 20–22, *C. flammeus* n. sp. *Ogp*, outer gonostylar plate; *igp*, inner gonostylar plate; *mgl*, main gonostylar lobe; *vp*, ventral plate; *va*, ventral apophyses. Scale 200  $\mu$ m.





**FIGURES 23–31.** 23–29 Head. 23, 25, 27, 29 male. 24, 26, 28 female. 23–24, *C. opaciceps*. 25–26, *C. cyanopygus*. 27–28, *C. flammeus* n. sp. 29, *C. galletue*. 30–31 clypeus, female. 30, *C. thamyris*. 31, *C. opaciceps*. Scale 200  $\mu$ m.



**FIGURES 32–38.** Hind tibial spur of the female. 32, *C. opaciceps*. 33, *C. cyanopygus*. 34, *C. flammeus* n. sp. 35, *C. iodurus*. 36, *C. turquesa*. 37, *C. thamyris*. 38, *C. autumnalis*. Scale 50  $\mu$ m.

### *Caenohalictus galletue* Rojas & Toro

(Figs. 6, 14–16, 29)

*Caenohalictus galletue* Rojas & Toro 2000: 175–176. Holotype: male. Chile, Malleco, Termas de Manzanares. Museo Nacional de Historia Natural, Santiago.

**Diagnosis.** This species is very similar to *C. opaciceps*, with which it is sympatric. It can be distinguished by the less produced clypeus (Fig. 29) and the strong punctures of T1–T3 separated by 1–2 PD in the male (Fig. 6). Male genital capsule (Figs. 14–16): *igp* scarcely developed, slightly produced dorsally but not reaching the penis valve; penis valve without outer basal tooth; *ogp* with a few scattered short setae; *mgl* rounded, small; *va* slender, short. Unfortunately we do not have any females of this species, but according to the key of Rojas and Toro (2000) they can be identified by the weakly carinate pronotal lobe and the dark marginal zones of the terga, shiny greenish medially.

**Variation.** As in many *Caenohalictus* species, *C. galletue* varies in color, with the mandible of the male with either brown or yellow apex.

**Comments.** One of the male specimens examined was from the same locality and date of the specimens studied by Rojas and Toro (2000): “Malleco Chile/Cord. Lonquimay/2.ii.62 Lago Galletué” (MLPA). This species visits flowers of *Baccharis rhetinodes* (Asteraceae).

**Distribution in Argentinean Patagonia.** Humid regions of Western Neuquén. Also found in Chile: Maule, Bío Bío and La Araucanía.

**Examined material.** ARGENTINA: Neuquén: 4M, Lago Moquehue, 28–I–2012, R. González Vaquero (MACN). 1M, Lago Moquehue, 3–II–2012, J.P. Torretta (FAUBA). 3M, Villa Pehuenia, 27–I–2012, R. González Vaquero (MACN). CHILE: La Araucanía: 1M, Lonquimay Lago Galletué, 2–II–1962 (MLPA).

***Caenohalictus cyanopygus* Rojas & Toro**

(Figs. 9, 17–19, 25–26, 33, 59)

*Caenohalictus cyanopygus* Rojas & Toro 2000: 182–183. Holotype: male. Chile, Valparaíso, Cuesta de Pucalán. Museo Nacional de Historia Natural, Santiago.

**Diagnosis.** This striking species can be separated by two unique features: the long, crenulate male antenna, with F2 longer than F1 and pedicel together, and the hind tibial spur of the female, which has very short teeth (Fig. 33). The creamy-yellow markings of the male are limited to the apical band of the clypeus, labrum, front of the tibia I and anterior surface of the flagellum. This species has broad black apical bands on the terga of the male, compound eyes with dark brown hairs, vertex and mesoscutum with dark scattered hairs, head and mesosoma shiny green, and metapostnotum usually blue. Male genital capsule (Figs. 17–19): *igp* covered by several short, specialized setae, slender dorsal process with an acute apex, reaching the penis valve; penis valve with an outer basal tooth; *ogp* with 3–4 long setae, finely plumose apically, that overlap those of the opposite gonostylus, plate with an acute inner apical angle dorsally; *mgl* strongly concave; *vp* slightly displaced towards the sides; *va* slightly compressed, with its apical half tapering.

**Variation.** A few females have coppery highlights on the mesoscutum, but the rest displayed a common pattern: head and mesoscutum green, the rest of the mesosoma blue and metasoma blue or bluish-green.

**Comments.** Although Rojas and Toro (2000) reported a genital capsule similar to the one described herein, their figure 60 does not match their description mainly in the shape of the *mgl* and the length of the setae of the *ogp*. The following plants are visited by *C. cyanopygus*: Anacardiaceae: *Schinus patagonicus*; Asteraceae: *Baccharis obovata*, *B. rhotinodes*, *Carduus thoermeri*, *Chrysanthemum* sp., *Hypochaeris radicata*, *Solidago chilensis*, *Taraxacum officinale*; Berberidaceae: *Berberis darwinii*; Boraginaceae: *Phacelia secunda*, *Phacelia* sp.; Buddlejaceae: *Buddleja globosa*; Elaeocarpaceae: *Aristotelia chilensis*; Escalloniaceae: *Escallonia alpina*, *E. virgata*; Fabaceae: *Cytisus scoparius*, *Lathyrus magellanicus*, *Medicago lupulina*, *Trifolium repens*; Geraniaceae: *Geranium* sp.; Grossulariaceae: *Ribes magellanicum*; Oxalidaceae: *Oxalis* sp.; Proteaceae: *Lomatia hirsuta*; Rhamnaceae: *Discaria articulata*, *D. chacaye*; Rosaceae: *Malus* sp.; Thymelaeaceae: *Ovidia andina*; Verbenaceae: *Diostea juncea*.

**Distribution in Argentinean Patagonia:** Humid to perhumid regions of southwestern Neuquén, western Río Negro and northwestern Chubut. Also found in Chile: from Valparaíso to Aysén.

**Examined material. ARGENTINA: Neuquén:** 4M, Lago Moquehue, 28–I–2012, R. González Vaquero (MACN). 1M, Junín de los Andes, 7–III–1955 (MLPA). 2M, Lanín: Pucará, I–1953, Schajovskoi (MACN). 1F, Lanín: Pucará, XII–1953, Schajovskoi (MACN). 1M, Lanín: Pucará, 25–I–1973, Schajovskoi (MACN). 4F, Lanín: Pucará, XI–1951, Schajovskoi (MLPA). 2F, Lanín: Pucará, XI/XII–1952, Schajovskoi (MLPA). 3F, Lanín: Pucará, 15–XI–1955, Schajovskoi (MLPA). 3M, Lanín: Pucará, I–1973, Fritz (MLPA). 1M, Lanín: Pucará, 22–I–1957, A. Ogloblin (MLPA). 1M, Lanín: Boquete del Lago Lolog, 25–IV–1964 (MACN). 2M 1F, Lanín: Lago Queñi, 19–II–2007, L. Compagnucci (MACN). 8F, Lanín: Lago Queñi, 10/12–XII–1999, Montaldo, Devoto & Gleiser (FAUBA). 2F, Lanín: Hua Hum, 18–XII–2010, Compagnucci & González Vaquero (MACN). 1F, Lanín: Margen N Lago Lácar, 18–XII–2010, Compagnucci & González Vaquero (MACN). 6F, Lanín: Lago Tromen 996m, 13–I–2003, G. Debandi (FAUBA). 2F, Lanín: Cabecera E Lago Tromen, 10/14–XII–1998, Roitman, Montaldo & Devoto (MACN). 3F, Lanín: Cabecera SE Lago Tromen, 12–XII–2003, Medán, Devoto & Torreta (FAUBA). 2M, Camino Lagos Lolog–Curruhué, 7–II–2012, R. González Vaquero (MACN). 1F, Cabecera E Lago Lolog, 6–II–2012, R. González Vaquero (MACN). 1M, San Martín de los Andes, IV–1964 (MACN). 1M, San Martín de los Andes, 30–III–1964, M. Gentili (MACN). 1M, San Martín de los Andes, 7–I–1941, M. Bridarolli (MLPA). 1M, San Martín de los Andes, 25–III–1954 (MLPA). 1F, 8k N San Martín de los Andes 1000m, 16/22–XI–1997, C. & M. Vardy (BMNH). 3F, Chapelco 1000m, 28–XII–1951, Schajovskoi (MLPA). 2F, Nahuel Huapi: Puerto Arrayán, 20–XII–2010, Compagnucci & González Vaquero (MACN). 3F, Nahuel Huapi: Villa Traful, 9/10–XII–2001, Medán, Montaldo & Devoto (FAUBA). 2F, Nahuel Huapi: Villa Traful, 17–XII–2002, Devoto & Torretta (FAUBA). 3F, Nahuel Huapi: Villa Traful, 17–I–2003, M. Devoto (FAUBA). 1F, Nahuel Huapi: Quetrihué, 25–X–1999, D. Vázquez (MACN). 1F, Nahuel Huapi: Villa La Angostura, 10–I–2007, P. Turienzo (MACN). 7M 1F, Nahuel Huapi: Isla Victoria, I–1943, F. Monrós (MLPA). 3F, Nahuel Huapi: Isla Victoria, 1943 (MLPA). 1F, Nahuel Huapi: Isla Victoria, 15–II–1949, W. Wittmen (MLPA). **Río Negro:** 5M 2F, Nahuel Huapi (MACN). 10M 1F, Nahuel Huapi: Valle del Challhuaco, 24/I–2/II–2011, R. González Vaquero (MACN). 1M, Nahuel Huapi: Cerro



Catedral 1359m, 26-I-2011, R. González Vaquero (MACN). 1M, Nahuel Huapi: Pampa Linda, 31-I-2011, R. González Vaquero (MACN). 1M, Nahuel Huapi: Lago Los Moscos, 28-I-2011, R. González Vaquero (MACN). 1F, Nahuel Huapi: Lago Mascardi, 21-X-1999, D. Vázquez (MACN). 1M, Bariloche Ñireco, III-1953, A. Ogloblin (MLPA). **Chubut:** 3M, INTA Trevelin, 25-I-2006/14-II-2006, A-I. Gravel (MACN). 1M, INTA Trevelin, 25-I-2006/14-II-2006, A-I. Gravel (IADIZA). 24M 117F, INTA Trevelin, 24-X-2005/16-II-2006, A-I. Gravel/M.E. Hollmann (PCYU). 1M 2F, INTA Trevelin, 22-XI-2006/3-II-2007, A-I. Gravel (MACN). 20M 58F, INTA Trevelin, 2-XI-2006/17-II-2007, A-I. Gravel/MIK. Gravel (PCYU). 4M, INTA Trevelin, 1-II-2006, M.E. Hollmann (MACN). 3M 16F, INTA Trevelin, 31-X-2005/14-II-2006, M.E. Hollmann (PCYU). 2M 1F, INTA Trevelin, 7/19-I-2007, R. González Vaquero (MACN). 15M 3F, Lago Puelo: Near Intendencia 205m, 31/XII-6/I-1998, Malaise trap, C. & M. Vardy (MACN). 59M 2F, Lago Puelo: Near Intendencia 205m, 31/XII-6/I-1998, Malaise trap, C. & M. Vardy (BMNH). 6M 6F, Lago Puelo: Near Intendencia 205m, 31/XII-6/I-1998, yellow pan trap, C. & M. Vardy (BMNH). 1F, Los Alerces: Lago Futalaufquen Forest track 500m, 14-XII-1997, C. & M. Vardy (MACN). 1F, Los Alerces: Lago Futalaufquen 520m, 13/18-XII-1997, Malaise trap, C. & M. Vardy (BMNH). 1F, Los Alerces: Villa Futalaufquen 520m, 13/18-XII-1997, C. & M. Vardy (BMNH). 1F, Los Alerces: Río Desaguadero 2k NE Villa Futalaufquen 520m, 18-XII-1997, yellow pan trap, C. & M. Vardy (BMNH). 3M, Los Alerces: Puerto Limonao, II-1959 (MLPA).

**CHILE: Los Lagos:** 1M, Chiloé Islotes de Puñihuil, 5-II-2001, C. Domínguez (IADIZA).

***Caenohalictus flammeus* n. sp.**

(Figs. 8, 20–22, 27–28, 34, 60)

*Caenohalictus thauca*: Rojas & Toro, 2000: 184–185 (Not Schrottky 1909, misidentification).

**Diagnosis.** This species is easily distinguished by its shiny red mesoscutum, a bit faded or with green or coppery highlights in some males, and the compound eyes with brown hairs. Females have T3–T4 with a hairless marginal zone (as in Fig. 9), at most with a few hairs scattered on the sides, an unusual feature displayed only by this species and *C. cyanopygus*. The hind tibial spur is similar to that of *C. opaciceps*, but the teeth are rather parallel-sided instead of having a paddle-like shape (Fig. 34). Male genital capsule (Figs. 20–22): see description below.

**Description.** Male (holotype). Length, 5.8 mm; forewing length, 4.7 mm (paratypes, length, 5.2–5.8 mm; forewing length, 4.4–4.7 mm).

**Color:** Head and mesosoma dark green with a metallic reddish tint on lower head area, mesoscutum, scutellum and metanotum. Following parts creamy-yellow: labrum, apical band of clypeus, anterior surface of flagellum and front of tibia I. Following parts dark brown to black: rest of antenna, malar area, mandible except reddish apex, tegula, legs and metasoma. Metasoma with a greenish tint on disk of terga. Wings light amber, with dark brown veins and pterostigma, base of costal vein light brown.

**Pubescence:** Whitish. Dark brown on compound eyes, lower area of face and frons. Compound eyes with hairs as long as MOD. Head with dense, short, plumose hairs on lower part of paraocular area; erect hairs on genal area as long as 1.7–2.5 times MOD; hairs on vertex as long as 2.3 times MOD. Thorax with plumose hairs on mesoscutum and scutellum (1.6–2.2 times MOD), longer on pleura and metanotum (up to 2.9 times MOD). Lateral side of propodeum with plumose hairs as long as 1.2–2.2 times MOD. Vestiture sparse on legs. Base of T1 with plumose hairs as long as 1–1.2 MOD. Terga with hairless marginal zones; disc of terga with very short erect simple hairs, as long as 0.2 times MOD, with slightly longer scattered plumose hairs, as long as 0.6 MOD; T2–T7 with some longer plumose hairs on lateral apical part, with their apices directed latero-posteriorly. S1 with plumose hairs up to 2.3 times MOD, shorter and very sparse on the following sterna.

**Sculpture:** Labrum impunctate. Clypeus with punctures separated by 1.5–2 PD, denser at sides, sparser apically. Lower paraocular area with punctation finer than that of clypeus, separated by 2–3 PD, sparser on supraclypeal area. Upper paraocular area with punctation even finer and sparser. Punctures on disc of mesoscutum, scutellum, pleura and propodeum separated by 6–7 PD; those on metanotum separated by 3–4 PD. Dorsal surface of metapostnotum and propodeum finely microareolate. Metasoma with fine, very sparse punctation. Surface between punctures equally reticulate throughout the body, slightly finer on metasoma; marginal zones on metasoma substrigulate.

**Structure:** Head slightly broader than long, 1.04:1 (paratypes, 1.01–1.05:1). Proportion of lower to upper interocular distance 0.67:1 (paratypes, 0.66–0.71). Labrum twice broader than long, with a short apical median process; apical margin bearing a row of setae. Clypeus broader than long, 1.54:1 (paratypes, 1.36–1.52:1). Proportion of interantennal to antennocular distance, 1.7:1 (paratypes, 1.49–1.71:1). Proportion of posterior interocelar to oculo-ocular distance, 1.03:1 (paratypes, 0.99–1.31:1). Proportion of length of scape, pedicel and first three flagellomeres 1.68:0.47:0.50:1.07:1 (paratypes, 1.53–1.78:0.40–0.61:0.43–0.61:1.01–1.22:1). Second flagellomere 1.74 times as long as its apical width (paratypes, 1.75–2.00). Pygidial plate apically rounded. S1 with a rounded apical median notch, the following sterna with their apical margin straight. S7 long and curved, with a median apical rounded process. S8 short, three times broader than long. Genital capsule (Figs. 20–22): *igp* reduced to a slender dorsal process with an acute apex, reaching the penis valve; penis valve with outer basal tooth; *ogp* not greatly expanded dorsally, with 3 setae, finely plumose apically; *mgl* half-moon shaped; *va* compressed, with its apical half tapering.

Female. Length, 5.6–5.9 mm; forewing length, 4.3–4.8 mm.

**Color:** dark green with a slightly golden tint on face, mesoscutum red. Black apical band of clypeus occupying more than half of its length, extending along the inner orbits up to level of antennal sockets. Sometimes disc of supraclypeal area dark purple. Following parts dark brown: labrum, mandible except reddish apex, scape, pedicel, posterior surface of flagellum, legs, sterna and marginal zone of terga. Anterior surface of flagellum light brown. Tegula translucent. Wings light amber with dark brown veins and pterostigma, base of costal vein light brown.

**Pubescence:** Whitish on paraocular area, gena, thorax except mesoscutum, and metasoma. Whitish to light brown on legs and T5. Dark brown on compound eyes, lower area of face, frons and mesoscutum. Compound eyes with hairs as long as MOD. Head with erect, plumose hairs; those on paraocular area and vertex as long as 1.7–2.9 times MOD; hairs on lower part of genal area 1.6–2.5 MOD. Thorax with plumose hairs on mesoscutum (0.8–1.4 times MOD), longer on pleura (2.1–2.8 times MOD) and metanotum (up to 2.1 times MOD). Lateral side of propodeum with very short, plumose hairs (0.2–0.3 times MOD) and intermixed longer hairs (up to 2.1 times MOD). Vestiture rather dense on legs. Terga with hairless marginal zones, at most a few hairs scattered on the sides of T3–T4; disc of terga with very short, erect hairs, laterally with some longer hairs with their apices directed latero-posteriorly. S2–S5 with long, simple hairs as well as rather long-barbed hairs, with their apices directed posteriorly.

**Sculpture:** Labrum with verrucose, median, basal elevation (Fig. 60). Lower paraocular area with strong punctures, separated by 1–2 PD. Base of clypeus with punctures separated by 2 PD, slightly sparser on supraclypeal area; rest of face with punctation finer and sparser. Punctures on disc of mesoscutum, metanotum, pleura and propodeum separated by 6–7 PD. Scutellum with fine scattered punctures, and coarse punctures, even sparser. Dorsal surface of metapostnotum finely microareolate as propodeum. T2–T3 with punctures separated by 2–3PD, much sparser on T1, T4 and T5. Surface between punctures reticulate throughout the body, finer on clypeus, supraclypeal area and metasoma; marginal zones on metasoma subtrigulate.

**Structure:** Head broader than long, 1.07–1.10:1. Proportion of lower to upper interocular distance 0.86–0.90:1. Clypeus broader than long, 1.77–1.91:1. Proportion of interantennal to antennocular distance, 0.65–0.71:1. Proportion of posterior interocelar to oculo-ocular distance, 1.07–1.16:1. Inner hind tibial spur pectinate, with two to four straight teeth, the one which is nearer the apex bent down to the axis (Fig. 34).

**Etymology.** This species is named *flammeus*, Latin word for fiery red, for the conspicuous, shiny red mesoscutum of the female.

**Comments.** Specimens of this species run, with some difficulties, to *C. thauca* in the key of Rojas and Toro (2000), a species name ascribed to Schrottky (1909) from Chubut. The original description of *Oxystoglossa thauca* mentions a green female with bluish reflections, terga with violaceous apical bands, and blue metasomal sterna. Schrottky describes a transverse carina bordering the posterior margin of the dorsal area of the metapostnotum, a feature absent in all the Chilean and Argentinean species of *Caenohalictus* seen by us. He also mentions a deep median sulcus on the mesoscutum and a total length of 7 mm. These features do not agree with the specimens studied by us, moreover, Schrottky does not mention a red mesoscutum, characteristic of *C. flammeus*. Moure (1944) and Rojas and Toro (2000) claimed to have studied the type of *thauca*, which nowadays seems to be lost (Rasmussen *et al.* 2009) and we have not been able to locate it. The identity of *Oxystoglossa thauca* remains doubtful, until the type is located, or specimens agreeing with the original description are found.



Plants visited by *C. flammeus* n. sp.: Anacardiaceae: *Lithraea caustica*; Asteraceae: *Baccharis rhetinodes*, *Hypochaeris radicata*, *Matricaria inodora*, *Taraxacum officinale*; Fabaceae: *Adesmia* sp.; Iridaceae: *Solenomelus* sp.; Nothofagaceae: *Nothofagus* sp.

**Distribution in Argentinean Patagonia.** Humid to perhumid regions of Southwestern Neuquén, western Río Negro and northwestern Chubut. Also found in Chile: Valparaíso, Santiago Metropolitan Region, Bío Bío and La Araucanía.

**Examined material. ARGENTINA:** Holotype male: Nahuel Huapi: Valle del Challhuaco –41.242972 –71.286694, 2–II–2011, R. González Vaquero, MACN–En 8254 (MACN). Paratypes: **Neuquén:** 3M, Lago Moquehue, 28–I–2012, R. González Vaquero (MACN). 3M, Villa Pehuenia, 27–I–2012, R. González Vaquero (MACN). 1F, Lanín: Puerto Arturo Lago Lolog, 6–II–2012, pan trap, R. González Vaquero (MACN). 1F, Lanín: Lago Curruhué Chico, 16–XII–2010, Compagnucci & González Vaquero (MACN). 1M 1F, Camino Lagos Lolog–Curruhué, 7–II–2012, R. González Vaquero (MACN). 4F, San Martín de los Andes Tr. Kura 1000m, 18/30–XI–1985, M. & P. Gentili (MACN). 1F, 8k N San Martín de los Andes 1000m, 16/22–XI–1997, Malaise trap, C. & M. Vardy (MACN). 2F, 8k N San Martín de los Andes 1000m, 16/22–XI–1997, Malaise trap, C. & M. Vardy (BMNH). 1F, 8k N San Martín de los Andes 900–1000m, 16/22–XI–1997, C. & M. Vardy (BMNH). 1F, Nahuel Huapi: Cabecera E Lago Huechulafquen, 15–XII–1997, Roitman & Montaldo (MACN). **Río Negro:** 3M, Nahuel Huapi: Valle del Challhuaco, 2–II–2011, R. González Vaquero (MACN). 1M, Ñorquinco, 7–I–1965, A. Gjai (MACN). **Chubut:** 1F, INTA Trevelin, 3–XI–2006, A–I. Gravel (PCYU). **CHILE: Santiago Metropolitan Region:** 1M, Cerro El Roble, 28–XI–2011, González Vaquero & Mondaca (MACN). **Valparaíso:** 1F, Cerro Las Vizcachas, 1/12–XII–1982, L. Peña (PCYU). **Bío Bío:** 4F, Las Trancas, Los Nirres, 3930ft, 11–XII–2006, L. Packer (PCYU). 1M, Ñuble, Las Trancas, SE Recinto, 1200m, I–1984, L. Peña (PCYU). **La Araucanía:** 1M, Lonquimay Lago Galletué, 2–II–1962 (MLPA). 1M, Lonquimay Lago Galletué, 2–II–1962, Valencia (MLPA). 2F, PN Nahuelbuta, Piedra del Aguila trail, 31–X–2001, Packer & Fraser (PCYU). 1F, PN Nahuelbuta, 3860ft, 6/9–I–2000, Webb & Yeates (PCYU).

### *Caenohalictus iodurus* (Vachal)

(Figs. 35, 39–41, 51–52)

*Halictus* (*Paragapostemon*) *iodurus* Vachal 1903: 123. Lectotype: male, Chile. Muséum National d'Histoire Naturelle, Paris.

Designated by Moure & Hurd, 1987: 180.

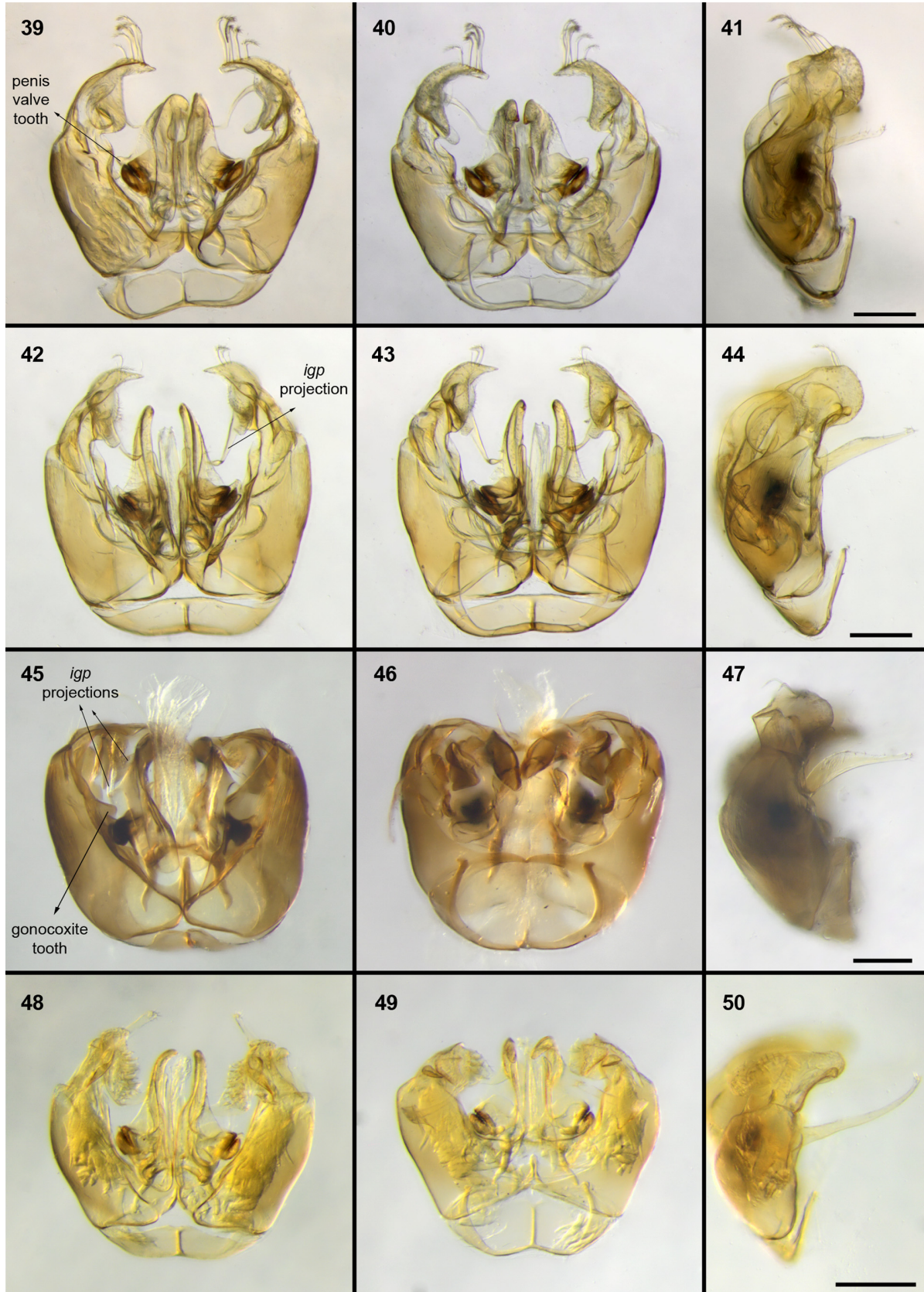
*Caenohalictus iodurus*: Michener 1979: 188.

**Diagnosis.** This species can be distinguished by its long malar area, longer than 1/3 of the mandibular width (Figs. 51–52), and the long whitish hairs scattered throughout the body. Although the male of *C. iodurus* can be separated from the male of *C. turquesa* by its longer malar area and features of the genital capsule, females of both species are difficult to separate. Females of *C. iodurus* also have a long malar area but the mid and hind basitarsi are entirely brown to dark brown. Male genital capsule (Figs. 39–41): *igp* slightly produced backwards, bearing a slender dorsal process with a rounded apex, which reaches the penis valve; penis valve with outer basal tooth; *ogp* with 4–5 long setae, finely plumose apically, that intersect those of the opposite gonostylus, plate with a smooth inner apical angle dorsally; *mgl* strongly concave; *va* slender, slightly compressed.

**Variation.** Rojas and Toro (2000) mentioned variation between specimens from Central Chile (Regions IV, VIII, IX and Santiago Metropolitan Region) and from Magallanes, in the extreme south of Chile. The specimens from Central Chile have compound eyes with dark hairs and differ in some features of the genital capsule of the male: they lack the outer basal tooth on the penis valve, and the slender dorsal process of *igp* ends in a sinuose apex, like the ones from Mendoza examined in this study. The males from the Patagonian steppe studied agree with those described by Rojas and Toro (2000) from Magallanes.

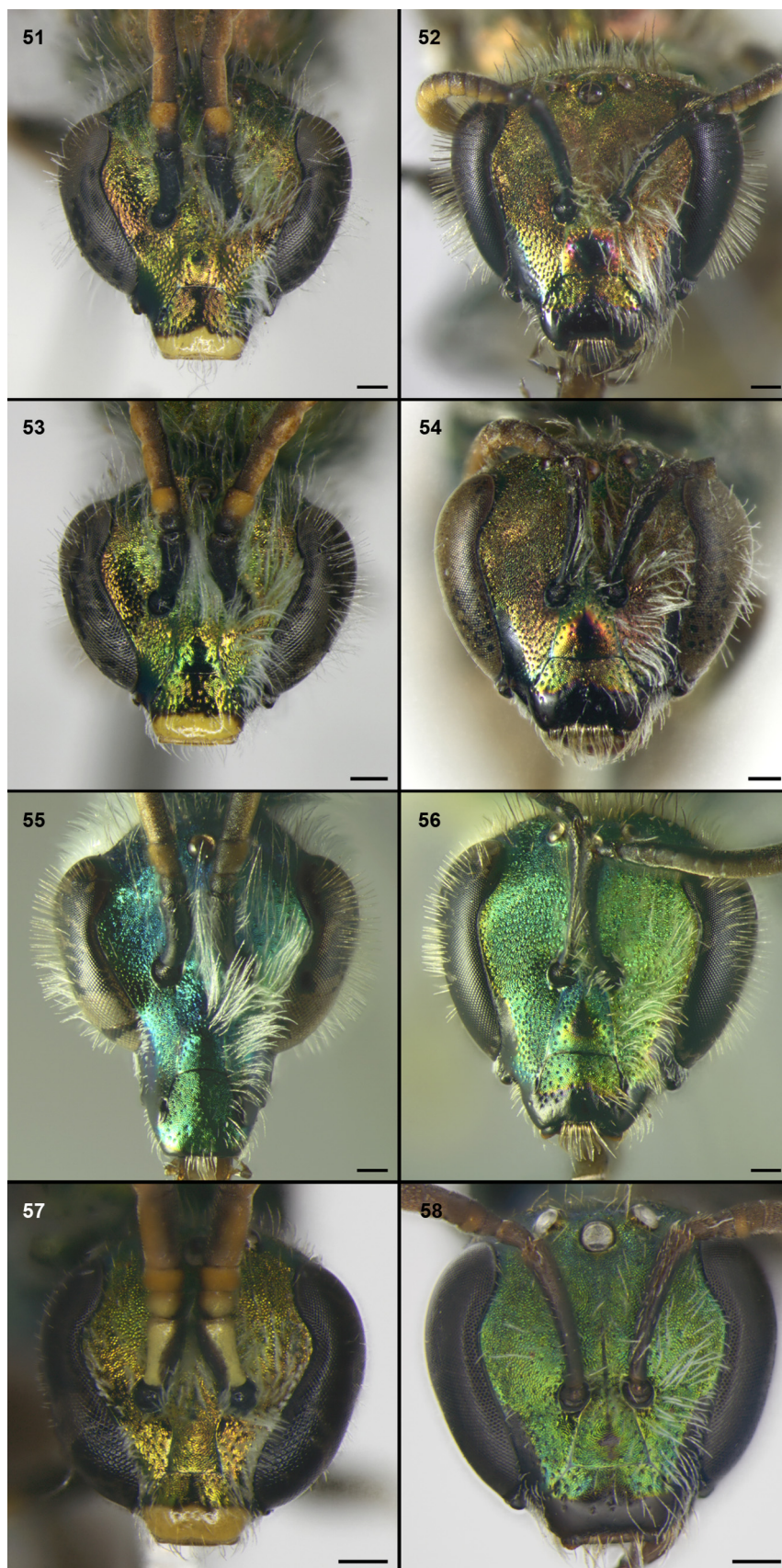
**Comments.** Females have the malar area as long as 1/3 of the mandibular width, and the mid and hind basitarsi are entirely brown to dark brown. Most specimens examined had no more than the apical quarter of the marginal zone of the terga translucent. Plants visited: unknown.

**Distribution in Argentinean Patagonia.** Arid to subhumid regions of Río Negro and western Santa Cruz. Also found in Mendoza (Argentina) and in Chile: Coquimbo, Santiago Metropolitan Region, Bío Bío, La Araucanía and Magallanes.



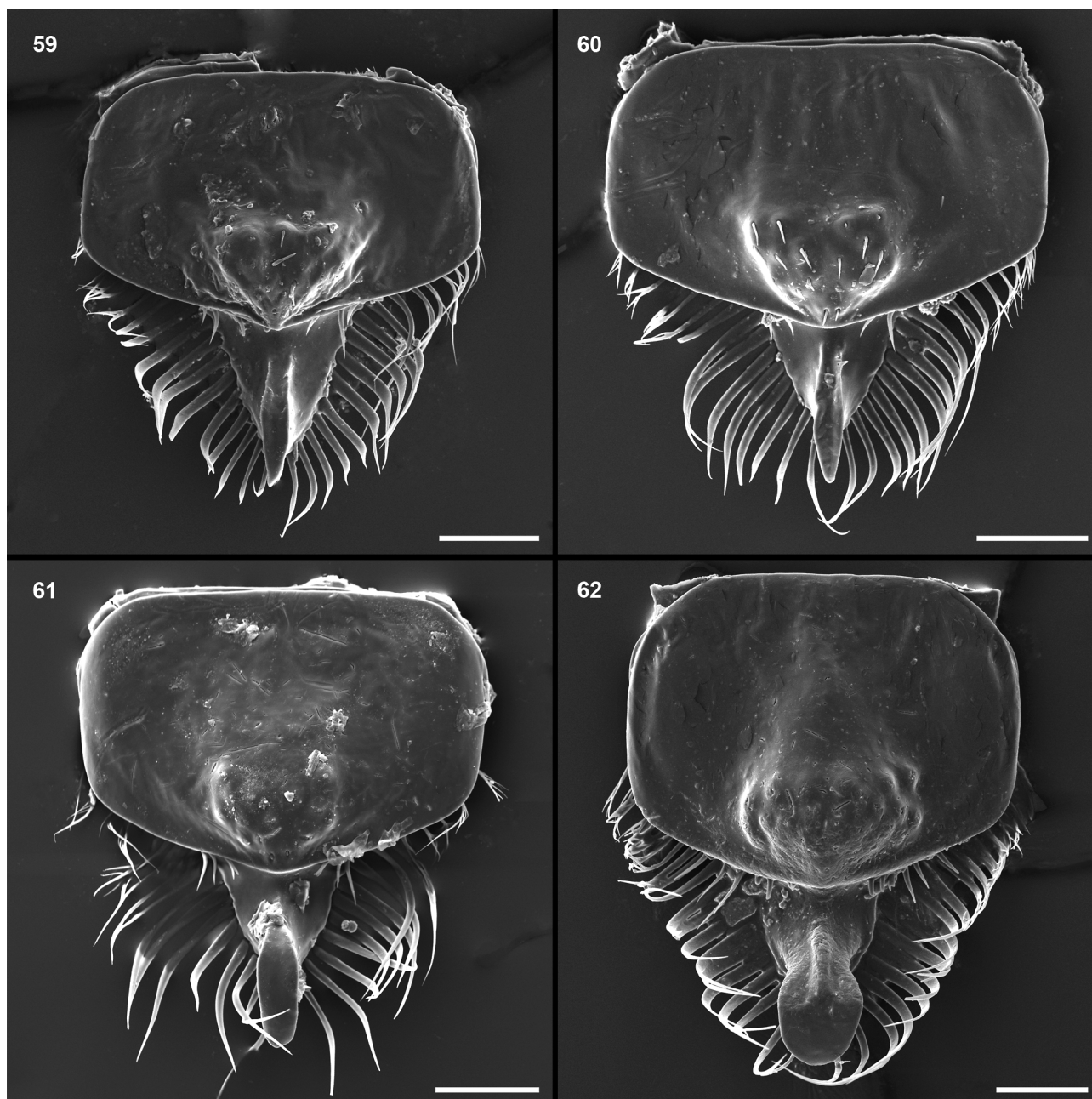
**FIGURES 39–50.** Genital capsule of the male. 39, 42, 45, 48 dorsal view. 40, 43, 46, 49 ventral view. 41, 44, 47, 50 lateral view. 39–41, *C. iodurus*. 42–44, *C. turquesa*. 45–47, *C. thamyris*. 48–50, *C. autumnalis*. *igp*, inner gonostylar plate. Scale 200  $\mu$ m.





**FIGURES 51–58.** Head. 51, 53, 55, 57 male. 52, 54, 56, 58 female. 51–52, *C. iodurus*. 53–54, *C. turquesa*. 55–56, *C. thamyris*. 57–58, *C. autumnalis*. Scale 200 $\mu$ m.





FIGURES 59–62. Labrum of the female. 59, *C. cyanopygus*. 60, *C. flammeus* n. sp. 61, *C. turquesa*. 62, *C. thamyris*. Scale 100  $\mu$ m.

**Examined material. ARGENTINA: Mendoza:** 2M 4F, Las Heras: Los Penitentes 2400m, 15–II/11–III–1995, I. Peralta (MACN). 1M, Las Cuevas, III–1940, A. Giai (MACN). 4F, Horcones 2900m, 10–I–1985, A. Roig Alsina (MACN). **Río Negro:** 1M, Valcheta, II–1924, M. Gómez (MACN). 4M, Ñorquinco, 5–II–1994, A. Roig Alsina (MACN). **Chubut:** 1F, Golfo San Jorge, 31–X–1906, C. Ameghino (MACN). **Santa Cruz:** 7M 5F, Ruta 40 Arroyo Feo, 27–I–1994, A. Roig Alsina (MACN). 6M 3F, Río Pinturas Cueva de las Manos, 28–I–1994, A. Roig Alsina (MACN). 1M 3F, Perito Moreno: Estancia La Oriental 840m, 14/17–II–1998, yellow pan trap, C. & M. Vardy (BMNH). 1F, Perito Moreno: Estancia La Oriental 840m, 14/17–II–1998, yellow pan trap, C. & M. Vardy (MACN). 5M 5F, Lago Argentino Estancia La Cristina, 27–I–1953, A. Willink (MLPA). 2F, 56km S of Perito Moreno, XI–2003, L. Packer (PCYU). 1M, Near Los Antiguos –46.6174 –71.2687, 17–XII–2005, Gravel & Rocha (PCYU). 4F, 25km S Los Antiguos –46.87972 –71.79472, 18–XI/24–XII–2006, pan trap, A–I. & M. Gravel & L. Packer (PCYU). **CHILE: Santiago Metropolitan Region:** 4F, Farellones, Valle Nevado, 9–XII–2006, L. Packer (PCYU).

## *Caenohalictus turquesa* Rojas & Toro

(Figs. 36, 42–44, 53–54, 61)

*Caenohalictus turquesa* Rojas & Toro 2000: 192–193. Holotype: male. Chile, Aysén, Aysén Chico. Museo Nacional de Historia Natural, Santiago.

**Diagnosis.** *Caenohalictus turquesa* can be confused with *C. iodurus* with which it is sympatric. Males can be separated by the malar area, at most as long as 1/3 of mandibular width (Fig. 53), and features of the genitalia. Females of both species are difficult to separate, see characters in the key. Male genital capsule (Figs. 42–44): *igp* small, covered by several short, specialized setae, slender dorsal process of plate with a rounded apex, which reaches the penis valve; penis valve with outer basal tooth; *ogp* with 2–3 short setae, finely plumose apically, plate not greatly expanded dorsally; *mgl* half-moon shaped; *va* compressed, with its apical half tapering.

**Variation.** Some males have the bluish highlights reported ubiquitously for the species by Rojas and Toro (2000), but most of them are completely green.

**Description.** Female. Length, 6.2–7.0 mm; forewing length, 4.9–5.4 mm.

**Color:** Head and mesosoma dark green with a metallic reddish tint, more evident on head, mesoscutum and scutellum. Black apical band occupying more than half of clypeus, extending along the inner orbits up to the level of antennal sockets. Following parts dark brown: labrum, mandible except reddish apex, scape, pedicel, posterior surface of flagellum, coxa, femur, tibia, spot on center of outer part of hind basitarsus, basal half of the marginal zone of terga, and disc of sterna. Anterior surface of flagellum, mid and hind tarsi, and apices of sterna light brown or yellow. Tegula and apical half of marginal zone of terga translucent. Wings light amber with light brown veins and pterostigma, costal and radial veins dark brown.

**Pubescence:** Whitish. Compound eyes with hairs as long as MOD. Head with erect, plumose hairs; those on paraocular area and vertex as long as 1.5–2.3 times MOD; hairs on lower part of genal area 1.6–3.2 MOD. Thorax with plumose hairs on mesoscutum (0.8–1.4 times MOD), much longer on pleura (2.3–3.6 times MOD) and metanotum (up to 2.5 times MOD). Lateral side of propodeum with very short plumose hairs (0.1–0.2 times MOD) and much longer hairs (up to 2.8 times MOD). Vestiture dense on legs. Terga with hairy marginal zones; disc of terga with very short erect hairs, laterally with some longer hairs with their apices directed latero-posteriorly. S2–S5 with long, short-barbed hairs, with their apices directed posteriorly.

**Sculpture:** Labrum with verrucose, median, basal elevation (Fig. 61). Lower paraocular area with strong punctures, separated by 0.5–1 PD. Base of clypeus and supraclypeal area with punctures separated by 2 PD; rest of face with punctation finer and sparser. Punctures on disc of mesoscutum separated by 5–6 PD, not easily seen due to sculpture, sparser on disc of scutellum and metanotum. Dorsal surface of metapostnotum finely microareolate as propodeum. Surface between punctures equally reticulate throughout the body, finer on clypeus, supraclypeal area and sterna; marginal zones on metasoma substrigulate.

**Structure:** Head broader than long, 1.27–1.59:1. Proportion of lower to upper interocular distance 0.89–0.99:1. Clypeus longer than broad, 1.51–1.82:1. Proportion of interantennal to antennocular distance, 0.86–0.88:1. Proportion of posterior interocelar to oculo-ocular distance, 0.92–0.97:1. Inner hind tibial spur pectinate, with two or three paddle-like teeth, the one which is nearer the apex bent down to the axis (Fig. 36).

**Comments.** Females have the malar area at most as long as 1/4 of the mandibular width, and the mid and hind basitarsi are light brown or yellow, with a dark brown spot at midlength of the outer part of the hind basitarsus. All specimens have the apical half of the marginal zone of the terga translucent. The female of *C. turquesa* is described here for the first time. This species visits flowers of *Discaria trinervis* and *Retanilla patagonica* (Rhamnaceae).

**Distribution in Argentinean Patagonia.** Arid to subhumid regions of Río Negro, Chubut and Santa Cruz. Also found in Mendoza (Argentina) and in Chile: Aysén.

**Examined material.** ARGENTINA: Mendoza: 1M, Cerro Cacheuta 1400m, XII–2005, G. Debandi (IADIZA). 3F, Río Blanco, XII–1996, D. Medán (FAUBA). 1F, Villavencio, 20–X–1941 (MLPA). Río Negro: 1M, Valcheta, II–1924, M. Gómez (MACN). 1F, Ñorquinco, 5–II–1994, A. Roig Alsina (MACN). Chubut: 1F, Comodoro Rivadavia, X–2003, M.E. Arce (MACN). 1F, Rada Tilly, 24–X–1992, M.E. Arce (FAUBA). 1F, Cañadón Ferrais, 5–X–1992, M.E. Arce (FAUBA). 2F, Cañadón Ferrais, 21–X–1995, M.E. Arce (FAUBA). 11F, Near Los Antiguos (Santa Cruz) S46°37.044' W071°16.133', 17–XII–2005/1–I–2006, pan trap, A–I. Gravel (PCYU). 2F, Near Gab. Costa S44°57.841' W070°25.355', XI–2005, pan trap, A–I. Gravel (PCYU). 2F, E of Las Heras, 17/27–XI–2003, pan trap, L. Packer (PCYU). 2M 6F, Golfo San Jorge, 31–X–1906, C. Ameghino (MACN).



**Santa Cruz:** 13M, El Pluma Ruta 43, 24–I–1994, A. Roig Alsina (MACN). 4M, Ruta 40 Arroyo Feo, 27–I–1994, A. Roig Alsina (MACN). 8M 2F, Río Pinturas Cueva de las Manos, 28–I–1994, A. Roig Alsina (MACN). 1M, Gobernador Gregores 350m, 12/13–II–1998, C. & M. Vardy (MACN). 2M, Gobernador Gregores 350m, 12/13–II–1998, C. & M. Vardy (BMNH). 1F, Los Antiguos, 18–XI–2006, pan trap (PCYU). 2F, 43km E of Perito Moreno, S46°26.057' W070°21.843, 540m, 16–XI–2003, L. Packer (PCYU). 3F, 23km W of Las Heras, S46°36.827' W069°38.394, 382m, 16–XI–2003, L. Packer (PCYU). 1F, 25km S Los Antiguos –46.87972 –71.79472, 18–XI/24–XII–2006, pan trap, A–I. & M. Gravel & L. Packer (PCYU). 33F 27M, 25km E Los Antiguos, S46°37'187'' W71°18'322'', 250m, 1–III–2007, blue van trap, A–I. & M. Gravel (PCYU).

### *Caenohalictus thamyris* (Jörgensen)

(Figs. 1, 4, 7, 30, 37, 45–47, 55–56, 62)

*Augochlora* (*Pseudaugochloropsis*) *thamyris* Jörgensen 1912: 114. Lectotype: female. Argentina, Mendoza. Museo de La Plata, La Plata. Examined, present designation.

*Pseudagapostemon babuarus* Jörgensen 1912: 112. Holotype: male. Argentina, Mendoza, Chacras de Coria. Museo de La Plata, La Plata. Examined, **new synonym**.

*Caenohalictus thamyris*: Michener 1979: 189.

**Diagnosis.** *Caenohalictus thamyris* has many unique features: its body size, longer than 7.5 mm, the finely striate metapostnotum (Fig. 7), the clypeus entirely producing under the lower orbital tangent, and the long malar area (Figs. 55–56). The male lacks the creamy-yellow apical band of the clypeus, and yellow markings on the legs (except on the apex of the distitarsi) and the mandible has no pre-apical tooth. In this species the apical margin of S4 is medially concave and S5 has a deep apical median notch and bears specialized setae directed inwards (Fig. 4); in the remaining species considered herein S4 and S5 are unmodified. Male genital capsule (Figs. 45–47): *igp* produced downwards, covered by a few short, flattened, truncated, specialized setae, plate bearing two short processes, one reaching the inner side, the other one reaching the small outer basal tooth of the penis valve; *ogp* bearing 1–2 long setae, plate expanded, with an acute inner apical angle, with a cluster of short setae laterally; *mgl* half-moon shaped; *va* compressed, with its apical half tapering. The clypeus of the female has a group of apical setae in the middle and well-defined, prominent lateral lobes (Fig. 30); the labrum also has a distinctive shape (Fig. 62).

**Variation.** Specimens studied from La Rioja and Misiones (Argentina) displayed a slightly more produced clypeus and compound eyes with dark brown hairs in contrast with the remaining specimens, which had compound eyes with whitish hairs.

**Comments.** Jörgensen (1912) described the sexes of this species with different names. The type of *Augochlora* (*Pseudaugochloropsis*) *thamyris* is in good condition, and for this reason we selected *thamyris* as the valid name for the species. Jörgensen (1912) did not mention a locality for *C. thamyris* in the original description, nor the number of specimens that he studied. There is only one female preserved in the Museum of La Plata, which is designated here as the lectotype. This specimen has the following labels: “Argentina/Mendoza/12.III.1907/P. Jörgensen” “*Augochlora/thamyris* n. sp.” (MLPA #2186). The holotype of *Pseudagapostemon babuarus* lacks the head and is weakly discolored. Despite this, the specimen can be easily recognized as the male of *C. thamyris* by the specialized setae of S4 and S5, and the finely striate metapostnotum. This specimen has the following labels: “Argentina/Mendoza/3.X.1908/P. Jörgensen” “*Pseudagaposte-/mon babuarus* n. sp.” (MLPA #2181).

*Caenohalictus thamyris* is extremely similar to *C. dolator* and *C. rostraticeps*. According to Rojas and Toro (2000), *C. rostraticeps* can be distinguished from *C. dolator* by its finely striate metapostnotum, which is imbricate with just a few short striae in *C. dolator*. The head and mesosoma are uniformly green in *C. rostraticeps*, whereas in *C. dolator* these structures have reddish highlights. *Caenohalictus rostraticeps* has a black greenish, dull, metasoma and metapostnotum, and the pygidial plate of the male is truncate, while *C. dolator* has a metallic green metapostnotum, a bluish-green metasoma, and the male has a rounded pygidial plate. *Caenohalictus thamyris* has a shiny bluish-green metasoma and metapostnotum, a finely striated metapostnotum, the male has a rounded pygidial plate and the S8 lacks the short median process illustrated by Rojas and Toro (2000: figure 38). In spite of these differences, the genital capsule and the S5 are very similar. Whether these differences represent variation of a single species or characterize three different species, needs to be further investigated taking in consideration specimens from the whole distribution area.

In contrast with the other species mentioned in this study, *C. thamyris* has a broad distribution and can be found in very distant provinces of Argentina, such as Misiones, La Rioja and Chubut. This species visits the following plants: Asteraceae: *Proustia cuneifolia*, *Senecio filaginoides*; Brassicaceae: *Diplotaxis tenuifolia*, *Sisymbrium* sp.; Fabaceae: *Prosopis* sp., *Zuccagnia punctata*; Loranthaceae: *Ligaria cuneifolia*; Zygophyllaceae: *Larrea cuneifolia*, *L. divaricata*.

**Distribution in Argentinean Patagonia.** Arid to semiarid regions of Río Negro and Chubut. The only species of *Caenohalictus* with records for almost every province in Argentina besides Patagonia. As this species reaches northern Argentina, it probably occurs in neighboring countries too.

**Examined material. ARGENTINA: Misiones:** 24M 3F, Gobernación de Misiones, Del Ponte (MACN). **Jujuy:** 1F, Ruta 9 Km 1762 ca Posta de los Hornillos 2380m, yellow pan trap, P. Fidalgo (MACN). **Salta:** 1M, Iruya, 29–XII–2001, L. Compagnucci (MACN). **Catamarca:** 1M, Portezuelo, 27–XI–1941 (MLPA). 1M, El Rodeo 1240m, I–1942, B. Schaefer (MLPA). **La Rioja:** 2M, Aminga, 5–XI–2011, Roig Alsina, González Vaquero & Compagnucci (MACN). 2M, Anillaco, 1/6–XI–2011, Roig Alsina, González Vaquero & Compagnucci (MACN). 2M 2F, Sanagasta Pampa de la Viuda 2100m, 4–XI–2011, Roig Alsina, González Vaquero & Compagnucci (MACN). 45M, sin localidad, E. Giacomelli (MACN). 4M, San Francisco, 10–II–1923, M. Gómez (MACN). 3M, San Francisco, II–1923, M. Gómez (MACN). 7M, sin localidad, 18–I–1923 (MACN). 1M, sin localidad, I–1923, M. Gómez (MACN). 1M 1F, sin localidad, E. Giacomelli (MACN). 1F, sin localidad, M. Gómez (MACN). 3M, sin datos (MACN). 2M, Sébila, 21–XI–1944 (MLPA). **San Juan:** 1M, Calingasta PN El Leoncito, 19–V–2011, D. Medán (FAUBA). **Santiago del Estero:** 1M, Cuesta del Salado Desvío 511, M. Gómez (MACN). 1M 3F, Guayasán Santos Lugares, 5–V–1948 (MLPA). **Mendoza:** 1M, San Rafael 14km NW El Sosneado, 17–I–2012, D. Medán (FAUBA). 1F, Ñacuñán, 23–X–1994, G. Debandi (MACN). 1F, Ñacuñán, 18/VII–16/VIII–1998, S. Lagos (IADIZA). 1M, Luján Cerro Cacheuta 1400m, XII–2005, G. Debandi (IADIZA). 1M, Ciudad de Mendoza Zoológico, V/VI–1997, Roig & Debandi (IADIZA). 1M 2F, Ciudad de Mendoza Reserva Divisadero Largo, 1/18–X–2002, G. Debandi (IADIZA). 1M, Cerro de la Gloria, 17–XI–1941 (MLPA). **Santa Fé:** 1F, Cerca de Rosario, J. Lazarte (MACN). **San Luis:** 4M, Potrero de los Funes, I/II–1926, M. Gómez (MACN). 1M, San Jerónimo, XI–1972, G.J. Williner (MACN). **Córdoba:** 1M, Agua de Oro, XII–1939, J. De Carlo (MACN). 1F, Sierras de Córdoba (MACN). 1M, sin localidad, E. Giacomelli (MACN). **Buenos Aires:** 2M, Saldungaray, 2–XI–2006, L. Compagnucci (MACN). **La Pampa:** 1M, Lihuel Calel, 13–II–2007, L. Compagnucci (MACN). 4M 2F, Toay, E. Anquilloo, H. Marrero (FAUBA). 1F, Dique las Carreras, 21/26–II–1993, S. Roig (IADIZA). **Río Negro:** 1F, Chimpay Estancia La Irma, 5/8–X–1993, Malaise trap, J.L. Farina (MLS). 2F, Río Colorado, 2–III–1954 (MLPA). **Chubut:** 1M, Puerto Madryn, 8–II–2011, H.M. Mazzeo (FAUBA). 2F, Puerto Madryn Botánico CENPAT, 2–X–2012, R. González Vaquero (MACN). 2M, Puerto Madryn, 2–X–2012, R. González Vaquero (MACN).

### *Caenohalictus autumnalis* (Jörgensen)

(Figs. 38, 48–50, 57–58)

*Halictomorpha autumnalis* Jörgensen 1912:116. Lectotype: male. Argentina, Mendoza, Chacras de Coria. Museo de La Plata, La Plata. Examined, **present designation**.  
*Caenohalictus autumnalis*: Michener 1979: 188.

**Diagnosis.** This species can be easily distinguished by the following combination of characters: body length 5.0–5.5 mm, male very slender, head rounded, compound eyes with hairs shorter than 1/3 the diameter of the median ocellus. The metasoma is light brown, sometimes with greenish highlights at the base. The male has a creamy-yellow apical band occupying more than half of clypeus, and a patch of appressed, very short plumose hairs on the lower paraocular area along the inner orbits (Fig. 57). The tarsi, foretibia, front side of the scape, pedicel and anterior surface of the flagellum of the male are yellow. Male genital capsule (Figs. 48–50): *igp* wide, entirely covered by short, flattened, truncated, specialized setae, plate not reaching the penis valve dorsally; penis valve with a smooth outer basal tooth; *ogp* without setae, extended dorsally with a rounded edge; *mgl* small, half-moon shaped; *va* compressed, elongate. Female with T3–T4 with hairy marginal zones and inner side of tibia I yellow.

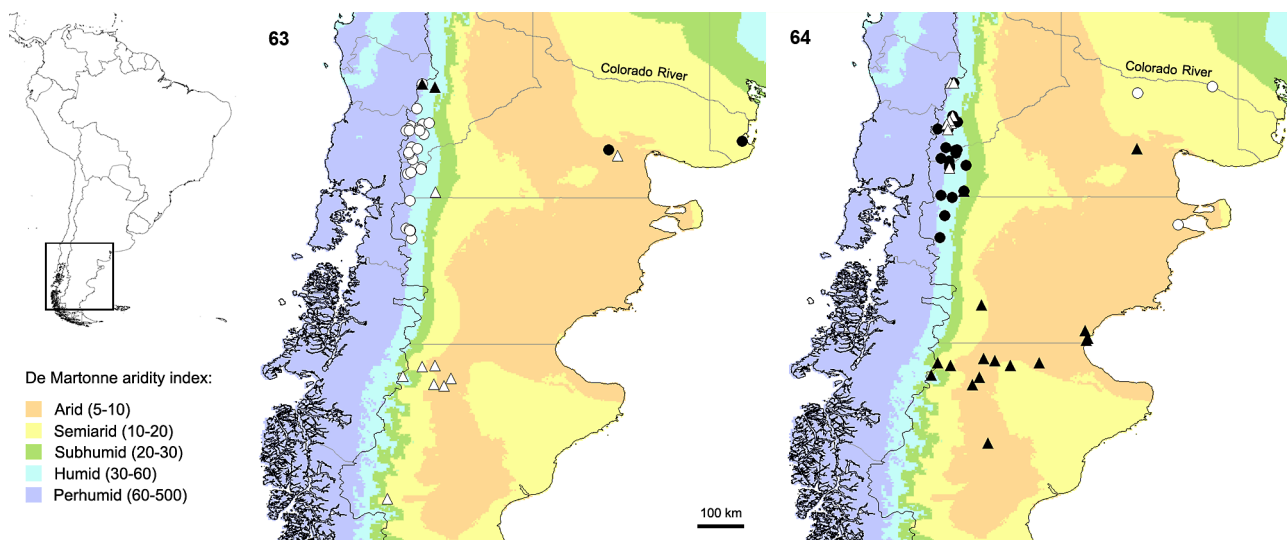
**Comments.** The syntypes housed in the Museum of La Plata are a male with the left foreleg broken beyond femur, the antennae broken beyond first and second flagellomeres respectively, and only a basal stump left of the

right forewing; a female with no metasoma is on the same pin. A male mesosoma and a female in good condition are on another pin. Both pins have the same labels: “Argentina/Mendoza/30.V.1908/P. Jörgensen” “*Halictomorpha* n. sp./*autumnalis*” (MLPA #2175). The syntypes match well with the original description, although the female legs and metasoma are mostly brown instead of green. The male specimen in the best condition on the first pin is designated here as the lectotype, and the remaining syntypes are designated here as the paralectotypes.

*Caenohalictus autumnalis* visits the plant species *Geoffroea decorticans* and *Prosopis flexuosa* (Fabaceae). Jörgensen (1912) reported that this species also visits *Baccharis salicifolia*, *Solidago chilensis*, *Taraxacum officinale* (Asteraceae), *Lobularia maritima* (Brassicaceae) and *Sphaeralcea bonariensis* (Malvaceae).

**Distribution in Argentinean Patagonia.** Arid regions of Río Negro. Also found in Catamarca, La Rioja, Mendoza, La Pampa and Buenos Aires (Argentina).

**Examined material. ARGENTINA: La Rioja:** 2M, I–1925, M. Gómez (MACN). 1F, XI–1934, M. Gómez (MACN). 1M, Iliar, M. Gómez (MACN). **Catamarca:** 1M, Hualfin, 14–I–1981, A. Roig Alsina (MACN). **Mendoza:** 1F, Ciudad de Mendoza Zoológico, Roig & Debandi (IADIZA). 1F, Ñacuñán, 23–X–1994, G. Debandi (IADIZA). 1F, Ñacuñán, 7/9–XI–2001, G. Debandi (IADIZA). 1F, Ñacuñán, 2–X–2002, G. Debandi (IADIZA). 2F, Ñacuñán, 2–X–2002, G. Debandi (MACN). 1F, Ñacuñán, 14/16–VII–1997, S. Roig (IADIZA). **Buenos Aires:** 1M, San Blas, J.B. Daguerre (MACN). 2M, Algarrobo, 5–III–1958, A. Ogloblin (MLPA). **La Pampa:** 2M, Santa Rosa Laguna Don Tomás, 20–XII–2006, J.J. Martínez (MACN). 2M, Lihuel Calel, 13–II–2007, L. Compagnucci (MACN). 1F, Dique Las Carreras, 21/26–II–1993, S. Roig (IADIZA). **Río Negro:** 3M, Valcheta, II–1924, M. Gómez (MACN).



**FIGURES 63–64.** Distribution maps. Color patterns follow De Martonne aridity index. 63, black circles, *C. autumnalis*; white circles, *C. cyanopygus*; black triangles, *C. galletue*; white triangles, *C. iodurus*. 64, black circles, *C. opaciceps*; white circles, *C. thamyris*; black triangles, *C. turquesa*; white triangles, *C. flammeus* n. sp.

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