



## Taxonomic review of the species of *Helina* R.-D. (Diptera: Muscidae) from Andean-Patagonian forests

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### Abstract

*Helina* Robineau-Desvoidy, 1830 is the second genus of Muscidae in terms of richness. This genus includes several species collected at high altitudes and high latitudes, and is poorly studied in the Neotropical region. Only 12 species of *Helina* have been recorded in the southern limit of South America in the Andean-Patagonian forests. In the present work, we studied all the species known from the Andean-Patagonian forests, with the exception of *H. viola* Malloch, 1934, present three new species, *H. araucana* sp. nov., *H. dorada* sp. nov., and *H. ouina* sp. nov., and provide the first description of the females of *H. australis* Carvalho & Pont, 1993 and *H. rufoapicata* Malloch, 1934. We also propose four new synonymies: *H. nigrimana basilaris* (Carvalho & Pont, 1993) and *H. nigrimana grisea* (Malloch, 1934) as new junior synonyms of *H. nigrimana* (Macquart, 1851); and *H. fulvocalyptrata* Malloch, 1934 and *H. simplex* Malloch, 1934 as new junior synonyms of *H. chilensis* Malloch, 1934. Finally, we provide a generic diagnosis and a new key for the *Helina* species of the Andean-Patagonian forests, as well as notes on the biology and distribution maps of each specimen, and discuss a preliminary construction of groups of species.

**Key words:** Argentina, Andean-Patagonian forests, Muscidae, Patagonia

### Introduction

*Helina* Robineau-Desvoidy, 1830, the second genus of Muscidae in terms of richness, occurs in all zoogeographic regions and comprises over 530 species (Zhang *et al.* 2011, Xue & Sun 2015). There is little information on the biology of adults. Species of this genus collected at high altitudes and high latitudes are associated with vegetation and flowering plants (Sorokina & Pont 2011), and their larvae develop in moss or humus soil from which they invade adjacent materials such as cow dung (Skidmore 1985).

The internal relationships and affinities of this large genus with other muscid genera are still unclear (Wang *et al.* 2008). This genus needs critical revisions because many species whose identity cannot be assigned to any other genus have been lumped as part of *Helina*. In the Palearctic region (Ringdahl 1924) and Oriental region (Wang *et al.* 2006), some authors have attempted to recognize species groups, whereas in the Nearctic region, only a faunistic review was made (Snyder 1949). In the Neotropical region, *Helina* is represented by 90 species, many of which are known only through their original description (Carvalho *et al.* 2005). Hence, further comprehensive taxonomic revisions are needed (Carvalho 2002).

The species of *Helina* inhabiting the southern extreme of South America were studied by Malloch (1934) as part of his revision of the “Diptera of Patagonia and South Chile, part VII, Muscidae”. Malloch (1934) described nine new species (some of them based only on male or female specimens) and two variations (subspecies), and included two older species described by Bigot (1885) and Stein (1911). Later, Snyder (1957) added a new species collected at the southern extreme of Argentina based on a single female. In the southern extreme of South America, the genus currently comprises 12 species with three subspecies. All these species have large external morphological similarity regarding color and chaetotaxy, except for *Helina viola* Malloch 1934, which presents metallic coloration. Thus, the large fraction of specimens of *Helina* currently known for the southern extreme of

South America are those studied by Malloch (1934), which had been collected during the Anglo-Argentine entomological expedition made by F.W. Edwards and R.C. Shannon in 1926. The expedition covered a small area between Bariloche city in Argentina (41° S) and Chiloé Island in Chile (43° S) (Edwards 1929), which, from a phytogeographical viewpoint, belongs to the Andean-Patagonian temperate forest. However, this forest is extended along a narrow but long strip of land between 35° S–55° S at the west margin of southern South America. So, the current information of *Helina* available for the Andean-Patagonian forests is strongly restricted and biased, indicating the poorly explored status of this genus in this habitat.

This study is part of an extensive exploration of the muscid fauna inhabiting the Andean-Patagonian forests, and is largely based on surveys performed in preserved natural areas from Argentina. We provide redescrptions of all species from the Andean-Patagonian forests, with the exception of *H. viola*, descriptions of three new species, *Helina araucana* sp. nov., *H. dorada* sp. nov., and *H. ouina* sp. nov., and the first description of the females of *H. australis* Carvalho & Pont, 1993 and *H. rufoapicata* Malloch, 1934. We also propose four new synonymies: *Helina nigrimana basilaris* (Carvalho & Pont, 1993) and *Helina nigrimana grisea* (Malloch, 1934) as new junior synonyms of *Helina nigrimana* (Macquart, 1851); and *Helina fulvocalyprata* Malloch, 1934 and *Helina simplex* Malloch, 1934 as new junior synonyms of *Helina chilensis* Malloch, 1934. This work also provides a key of the species, an updated generic diagnosis, and several new records for Argentina and Chile.

## Materials and methods

**Study area.** The Andean-Patagonian forest extends along narrow but latitudinally extended territories between 35° S–55° S at the west margin of southern South America. This forest contains a high proportion of endemic species, and presents a cold temperate humid climate with abundant rainfall caused by air masses from the Pacific Ocean, which decrease markedly across the Andes. Located within the Subantarctic subregion (Morrone 2000), this forest possesses a blend of deciduous or evergreen forest, grasslands, and peatbogs. The most characteristic species are: *Araucaria araucana*, *Fitzroya cupressoides*, *Nothofagus antarctica*, *Nothofagus dombeyi*, and *Nothofagus pumilio* (Cabrera 1971). While most of the Andean-Patagonian forests are located in Chile, an important extension is present in Argentina, where it is protected by several natural reserves and National Parks (Figure 1).

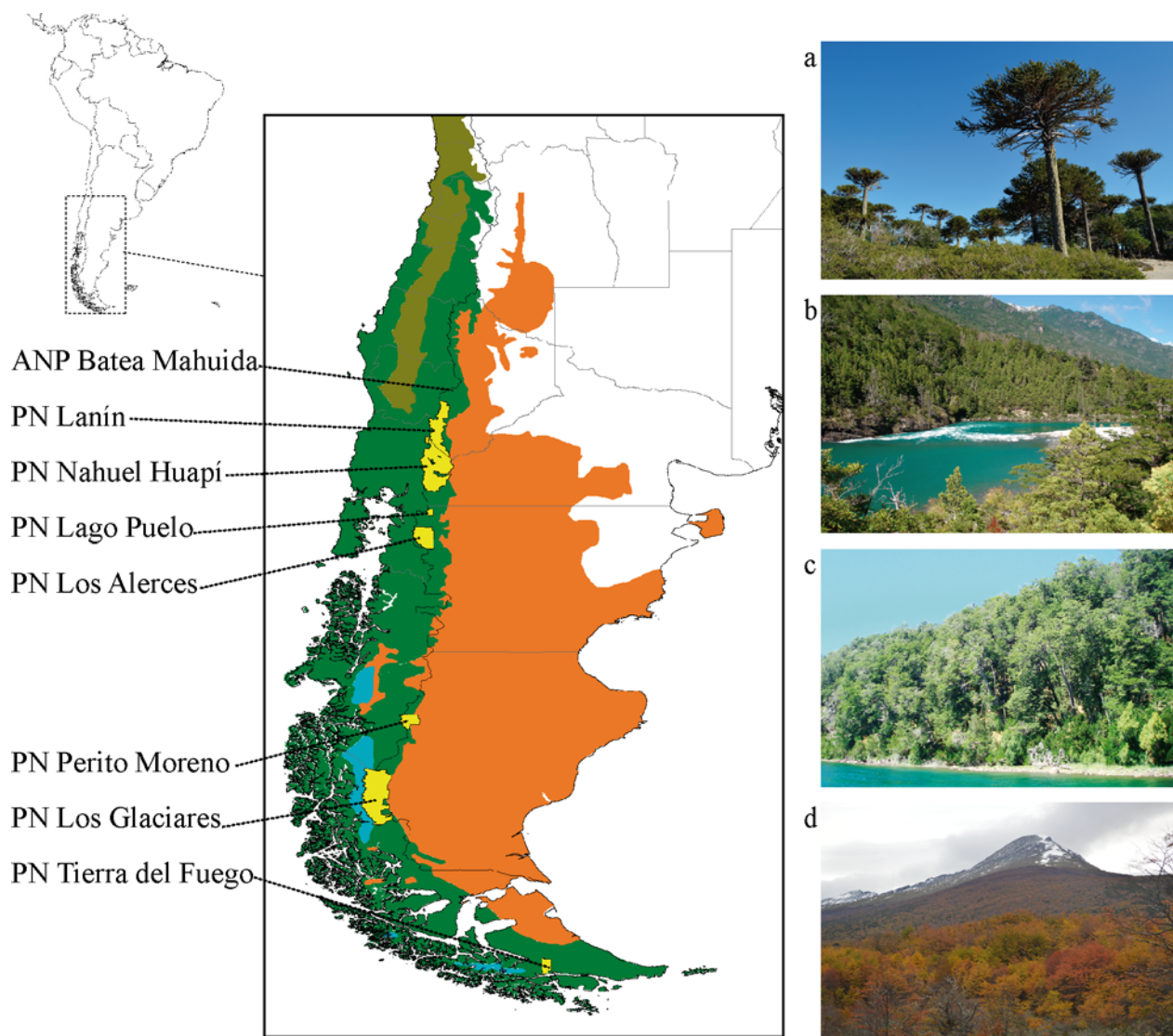
Most of the specimens of *Helina* studied in this work were captured by the authors in the following protected natural areas: “Área Natural Protegida Batea Mahuida” (ABM), “Parque Nacional Lanín” (PNL), and “Parque Nacional Nahuel Huapi” (PNNH), in the northern part of this large region; “Parque Nacional Lago Puelo” (PNLP) and “Parque Nacional Los Alerces” (PNLA), in the central part of the region, in the province of Chubut; and Parque Nacional Perito Moreno (PNPM), Parque Nacional Los Glaciares (PNLG), and Parque Nacional Tierra del Fuego (PNTF), in the southern extreme of the region, in the provinces of Santa Cruz and Tierra del Fuego.

ABM, located in the mid-west of the province of Neuquén, is considered the extreme north of the region of the Andean-Patagonian glacial lakes. The vegetation in this protected area is mainly composed of open forests of *A. araucana* with an understory of *N. antarctica*. PNL is located southwest of the province of Neuquén and, together with PNNH, constitutes the largest protected area of Argentina. The northern sector of PNL presents forest of *A. araucana*, *N. antarctica*, and *N. pumilio*, while the central and south sectors of the park are dominated by forest of *N. dombeyi*, *Nothofagus alpina* and *Nothofagus obliqua*. Finally, PNNH, located in the provinces of Neuquén and Río Negro, presents areas with humidity where the Valdivian forest dominated with an understory of *Chusquea culeou*, ferns, mosses and lichens. Also, small forests of *Myrtus communis* are present in different areas of the park (Chebez, 2005a).

PNLP presents some of the lower valleys on the eastern slopes of the Patagonian Andes (200 m a.s.l.) covered by the humid Valdivian forest. Besides *Austrocedrus chilensis* and *N. dombeyi*, this forest has its own vegetation of *Aextoxicon punctatum*, *Eucryphia cordifolia*, *Gevuina avellana*, and *Persea lingue*. Also, this National Park features a unique forest of *Myrceugenia exsucca*. PNLA comprises the southern end of the Valdivian forest in Argentina. This park is dominated by forests of *Drimys winteri*, *F. cupressoides*, *N. dombeyi*, *Weinmannia trichosperma*, and a dense understory of *C. culeou* (Chebez, 2005a).

PNPM presents a small portion of the Andean-Patagonian forests, dominated by *N. pumilio* and *N. dombeyi*. PNLG preserves a large area of ice sheets and glaciers, as well as part of the Andean-Patagonian southern forests

and representative areas of the Patagonian steppe. The tree species in this forest are *Nothofagus betuloides*, *N. antarctica*, and *N. pumilio*. On the other hand, PNTF preserves an extensive forest area, peatlands and coastal environments of the south end of the continent. The most representative species are *N. antarctica* and *N. pumilio* (Chebez, 2005b).



**FIGURE 1.** Study area. *Colors on the map: Green*, Andean-patagonian forests; *yellow*, National Parks and Natural Reserve; *light blue*, glaciers and continental ice; *orange*, Patagonia stepe; *brown*, Chilean Matorral. *Landscape pictures at the right: a*, AN Batea Mahuida; *b*, PN Lago Puelo; *c*, PN Los Alerces; *d*, PN Tierra del Fuego.

**Sampling methods.** Specimens collected by the authors were obtained between 1997 and 2014 by using different techniques. Those collected by JCM in PNLG and PNTF between 1997 and 2007 were obtained with a hand net on attracting baits (rotten meat), focusing exclusively on saprophagous calyprate Diptera. More recent samplings performed in ABM, PNLP, PNL and PNLA between 2010 and 2014 three different techniques: 1) active capture with entomological net over vegetation, 2) a malaise trap, and 3) a bottle trap modified from Hwang & Turner (2005) with rotten bone meal (fertilizer).

**Taxonomic work.** All the specimens studied belong to the following institutions (acronyms in parentheses): Natural History Museum, London, United Kingdom (BMNH); Facultad de Agronomía, Universidad de Buenos Aires, Buenos Aires, Argentina (FAUBA); Instituto y Fundación Miguel Lillo, Tucumán, Argentina (IFML); Museo Argentino de Ciencias Naturales “Bernardino Rivadavia” (MACN); Museu Nacional, Universidade Federal do Rio Janeiro, Rio de Janeiro, Brazil (MNRJ); and National Museum of Natural History, Washington D.C., USA (USNM). The specimens collected were deposited at the MACN.

Specimens were identified using the original descriptions (Malloch 1934; Snyder 1957) and type specimens. Descriptions were elaborated with type specimens and specimens collected by the authors. To study the morphology of terminalia, the abdomen of selected specimens was detached and transferred to 90% lactic acid for two weeks. After clearing, the genital structures were removed and temporarily mounted on concave glass slides in glycerin. After the study, the dissected parts were placed in a plastic microvial with glycerin and pinned with the respective specimen. The terminology used for the external morphology follows Cumming & Wood (2009) and Xue & Sun (2015).

The labels of the type specimens examined are cited verbatim, lines separated by a slash, different labels by semicolon, and comments are given in brackets.

Digital photographs were taken using an Olympus DP 25 digital camera mounted on an Olympus SZX 16 stereomicroscope. The image processing software was *Olympus cellSens Standard software* and *Combine ZM*. Line drawings were produced from images taken with a Leica EC3 digital camera mounted on a Leica S6D stereomicroscope. Measurements were digitally obtained with the software *Leica Application Suite EZ Version 2.1.0*. Maps were made in the software *DIVA-GIS, version 7.5* (Hijmans *et al.* 2012).

## Results

### Key to *Helina* species of Andean-Patagonian forests (modified from Malloch 1934)

(Species in brackets were not observed)

- 1 Metallic violet-blue species; calypteres and halter black. Male unknown . . . . . [*H. viola* Malloch, 1934].
- Black species, with grey or brownish-yellow pollinosity; calypteres and halter yellow or white . . . . . 2
- 2 Mid and hind femora entirely yellow . . . . . 3
- Mid and hind femora black, or with a part yellow, but never entirely yellow . . . . . 8
- 3 Fore femur entirely yellow . . . . . 4
- Fore femur almost entirely black, at most the apex yellow . . . . . 5
- 4 Abdomen black with grey-brown pollinosity, arista with hairs three times as long as its basal diameter . . . . . *H. australis* Carvalho & Pont, 1993
- Abdomen black with golden-yellow pollinosity, arista with hairs shorter than basal diameter . . . . . *H. dorada* **sp. nov.**
- 5 Wing with an extra little vein close to cross-vein r-m and the transverse cross-vein dm-cu curved and infuscated . . . . . *H. ouina* **sp. nov.** (in part)
- Wing without an extra little vein close to cross-vein r-m . . . . . 6
- 6 Mid tibia without anterodorsal seta. Male: hind femur with long and fine setae on posteroventral surfaces at basal middle . . . . . *H. nigrimana* (Macquart, 1851) (in part)
- Mid tibia with anterodorsal setae. Male: hind femur without long and fine setae on posteroventral surfaces at basal middle . . . . . 7
- 7 Thorax in lateral view black, parafrontal plate bare, prealar seta the half as long as its anterior supra-alar postsutural seta . . . . . *H. connexa* Malloch, 1934
- Thorax in lateral view grey-brown, parafrontal plate setulose, prealar seta one-third the length of the anterior supra-alar postsutural setae. Male unknown . . . . . *H. neosimplex* Snyder, 1957.
- 8 Mid and hind femora yellow at base . . . . . 9
- Mid and hind femora black at base . . . . . 10
- 9 Dorsocentral seta 2+3, abdomen with spots . . . . . *H. xena* Malloch, 1934
- Dorsocentral seta 2+4, abdomen without spots. . . . . *H. araucana* **sp. nov.**
- 10 Arista bare or pubescent with its longest hairs hardly longer than diameter of arista . . . . . 11
- Arista plumose, with its longest hairs two or three times as long as its diameter of arista. . . . . 13
- 11 Wings with spots on cross-veins and with an extra little vein close to cross-vein r-m, mid and hind femora almost black, arista bare . . . . . *H. ouina* **sp. nov.** (in part)
- Wings without spots on cross-veins and an extra little vein close to cross-vein r-m, mid and hind femora black with apical yellow, arista pubescent . . . . . 12
- 12 Prealar seta less than one fourth of the length of the anterior supra-alar postsutural setae, cross vein dm-cu at middle of cell  $r_{4+5}$  . . . . . *H. discolor* (Stein, 1911)
- Prealar seta half as long as its anterior supra-alar postsutural seta, cross vein dm-cu in basal half of cell  $r_{4+5}$ . . . . . *H. nigrimana* (Macquart, 1851) (in part)
- 13 Prealar setae half of the length of the anterior supra-alar postsutural setae, mid tibia without anterodorsal setae. . . . . *H. bigoti* Malloch, 1934
- Prealar setae one third or one fourth of the length of the anterior supra-alar postsutural setae, mid tibia with 1 or 2 anterodorsal setae . . . . . 14
- 14 Prealar setae thin, less than one fourth of the length of the anterior supra-alar postsutural setae. Fronto-orbital plate and parafa-

cial black with brown pollinosity. Male: dichoptic, the shortest distance between eyes is 0.46–0.48 mm; frontal seta with 1–2 laterocline orbital setae before ocelli. Sternite 5 with yellow spots on posterior margin. . . . . *H. rufoapicata* Malloch, 1934

- Prealar setae strong, one third of the length of the anterior supra-alar postsutural setae. Fronto-orbital plate and parafacial black with silver or light grey pollinosity. Male: holoptic, the shortest distance between eyes is 0.16–0.32 mm. Sternite 5 without yellow spots on posterior margin. . . . . *H. chilensis* Malloch, 1934

## *Helina* Robineau-desvoidy, 1830

**Diagnosis to *Helina* species of Andean-Patagonian forests.** Black species, with grey or brownish-yellow pollinosity [except *H. viola* with metallic blue color]; presutural acrostichal setae differentiated; dorsocentral setae 2+3-4; prealar present; katapisternal setae 2+2; prosternum and anepimeron bare; veins bare; lower calypter glossiform; legs black, yellow or black and yellow; fore tibia with 1 or 2 median setae on posterior surface; calcar absent.

To avoid lengthy and redundant descriptions, the characters listed below, present in all species of *Helina* described in this article, will not be repeated in each description. **Male. Head:** frontal vitta black; gena with black setae; inner vertical setae convergent and outer vertical setae divergent; antenna in lateral view inserted at the mid-level of the eye; palpus filiform. **Thorax:** intra-alar setae 1+2; supra-alar setae 1+2; notopleuron bare; scutellum with long and strong lateral and apical setae; proepisternals 2, the anterior one smaller; proepimerals 2; katapisternals 2+2; anepimeron, katepimeron and meron bare; prosternum bare. **Wing:** veins bare; lower calypter glossiform; halter and knob yellow. **Abdomen:** Sternite 1 bare. **Female. Head:** interfrontal cruciate setae absent. **Terminalia:** intersegmental membrane without microtrichiae. Tergites 6 and 7 divided into 2 enlarged parallel sclerotized plates. Sternites 6 and 7 with one central plate; sternite 8 with 2 parallel sclerotized plates, with setulae on the distal margin. Three spermathecae.

### *Helina araucana* sp nov.

(Figs. 2, 9A)

**Description. Male** (Fig. 2A). Length. Body: 5.90–7.31 mm, wing: 4.89–6.45 mm.

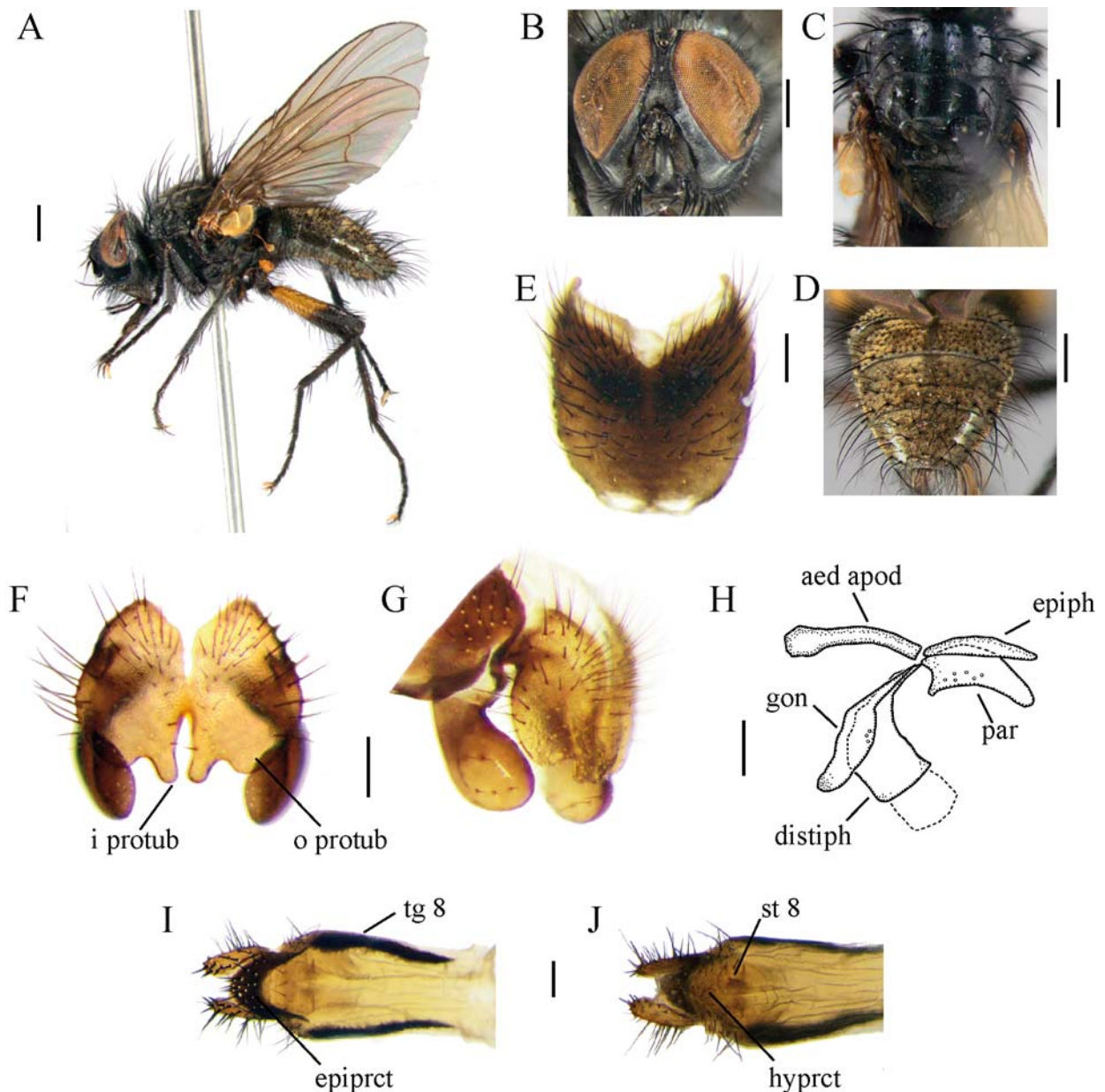
**Head** (Fig. 2B). Black with silver pollinosity. Holoptic, the shortest distance between eyes is 0.16–0.23 mm. 6–8 pairs of frontal setae. Eye hairs long and sparse. Lunule dark brown; fronto-orbital plate, parafacial, postgena, and occiput black with silver pollinosity. Parafrontal plate bare. Gena with brown pollinosity. Postocular setae proclinate. Antenna black; arista with short hairs two times as long as its basal diameter. Palpus black.

**Thorax** (Fig. 2C). Scutum black with three white-grey pollinose vittae; scutellum black; anepisternum, anepimeron, katepimeron, katapisternum, proepisternum, proepimeron and meron black; anterior and posterior spiracles brown. Chaetotaxy: acrostichal setae 2+1; dorsocentral setae 2+4; humeral setae 3, the inner one shorter and thinner; notopleural setae 2, of similar size. Prealar setae strong, less than one third of the anterior postsutural supra-alar setae. Scutellum with thinner and short basal and subapical setae. Anepisternum with a series of 6–8 strong setae.

**Wing.** Yellowish-hyaline; costal spine longer than the costal bristles; the transverse cross-vein dm-cu slightly curved; vein R 4+5 and vein M diverge apically; cross vein dm-cu in basal half of cell  $r_{4+5}$ . Both calypters yellow with yellow margins.

**Legs.** Coxa, trochanter, femur I, tibiae, and tarsi black; mid and hind femora yellow, with the apical third black. Fore femur with rows of dorsal, posterodorsal, and posteroventral setae; fore tibia with 1 posterior seta and with 4 preapical setae. Mid femur with a row of posteroventrals setae at the apical middle; a ventral row of thinner and long hairs, and 2–3 preapical setae on dorsal to posterior surface; mid tibia with 4–5 posterior setae, and 4 apical setae (anterodorsal, posteroventral, ventral, and anteroventral). Hind femur with an anterodorsal row of setae and 6–7 long and irregular setae in the apical middle of anteroventral surface, and fine hairs in the apical middle on posteroventral surface; hind tibia a row of long anteroventral setae, 2–3 anterodorsal setae and a row of long posterodorsal setae, calcar absent. Fore claws and pulvilli longer than mid and hind.

**Abdomen** (Fig. 2D) Black with brownish pollinosity. Sternite 5 with similar length and width; setulose; posterior margin membranous with two pointed processes (Fig. 2E).



**FIGURE 2.** *Helina araucana* sp. nov. A–H. Male: A. Lateral view (scale bar: 1 mm). B. Head, frontal view. C. Thorax, dorsal view. D. Abdomen, dorsal view (scale bars: 0.5 mm). E. Sternite 5 (scale bar: 0.2 mm). F. Cercal plate and surstyli, posterior view. G. Cercal plate and surstylus, lateral view (scale bar: 0.1 mm). H. Phallic complex, lateral view (scale bar: 0.1 mm). I–J. Female, apical portion of ovipositor: I. Dorsal view. J. Ventral view (scale bar: 0.5 mm). (Abbreviations: aed apod, aedeagal apodeme; distiph, distiphallus; epiph, epiphallus; epiprct, epiproct; gon, gonopodo; hypcrct, hypoproct; i protub, inner protuberance; o protub, outer protuberance; par, paramere; st 8, sternite 8; tg 8, tergite 8.)

**Terminalia.** Cercal plate with a similar length and width, with two incisions (distal and proximal); and with four protuberances at the apex: inner protuberance short and rounded, outer protuberance with broad lobed shape (Fig. 2F). Surstylus broad and curving backwards distally, with some setae on inner surface (Fig. 2G). Aedeagus with aedeagal apodeme slightly curved and strongly sclerotized; epiphallus slightly sclerotized, paramere slightly bent downward with setula; gonopod with short setulae; and distiphallus tubular, slightly sclerotized (Fig. 2H).

**Female.** Length. Body: 6.08–6.94 mm, wing: 4.95–6.58 mm.

Differs from male as follows: **Head**, dichoptic, the shortest distance between eyes is 0.85–0.87 mm; fronto-orbital plate setulose with 2 reclinate orbital setae. Parafrontal plate setulose. Eye hairs short and sparse. **Legs.** Mid femur with 3–4 strong of setae in the basal third on ventral surface. Hind femur with 3–4 setae in the apical middle of anteroventral surface; hind tibia brown-yellowish with 2–3 anteroventral setae, 2–3 anterodorsal setae. Claws and pulvilli similar size in all three legs. **Terminalia.** Tergite 8 divided into 2 enlarged parallel sclerotized plates;

epiproct with proximal margin curved, and several strong spines, cercus digitiform with strong spines (Fig. 2I). Hypoproct rounded, sclerotized and setulose (Fig. 2J).

**Type material.** **Holotype** male, pinned, label: “Arg. Neuquén, P.N. Lanín / Rucachoroi 1245m (Baited trap) / 39°13'53” S 71°10'37” W / I-2013 Mulieri leg.” (MACN). **Paratypes**: one female: “Arg. Neuquén, P.N. Lanín / Rucachoroi 1245m (Baited trap) / 39°13'53” S 71°10'37” W / I-2013 Mulieri leg.” (MACN), two females, pinned, one with abdomen dissected: “Arg. Neuquén, P.N. Lanín / Rucachoroi 1245m (Baited trap) / 39°13'53” S 71°10'37” W / I-2013 Patitucci leg.” (MACN), one female, pinned, one with abdomen dissected: “Arg. Neuquén, P.N. Lanín / Rucachoroi 1245m (Baited trap) / 39°13'53” S 71°10'37” W / I-2013 Patitucci leg.” (IFML).

**Other specimens examined.** **ARGENTINA: Neuquén:** 1 female, APN Batea Mahuida, -38.845457, -71.093002, I-2013, Olea, Mulieri & Patitucci leg. (MACN), 1 male, APN Batea Mahuida, -38.837593, -71.097928, XII-2013, Mulieri leg. (MACN),

2 males, PN Lanín, Lago Huechulafquen, -39.790825, -71.217776, 14-XII-2013 Mulieri & Patitucci leg. (MACN), 2 males, PN Lanín, Lago Tromen, -39.563419, -71.418872, 12-XII-2003, Medan, Devoto & Torretta leg. (FAUBA), 1 male, PN Lanín, Lago Tromen, -39.563419, -71.418872, XII-1998, Medan & Basilio leg. (FAUBA), 3 females, 8 km northwest of San Martin de los Andes, 27-IX-1986, Gentili leg. (IFML).

**Distribution** (Fig. 9A). ARGENTINA: Neuquén.

**Remarks.** *Helina araucana* **sp. nov.** is similar to *H. xena*, but is distinguished by the number of dorsocentral setae, longer arisal hairs, wings without cloud, cross-vein dm-cu slightly curved, abdomen without spots.

**Biology.** Specimens collected by the authors from PNL and ABM were obtained with baited and Malaise traps. Several specimens studied in this work were collected on *Discaria chacaye* with a hand net. All specimens were captured over 1000 m a.s.l.

**Etymology.** The name refers to *Araucaria araucana*, the dominant tree species of the forests where the species was collected.

### *Helina australis* Carvalho & Pont in Carvalho *et al.* 1993

(Figs. 3, 9B)

For a complete list of references, see the catalog by Carvalho *et al.* (2005).

Information subsequent to this catalog: Löwerberg-Neto *et al.* 2011 (biogeography); Löwerberg-Neto & Carvalho 2013 (checklist).

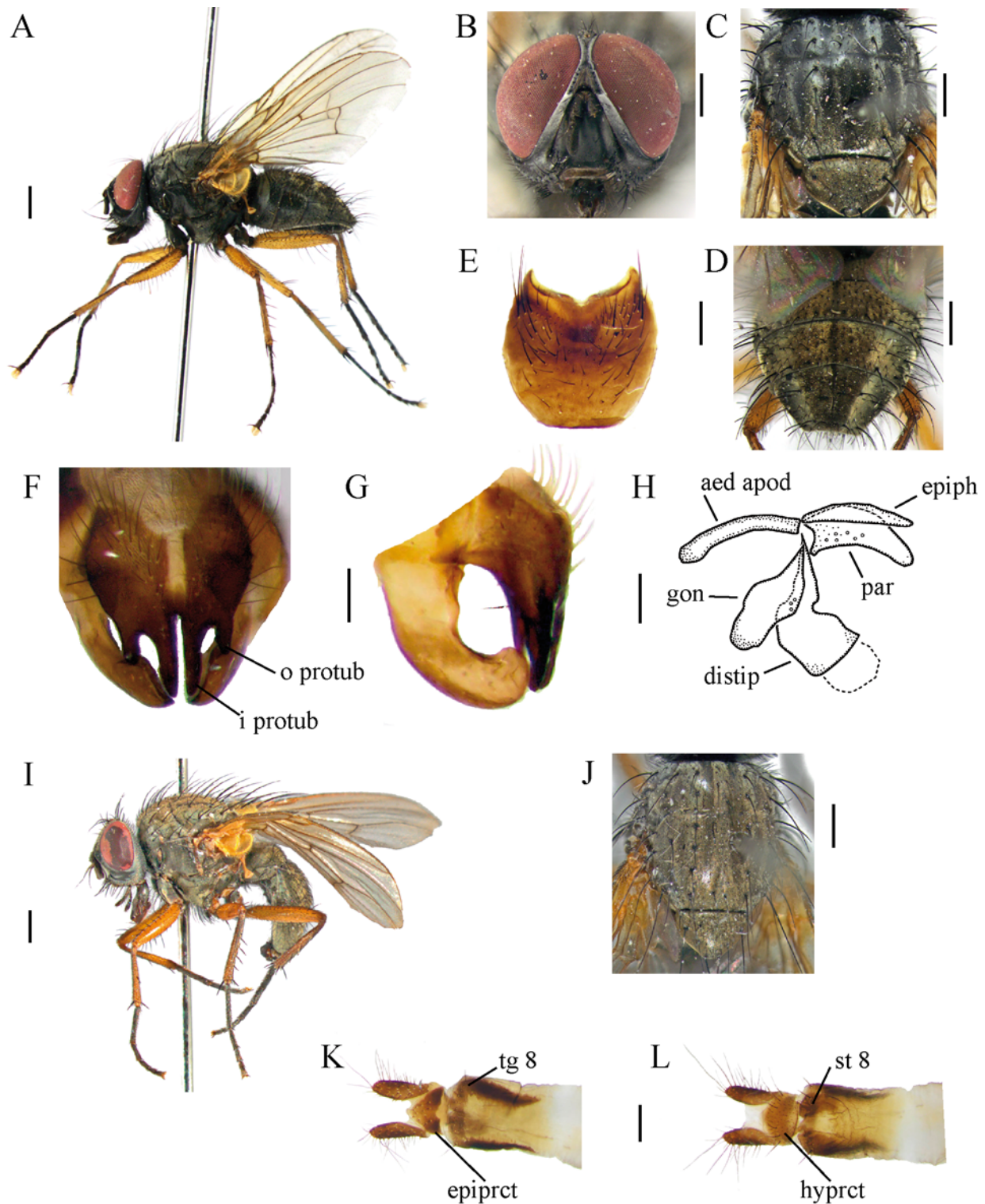
**Redescription.** **Male** (Fig. 3A). Length. Body: 6.74–7.03 mm, wing: 5.81–6.97 mm.

**Head** (Fig. 3B). Black with silver pollinosity. Holoptic, the shortest distance between eyes is 0.13–0.14 mm. 6–8 pairs of frontal setae. Eye hairs long and sparse. Lunule pale brown; fronto-orbital plate, parafacial, gena, postgena, and occiput black with silver pollinosity. Parafrontal plate bare. Postocular setae proclinate. Antenna black; arista with hairs three times as long as its basal diameter. Palpus black.

**Thorax** (Fig. 3C). Scutum black with three grey pollinose vittae, the central vitta is inconspicuous; scutellum black with grey pollinosity; anepisternum, anepimeron, katepimeron, katepisternum, proepisternum, proepimeron and meron black; anterior and posterior spiracles brown. Chaetotaxy: acrostichal setae 1-2+1; dorsocentral setae 2+4; humeral setae 3, the inner one shorter and thinner; notopleural setae 2, of similar size. Prealar seta strong, half as long as its anterior supra-alar postsutural seta. Scutellum with thinner and short basal and subapical setae. Anepisternum with a series of 8–10 strong setae.

**Wing.** Yellowish-brown; costal spine little longer than the costal bristles; the transverse cross-vein dm-cu strongly curved; vein R 4+5 and vein M diverge apically; vein R 4+5 and vein M diverge apically; cross vein dm-cu in basal half of cell  $r_{4+5}$ . Both calypters yellow with yellow margins.

**Legs.** Coxa and trochanter black; femora and tibiae yellow, tarsi dark brown. Fore femur with rows of dorsal, posterodorsal, and posteroventral setae; fore tibia with one posterior seta, 4 preapical seta. Mid femur with only 3–4 setae in the basal middle on ventral surface; 3 preapical setae on dorsal to posterior surface; mid tibia with 4 posterior setae and 4 apical setae (anterodorsal, posteroventral, ventral, and anteroventral). Hind femur with an anterodorsal row of setae and 6–7 setae in the apical middle of anteroventral surface; hind tibia with 2–3 anteroventral setae, 2 anterodorsal setae and 2–3 posterodorsal setae, calcar absent. Claws and pulvilli of similar size in all three legs.



**FIGURE 3.** *Helina australis* Carvalho & Pont. **A–H.** Male: **A.** Lateral view (scale bar: 1 mm). **B.** Head, frontal view. **C.** Thorax, dorsal view. **D.** Abdomen, dorsal view (scale bars: 0.5 mm). **E.** Sternite 5 (scale bar: 0.2 mm). **F.** Cercal plate and surstyli, posterior view. **G.** Cercal plate and surstylus, lateral view (scale bar: 0.1 mm). **H.** Phallic complex, lateral view (scale bar: 0.1 mm). **I–L.** Female: **I.** Lateral view (scale bar: 1 mm). **J.** Thorax, dorsal view. **K.** Apical portion of ovipositor, ventral view. **L.** Apical portion of ovipositor, ventral view (scalebar: 0.5 mm). (Abbreviations: aed apod, aedeagal apodeme; distiph, distiphallus; epiph, epiphallus; epiprct, epiproct; gon, gonopodo; hypcrct, hypoproct; i protub, inner protuberance; o protub, outer protuberance; par, paramere; st 8, sternite 8; tg 8, tergite 8.)



**Abdomen** (Fig. 3D). Black with brown pollinosity, with little spots on the base of each seta. Sternite 5 with similar length and width, with two long setae on apical third; posterior margin membranous with two projections (Fig. 3E).

**Terminalia.** Cercal plate with a similar length and width, with two incision (distal and proximal); with four protuberances at the apex: inner protuberance long and straight, outer protuberance short and straight (Fig. 3F), curved backwards of the inner protuberance in lateral view (Fig. 3G). Surstylus broad basally, distal part curved strongly forwards, on inner surface with setae in a button-shaped structure (Fig. 3G). Aedeagus with aedeagal apodeme curved and strongly sclerotized; epiphallus slightly sclerotized, paramere slightly bent downward with setula; gonopod with short setulae; and distiphallus tubular, slightly sclerotized (Fig. 3H).

**Female.** Length. Body: 5.23–6.75 mm, wing: 5.63–6.15 mm.

Differs from male as follows: **Color:** black with grey pollinosity (Fig. 3I) **Head:** dichoptic, the shortest distance between eyes is 0.66–0.86 mm; fronto-orbital plate setulose with 2 reclinate orbital setae. Parafrontal plate setulose. **Thorax.** Black with grey pollinosity, scutum brown with three grey pollinose vittae (Fig. 3J). **Legs.** Hind femur with 2–3 setae in the apical third of anteroventral surface; hind tibia with 3 anteroventral setae, 2 anterodorsal setae and without posterodorsal setae.

**Terminalia.** Tergite 8 with 2 parallel sclerotized plates, fused and with setulae on the distal margin; epiproct with proximal margin straight, and setulose, cercus digitiform with long setulae (Fig. 3K). Hypoproct rounded, sclerotized, with long setula on distal margin (Fig. 3L).

**Material examined.** **ARGENTINA: Chubut:** 1 male, PN Lago Puelo, Gendarmería, -42.097468, -71.681953, I-2012, Mulieri & Patitucci leg. (MACN), 2 females, PN Los Alerces, Lago Futalaufquen, -42.840982, -71.632934, 14-I-1962 (MACN), 3 females, PN Los Alerces, Cabaña. La Cascada, -42.888499, -71.592376, II-2013, Olea, Mulieri & Patitucci leg. (MACN); **Neuquén:** 1 male, San Martín de los Andes, I-1941, Bridarolli leg. (MACN), 1 female, PN Nahuel Huapí, Puerto Arrayanes, Villa Trafúl, -40.612373, -71.545571, 31-I-1968, Stange leg. (IFML). **CHILE: Región de los Lagos:** 3 females, 1 male, Osorno, Pucatrihue, -40.563537, -73.284407, 1/12-II-1980, Peña leg. (MACN), 1 female, Colonia El Chingue, -42.404234, -72.695709, 20/25-I-1990, Peña leg. (MACN).

**Distribution** (Fig. 9B). **ARGENTINA:** Chubut (new record); Neuquén (new record). **CHILE:** Región de los Lagos.

**Remarks.** Bigot (1885) described *Yetodesia dubia* with only one male specimen from an unspecified location of Chile. Later, Stein (1907) presented a brief redescription of the type specimen, and Malloch (1934) redescribed the species with new male specimens collected from Casa Pangué, Chile. Carvalho & Pont (Carvalho *et al.* 1993) established a junior primary homonym of *dubia* Meade, 1881, and renamed the species as *Helina australis*. In this work, we provide a redescription of the male and description of the female, including details of male and female terminalia.

**Biology.** Unknown. The specimens studied in this work were collected from PNLN and PNLA with a Malaise trap.

### ***Helina bigoti* Malloch, 1934**

(Figs. 4, 9C)

For a complete list of references, see the catalog by Carvalho *et al.* (2005).

Information subsequent to this catalog: Löwerberg-Neto & Carvalho 2009 (endemism). Löwerberg-Neto *et al.* 2011 (biogeography); Löwerberg-Neto & Carvalho 2013 (checklist, new records).

**Redescription. Male** (Fig. 4A). Length. Body: 6.30–7.93 mm, wing: 4.92–6.98 mm.

**Head** (Fig. 4B). Black with silver pollinosity. Holoptic, the shortest distance between eyes is 0.15–0.24 mm. 8–10 pairs of frontal setae. Eye hairs long and sparse. Lunule dark brown; fronto-orbital plate, parafacial, gena, postgena, and occiput black with silver pollinosity. Parafrontal plate bare. Postocular setae proclinate. Antenna dark brown; arista plumose, with hairs four times as long as its basal diameter. Palpus dark brown.

**Thorax** (Fig. 4C). Scutum black with three white pollinose vittae, the central vitta is inconspicuous; scutellum black; anepisternum, anepimeron, katapimeron, katapisternum, proepisternum, proepimeron and meron black; anterior and posterior spiracles brown. Chaetotaxy: acrostichal setae 1-2+1; dorsocentral setae 2+4; humeral setae

3–4; notopleural setae 2, posterior seta smaller. Prealar strong, two-thirds the length of the anterior supra-alar postsutural seta. Scutellum with thinner and long basal and subapical setae. Anepisternum with a series of 8–10 strong setae.

*Wing.* Yellowish-brown; costal spine little longer than the costal bristles; the transverse cross-vein dm-cu slightly curved; vein R 4+5 and vein M straight; cross vein dm-cu in basal half of cell  $r_{4+5}$ . Both calypters yellow with yellow margins.

*Legs.* Black, mid and hind femora yellow apically, hind tibia brown yellow apically. Fore femur with rows of dorsal, posterodorsal, and posteroventral setae; fore tibia with one posterior seta, and one strong preapical dorsal seta. Mid femur with 4–5 setae in the basal third on ventral surface; and 3 preapical setae on anterodorsal to posterior surface; mid tibia with 4 posterior setae and 4 apical setae (anterodorsal, posteroventral, ventral, and anteroventral). Hind femur with anterodorsal row and 6–7 setae in the apical middle of anteroventral surface; hind tibia with 4 anteroventral setae, 4 anterodorsal setae and 5–6 posterodorsal setae, calcar absent. Claws and pulvilli with similar size in all three legs.

*Abdomen* (Fig. 4D). Dark brown with grey pollinosity. Sternite 5 longer than wide, with several strong setae on the apical third; posterior margin membranous (Fig. 4E).

*Terminalia.* Cercal plate longer than wide, with a distal incision; and with two protuberances (Fig. 4F), curved backwards at the apex (Fig. 4G). Surstylus straight, broad distally, with setae on inner surface (Figs. 4 F–G). Aedeagus with aedeagal apodeme curved strongly sclerotized, and dilated at the apex; epiphallus sclerotized, paramere slightly bent downward with setula; gonopod with short setulae; and distiphallus tubular, straight, and slightly sclerotized (Fig. 4H).

**Female.** Length. Body: 6.00–6.99 mm, wing: 5.95–6.66 mm.

Differs from male as follows: *Head:* dichoptic, the shortest distance between eyes is 0.74–0.80 mm; fronto-orbital plate setulose with 2 reclinate orbital setae. Postocular setae divergent. Parafrontal plate setulose. *Legs.* Mid and hind femora black, with a little more than the apical third yellow. Mid femur with a row of anterior setae in the basal middle; 2–3 setae in the apical third of anteroventral surface. Hind femur with only an anterodorsal row setae, and 3 long and curved setae in the basal third on anteroventral surface, hind tibia with only 2 anteroventral setae and 3 anterodorsal setae.

*Terminalia.* Tergite 8 with 2 parallel sclerotized plates, fused and with setulae on the distal margin; epiproct with proximal margin curved, and setulose, cercus digitiform with long setulae (Fig. 4I). Hypoproct rounded, sclerotized, with long setulae on distal margin (Fig. 4J).

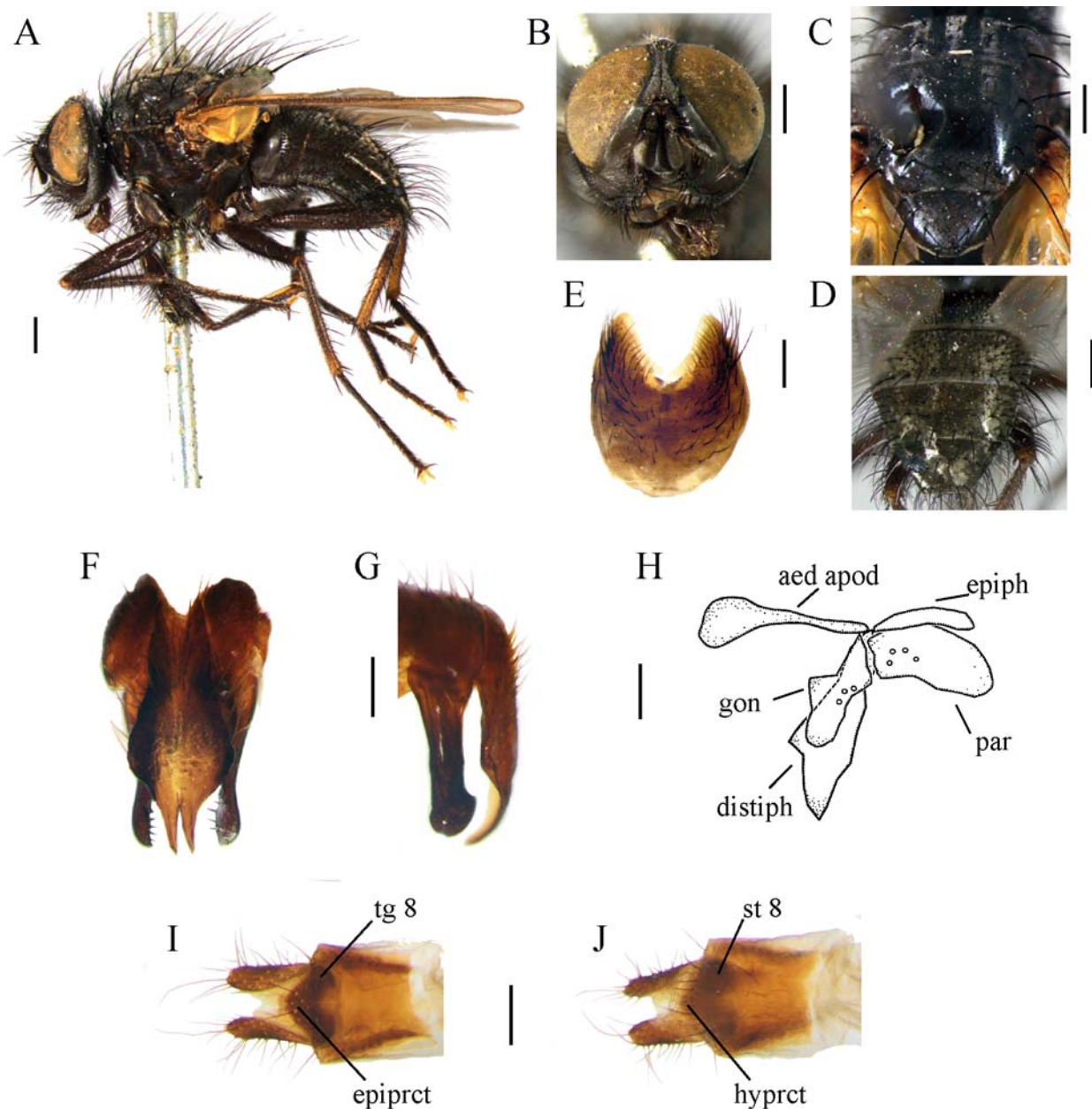
**Type material examined.** (MNRJ). **Paratype** 1 male, pinned, in good condition, labels: “Castro [printed] [crossed out] Ancud [handwritten] / Isla Chiloe / Chile Dec 1926 / R & Shannon [printed]” on white paper; “Paratype No [printed] / 49856 [handwritten] / U.S.N.M. [printed]” on red paper; “Helina bigoti / Malloch, 1934 [handwritten] / C.J.B. Carvalho det. 198 [printed] 5[handwritten]” on white paper; “Helina / flavisquama” handwritten on white paper; “♂” handwritten on white paper; “M.N.R.J [printed] / 1433 [handwritten]” on white paper, black frame. **Paratype** 1 male, pinned, “Castro / Isla Chiloe / Chile Dec 1926 / R & Shannon” printed on white paper; “Paratype No [printed] / 49856 [handwritten] / U.S.N.M. [printed]” on red paper; “Helina / bigoti” handwritten on white paper; “♂” handwritten on white paper; “M.N.R.J [printed] / 1431 [handwritten]” on white paper, black frame. **Paratype** 1 female, pinned, abdomen pinned below in glass vial, “Castro [printed] [crossed out] Ancud [handwritten] / Isla Chiloe / Chile Dec 1926 / R & Shannon [printed]” on white paper; “Paratype No [printed] / 49856 [handwritten] / U.S.N.M. [printed]” on red paper; “Helina / bigoti Malloch [handwritten] / C.J.B. Carvalho det. 198 [printed] 8 [handwritten]” on white paper; “Helina / flavisquama” handwritten on white paper; “♀” handwritten on white paper; “M.N.R.J [printed] / 1433 [handwritten]” on white paper, black frame.

**Other material examined.** **ARGENTINA: Chubut:** 2 females, PN Los Alerces, -42.672556, -71.864390, 23-XI-1993, Mariluis leg. (MACN). **CHILE:** 4 males, I-1927 (MACN); **Región de Bio-Bio:** 1 female, Concepción, Parque Botánico Hualpen, -36.8300, -73.0500, II-1970, Cekalovic leg. (MNRJ); **Región de los Lagos:** 2 females, Osorno, Pucatrihue, -40.563537, -73.284407, 1/12-II-1980, Peña leg. (MACN).

**Distribution** (Fig. 9C). ARGENTINA: Chubut (new record). CHILE: Región de Bio-Bio (new record), Región de los Lagos, Región Metropolitana.

**Remarks.** Malloch (1934) described the species from male and female specimens from Ancud, Castro and Puerto Varas, Chile. We provide a redescription and, for the first time, descriptions of male and female terminalia.

**Biology.** The specimens captured by JCM were collected over rotten meat with a hand net.



**FIGURE 4.** *Helina bigoti* Malloch. **A–H.** Male: **A.** Lateral view (scale bar: 1 mm). **B.** Head, frontal view. **C.** Thorax, dorsal view. **D.** Abdomen, dorsal view (scale bars: 0.5 mm). **E.** Sternite 5 (scale bar: 0.2 mm). **F.** Cercal plate and surstyli, posterior view. **G.** Cercal plate and surstylus, lateral view (scale bar: 0.1 mm). **H.** Phallic complex, lateral view (scale bar: 0.1 mm). **I–J.** Female, apical portion of ovipositor: **I.** Dorsal view. **J.** Ventral view (scalebar: 0.5 mm). (Abbreviations: aed apod, aedeagal apodeme; distiph, distiphallus; epiph, epiphallus; epiprct, epiproct; gon, gonopodo; hyprct, hypoproct; par, paramere; st 8, sternite 8; tg 8, tergite 8.)

### *Helina chilensis* Malloch, 1934

(Figs. 5, 9D)

*Helina fulvocalyprata* Malloch, 1934. **New synonymy.**

*Helina simplex* Malloch, 1934. **New synonymy.**

For a complete list of references, see the catalog by Carvalho *et al.* (2005). Information subsequent to this catalog:

*Helina chilensis*; Löwerberg-Neto *et al.* 2011 (biogeography); Löwerberg-Neto & Carvalho 2013 (checklist).

*Helina fulvocalyprata*; Pont & Werner 2006 (type specimens); Löwerberg-Neto *et al.* 2011 (biogeography); Löwerberg-Neto

& Carvalho 2013 (checklist); Pont 2013 (type specimens).  
*Helina simplex*; Löwerberg-Neto *et al.* 2011 (biogeography); Löwerberg-Neto & Carvalho 2013 (checklist, new records).

**Redescription. Male** (Fig. 5A). Length. Body: 5.56–7.67 mm, wing: 5.23–6.76 mm.

**Head** (Fig. 5B). Black. Holoptic, the shortest distance between eyes is 0.16–0.32 mm. 6–8 pairs of frontal setae. Eye hairs long and sparse. Lunule pale brown; fronto-orbital plate, parafacial, gena, postgena, and occiput black with silver pollinosity. Postocular setae proclinate. Parafrontal plate bare. Antenna dark brown; arista plumose, two or fourth times as long as its basal diameter. Palpus black.

**Thorax** (Fig. 5C). Scutum black with three white-grey pollinose vittae; scutellum; anepisternum, anepimeron, katepimeron, katepisternum, proepisternum, proepimeron and meron black with grey pollinosity; anterior and posterior spiracles black. Chaetotaxy: acrostichal setae 1-2+1; dorsocentral setae 2–4; humeral setae 3–5; notopleural setae 2, posterior seta smaller. Prealar strong, one third-one fourth of the length of the anterior supra-alar postsutural seta. Scutellum with thinner and short basal and subapical setae. Anepisternum with a series of 4–6 strong setae.

**Wing**. Infusate, brown; costal spine two or three time as long as its costal bristles; the transverse cross-vein dm-cu slightly curved; vein R 4+5 and vein M divergent apically; cross vein dm-cu in basal half of cell  $r_{4+5}$ . Both calypters yellow with yellow margins.

**Legs**. Coxa and trochanter black; fore femur black (some specimens yellow apically), fore tibia black; mid femur black at base with apical third yellow (some specimens with apical middle yellow), mid tibia black or dark-brown; hind femur black at base with apical third yellow (some specimens with apical two-third or more yellow), hind tibia dark-brown. Fore femur with rows of dorsal, posterodorsal, and posteroventral setae; fore tibia with one posterior setae, and 3 preapical setae. Mid femur with 4–6 setae in the basal third on ventral surface, and 3 preapical setae on posterodorsal to posterior surface; mid tibia with 3–4 posterior setae, 1–2 posteroventral seta, 1–2 anterodorsal setae (some specimens without setae) and 4 apical setae (anterodorsal, posteroventral, ventral, and anteroventral). Hind femur with a anterodorsal row, and 4–5 setae in the apical middle of anteroventral surface; hind tibia with 3–5 anteroventral setae, 3–6 anterodorsal setae, and 6–7 posterodorsal setae, calcar absent. Fore claws and pulvilli longer than mid and hind.

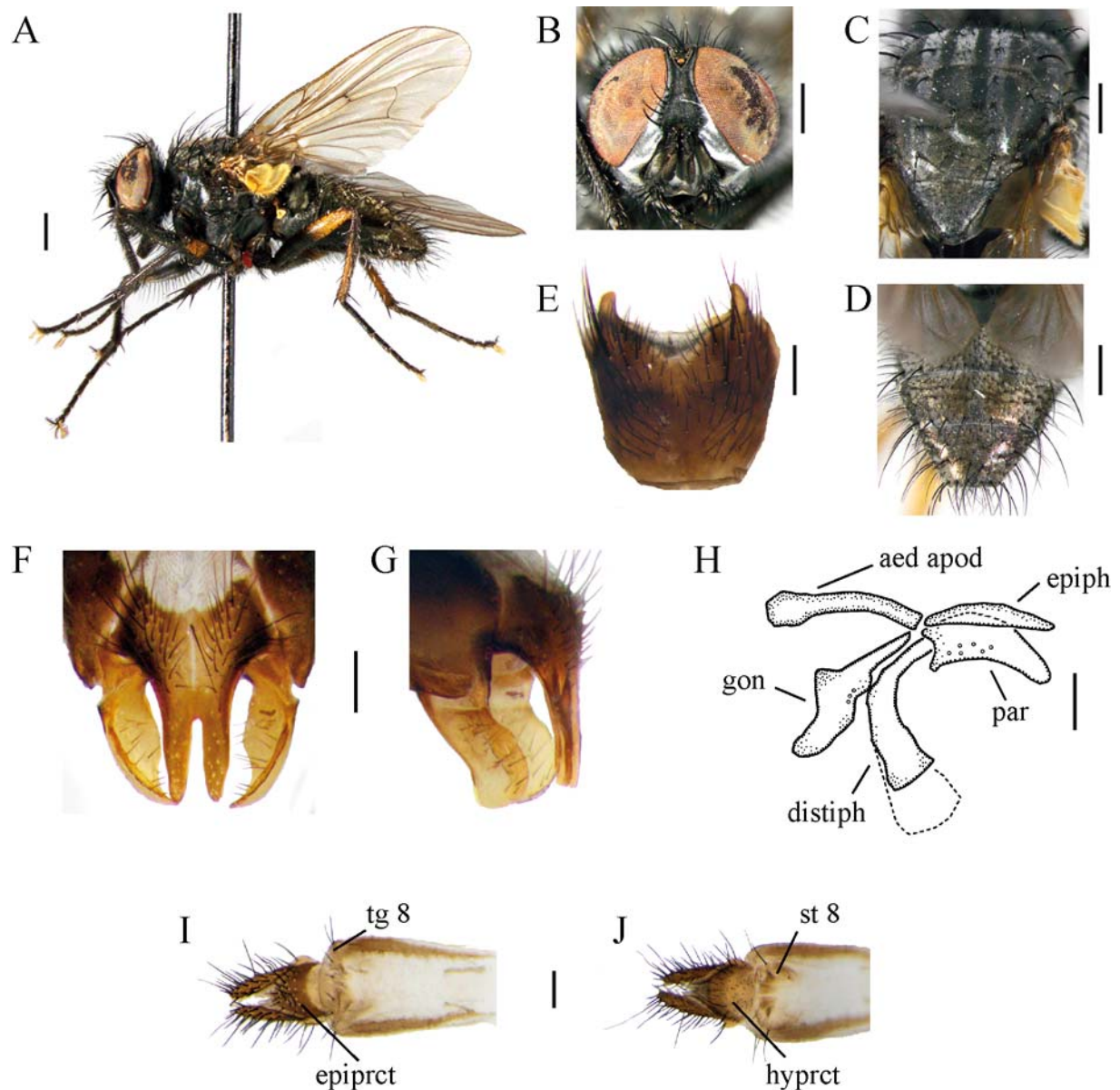
**Abdomen** (Fig. 5D). Black with brown pollinosity. Sternite 5 longer than wide, with several strong setae on the apical third; posterior margin with two projections (Fig. 5E).

**Terminalia**. Cercal plate longer than wide, with a distal incision; with two straight protuberances at the apex (Fig. 5F). Surstylus curving forwards basally and inwards apically, with a wide margin in posterior view, and with strong setae on inner surface (Figs. 5 F–G). Aedeagus with aedeagal apodeme straight and strongly sclerotized; epiphallus slightly sclerotized, paramere slightly bent downward with setula; gonopod with short setulae; and distiphallus tubular, slightly sclerotized (Fig. 5H).

**Female**. Length. Body: 6.11–7.05 mm, wing: 5.80–6.02 mm.

Differs from male as follows: **Head**, dichoptic, the shortest distance between eyes is 0.85–0.89 mm; fronto-orbital plate setulose with 2 reclinate orbital setae. Parafrontal plate setulose. **Legs**. Mid femur with 4–5 setae in the basal third on ventral surface; with a row of anterior setae in the basal middle, and 3 preapical setae on anterodorsal to posterior surface. Hind femur with only an anterodorsal row setae, and 3 long and curved setae in the basal third on anteroventral surface, hind tibia with only 3 anteroventral setae and 4 anterodorsal setae. **Terminalia**. Tergite 8 with 2 parallel sclerotized plates, fused and with setulae on distal margin; epiproct with proximal margin curved, and several strong spines, cercus digitiform with strong spine (Fig. 5I). Hypoproct rounded, sclerotized, with strong setulae on distal margin (Fig. 5J).

**Type material examined. Holotype** 1 male, pinned, without left wing, labels: “*Helina / chilensis / Type* [handwritten] / det. JRMalloch [printed]” on white paper, black frame; “*Perales / I-25*” handwritten on white paper; “*Type No.* [printed] / 49855 [handwritten] / U.S.N.M. [printed]” on red paper (USNM). **Holotype**, 1 male, pinned, damaged, “*Helina / simplex / Type* [handwritten] / det. JRMalloch [printed]” on white paper, black frame; “*Type No.* [printed] / 49854 [handwritten]” on red paper (USNM). **Holotype** 1 male, pinned, without fore and hind legs, labels: “*Helina / fulvocalyptata / Type* [handwritten] / det. JRMalloch [printed]” on white paper, black frame; “*Argentina: / Terr. Rio Negro. / F. & M. Edwards. / B. M. 1927-63.*” printed, on white paper; “*L Correntoso. / 18-25.xi.1926.*” printed, on white paper; “*Holo- / type*” printed, on white paper, red frame (BMNH).



**FIGURE 5.** *Helina chilensis* Malloch. **A–H.** Male: **A.** Lateral view (scale bar: 1 mm). **B.** Head, frontal view. **C.** Thorax, dorsal view. **D.** Abdomen, dorsal view (scale bars: 0.5 mm). **E.** Sternite 5 (scale bar: 0.2 mm). **F.** Cercal plate and surstyli, posterior view. **G.** Cercal plate and surstyli, lateral view (scale bar: 0.1 mm). **H.** Phallic complex, lateral view (scale bar: 0.1 mm). **I–J.** Female, apical portion of ovipositor: **I.** Dorsal view. **J.** Ventral view (scalebar: 0.5 mm). (Abbreviations: aed apod, aedeagal apodeme; distiph, distiphallus; epiph, epiphallus; epiprct, epiproct; gon, gonopodo; hyprct, hypoproct; par, paramere; st 8, sternite 8; tg 8, tergite 8.)

**Other material examined. ARGENTINA: Chubut:** 1 male, PN Lago Puelo, Intendencia, -42.085077, -71.614662, 15-I-2011, Mulieri & Patitucci leg. (MACN); 6 females, PN Los Alerces, Cabaña La Cascada, -42.888499, -71.592376, II-2013, Patitucci leg. (MACN); 1 male, PN Los Alerces, Puerto Mermoud, -42.723187, -71.748741, X-2014, Mulieri leg. (MACN); **Mendoza:** 3 males, Malargüe, Valle Hermoso, -35.066667, -70.216667, 10-I-1993, Medan leg. (FAUBA); **Neuquén:** 4 females, APN Batea Mahuida, -38.845457, -71.093002, I-2013, Mulieri & Patitucci leg. (MACN), 2 males, APN Batea Mahuida, -38.837593, -71.097928, XII-2013, Mulieri & Patitucci leg. (MACN), 4 females, Cerro Chapelco, -40.197050, -71.298453, I/II-1983, Gentili leg. (MACN); 2 females, 4 males, Cerro Chapelco, -40.197050, -71.298453, II-2011, Mariluis leg. (MACN); 2 males, Copahue, -37.820278, -71.101111, I-2002, Medan & Alvarez leg., (FAUBA), 1 female, 1 male, PN Lanín, Hua Hum, -40.116265, -71.662723, II-2011, Patitucci leg. (MACN); 3 males, PN Lanín, Lago Tromen, -39.563419, -71.418872, XII-1998, Medan & Basili leg. (FAUBA), 1 female, PN Lanín, Mirador Bandurrias, -40.159804, -

71.371661, II-2011, Mulieri & Patitucci leg. (MACN), 2 females, 3 males, PN Lanín, Ñorquinco, -39.146931, -71.232717, I-2013, Olea, Mulieri & Patitucci leg. (MACN), 4 females, 2 males, PN Lanín, Ruca Choroí, -39.229641, -71.177417, 10-I-2013, Olea, Mulieri & Patitucci leg. (MACN), 5 females, 2 males, PN Lanín, Seccional Bandurrias, -40.144240, -71.342986, II-2011, Mulieri & Patitucci leg. (MACN). 1 female, San Martín de los Andes, -40.162242, -71.356484, I-1962, (MACN), **Río Negro**: 3 females, PN Nahuel Huapí, Llao Llao, -41.046, -71.572897, 8-I-1962, (MACN); **Santa Cruz**: 2 females, 4 males, PN Los Glaciares, Península Magallanes, Río Mitre, -50.418967, -72.742651, XII-1994, Mariluis leg. (MACN). **CHILE: Región de Bio-Bio**: 3 females, 1 male, Concepción, Parque Botánico Hualpen, -36.8300, -73.0500, II-1970, Cekalovic leg. (MNRJ).

**Distribution** (Fig. 9D). ARGENTINA: Chubut (new record), Mendoza (new record), Neuquén, Río Negro, Santa Cruz (new record). CHILE: Región de Bio-Bio, Región de los Lagos.

**Remarks.** Stein (1904) described *Spilogaster fulvisquama* based on a single female from an unspecified location of Chile. Later, Malloch (1934) described *H. fulvocalyprata* with specimens from several locations of Argentina and Chile, and suggested that it was similar to *S. fulvisquama*. More recently, Pont (1972) explicitly established the synonym. Also, Malloch (1934) described *H. chilensis* from one male specimen from Perales, Chile, and *H. simplex* from a single male specimen without locality. In our samplings, we collected the following combinations from different localities: male specimens of *H. fulvocalyprata* with female specimens of *H. simplex*; male specimens of *H. chilensis* with female specimens of *H. simplex*, and male and female specimens of *H. simplex*. We observed that the variation in the coloration of legs and in the number of setae in the mid and hind tibia of males was not correlated with differences in terminalia structures, which are similar in all specimens. Based on these observations, we concluded that these are the same biological entity. The three names available were published by Malloch (1934); we chose *H. chilensis* because it was first mentioned (Malloch 1934: 176), and provide a redescription with details of female and male terminalia.

**Biology.** Specimens collected by the authors were captured with a baited trap, a Malaise trap, and a hand net over vegetation. Several of the specimens studied in this work were collected on *Discaria nana* with a hand net over 2000 m a.s.l.

### ***Helina connexa* Malloch, 1934**

(Figs. 6, 9E)

**Redescription. Male** (Fig. 6A). *Head.* Black with silver pollinosity. Holoptic. 6–8 pairs of frontal setae. Eye hairs long and numerous. Lunule pale brown; fronto-orbital plate, parafacial, gena, postgena, and occiput black with silver pollinosity. Gena with black setae. Postocular setae proclinated. Palpus black.

*Thorax.* Scutum black with two grey pollinose vitta; scutellum; anepisternum, anepimeron, katepimeron, katepisternum, proepisternum, proepimeron and meron black; anterior and posterior spiracles brown. Chaetotaxy: acrostichal setae 1-2+1; dorsocentral setae 2+4; humeral setae 2; notopleural setae 2, of similar size. Prealar strong, half as long as its anterior supra-alar postsutural seta. Anepisternum with a series of 8–10 strong setae.

*Wing.* Yellowish-brown; costal spine longer than the costal bristles, the transverse cross-vein dm-cu curved; vein R 4+5 and vein M slightly divergent; cross vein dm-cu in basal half of cell  $r_{4+5}$ . Both calypters yellow with yellow margins.

*Legs.* Coxae, trochanter, and fore femur black; fore tibia brown-yellow; mid and hind femora and tibiae yellow; tarsi black. Fore femur with long and fine setula on dorsal, posterodorsal, and posteroventral surface; fore tibia with 1–2 posterior setae, and four strong preapical dorsal setae. Mid femur with long and fine setula on dorsal, posterodorsal, and posteroventral surface, and 3 preapical setae on posterodorsal to posterior surface; with 3 preapical setae on posterodorsal to posterior surface; mid tibia with 3 posterior setae, 2 anterodorsal setae, and 4 apical setae (anterodorsal, posteroventral, ventral, and anteroventral). Hind femur with a strong anterodorsal row of setae, an anteroventral row of curved setae at the apical middle, and posteroventral row of setae at the apical middle; hind tibia with several anteroventral setae, 2 anterodorsal setae and several posterior setae, calcar absent.

*Abdomen.* Dark brown with grey pollinosity, a central line without pollinosity.

**Female.** Length. Body: 5.64–7.06 mm, wing: 5.27–6.81 mm.

Differs from male as follows: *Head*, dichoptic, the shortest distance between eyes is 0.71–0.84 mm; fronto-orbital plate setulose with 2 reclinate orbital setae. Parafrontal plate setulose. *Legs.* Mid femur with 3–4 setae in the

basal middle on ventral surface; and a row of setae in the basal middle on anterior surface. Mid tibia with 2–3 setae on anterodorsal surface, and 4–5 setae on posterodorsal surface. Hind femur with 2–3 setae in the apical middle of anteroventral surface; hind tibia with 3–4 anteroventral setae, 3–4 anterodorsal setae, without seta on posterior surface.

**Terminalia.** Tergite 8 divided into 2 enlarged parallel sclerotized plates; epiproct with proximal margin straight, and several setulae on distal margin, cercus digitiform and setulose (Fig. 6D). Hypoproct rounded, sclerotized, and setulose (Fig. 6C).

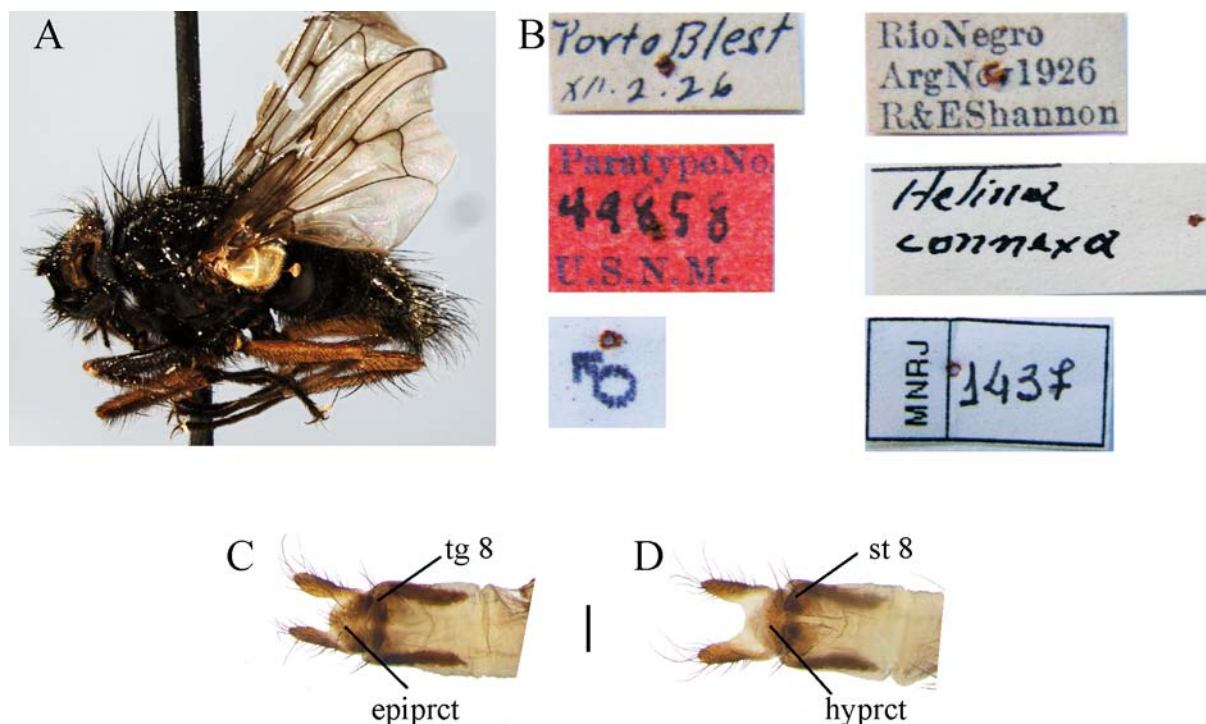
**Type material examined.** (MNRJ). **Paratype** 1 male, pinned, without antenna and wings damaged, labels (Fig. 6B): “Porto Blest / XII.2.26” handwritten on white paper; “Rio Negro / Arg Nov 1926 / R & E Shannon” printed on white paper; “Paratype No [printed] / 49858 [handwritten] / U.S.N.M. [printed]” on red paper; “Helina / connexa” handwritten on white paper; “♂” handwritten on white paper; “M.N.R.J [printed] / 1437 [handwritten]” on white paper, black frame.

**Other material examined.** **ARGENTINA: Chubut:** 1 female, PN Los Alerces, Delta del río Stange, -42.872517, -71.774445, II-2013, Mulieri leg. (MACN); 1 female, PN Los Alerces, Arroyo Torcido, -42.761269, -71.751391, X-2014, Patitucci leg. (MACN); **Neuquén:** 1 female, PN Lanín, Laguna Pudu-Pudu, -40.364956, -71.468841, II-2011, Mulieri leg. (MACN); 1 female, PN Lanín, Pucará, I-1973, Fritz leg. (MACN); **Santa Cruz:** 1 female, PN Los Glaciares, Península Magallanes, Río Mitre, -50.418967, -72.742651, I-1996, Mariluis leg. (MACN), 1 female, X-1994, (MACN): 1 female, PN Los Glaciares, Ventisquero Moreno, I-1977, Stange leg. (IFML); **Tierra del Fuego:** 2 females, PN Tierra del Fuego, -54.834897, -68.446657, I-1996, Mariluis leg. (MACN). **CHILE: Región de los Lagos:** 1 female, el Chingue, I-1980, Peña leg. (MACN)

**Distribution** (Fig. 9E). ARGENTINA: Chubut (new record), Neuquén, Río Negro, Santa Cruz (new record), Tierra del Fuego (new record). CHILE: Región de los Lagos, Región Magallanes.

**Remarks.** This species was briefly described by Malloch (1934) based on male and female specimens from several locations. This author suggested that this species is similar to *H. nigrimana*, but different in the shape of the cercal plate (Malloch 1934: 307, fig. 55b, c). We provided a redescription based on a single male paratype housed in MNRJ, and females collected in several locations. No male terminalia extraction was performed.

**Biology.** The specimens captured by the authors were collected over rotten meat with a hand net and with a baited trap.



**FIGURE 6.** *Helina connexa* Malloch. **A–B.** Paratype, male: **A.** Lateral view (scale bar: 1 mm). **B.** Labels. **C–D.** Female, apical portion of ovipositor: **C.** Dorsal view. **D.** Ventral view (scalebar: 0.5 mm). (Abbreviations: epiprct, epiproct; hyprct, hypoproct; st 8, sternite 8; tg 8, tergite 8.)

***Helina discolor* (Stein, 1911)**

(Figs. 7, 9F)

For a complete list of references, see the catalog by Carvalho *et al.* (2005).

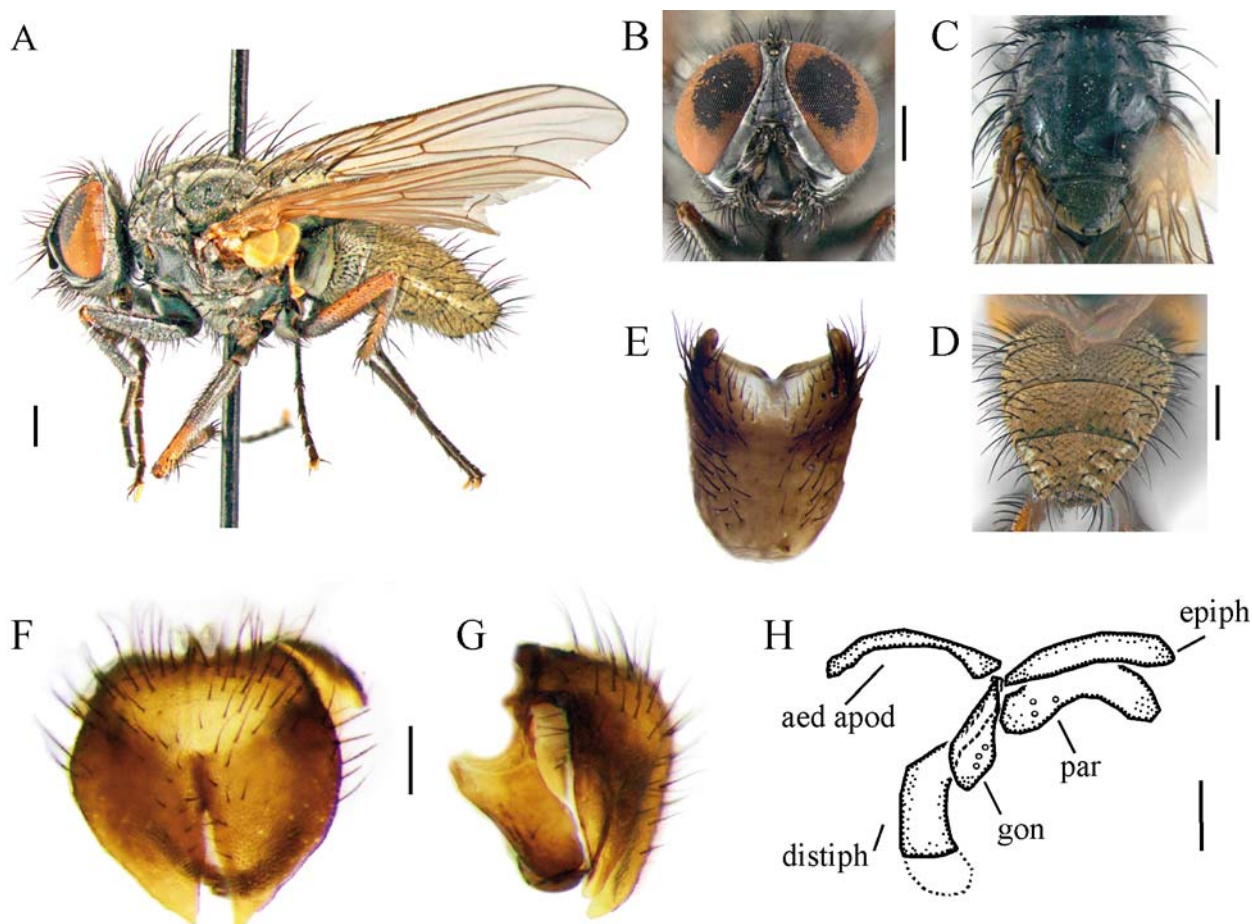
Information subsequent to this catalog: Löwerberg-Neto *et al.* 2011 (biogeography); Löwerberg-Neto & Carvalho 2013 (checklist), Pont 2013 (type specimens).

**Redescription. Male** (Fig. 7A). Length. Body: 6.26–7.68 mm, wing: 4.90–6.42 mm.

**Head** (Fig. 7B). Black with silver pollinosity. Holoptic, the shortest distance between eyes is 0.23–0.27 mm. 8–10 pairs of frontal setae. Eye hairs long and sparse. Lunule dark brown; fronto-orbital plate, parafacial, gena, postgena, and occiput black with silver pollinosity. Parafrontal plate bare. Postocular setae proclinate. Antenna black; arista with its longest hairs hardly longer than its basal diameter. Palpus black.

**Thorax** (Fig. 7C). Scutum black with two poorly defined white pollinose vittae; scutellum black with grey pollinosity; anepisternum, anepimeron, katepimeron, katepisternum, proepisternum, proepimeron and meron black; anterior and posterior spiracles dark brown. Chaetotaxy: acrostichal setae 1-2+1; dorsocentral setae 2+4; humeral setae 3; notopleural setae 2, of similar size. Prealar strong, less than one fourth of the length of the anterior supra-alar postsutural seta. Scutellum with short and strong basal and subapical setae. Anepisternum with a series of 8–10 strong setae.

**Wing.** Yellow-brownish; costal spine little longer than the costal bristles; the transverse cross-vein dm-cu strongly curved; vein R 4+5 and vein M straight; cross vein dm-cu at middle of cell  $r_{4+5}$ . Both calypters hyaline with yellow margins.



**FIGURE 7.** *Helina discolor* (Stein), male: **A.** Lateral view (scale bar: 1 mm). **B.** Head, frontal view. **C.** Thorax, dorsal view. **D.** Abdomen, dorsal view (scale bars: 0.5 mm). **E.** Sternite 5 (scale bar: 0.2 mm). **F.** Cercal plate, posterior view. **G.** Cercal plate and surstylus, lateral view (scale bar: 0.1 mm). **H.** Phallic complex, lateral view (scale bar: 0.1 mm). (Abbreviations: aed apod, aedeagal apodeme; distiph, distiphallus; epiph, epiphallus; gon, gonopodo; par, paramere.)



*Legs.* Coxa and trochanter black. Fore femur and tibia black; mid and hind femora with basal half black and mid and hind tibia brownish-yellow. Fore femur with rows of dorsal, posterodorsal, and posteroventral setae; fore tibia with one posterior seta, four strong preapical setae. Mid femur with 3–4 setae in the basal third on ventral surface; and 3 preapical setae on anterodorsal to posterior surface; mid tibia with 2 anterodorsal setae, 3–4 posterior setae, and one strong posteroventral seta at middle; and 4 apical setae (anterodorsal, posteroventral, ventral, and anteroventral). Hind femur with anterodorsal row and 5–7 setae in the apical middle of anteroventral surface; hind tibia with 4 anteroventral setae, 4 anterodorsal setae and 6–7 posterodorsal setae, calcar absent. Fore claws and pulvilli longer than mid and hind.

*Abdomen* (Fig. 7D). Dark brown with brown-golden pollinosity. Sternite 5 longer than wide, with several strong setae on the apical third; posterior margin with two rounded processes (Fig. 7E).

*Terminalia.* Cercal plate with a similar length and width; with a distal incision, and with two protuberances at the apex (Fig. 7F). Surstylus short than cercal plate, broad, and curving inward distally (Figs. 7 F–G). Aedeagus with aedeagal apodeme curved and strongly sclerotized; epiphalus sclerotized, paramere slightly bent downward with setula; gonopod with short setulae; and distiphallus tubular, slightly sclerotized (Fig. 7H).

**Material examined.** ARGENTINA: Neuquén: 3 males, Cerro Chapelco, -40.197050, -71.298453, II-2011, Mariluis leg. (MACN); 1 female, Cerro Chapelco, -40.197050, -71.298453, 21-28-III-1983, Gentili leg. (IFML); Santa Cruz: 1 male, El Calafate, -50.321674, -72.263421, X-1994, Mariluis leg. (MACN); 3 males, PN Los Glaciares, Península Magallanes, Río Mitre, -50.418967, -72.742651, II-1995, Mariluis leg. (MACN), Tierra del Fuego: 1 male, Río Grande, -53.785843, -67.702577, II-1998, Mariluis leg. (MACN).

**Distribution** (Fig. 9F). ARGENTINA: Neuquén (new record), Río Negro, Santa Cruz (new record), Tierra del Fuego (new record). PERU: Cuzco, Potosí.

**Remarks.** Stein (1911) described *Mydaea discolor* with male and female specimens from Cuzco, Perú. Subsequently, Malloch (1934) recorded this species from Bariloche, Argentina. We provided a redescription of the male, and for the first time, the description of the male terminalia. No females were collected. (see comments on *H. neosimplex*).

**Biology.** The specimens captured by JCM in Santa Cruz province and Tierra del Fuego province were collected over rotten meat with a hand net.

### ***Helina dorada* sp. nov.**

(Figs. 8, 9G)

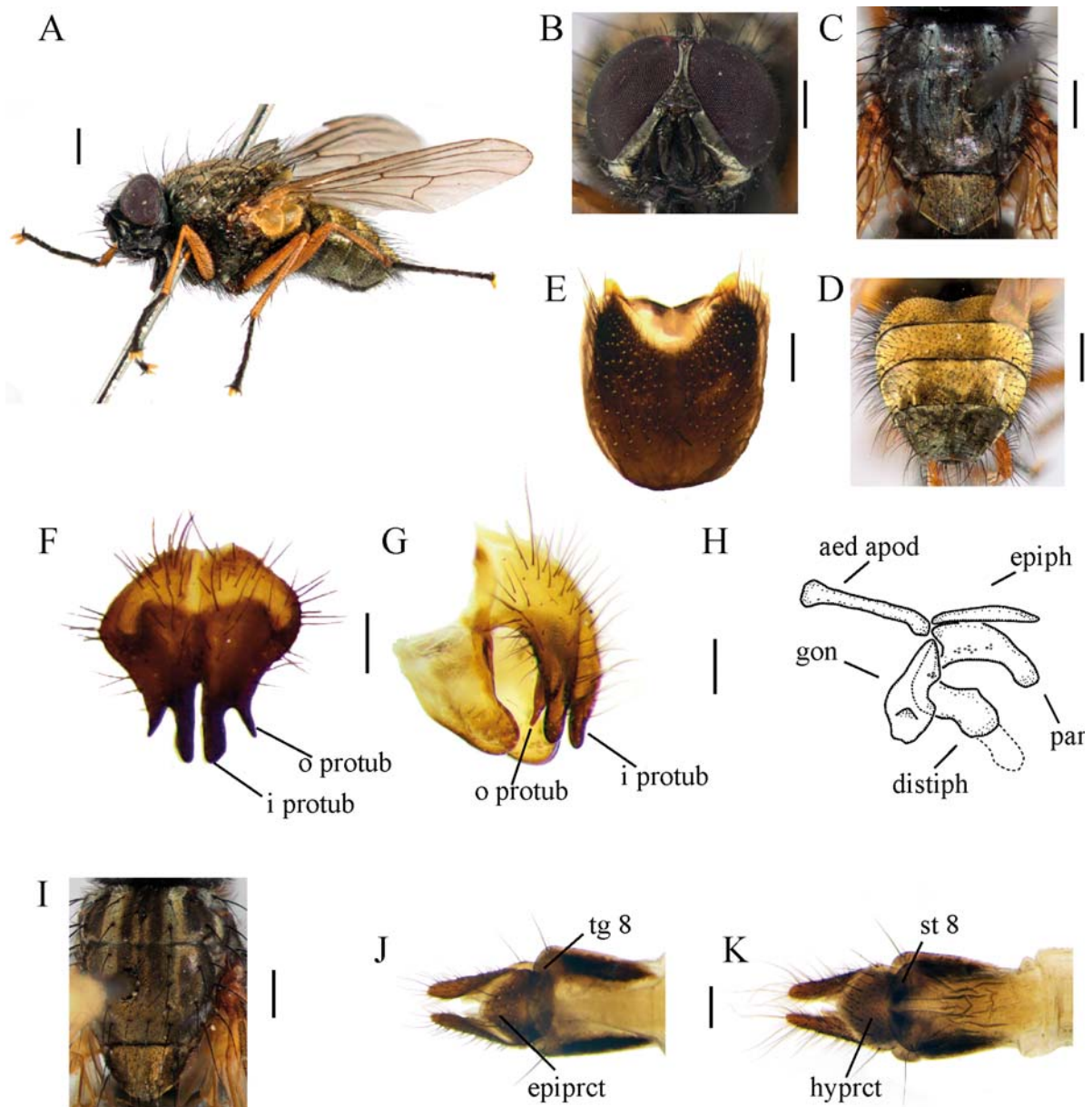
**Description. Male** (Fig. 8A). Length. Body: 7.91–8.47 mm, wing: 8.22–8.93 mm.

*Head* (Fig. 8B). Black with silver pollinosity. Holoptic, the shortest distance between eyes is 0.14–0.23 mm. 6–8 pairs of frontal setae. Eye hairs long and numerous. Lunule pale brown; fronto-orbital plate, parafacial, gena, postgena, and occiput black with silver pollinosity. Parafrontal plate bare. Postocular setae proclinate. Antenna black; arista with hairs shorter than basal diameter. Palpus black.

*Thorax* (Fig. 8C). Scutum black with two white pollinose vittae; scutellum black with golden-brown pollinosity; anepisternum, anepimeron, katapimeron, katapisternum, proepisternum, proepimeron and meron black; anterior and posterior spiracles brown. Chaetotaxy: acrostichal setae 1-2+1; dorsocentral setae 2+4; humeral setae 3; notopleural setae 2, of similar size. Prealar seta strong, half as long as its anterior supra-alar postsutural seta. Scutellum with thinner and long basal and subapical setae. Anepisternum with a series of 8–10 strong setae.

*Wing.* Yellowish-brown; costal spine little longer than the costal bristles; the transverse cross-vein dm-cu slightly curved; vein R 4+5 and vein M diverge apically; cross vein dm-cu in basal half of cell  $r_{4+5}$ . Both calypters hyaline with yellow margins.

*Legs.* Coxa and trochanter dark brown; femora and tibiae yellow, tarsi dark brown. Fore femur with rows of dorsal, posterodorsal, and posteroventral setae; fore tibia with one posterior seta, 4 preapical setae. Mid femur with 6–7 setae in the basal middle on ventral surface; and 2–3 preapical setae on dorsal to posterior surface; mid tibia with 2–4 posterior setae and 4 apical setae (anterodorsal, posteroventral, ventral, and anteroventral). Hind femur with anterodorsal row of setae and 6–7 setae in the apical middle of anteroventral surface; hind tibia with 5–6 anteroventral setae, 2 anterodorsal setae and 5–6 posterodorsal setae, calcar absent. Claws and pulvilli of similar size in all three legs.



**FIGURE 8.** *Helina dorada* sp. nov. A–H. Male: A. Lateral view (scale bar: 1 mm). B. Head, frontal view. C. Thorax, dorsal view. D. Abdomen, dorsal view (scale bars: 0.5 mm). E. Sternite 5 (scale bar: 0.2 mm). F. Cercal plate, posterior view. G. Cercal plate, and surstyli, lateral view (scale bar: 0.1 mm). H. Phallic complex, lateral view (scale bar: 0.1 mm). I–K. Female: I. Thorax, dorsal view (scale bars: 0.5 mm). J. Apical portion of ovipositor, dorsal view. K. Apical portion of ovipositor, ventral view (scalebar: 0.5 mm). (Abbreviations: aed apod, aedeagal apodeme; distiph, distiphallus; epiph, epiphallus; epiprct, epiproct; gon, gonopodo; hyprct, hypoproct; i protub, inner protuberance; o protub, outer protuberance; par, paramere; st 8, sternite 8; tg 8, tergite 8.)

*Abdomen* (Fig. 8D). Black with golden-yellow pollinosity. Sternite 5 longer than wide, setulose; posterior margin with two flat and membranous processes (Fig. 8E).

*Terminalia*. Cercal plate with a similar length and width, with a distal incision; and with four protuberances at the apex: inner protuberance long and slightly curved, outer protuberance short and curved backward (Fig. 8F). Surstylus very broad basally, narrow distally, and with several setae on inner surface at distal part (Fig. 8G). Aedeagus with aedeagal apodeme straight and strongly sclerotized; epiphallus slightly sclerotized, paramere slightly sclerotized with setula; gonopod with short setulae; and distiphallus curved, slightly sclerotized (Fig. 8H).

*Female*. Length. Body: 7.30–7.73 mm, wing: 7.37–8.27 mm.

Differs from male as follows: *Head*: dichoptic, the shortest distance between eyes is 0.90–1.07 mm; fronto-orbital plate setulose with 2 reclinate orbital setae. Eye hairs short and sparse. Parafrontal plate with few little hairs.

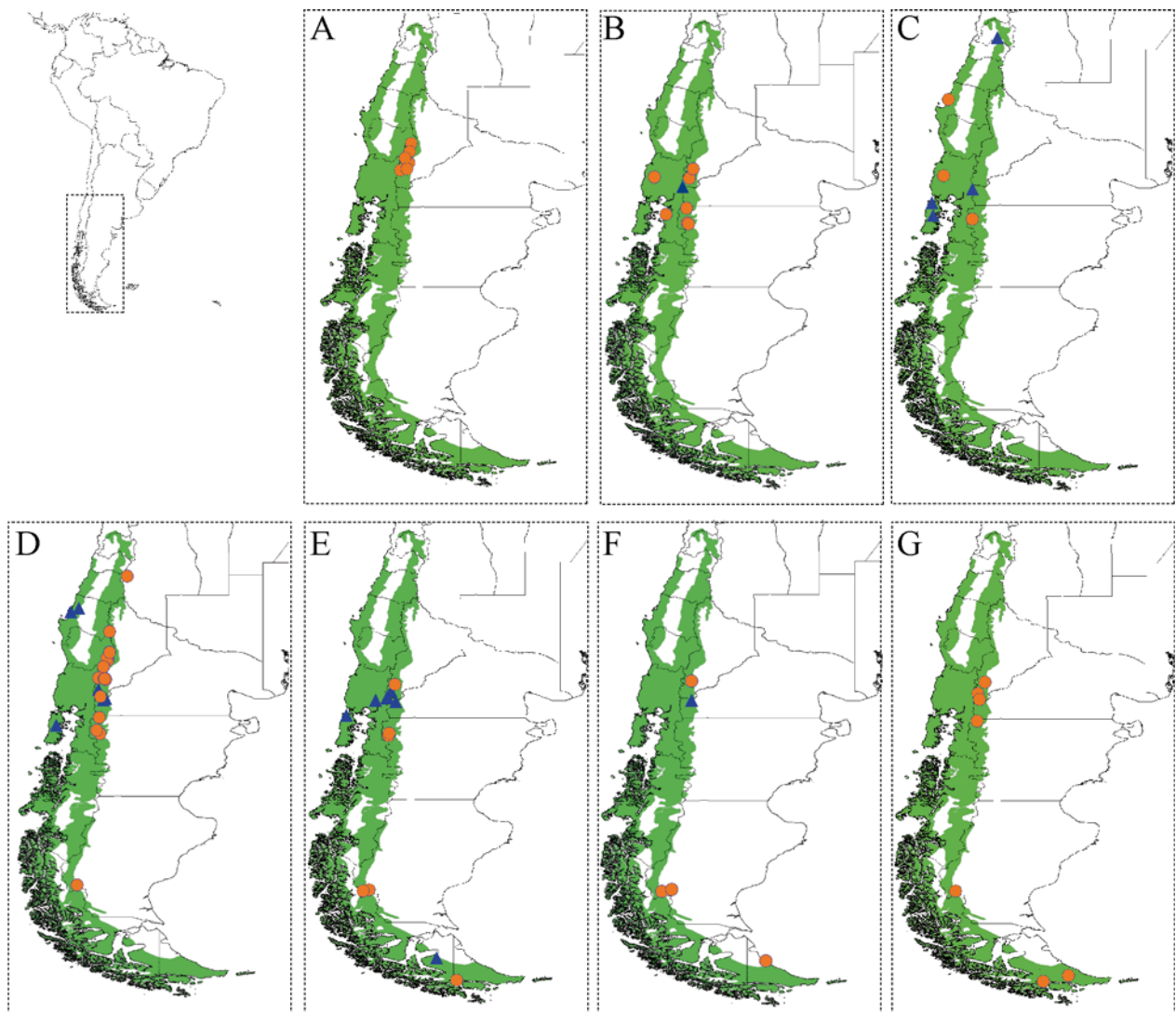
Parafacialia with silver-brown pollinosity. Postocular setae divergent. *Thorax* (Fig. 8I). Black with two yellow-brownish pollinose vittae. *Legs*. Mid femur with a row of setae on ventral surface shorter toward the apex; mid tibia with 3–4 posterior setae and 2 anterodorsal setae. Hind femur with 2–3 setae in the apical middle of anteroventral surface; hind tibia with 2–3 anteroventral setae, 2–3 anterodorsal setae. Claws and pulvilli smaller than male.

*Terminalia*. Tergite 8 with 2 parallel sclerotized plates, fused and with setulae on distal margin; epiproct with proximal margin straight and setulose, cercus digitiform with long setulae (Fig. 8J). Hypoproct rounded, sclerotized, with a row of long setula on distal margin (Fig. 8K).

**Type material.** **Holotype** male, pinned, abdomen dissected and pinned below, label: “Arg. Chubut, Parque Nacional / Lago Puelo (Gendarmería Malaise) / 42° 05,847’ S 71° 40,937’W / I-2012 Mulieri & Patitucci leg.” (MACN). **Paratypes**: two females, pinned: “Arg. T. del Fuego / L. Fagnano / I-99 Mariluis” (MACN), one female, pinned: “Arg. T. del Fuego / L. Fagnano / I-99 Mariluis” (IFML).

**Other material examined.** **ARGENTINA:** **Neuquén:** 1 female, Cerro Chapelco, -40.197050, -71.298453, III-1983, Gentilli leg. (IFML), 1 female, Villa La Angostura, -40.763229, -71.646313, 25-II-1994, Mariluis leg. (MACN); **Río Negro:** 1 male, PN Nahuel Huapí, Llao Llao, -41.046, -71.572, 8-I-1962, (MACN); **Santa Cruz:** 20 females, 1 male, PN Los Glaciares, Península Magallanes, Río Mitre, -50.418967, -72.742651, I-II-1995, Mariluis leg. (MACN); **Tierra del Fuego:** 14 females, 1 male, Lago Fagnano, -54.537434, -67.223272, I-1982, Gondell leg. (MACN), 1 female, PN Ushuaia, -54.834897, -68.446657, II-1996, Mariluis leg. (MACN).

**Distribution** (Fig. 9G). **ARGENTINA:** Chubut, Neuquén, Río Negro, Santa Cruz, Tierra del Fuego.



**FIGURE 9.** Geographical distribution. **A.** *Helina araucana* sp. nov. **B.** *Helina australis* Carvalho & Pont. **C.** *Helina bigoti* Malloch. **D.** *Helina chilensis* Malloch. **E.** *Helina connexa* Malloch. **F.** *Helina discolor* (Stein). **G.** *Helina dorada* sp. nov. (Green area: Andean-Patagonian forests; orange circle: new records; blue triangle: previous distribution.)

**Remarks.** *Helina dorada* **sp. nov.** is similar to *H. australis*, but is distinguished by the short hairs of the arista, general coloration, the number of setae in the basal middle of ventral surface of the mid femur, the number of setae of the mid tibia, and the shape of the cercal plate and surstylus.

**Biology.** The specimens captured by JCM in Santa Cruz and Tierra del Fuego provinces were collected over rotten meat with a hand net.

**Etymology.** The specific epithet is a Spanish adjective agreeing in gender with *Helina*, meaning “golden”.

### ***Helina neosimplex* Snyder, 1957**

(Figs. 10, 15A)

For a complete list of references, see the catalog by Carvalho *et al.* (2005).

Information subsequent to this catalog: Patitucci *et al.* 2011 (type specimens); Löwerberg-Neto & Carvalho 2013 (checklist).

**Redescription. Female** (Fig. 10A). Length. Body: 6.12–6.69 mm, wing: 5.34–6.36 mm.

**Head** (Fig. 10B). Black with silver pollinosity. Dichoptic, the shortest distance between eyes is 0.64–0.96 mm. 8–10 pairs of frontal setae. Fronto-orbital plate setulose with 2 reclinate orbital setae. Parafrontal plate setulose. Eye hairs short and abundant. Lunule dark brown; fronto-orbital plate, parafacial, gena, postgena, and occiput black with grey pollinosity. Postocular setae divergent. Antenna black; arista pubescent, with its longest hairs hardly longer than its basal diameter. Palpus black.

**Thorax** (Fig. 10C). Scutum black with three black-grey pollinose vitta; scutellum black; anepisternum, anepimeron, katapimeron, katapisternum, proepisternum, proepimeron and meron black with grey pollinosity; anterior and posterior spiracles brown. Chaetotaxy: acrostichal setae 1-2+1; dorsocentral setae 2+4; humeral setae 3; notopleural setae 2, of similar size. Prealar strong, one-third of the length of the anterior supra-alar postsutural seta. Scutellum with strong and short basal and subapical setae. Anepisternum setulose.

**Wing.** Yellowish-brown; costal spine longer than the costal bristles; transverse cross-vein dm-cu strongly curved; vein R 4+5 and vein M diverge apically; cross vein dm-cu at middle of cell  $r_{4+5}$ . Both calypters yellow with yellow margins.

**Legs.** Coxa, trochanter, and fore femur black; tip of fore femur, mid and hind femur, and tibiae yellow, tarsi dark brown. Fore femur with rows of dorsal, posterodorsal, and posteroventral setae; fore tibia with one posterior seta, 4 preapical setae. Mid femur with only 3–4 setae in the basal middle on ventral surface; a row of setae on anterior surface, and 3 preapical setae on dorsal to posterior surface; mid tibia with 3 anterodorsal setae, 3 posterodorsal setae, 1 posteroventral seta, and 4 apical setae (anterodorsal, posteroventral, ventral, and anteroventral). Hind femur with anterodorsal row of setae and 3–4 setae in the apical middle of anteroventral surface; hind tibia with 2–3 anteroventral setae, and 2 anterodorsal setae; calcar absent. Claws and pulvilli of similar size in all three legs.

**Abdomen** (Fig. 10D). Black with brownish-gray pollinosity.

Tergite 8 divided into 2 enlarged parallel sclerotized plates; epiproct with proximal margin curved, and several strong spines, cercus digitiform with strong spines (Fig. 10E). Hypoproct rounded, sclerotized and setulose (Fig. 10F).

**Type material examined** (IFML). 1 female, pinned, in good condition, labels: “Santa Cruz / Lago Argentino / 13-I-953 / coll: Dr. Willink” handwritten on white paper, black frame; “Holotype ♀ / *Helina* / *neosimplex* / Snyder” handwritten on red paper.

**Other material examined. ARGENTINA: Santa Cruz:** 1 female, PN Los Glaciares, El Chaltén, -49.329877, -72.886233, 31-I-2005, Medan leg. (FAUBA), 4 females, PN Los Glaciares, El Chaltén -49.329877, -72.886233, II-2007, Mariluis leg. (MACN).

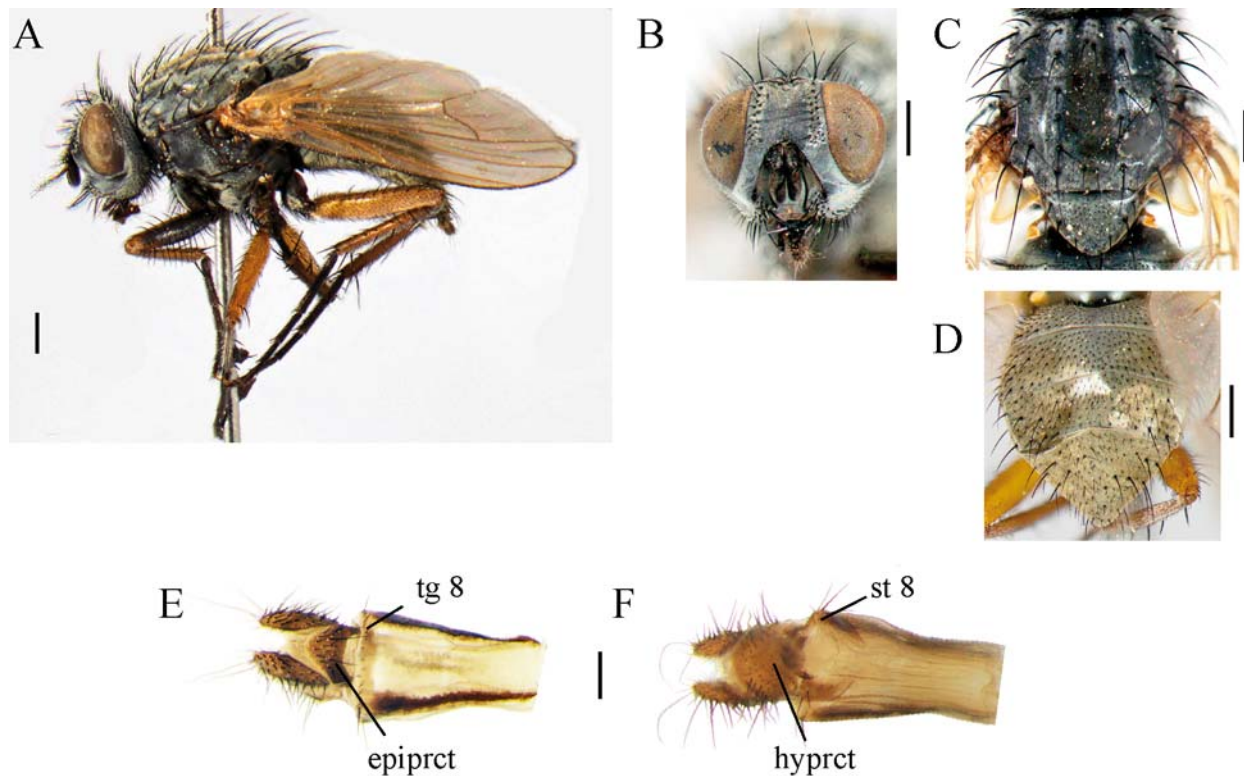
**Distribution** (Fig. 15A). ARGENTINA: Santa Cruz.

**Remarks.** Snyder (1957) described the species with a single female specimen, and suggested that it differs from *H. nigrimana* in the width of the frons and setae of the mid tibia and hind femur. Here, we provide a redescription of the female, and for the first time, the description of female terminalia. Male unknown.

*Helina neosimplex* has a strong morphology similarity with *H. discolor* (Stein, 1911) redescribed by Malloch (1934). This author redescribed *H. discolor* on the basis of a single male collected in Bariloche, and not provided

an explicit mention of the type examination. We suppose the male of *H. discolor* described by Malloch may be the couple of *H. neosimplex*. However, we not collected *H. neosimplex* and *H. discolor* together in samples, and we only observed the type specimen of *H. neosimplex*. Hence, we prefer not to synonymize the species.

**Biology.** The specimens captured by JCM in Santa Cruz province were collected over rotten meat with a hand net. Several of the specimens studied in this work were collected on *Senecio patagonicus* with a hand net.



**FIGURE 10.** *Helina neosimplex*, female: **A.** Lateral view (scale bar: 1 mm). **B.** Head, frontal view. **C.** Thorax, dorsal view. **D.** Abdomen, dorsal view (scale bars: 0.5 mm). **E–F.** Female, apical portion of ovipositor: **E.** Dorsal view. **F.** Ventral view (scalebar: 0.5 mm). (Abbreviations: epiprct, epiproct; hyprct, hypoproct; st 8, sternite 8; tg 8, tergite 8.)

***Helina nigrimana* (Macquart, 1851)**  
(Figs. 11, 15B)

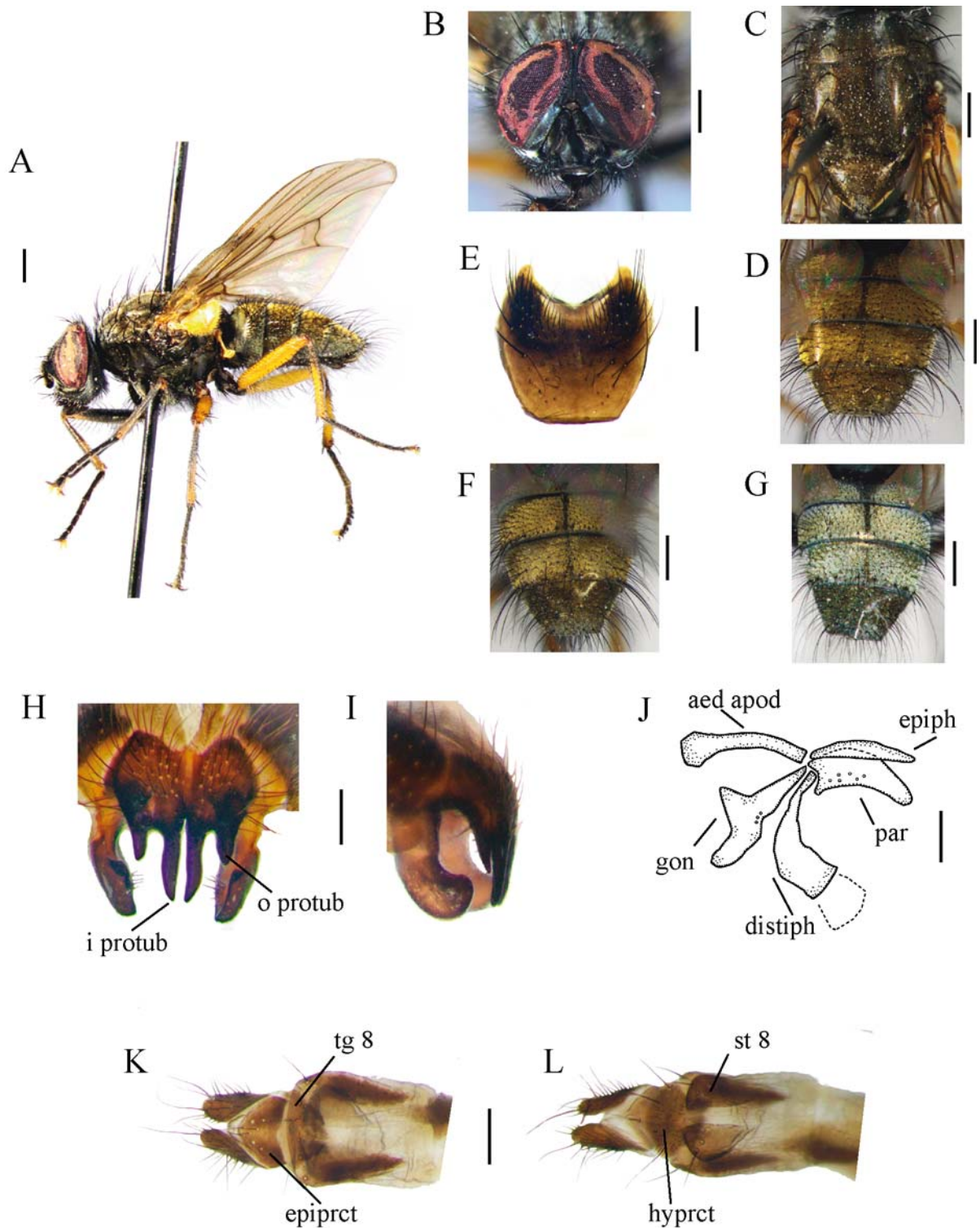
*Helina nigrimana basilaris* Carvalho & Pont, in Carvalho *et al.* 1993. **New synonymy.**  
*Helina nigrimana grisea* (Malloch, 1934). **New synonymy.**

For a complete list of references, see the catalog by Carvalho *et al.* (2005).  
Information subsequent to this catalog: Löwerberg-Neto *et al.* 2011 (biogeography); Pont 2012 (type specimen, explanation of the type-locality); Löwerberg-Neto & Carvalho 2013 (checklist, new records).

**Redescription. Male** (Fig 11A). Length. Body: 6.64–8.76 mm, wing: 5.69–7.90 mm.

**Head** (Fig. 11B). Black with silver pollinosity. Holoptic, the shortest distance between eyes is 0.09–0.15 mm. 6–8 pairs of frontal setae. Eye hairs long and sparse. Lunule pale brown; fronto-orbital plate, parafacial, gena, postgena, and occiput black with grey pollinosity. Parafrontal plate bare. Postocular setae proclinated. Antenna black; arista pubescent, with its longest hairs hardly longer than its basal diameter. Palpus black.

**Thorax** (Fig. 11C). Scutum black with two white pollinose vitta; scutellum black with brown pollinosity, lateral margin with yellow pollinosity; anepisternum, anepimeron, katepimeron, katepisternum, proepisternum, proepimeron and meron black; anterior and posterior spiracles black. Chaetotaxy: acrostichal setae 1-2+1; dorsocentral setae 2+4; humeral setae 2–3; notopleural setae 2, posterior seta smaller. Prealar seta half as long as and thinner than the anterior supra-alar postsutural seta. Scutellum with thin and long basal and subapical setae. Anepisternum with a series of 8–10 strong setae.



**FIGURE 11.** *Helina nigrimana* (Macquart). **A–J.** Male: **A.** Fronto-lateral view (scale bar: 1 mm). **B.** Head, frontal view. **C.** Thorax, dorsal view. **D.** Abdomen, dorsal view (scale bars: 0.5 mm). **E.** Sternite 5 (scale bar: 0.2 mm). **F.** Thorax, dorsal view (belongs to the color variation observed in *H. nigrimana basalis*). **G.** Thorax, dorsal view (belongs to the color variation observed in *H. nigrimana grisea*) (scale bars: 0.5 mm). **H.** Cercal plate and surstyli, posterior view. **I.** Cercal plate and surstylus, lateral view (scale bar: 0.1 mm). **J.** Phallic complex, lateral view (scale bar: 0.1 mm). **K–L.** Female, apical portion of ovipositor: **K.** Dorsal view. **L.** Ventral view (scalebar: 0.5 mm). (Abbreviations: aed apod, aedeagal apodeme; distiph, distiphallus; epiph, epiphallus; epiprct, epiproct; gon, gonopodo; hyprct, hypoproct; i protub, inner protuberance; o protub, outer protuberance; par, paramere; st 8, sternite 8; tg 8, tergite 8.)

*Wing.* Hyaline, infuscate; costal spine little longer than the costal bristles; the transverse cross-vein dm-cu strongly curved; vein R 4+5 and vein M diverge apically; cross vein dm-cu in basal half of cell  $r_{4+5}$ . Both calypters hyaline with yellow margins.

*Legs.* Coxa and trochanter black; fore femur black, fore tibia dark brown (some specimens yellow apically), mid and hind femora yellow (some specimens dark brown at base), mid and hind tibia yellow, brown at base; tarsi black. Fore femur with long and fine setula on dorsal, posterodorsal, and posteroventral surface; fore with 1–2 posterior setae, 4 preapical setae. Mid femur an anterodorsal row of setae, and with long and fine setula on ventral surface, and 3 preapical setae on posterodorsal to posterior surface; mid tibia with 4 posterior setae, and 4 apical setae (anterodorsal, posteroventral, ventral, and anteroventral). Hind femur with a strong anterodorsal row, anteroventral row, and with long and fine posteroventral row of setae at the basal middle, hind tibia with 5–6 anteroventral setae, 2–3 anterodorsal setae and 6–7 posterodorsal setae, calcar absent. Claws and pulvilli similar size in all three legs.

*Abdomen* (Figs. 11 D, F–G). Black with golden-brown pollinosity (some specimens with grey-brown pollinosity), a central line without pollinosity. Sternite 5 with similar length and width, setulose with strong setae on lateral margin; posterior margin with two processes (Fig. 11E).

*Terminalia.* Cercal plate with a similar length and width, with two incision (distal and proximal); with four protuberances at apex: inner protuberance long and curving distally, outer protuberance short and wide, curving forward of the inner protuberance in laterl view (Fig. 11H). Surstylus broad basally, distal part curved strongly forwards, on inner surface with setae in a button-shaped structure (Figs. 11 H–I). Aedeagus with aedeagal apodeme straight and strongly sclerotized, epiphalus slightly sclerotized, paramere slightly bent downward with setula; gonopod with short setulae; and distiphallus tubular and curved, slightly sclerotized (Fig. 11J).

**Female.** Length. Body: 5.60–6.75 mm, wing: 5.23–6.43 mm.

Differs from male as follows: *Head:* dichoptic, the shortest distance between eyes is 0.68–0.86 mm; fronto-orbital plate setulose with 2 reclinate orbital setae. Eye with short hairs. Parafrontal plate setulose. Postocular setae divergent. *Thorax.* Scutum and scutellum black with golden-brown pollinosity. Prealar strong, one-third the length of the supra-alar postsutural seta. *Legs.* Hind femur without long and fine posteroventral row of setae at the basal middle, tibia with 2–3 anteroventral setae, 2 anterior setae, posterior surface bare.

*Terminalia.* Tergite 8 with 2 parallel sclerotized plates, fused and with setulae on distal margin; epiproct with proximal margin straight, and setulose, cercus digitiform and setulose (Fig. 11K). Hypoproct rounded, sclerotized, setulose with a row of long setula on distal margin (Fig. 11L).

**Type material examined.** (MNRJ). *Helina nigrimana nigrimana:* **Paratype** 1 male, pinned, “Porto blest / XII.2.26” handwritten on white paper; “Rio Negro / Arg Nov 1926 / R & E Shannon” printed on white paper; “Paratype No [printed] / 49857 [handwritten] / U.S.N.M. [printed]” on red paper; “♂” handwritten on white paper; “M.N.R.J [printed] / 2664 [handwritten]” on white paper, black frame [leg glued]. **Paratype** 1 male, pinned, “Correntoso / Rio Negro / Arg Nov 1926 / R & E Shannon” printed on white paper; “Paratype No [printed] / 49859 [handwritten] / U.S.N.M. [printed]” on red paper; “♂” handwritten on white paper; “M.N.R.J [printed] / 2666 [handwritten]” on white paper, black frame. **Paratype** 1 male, pinned, “Los Loros / Santiago / Chile Jan 1927 / R & E Shannon” printed on white paper; “Paratype No [printed] / 49849 [handwritten] / U.S.N.M. [printed]” on red paper; “♂” handwritten on white paper; “M.N.R.J [printed] / 1432 [handwritten]” on white paper, black frame. **Paratype** 1 female, pinned, “Bariloche / Rio Negro / Arg Nov 1926 / R & E Shannon” printed on white paper; “Paratype No [printed] / 49857 [handwritten] / U.S.N.M. [printed]” on red paper; “♀” handwritten on white paper; “M.N.R.J [printed] / 2665 [handwritten]” on white paper, black frame. *Helina nigrimana basalis:* **Paratype** 1 male, pinned, “Los Loros / Santiago / Chile Jan 1927 / R & E Shannon” printed on white paper; “Paratype No [printed] / 49849 [handwritten] / U.S.N.M. [printed]” on red paper; “Helina / bifimbriata / var. basalis” handwritten on white paper, black frame; “M.N.R.J [printed] / 2663 [handwritten]” on white paper, black frame. **Paratype** 1 male, pinned, “Los Loros / Santiago / Chile Jan 1927 / R & E Shannon” printed on white paper; “Paratype No [printed] / 49849 [handwritten] / U.S.N.M. [printed]” on red paper; “♂” handwritten on white paper; “M.N.R.J [printed] / 2663 [handwritten]” on white paper, black frame.

**Other material examined.** **ARGENTINA: Chubut:** 1 female, PN Lago Puelo, Los Hitos, -42.097993, -71.684775, I-2011, Patitucci leg. (MACN), 3 females, 2 males, PN Los Alerces, Arroyo Torcido, -42.761269, -71.751391, X-2014, Mulieri, Patitucci & Torretta leg. (MACN); 3 females, 1 male, PN Los Alerces, Lago Futalaufquen, -42.840982, -71.632934, X-1993, Mariluis leg. (MACN); 1 female, 9 males, PN Los Alerces, Lago

Verde, -42.717506, -71.725197, X-2014, Compagnucci, Mulieri, Patitucci & Torretta leg. (MACN); 4 females, 10 males, PN Los Alerces, Puerto Mermoud, -42.723187, -71.748741, X-2014, Mulieri, Patitucci & Torretta leg. (MACN); **Neuquén**: 21 females, 25 males, 8 km northwest of San Martín de los Andes, X-1985 & IX/X-1986, Gentili leg. (IFML), 34 females, 5 males, Cerro Chapelco, -40.197050, -71.298453, XII-1982 & I/III-1983, Gentili leg. (IFML), 6 females, 11 males, PN Lanín, Lago Curruhué, Arroyo Los Pinos, -39.877162, -71.453122, 14-XII-2013, Olea, Mulieri & Patitucci leg. (MACN), 1 male, San Martín de los Andes, -40.162242, -71.356484, I-1941, Bridarolli leg. (MACN), 1 female, 4 males, PN Nahuel Huapí, Paso Puyehue, -40.699856, -71.933292, 14-XII-2001, Medan, Montalto & Devoto leg. (FAUBA); **Río Negro**: 1 female, PN Nahuel Huapí, Puerto Blest, -41.024771, -71.813855, XI-1989, Mariluis leg. (MACN); **Santa Cruz**: 1 male, PN Los Glaciares, Glaciar Perito Moreno, -50.472017, -73.033116, XII-1994, Mariluis leg. (MACN); 4 females, 1 male, PN Los Glaciares, Península Magallanes, Río Mitre, -50.418967, -72.742651, X-1994, Mariluis leg. (MACN); **Tierra del Fuego**: 1 male, PN Ushuaia, -54.834897, -68.446657, 2-XI-1983, Gentili leg. (IFML).

**Distribution** (Fig. 15B). ARGENTINA: Chubut (new record), Neuquén, Río Negro, Santa Cruz (new record), Tierra del Fuego (new record). CHILE: Región de los Lagos, Región Metropolitana.

**Remarks.** Macquart (1851) described *Aricia nigrimanus* with a single male specimen, wrongly assigning “Océanie. Triton-bay” as type locality. Malloch (1934) described *Helina bifimbriata* with male and female specimens from several locations of Argentina and Chile. This author observed color differences in some male specimens and proposed two variations (subspecies): *H. bifimbriata* var. *basalis* and *H. bifimbriata* var. *grisea*. Pont (1967) studied the holotype of *A. nigrimanus*, established a synonym with *H. bifimbriata*, and suggested that the type locality of *A. nigrimanus* is probably Chile. More recently, Carvalho & Pont in Carvalho *et al.* (1993) established a junior secondary homonymy to *H. nigrimana basalis* Zetterstedt, and proposed *H. nigrimana basilaris*. In our samplings, we collected 6 females and 11 males, including the three subspecies and other male specimens with the combination of characters (coloration of abdomen and legs) of the subspecies, in Lago Curruhué, PNL, Neuquén, Argentina. We observed that the variation in the coloration of the males is not correlated with differences in terminalia structures, which are similar in all specimens. Based on these observations, we concluded that these are the same biological entity.

**Biology.** Specimens collected by the authors from PNLP and PNL were captured with a baited trap and a hand net over vegetation.

### *Helina ouina* sp nov.

(Figs. 12, 15C)

**Description. Male** (Fig. 12A). Length. Body: 7.14–8.05 mm, wing: 5.95–7.61 mm.

**Head** (Fig. 12B). Black with silver pollinosity. Holoptic, the shortest distance between eyes is 0.17–0.28 mm. 6–8 pairs of frontal setae, the upper shorter. Eye hairs long and sparse. Lunule pale brown; fronto-orbital plate, parafacial, gena, postgena, and occiput black with silver pollinosity. Postocular setae proclinate. Antenna black; arista bare. Palpus black.

**Thorax** (Fig. 12C). Scutum black with three grey pollinose vittae fused behind the suture; scutellum black with grey pollinosity and lateral margin with yellow pollinosity; anepisternum, anepimeron, katepimeron, katepisternum, proepisternum, proepimeron and meron black with grey pollinosity; anterior and posterior spiracles black. Chaetotaxy: acrostichal setae 1-2+1; dorsocentral setae 2+4; humeral setae 2–3; notopleural setae 2, with similar side. Prealar seta strong, half as long as its anterior supra-alar postsutural seta. Scutellum with strong and short basal and subapical setae. Anepisternum with a series of 8–10 strong setae.

**Wing.** Hyaline, infuscate; costal spine little longer than the costal bristles; transverse cross-vein r-m infuscated, an extra little vein close to cross-vein r-m; the transverse cross-vein dm-cu curved and infuscated; vein R 4+5 and vein M straight; cross vein dm-cu in basal half of cell  $r_{4+5}$ . Both calypters yellow with yellow margins.

**Legs.** Coxa, trochanter, fore femur black, mid and hind femora black with apice yellow, mid and hind tibiae, and tarsi black, hind tibia yellow, brown at base. Fore femur, with long and fine setae on dorsal, posterodorsal, and posteroventral surface; fore tibia black with 1–2 posterior setae. Mid femur with a posteroventral row of setae, and 3 preapical setae on posterodorsal to posterior surface; mid tibia with 3–4 posterior setae, and 4 apical setae (anterodorsal, posteroventral, ventral, and anteroventral). Hind femur with an anterodorsal row and 5–6

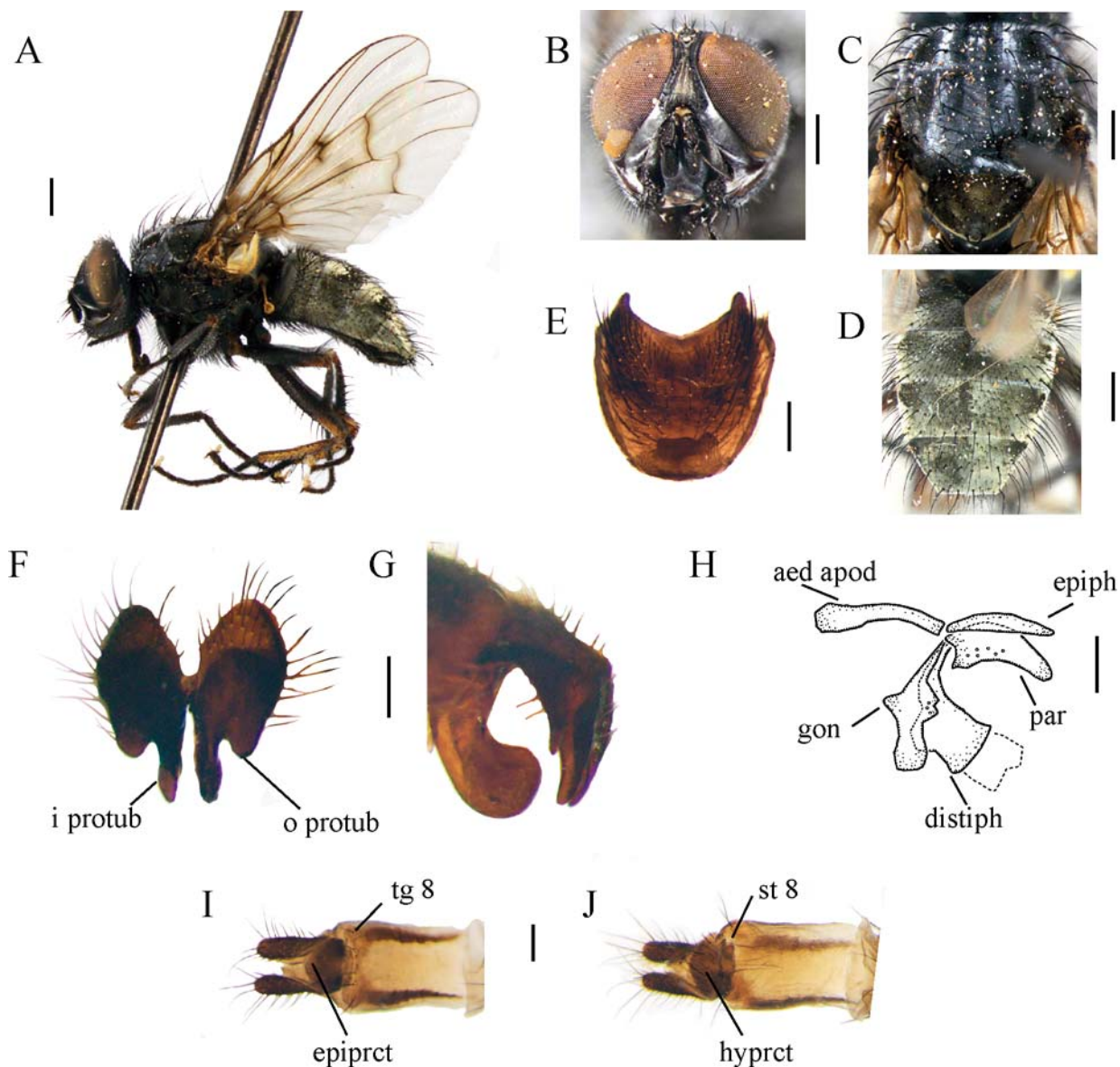


anteroventral setae at the apical middle, hind tibia yellow with 6–8 anteroventral setae, 3–4 anterodorsal setae and 6–7 posterior setae, calcar absent. Claws and pulvilli with similar size in all three legs.

**Abdomen** (Fig. 12D). Black with silver pollinosity. Sternite 5 with similar length and width, setulose; posterior margin with two processes (Fig. 12E).

**Terminalia.** Cercal plate with a similar length and width, with two incision (distal incision longer than proximal incision); with four protuberances at the apex: inner protuberance long and straight, outer protuberance protuberance short, wide, and rounded (Fig. 12F). Surstylus broad distally, distal part curved forwards, on inner surface with setae in a button-shaped structure (Fig. 12G). Aedeagus with aedeagal apodeme straight and strongly sclerotized, epiphallus slightly sclerotized, paramere slightly bent downward with setula; gonopod narrow at middle and with short setulae; and distiphallus campanulate, slightly sclerotized (Fig. 12H).

**Female.** Length. Body: 5.77–7.8 mm, wing: 5.69–6.63 mm.



**FIGURE 12.** *Helina ouina* sp. nov. A–H. Male: A. Lateral view (scale bar: 1 mm). B. Head, frontal view. C. Thorax, dorsal view. D. Abdomen, dorsal view (scale bars: 0.5 mm). E. Sternite 5 (scale bar: 0.2 mm). F. Cercal plate, posterior view. G. Cercal plate and surstylus, lateral view (scale bar: 0.1 mm). H. Phallic complex, lateral view (scale bar: 0.1 mm). I–J. Female, apical portion of ovipositor: I. Dorsal view. J. Ventral view (scalebar: 0.5 mm). (Abbreviations: aed apod, aedeagal apodeme; distiph, distiphallus; epiph, epiphallus; epiprct, epiproct; gon, gonopodo; hyprct, hypoproct; i protub, inner protuberance; o protub, outer protuberance; par, paramere; st 8, sternite 8; tg 8, tergite 8.)

Differs from male as follows: *Head*: dichoptic, the shortest distance between eyes is 0.82–0.95 mm; fronto-orbital plate setulose with 2 reclinate orbital setae. Parafrontal plate setulose. Postocular setae divergent. *Legs*. Fore femora black with apice yellow, mid and hind femora, and tibiae yellow. Hind femur with 2–3 setae in the apical third of anteroventral surface, hind tibia with 3–4 anteroventral setae, 4–5 posterodorsal setae.

*Terminalia*. Tergite 8 with 2 parallel sclerotized plates, fused and with setulae on distal margin; epiproct with proximal margin straight, and a row of setula on distal margin; cercus digitiform and setulose (Fig. 12I). Hypoproct rounded, sclerotized with setulose (Fig. 12J).

**Type material.** **Holotype** male, pinned: “Arg. T. del Fuego / P.N. Ushuaia, I-96 / Mariluis col.” (MACN).

**Paratypes**: eight males, same label data as holotype (MACN).

**Other material examined.** **ARGENTINA: Tierra del fuego**: 1 female, Lago Fagnano, -54.537434, -67.223272, I-1982, Gondell leg. (MACN), 1 female, PN Tierra del Fuego, -54.834897, -68.446657, I-1999, Mariluis leg. (MACN).

**Distribution** (Fig. 15C). ARGENTINA: Tierra del Fuego.

**Remarks.** *Helina ouina* sp. nov. is distinguished from the species of the genus by arista bare, the presence of spots on the wing, and a extra vein close to cross-vein r-m.

**Biology.** The specimens captured by JCM were collected over rotten meat with a hand net.

**Etymology.** The term "ouina" is a noun in apposition; the word was used by the indigenous tribe *Yamana* of Tierra del Fuego to designate a fly.

### ***Helina rufoapicata* Malloch, 1934** (Figs. 13, 15D)

For a complete list of references, see the catalog by Carvalho *et al.* (2005).

Information subsequent to this catalog: Löwerberg-Neto *et al.* 2011 (biogeography); Löwerberg-Neto & Carvalho 2013 (checklist).

**Redescription.** **Male** (Fig. 13A). Length. Body: 5.73–6.30 mm, wing: 4.76–4.85 mm.

*Head* (Fig. 13B). Black. Dichoptic, the shortest distance between eyes is 0.46–0.48 mm. 6–8 pairs of frontal setae, 1 or 2 posteriors lateroconate. Eye hairs short and sparse. Lunule dark brown; fronto-orbital plate, gena, postgena, and occiput black. Parafacialia with brown pollinosity. Parafrontal plate with 2–3 setula above the insertion of antenna. Postocular setae divergent. Antenna black; arista pubescent, plumose, hairs two or three times as long as its basal diameter. Palpus black.

*Thorax* (Fig. 13C). Scutum black with three grey pollinose vittae; scutellum black with grey pollinosity; anepisternum, anepimeron, katepimeron, katepisternum, proepisternum, proepimeron and meron black; anterior and posterior spiracles black. Chaetotaxy: acrostichal setae 1-2+1; dorsocentral setae 2+3-4; humeral setae 3; notopleural setae 2, posterior seta smaller. Prealar thinner, less than one fourth of the length of the anterior supra-alar postsutural seta. Scutellum with thin and short basal and subapical setae. Anepisternum with a series of 4–6 strong setae.

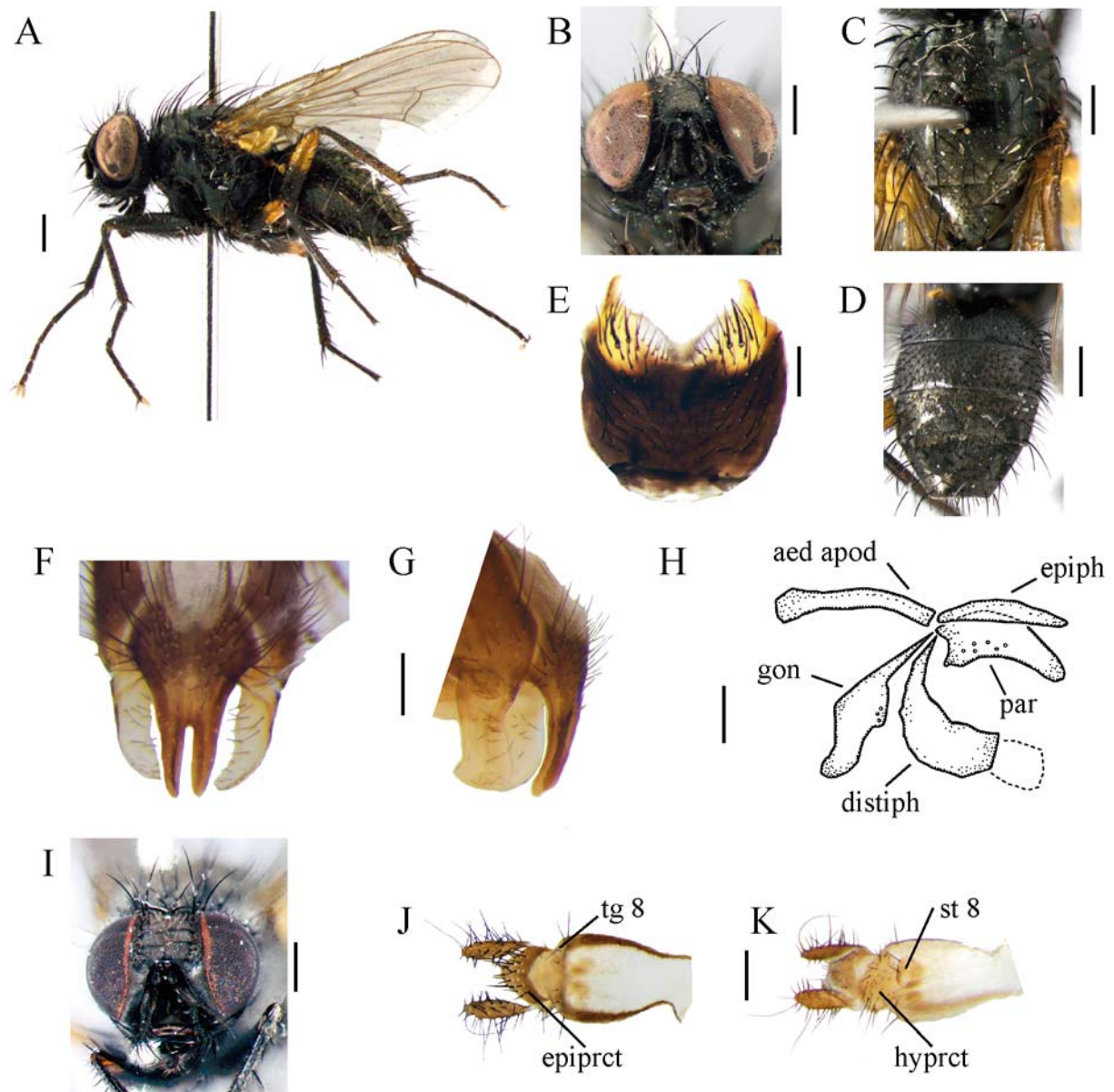
*Wing*. Yellowish-brown; costal spine three time as long as its costal bristles; the transverse cross-vein dm-cu slightly curved; vein R 4+5 and vein M divergent apically; cross vein dm-cu in basal half of cell  $r_{4+5}$ . Both calypters yellow with yellow margins.

*Legs*. Black, mid and hind femora with apical third yellow, hind tibia dark brown. Fore femur with long and fine setula on dorsal, posterodorsal, and posteroventral surface; fore tibia with one posterior seta, and 3 preapical setae. Mid femur with 4–5 setae in the basal third on ventral surface, and 3 preapical setae on posterodorsal to posterior surface; mid tibia with 4–5 posterior setae, one posteroventral seta, 1–2 anterodorsal setae, and 4 apical setae (anterodorsal, posteroventral, ventral, and anteroventral). Hind femur with a anterodorsal row, and 4–5 setae in the apical middle of anteroventral surface; hind tibia with 3–4 anteroventral setae, 3 anterodorsal setae and 2 posterior setae, calcar absent. Claws and pulvilli with similar size in all three legs.

*Abdomen* (Fig. 13D). Black with grey pollinosity. Sternite 5 with similar length and width, with two or three strong setae on the apical third; and yellow and with two processes at posterior margin (Fig. 13E).

*Terminalia*. Cercal plate longer than wide, with only a distal incision; with two protuberances straight at apex (Fig. 13F). Surstylus curving forwards basally and inwards apically, with a wide margin in posterior view, and with

strong setae on inner surface (Figs. 13 F–G). Aedeagus with aedeagal apodeme straight and strongly sclerotized; epiphallus slightly sclerotized, paramere slightly bent downward with setula; gonopod with short setulae; and distiphallus curved, slightly sclerotized (Fig. 13H).



**FIGURE 13.** *Helina rufoapicata* Malloch. **A–H.** Male: **A.** Lateral view (scale bar: 1 mm). **B.** Head, frontal view. **C.** Thorax, dorsal view. **D.** Abdomen, dorsal view (scale bars: 0.5 mm). **E.** Sternite 5 (scale bar: 0.2 mm). **F.** Cercal plate and surstyli, posterior view. **G.** Cercal plate and surstylus, lateral view (scale bar: 0.1 mm). **H.** Phallic complex, lateral view (scale bar: 0.1 mm). **I–K.** Female: **I.** Head, dorsal view (scale bars: 0.5 mm). **J.** Apical portion of ovipositor, dorsal view. **K.** Apical portion of ovipositor, ventral view (scalebar: 0.5 mm). (Abbreviations: aed apod, aedeagal apodeme; distiph, distiphallus; epiph, epiphallus; epiprct, epiproct; gon, gonopodo; hyprct, hypoproct; par, paramere; st 8, sternite 8; tg 8, tergite 8.)

**Female.** Length. Body: 5.76–6.63 mm, wing: 5.41–6.50 mm.

Differs from male as follows: **Head** (Fig. 13I). Dichoptic, the shortest distance between eyes is 0.74–0.92 mm. Parafrontal plate setulose. **Legs.** Mid femur with an anterior row of setae. Hind tibia brown without setae on posterior surface.

**Terminalia:** Tergite 8 with 2 parallel sclerotized plates, fused and with setulae on the distal margin; epiproct with proximal margin straight and strong spine, cercus digitiform with strong spine (Fig. 13J). Hypoproct rounded, sclerotized, and setulose (Fig. 13K).

**Material examined. ARGENTINA: Chubut:** 40 females, 93 males, PN Lago Puelo, Gendarmería, -

42.097468, -71.681953, I-2012, Mulieri & Patitucci leg. (MACN), 8 females, 2 males, PN Lago Puelo, La Playita, -42.099032, -71.607425, I-2012, Mulieri & Patitucci leg. (MACN), 3 females, PN Lago Puelo, Río Turbio, -42.228541, -71.666482, I-2011, Mulieri & Patitucci leg. (MACN), 8 females, 7 males, PN Los Alerces, Cabaña La Cascada, -42.888499, -71.592376, II-2013, Patitucci leg. (MACN); 1 female, 2 malea, PN Los Alerces, Lago Futalaufquen, -42.840982, -71.632934, 14-I-1962 (MACN); **Neuquén**: 5 females, PN Lanín, Mirador Bandurrias, -40.159804, -71.371661, II-2011, Mulieri & Patitucci leg. (MACN), 11 females, 2 males, PN Lanín, Ruca Choroí, -39.229641, -71.177417, 10-I-2013, Olea, Mulieri & Patitucci leg. (MACN), 2 females, 1 male, PN Nahuel Huapí, Lago Traful, -40.566117, -71.489854, 31-I-1968, Stange leg. (IFML); **Río Negro**: 12 females, El Bolson, Cerro Piltriquitón, -41.978228, -71.450864, I-2012, Mulieri & Patitucci leg. (MACN). **CHILE: Región de la Araucanía**: 2 females, 2 males, PN Nahuelbuta, Malleco, -37.773804 -72.984174, 12-II-1967, Schlinger leg. (MNRJ).

**Distribution** (Fig. 15D). ARGENTINA: Chubut (new record), Neuquén (new record), Río Negro. CHILE: Región de la Araucanía (new record).

**Remarks.** Malloch (1934) described *H. rufoplicata* from male and female specimens from several locations of Argentina and Chile. Here, we provide a redescription and, for the first time, descriptions of male and female terminalia.

**Biology.** Specimens collected by the authors were captured with a baited trap, a Malaise trap, and a hand net over vegetation.

### ***Helina viola* Malloch, 1934**

(Fig. 15E)

For a complete list of references, see the catalog by Carvalho *et al.* (2005).

Information subsequent to this catalog: Löwerberg-Neto *et al.* 2011 (biogeography); Löwerberg-Neto & Carvalho 2013 (checklist).

**Remarks.** Malloch (1934) described *H. viola* from a single female specimen from Lago Gutierrez, Río Negro, Argentina. This species is distinguished from other *Helina* species recorded in the region by the metallic coloration. We have not included the redescription of this species because we did not observe or collect any specimen.

**Biology.** Unknown.

**Distribution** (Fig. 15E). ARGENTINA. Río Negro.

### ***Helina xena* Malloch, 1934**

(Figs. 14, 15F)

For a complete list of references, see the catalog by Carvalho *et al.* (2005).

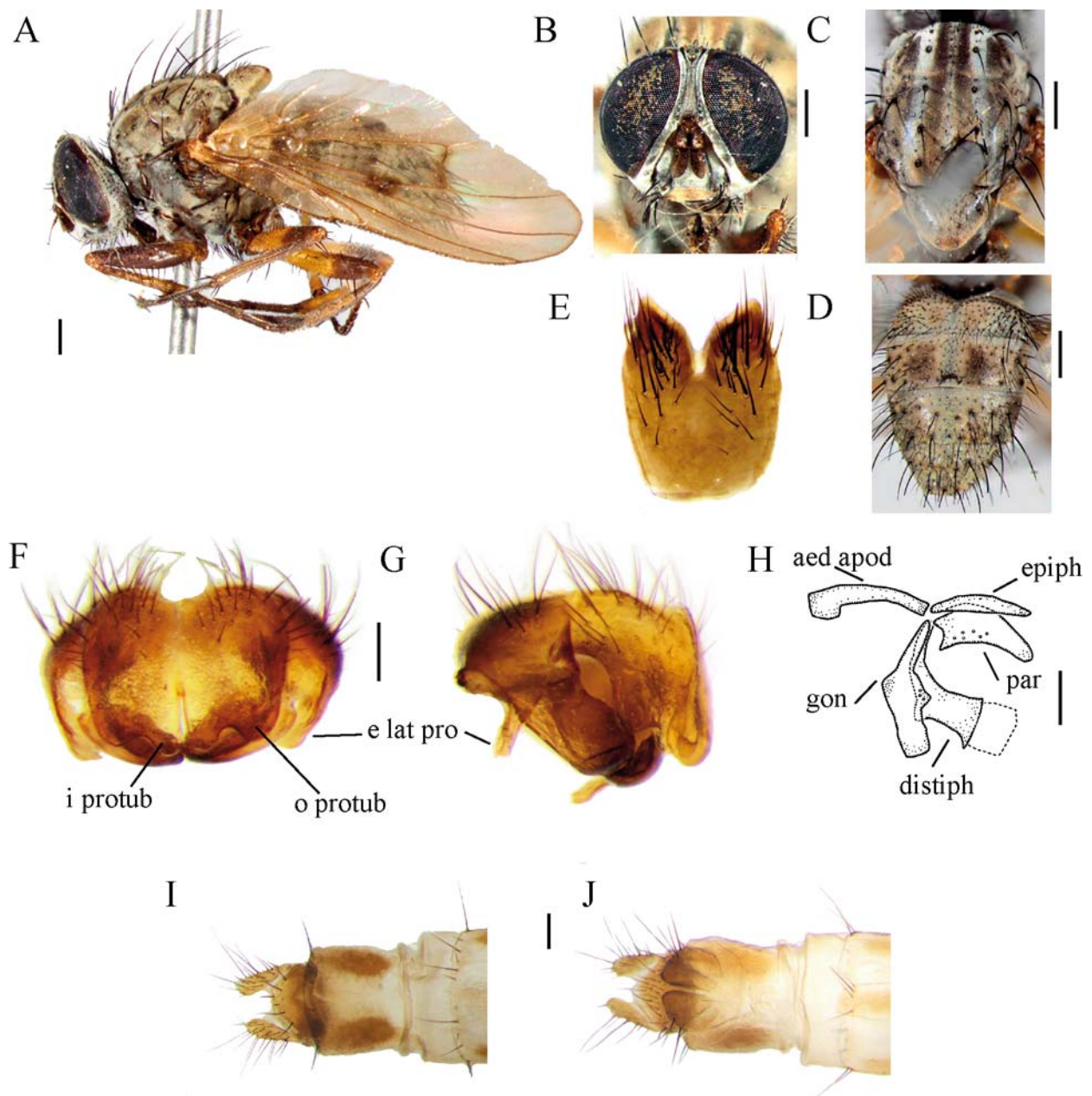
Information subsequent to this catalog: Löwerberg-Neto & Carvalho 2009 (endemism).

Löwerberg-Neto *et al.* 2011 (biogeography); Löwerberg-Neto & Carvalho 2013 (checklist).

**Redescription. Male** (Fig. 14A). Length. Body: 6.31 mm, wing: 5.94 mm.

**Head** (Fig. 14B). Black with silver pollinosity. Holoptic, the shortest distance between eyes is 0.16 mm. 4–5 pairs of frontal setae. Eye bare. Lunule brown; fronto-orbital plate, parafacial, gena, postgena, and occiput black with silver pollinosity. Antenna black; arista with hairs shorter than its basal diameter. Palpus black.

**Thorax** (Fig. 14C). Scutum black with four brownish-grey pollinose vittae; scutellum black with brownish-grey pollinosity; anepisternum, anepimeron, katepimeron, katepisternum, proepisternum, proepimeron and meron black with grey pollinosity; anterior spiracle black and posterior spiracle brown. Chaetotaxy: acrostichal setae short, the seta before the scutellum longer than previous seta; dorsocentral setae 2+3; humeral setae 2; notopleural setae 2, of similar size. Prealar seta strong, shorter than one fourth of the length of the anterior supra-alar postsutural seta. Scutellum with strong and short basal and subapical setae. Anepisternum with a series of 6–8 strong setae.



**FIGURE 14.** *Helina xena* Malloch. **A–H.** Male: **A.** Lateral view (scale bar: 1 mm). **B.** Head, frontal view. **C.** Thorax, dorsal view. **D.** Abdomen, dorsal view (scale bars: 0.5 mm). **E.** Sternite 5 (scale bar: 0.2 mm). **F.** Cercal plate, posterior view. **G.** Cercal plate and surstylus, lateral view (scale bar: 0.1 mm). **H.** Phallic complex, lateral view (scale bar: 0.1 mm). **I–J.** Female, apical portion of ovipositor: **I.** Dorsal view. **J.** Ventral view (scalebar: 0.5 mm). (Abbreviations: aed apod, aedeagal apodeme; distiph, distiphallus; e lat prot, epandrium lateral projection; epiph, epiphallus; epiprct, epiproct; gon, gonopodo; hypprct, hypoproct; i protub, inner protuberance; o protub, outer protuberance; par, paramere; st 8, sternite 8; tg 8, tergite 8.)

**Wing.** Yellowish-brown; costal spine longer than the costal bristles; the cross-veins with cloud; the cross-vein dm-cu straight, an extra little cross-vein close to cross-vein r-m; vein R 4+5 and vein M straight; cross vein dm-cu in basal half of cell  $r_{4+5}$ . Both calypters hyaline with yellow margins.

**Legs.** Coxa and trochanter black; fore femur black, yellow at base; mid and hind femora yellow, with black on apical third; tibiae yellow, tarsi black. Fore femur with rows of dorsal, posterodorsal, and posteroventral setae; fore tibia with one posterior seta, 4 preapical setae. Mid femur with 6–7 setae in the basal middle on ventral surface, a row of anterodorsal seta, and 3–4 preapical setae on dorsal to posterior surface; mid tibia with 2 posterior setae and 4 apical setae (anterodorsal, posteroventral, ventral, and anteroventral). Hind femur with anterodorsal row, anteroventral row of setae and 3–4 setae in the apical middle of posteroventral surface; hind tibia with 2–3

anteroventral setae, and one anterodorsal, calcar absent. Claws and pulvilli of similar size in all three legs.

**Abdomen** (Fig. 14D). Black with brown pollinosity, two dark brown spots on tergite 3 and 4. Sternite 5 longer than wide, setulose; posterior margin membranous (Fig. 14E).

**Terminalia.** Cercal plate with a similar length and width, with only a distal incision; and with four protuberances at apex: inner protuberance short and rounded, outer protuberance lobed shape, and straight in lateral view; epandrium with lateral projection (Figs. 14 F–G). Surstylus broad and curving forwards distally, with some setae on inner surface (Figs. 14 F–G). Aedeagus with aedeagal apodeme straight and strongly sclerotized; epiphallus slightly sclerotized, paramere slightly bent downward with setula; gonopod with short setulae; and distiphallus campanulate, slightly sclerotized (Fig. 14H).

**Female.** Length. Body: 4.95 mm, wing: 5.15 mm.

Differs from male as follows: **Head:** dichoptic, the shortest distance between eyes is 0.69 mm; fronto-orbital plate setulose with 2 reclinate orbital setae. Parafrontal plate setulose. **Legs.** Mid femur with 3–4 strong of setae in the basal third on ventral surface.

**Terminalia.** Tergite 8 with 2 parallel sclerotized plates with setulae on distal margin; epiproct with proximal margin straight, and a row of setula on distal margin, cercus digitiform with long setulae (Fig. 14I). Hypoproct rounded, sclerotized, and setulose (Fig. 14J).

**Material examined. ARGENTINA: Chubut:** 1 female, PN Los Alerces, Cabaña La Cascada, -42.888499, -71.592376, II-2013, Patitucci leg. (MACN); 1 male, PN Los Alerces, Puerto Limonao, Lago Futalaufquen, -42.862656, -71.624142, II-1959, Trelles leg. (MACN).

**Distribution** (Fig. 15F). ARGENTINA: Chubut (new record), Río Negro. CHILE: Región de la Araucanía, Región de los Lagos.

**Remarks.** Malloch (1934) described the species from male and female specimens from several locations from Argentina and Chile. The male specimen studied here has an extra little cross-vein close to cross-vein r-m; postocular setae, inner vertical setae, and outer vertical setae damaged.

**Biology.** Unknown. The specimen collected by the authors was captured with a Malaise trap.

## Morphological observations on the terminalia

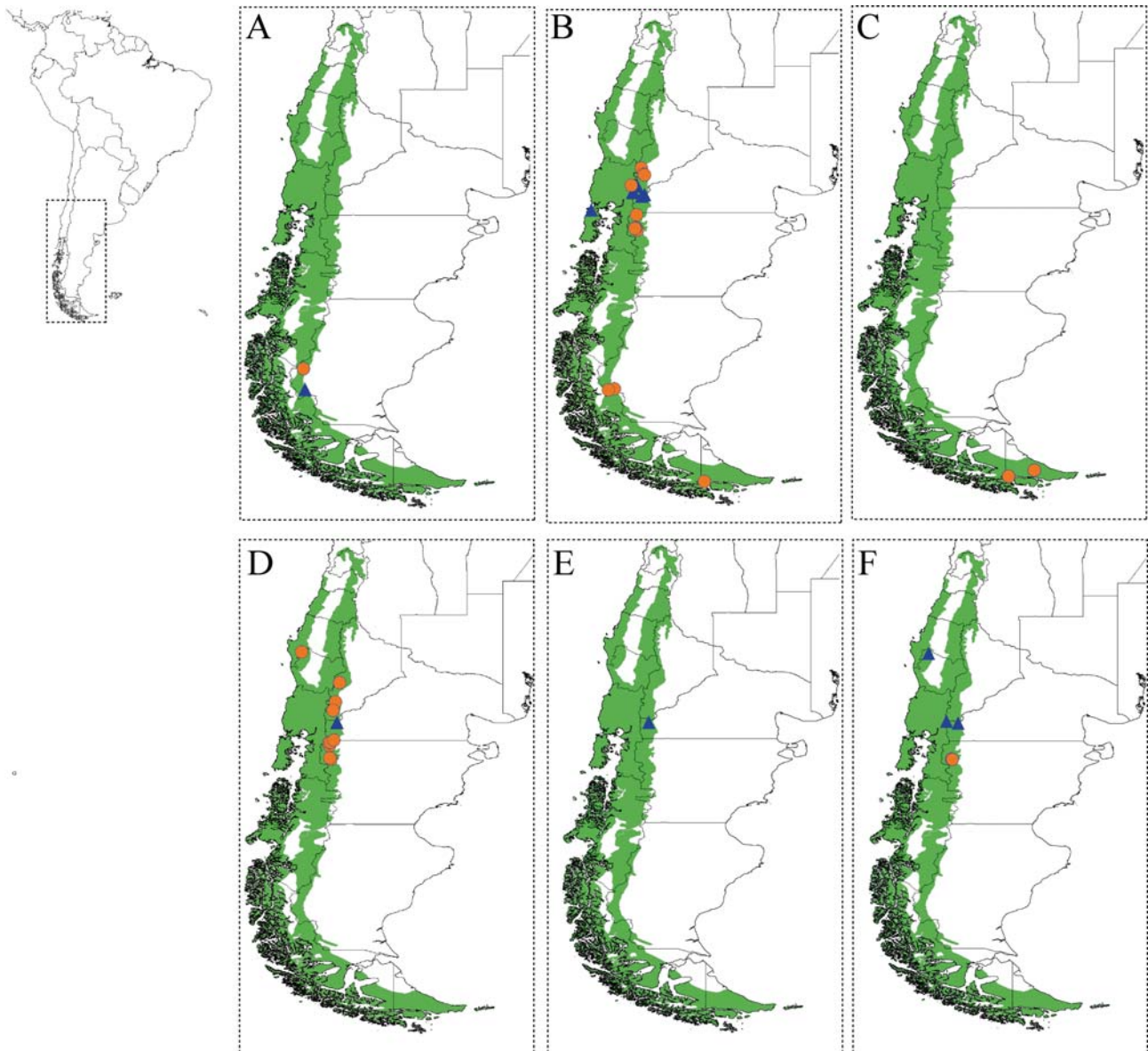
*Helina* species of the Andean-Patagonian forests are highly uniform in external morphology and coloration (except *H. viola*, which has metallic blue color), making them hard to identify to species level. However, the cercal plate of the male terminalia is a useful structure to establish the identity of species, and may contribute to future definitions of groups of species in the Neotropical region.

We observed three morphological patterns on the cercal plates of the *Helina* species of the Andean-Patagonian forests: 1) cercal plate with a similar length and width and with two protuberances at the apex (*H. araucana*, *H. australis*, *H. connexa*, *H. dorada*, *H. nigrimana*, *H. ouina*, and *H. xena*); 2) cercal plate with a similar length and width and with one protuberance at the apex (*H. discolor*); and 3) cercal plate longer than wide, with one protuberance at the apex (*H. bigoti*, *H. chilensis*, and *H. rufoapicata*).

Although 91 species of this genus have been described for the Neotropical region, only 22 of them show drawings of the cercal plate. Most of them are close to the second morphological pattern (*Helina albuquerquei* Pont, 1972; *Helina angustipennis* (Stein, 1911); *Helina auricolis* Albuquerque, 1980; *Helina luteola* Albuquerque, 1956; *Helina nobilis* Albuquerque, 1956; *Helina praecipua* (Walker, 1853); *Helina regobarrosi* Albuquerque, 1958; *Helina rufiguttata* (Macquart, 1851); *Helina subreptitia* (Albuquerque & Lopes, 1979)) (Albuquerque 1956a; 1956b; 1958; 1980; Albuquerque & Lopes 1979), while only *Helina longipila* Stein, 1918 shows a cercal plate with two protuberances (close to the first morphological pattern), and only *Helina nivalioides* Albuquerque, 1956 shows a cercal plate with one protuberance (close to the third morphological pattern) (Albuquerque 1956b).

Females presented two patterns of cheatotaxia in the epiproct: 1) epiproct with setula, and 2) epiproct with strong spines. Seven of the species here studied (*H. australis*, *H. bigoti*, *H. connexa*, *H. dorada*, *H. nigrimana*, *H. ouina*, and *H. xena*) showed the first pattern, while four species (*H. araucana*, *H. chilensis*, *H. neosimplex*, and *H. rufoapicata*) showed the second pattern. The literature provides drawings of the terminalia of only three species of the Neotropical region (*H. nivalioides*, *H. rufigutta*, and *H. subreptitia*), which are similar to the first pattern observed (Alquerque & Lopes 1979; Patitucci *et al.* 2013).

Due to the low number of species with detailed descriptions of genitalia for the Neotropical region, we avoided the formal definition of groups of species within *Helina*. Subsequent comprehensive studies may allow a better resolution of this issue.



**FIGURE 15.** Geographical distribution. **A.** *Helina neosimplex* Snyder. **B.** *Helina nigrimana* (Macquart). **C.** *Helina ouina* sp. nov. **D.** *Helina rufoapicata* Malloch. **E.** *Helina viola* Malloch. **G.** *Helina xena* Malloch. (Green area: Andean-Patagonian forests; orange circle: new records; blue triangle: previous distribution.)

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## References

- Albuquerque, D. de O. (1956a) Fauna do Distrito Federal: XXXIX. Duas novas espécies de *Helina* R.-D. (Diptera-Muscidae). *Revista Brasileira de Entomologia*, 5, 167–176.
- Albuquerque, D. de O. (1956b) Fauna do Distrito Federal. XLI. Redescricao de *Helina angustipennis* (Stein, 1911) e descricao de quatro espécies novas (Diptera-Muscidae). *Boletim do Museu Nacional. Nova série, Zoologia*, 148, 1–33.
- Albuquerque, D. de O. (1958) Sobre uma nova espécie de *Helina* R.-D., 1830 e notas sobre *Helina pleurasetta* Snyder, 1940 (Diptera, Muscidae). *Revista Brasileira de Entomologia*, 8, 47–54.
- Albuquerque, D. de O. (1980). Sobre uma espécie nova de *Helina* Robineau-Desvoidy, 1830 (Diptera, Muscidae, Phaoniinae). *Dusenya*, 12, 69–71.
- Albuquerque, D. de O. & Lopes, S.M.R. (1979) Estudos sobre o gênero *Xenothoracochaeta* Malloch, 1921 com descricao de uma espécie nova (Diptera, Muscidae). *Revista Brasileira de Biologia*, 39, 519–524.
- Bigot, J.M.F. (1885) Diptères nouveaux ou peu connus. 25e partie. XXXIII. Anthomyzides nouvelles. *Annales de la Société Entomologique de France* 6 (4 [1884]), 263–304.
- Cabrera, A.L. (1971). Fitogeografía de la República Argentina. *Boletín de la Sociedad Argentina de Botánica*, 14, 1–42.
- Carvalho, C.J.B. de (2002) *Muscidae (Diptera) of the Neotropical Region: taxonomy*. Editora Universidade Federal do Paraná, Curitiba. 287 pp.
- Carvalho, C.J.B. de, Couri, M.S., Pont, A.C., Pamplona, D. & Lopes, S.M. (1993) Part II. Muscidae. In: Carvalho, C.J.B. de (Ed.), *A catalogue of the Fanniidae and Muscidae (Diptera) of the Neotropical region*. Sociedade Brasileira de Entomologia, São Paulo, 201 pp.
- Carvalho, C.J.B. de, Couri, M.S., Pont, A.C., Pamplona, D. & Lopes, S.M. (2005) A Catalogue of the Muscidae (Diptera) of the Neotropical Region. *Zootaxa*, 860, 1–282.
- Chebez, J.C. (2005a) *Guía de las Reservas Naturales de la Argentina. I. Patagonia Norte*. Editorial Albatros, Buenos Aires. 192 pp.
- Chebez, J.C. (2005b) *Guía de las Reservas Naturales de la Argentina. I. Patagonia Austral*. Editorial Albatros, Buenos Aires. 192 pp.
- Cumming, J.M. & Wood, D.W (2009) Adult morphology and terminology. In: Brown, B.V., Borkent, A., Cumming, J.M., Wood, D.M., Woodley, N.E. & Zumbado, M. (Eds.), *Manual of Central American Diptera, Volume 1*. National Research Council of Canada Publishers, Ottawa, pp. 9–50.
- Edwards, F.W. (1929) Introduction. In: *Diptera of Patagonia and South Chile. Part 1, Fascicle 1 (Crane-Flies)*. British Museum (Natural History), London, pp. vii-xiv.
- Hwang, C. & Turner, B.D. (2005) Spatial and temporal variability of necrophagous Diptera from urban to rural areas. *Medical and Veterinary Entomology*, 19, 379–391.  
<http://dx.doi.org/10.1111/j.1365-2915.2005.00583.x>
- Hijmans, R. J., Guarino, L. & Mathur, P. (2012) *DIVA-GIS, version 7.5. Manual*. 77pp. Available from: <http://www.diva-gis.org/> (accessed 4 March 2015)
- Löwberg-Neto, P. & Carvalho, C.J.B. de (2009). Areas of endemism and spatial diversification of the Muscidae (Insecta: Diptera) in the Andean and Neotropical regions. *Journal of Biogeography*, 36, 1750–1759.
- Löwberg-Neto, P. & Carvalho, C.J.B. de (2013) Muscidae (Insecta: Diptera) of Latin America and the Caribbean: geographic distribution and check-list by country. *Zootaxa*, 3650, 01–147.
- Löwberg-Neto, P., Carvalho, C.J.B. de & Hawkins, B.A. (2011) Tropical niche conservatism as a historical narrative hypothesis for the Neotropics: a case study using the fly family Muscidae. *Journal of Biogeography*, 38, 1936–1947. <http://dx.doi.org/10.1111/j.1365-2699.2011.02540.x>
- Macquart, J. (1851) Diptères Exotiques nouveaux ou peu connus Suite du 4.e Supplément publié dans les mémoires de 1849 [part]. *Mémoires de la Société (Royale) des Sciences, de l'Agriculture et des Arts à Lille*, 1850, 134–294.
- Malloch, J.R. (1934) Muscidae. In: *Diptera of Patagonia and South Chile. Part 7, Fascicle 2*. British Museum (Natural History), London, pp. 171–346.
- Morrone, J.J. (2000) Biogeographic delimitation of the Subantarctic subregion and its provinces. *Revista del Museo Argentino de Ciencias Naturales “Bernardino Rivadavia”*, 2, 1–15.
- Patitucci, L.D., Mulieri, P.R. & Mariluis, J.C. (2011) The type specimens of Anthomyiidae, Muscidae and Sarcophagidae (Diptera: Calyptratae) housed at the Instituto – Fundación Miguel Lillo, Tucumán, Argentina. *Acta Zoologica Lilloana*, 55, 154–170.
- Patitucci, L.D., Mulieri, P.R., Olea, M.S. & Mariluis, J.C. (2013) Muscidae (Insecta: Diptera) of Argentina: revision of Buenos Aires province fauna, with a pictorial key to species. *Zootaxa*, 3702, 301–347.



<http://dx.doi.org/10.11646/zootaxa.3702.4.1>

- Pont, A.C. (1967) Notes on some Australasian Muscidae (Diptera) described by J. Macquart. *Annales de la Société Entomologique de France*, 3, 181–190.
- Pont, A.C. (1972) Family Muscidae. In: *A Catalogue of the Diptera of the Americas South of the United States*, Museu de Zoologia, Universidade de São Paulo, 97, 111 pp.
- Pont, A.C. (2012) Muscoidea (Fanniidae, Anthomyiidae, Muscidae) described by P. J. M. Macquart (Insecta, Diptera). *Zoosystema*, 34, 39–111. <http://dx.doi.org/10.5252/z2012n1a3>
- Pont, A.C. (2013). The Fanniidae and Muscidae (Diptera) described by Paul Stein (1852–1921). *Journal of Zoological Systematics and Evolutionary Research*, 89, 31–166. <http://dx.doi.org/10.1002/zoos.201300004>
- Pont, A.C. & Werner, D. (2006) The Types of Fanniidae and Muscidae (Diptera) in the Museum für Naturkunde, Humboldt-Universität zu Berlin, Germany. *Mitteilungen aus dem Zoologischen Museum in Berlin*, 82, 3–139. <http://dx.doi.org/10.1002/mmz.200600001>
- Ringdahl, O. (1924) Översikt av de hittills i vårt land funna arterna tillhörande släktena *Mydaea* R.- D. och *Helina* R.-D. (Muscidae) (Part.). *Entomologisk Tidskrift*, 45, 39–48.
- Skidmore, P. (1985) *The biology of the Muscidae of the world*. Series Entomologica, 29, 1–550.
- Snyder, F.M. (1949) Nearctic *Helina* Robineau-Desvoidy (Diptera, Muscidae). *Bulletin of the American Museum of Natural History*, 94, 111–160.
- Snyder, F.M. (1957) Notes and descriptions of some Neotropical Muscidae (Diptera). *Bulletin of the American Museum of Natural History*, 113, 437–490.
- Sorokina, V.S & Pont, A.C. (2011) Fanniidae and Muscidae (Insecta, Diptera) associated with burrows of the Altai Mountains Marmot (*Marmota baibacina baibacina* Kastschenko, 1899) in Siberia, with the description of new species. *Zootaxa*, 3118, 31–44.
- Stein, P. (1904) Die Amerikanischen Anthomyiden des Königlichen Museums für Naturkunde zu Berlin und des Ungarischen National-Museums zu Budapest. *Annales Historico-Naturales Musei Nationalis Hungarici*, 2, 414–495.
- Stein, P. (1907) Revision der Bigot'schen und einiger von Macquart beschriebenen aussereuropäischen Anthomyiden (Dipt.). [Concl.] *Zeitschrift für Systematische Hymenopterologie und Dipterologie*, 7, 273–293.
- Stein, P. (1911) Die von Schnuse in Südamerika gefangenen Anthomyiden. *Archiv für Naturgeschichte*, 77, 61–189.
- Wang, M., Wang, R. & Xue, Wq. (2006) A review of the *H. obtusipennis* species-group of the genus *Helina* R.-D. (Diptera: Muscidae) from the Palaearctic and Oriental regions, with description of one new species. *Zootaxa*, 1137, 63–68.
- Wang, M., Zhang, D. & Wang, R. (2008) Two new species of the genus *Helina* Robineau-Desvoidy (Diptera: Muscidae) from China with revised diagnosis on the Chinese species. *Annales de la Société Entomologique de France*, 44, 139–144. <http://dx.doi.org/10.1080/00379271.2008.10697550>
- Xue, Wq. & Sun, H. (2015) Diagnosis and key for the *Helina annosa*-group (Diptera: Muscidae) from China, with descriptions of nine new species. *Journal of Natural History*, 49, 1549–1583. <http://dx.doi.org/10.1080/00222933.2014.954019>
- Zhang, D., Li, K. & Wang, M. (2011) *Helina subpyriforma* sp. n., a new muscid fly (Diptera: Muscidae) from Yunnan, China. *Entomologica Fennica*, 22, 1–4.