

New species of the jumping spider genus *Ilargus* Simon, 1901 (Araneae: Salticidae), with notes on all Argentinean species

Новые виды пауков-скакунчиков рода *Ilargus* Simon, 1901 (Araneae: Salticidae), с заметками о всех аргентинских видах

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КЛЮЧЕВЫЕ СЛОВА: Aranei, Аргентина, географическое распространение, пауки-скакунчики, таксономия.

ABSTRACT. A study of the jumping spider genus *Ilargus* Simon, 1901 from Argentina, with live colour photographs of all recorded species, is presented. Two new species, *I. delnoa* sp.n. (♂♀) and *I. carinae* sp.n. (♂), are described. All the *Ilargus* species occurring in the country are diagnosed and provided with new geographic records, and a potential distribution of the genus is modelled. *Ilargus* is known from at least two ecoregional sectors of Argentina.

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РЕЗЮМЕ. Представлены результаты изучения пауков-скакунчиков рода *Ilargus* Simon, 1901 Аргентины, с прижизненными цветными фотографиями всех видов. Описаны два новых для науки вида, *I. delnoa* sp.n. (♂♀) и *I. carinae* sp.n. (♂). Даны диагнозы всех аргентинских видов *Ilargus*, приведены новые географические находки; предложена модель распространения рода, который известен как минимум из двух экорегинальных секторов Аргентины.

Introduction

Within the family Salticidae, the Neotropical genus *Ilargus* Simon, 1901 belongs to the tribe Euophryini Simon, 1901. It is relatively poorly known, comprising of 10 species only [WSC, 2022], of which six were recently described by Zhang & Maddison [2012]. In Argentina, only *Ilargus coccineus* Simon, 1901 has been recorded to date [CAA, 2022; Metzner, 2022].

Spiders of this genus are medium-sized, often having striking shapes and colours (Fig. 1). Based on body colouration and patterns (see Metzner [2022] for comparative images), *Ilargus* species can be divided into two groups. Species of the first group possess light/colourful scales, with longitudinal bands running across their entire body (*I. coccineus* and *I. serratus* Zhang et Maddison, 2012), whereas those of the second one possess foliage/chevron-like markings on the dorsum (*I. florezi* Galvis, 2015; *I. foliosus* Zhang et Maddison, 2012; *I. galianoae* Zhang et Maddison, 2012; *I. macrocornis* Zhang et Maddison, 2012; *I. moronatigus* Zhang et Maddison, 2012; *I. nitidisquamulatus* Soares et Camargo, 1948; *I. pilleolus* Zhang et Maddison, 2012 and *I. singularis* (Caporiacco, 1955).

The genus *Ilargus* can be distinguished from other similar genera (e.g., *Coryphasia* Simon, 1902) by the presence of one unidentate retromarginal and two pro-marginal teeth on chelicerae and the absence of the second spermathecae in the vulva [Zhang, Maddison, 2012]. The male palp consists of the wide bulb and the coiled embolus (usually one revolution); the RTA is narrow and relatively long, slightly differing within the genus. The epigyne presents a window with a medial septum [Zhang, Maddison, 2012]. Yet, most of these characters are also typical for the Euophryini and can hardly be considered truly diagnostic of the genus (D. Logunov, pers. comm.). Hence, further work is required to discover the reliable diagnostic characters for *Ilargus* in the copulatory organs.

In the present paper, two new species of *Ilargus* are described. Both were found in two well-differentiated ecoregions: one lying at the Yungas forest and the other at the Atlantic Forest. New records complement the knowledge of the geographic distribution of all the three *Ilargus* species known from Argentina and, to-



Fig. 1. *Ilargus* species, habitus of live specimens; *I. coccineus* Simon, 1901 (A–C); *I. delnoa* sp.n. (D–F); *I. carinae* sp.n. (G, H). Males (A, B, D, E, G, H), females (C, F).

Рис. 1. Виды *Ilargus*, внешний вид живых экземпляров; *I. coccineus* Simon, 1901 (A–C); *I. delnoa* sp.n. (D–F); *I. carinae* sp.n. (G, H). Самцы (A, B, D, E, G, H), самки (C, F).

gether with previous records, have been used to model the potential distribution of the genus.

Material and Methods

SAMPLING. Specimens were collected from different sites in northern Argentina, using garden-vacuum and beating methods to catch spiders from the vegetation.

TAXONOMIC DESCRIPTION. Specimens from the collections of the Instituto de Biología Subtropical, Misiones, Argentina (IBSI-Ara, G. Rubio) were examined. The description style, terminology, abbreviations and measurements follow the latest study on the euophryines by Zhang &

Maddison [2012]. Female copulatory organs were dissected, as described by Levi [1965], examined after digestion in hot solution of ~15% NaOH, and cleared in clove oil to examine their internal structure. Temporary preparations (on a slide) were prepared, examined and photographed using a Leica DM500 compound microscope and a Leica M60 stereomicroscope. Measurements were taken directly from the microscope ocular lens with an ocular micrometer and are expressed in millimeters. Photographs of live spiders were taken using a Nikon D3400 digital camera with a Raynox 250 or a Micro-Nikkor 85 mm lenses. Figure plates were composed in Corel Draw X3.

Acronyms used in the text and figures are as follows: ALE — anterior lateral eye, CD — copulatory duct, CO —

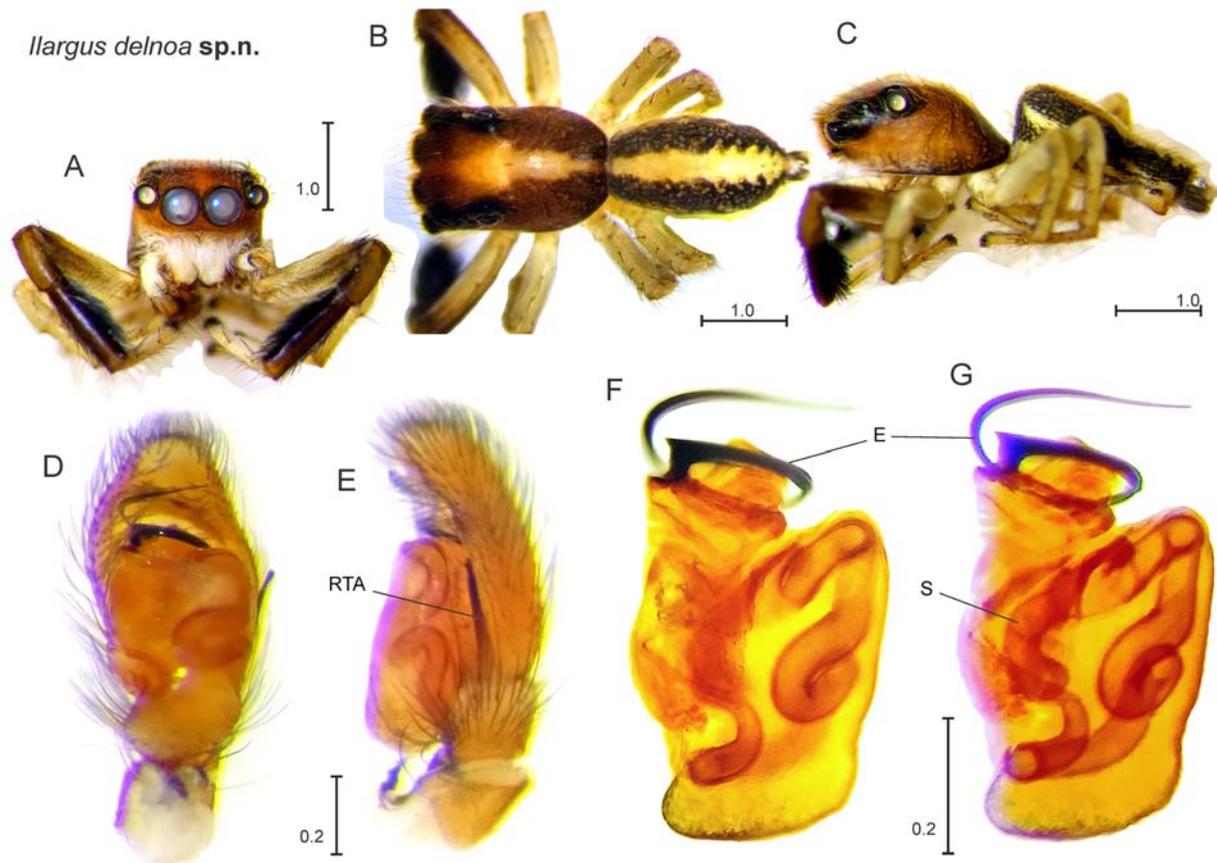


Fig. 2. The male of *Ilargus delnoa* sp.n., paratype (IBSI-Ara 1696): Habitus in frontal (A), dorsal (B) and lateral (C) views; left palp in ventral (D) and retrolateral (E) views; details of bulb (F) and same, different focus (G).

Рис. 2. Самец *Ilargus delnoa* sp.n., паратип (IBSI-Ara 1696): Внешний вид, фронтально (A), дорсально (B) и латерально (C); левая пальпа, вентрально (D) и ретролатерально (E); детали строения бульбуса (F) и то же, в другой проекции (G).

copulatory opening, E — embolus, PLE — posterior lateral eye, RTA — retrolateral tibial apophysis, S — spermophore, Sp — spermathecae.

MODELING. The record dataset consists of 13 valid (non-duplicate) locality points and was arranged to be used within a geographic information system (DIVA-GIS 5.4, Hijmans *et al.* [2005a]). The potential distribution of *Ilargus* species was modelled for Argentina using six bioclimatic parameters (bc1-4, bc12, bc15; see Rubio & Acosta [2011]) extracted from the WorldClim database [Hijmans *et al.*, 2005b] at a resolution of 30 arc-seconds (1 km²). The model was built with Bioclim algorithm using its implementation in DIVA-GIS 5.4 [Rubio, Acosta, 2011].

Taxonomy

Family Salticidae Blackwall, 1841
Subfamily Salticinae Blackwall, 1841
Tribe Euophryini Simon, 1901
Genus *Ilargus* Simon, 1901

Ilargus delnoa sp.n.
Figs 1D–F, 2, 3.

TYPES. Holotype ♂ (IBSI-Ara 1695), ARGENTINA, Tucumán, Aconquija National Park (S27.28°, W65.87°), 19 November 2021,

C.E. Stolar & M. Herrera. Paratypes: 1 ♂ 1 ♀ (IBSI-Ara 1696), together with the holotype.

ETYMOLOGY. The specific name is a noun in apposition taken from a contraction of “del NOA”, meaning “from the NOA” and referring to the geographic distribution area of this species (Noroeste de Argentina = northwest Argentina).

DIAGNOSIS. In the body colouration, particularly dorsal longitudinal dark and light abdominal stripes, *I. delnoa* sp.n. resembles *I. serratus* and *I. coccineus* [Zhang, Maddison, 2012: figs 84, 85; 2015: figs 289, 290]. The males of these species possess similar palpal bulbs, wide and large, and the females have similar epigyne windows, with a median septum and relatively long-stretching CDs [Zhang, Maddison, 2012: figs 86, 91; 2015: figs 291, 295]. The male of *Ilargus delnoa* sp.n. can be easily distinguished from both similar species by the embolic disc and the coiled embolus whose spiral plane is perpendicular to the longitudinal axis of the bulb, and by the straight and smooth RTA, without serrated or bi-pointed edge or tip (Fig. 2D–G; cf. with figs 87 and 292 in Zhang & Maddison [2012, 2015], respectively). The female of the new species differs in having the tube-shaped spermathecae (ovoid in the related species) and the much longer CDs, with at least one more revolution, matching the longer embolus in the new species (Fig. 3E, F).

DESCRIPTION. *Male (holotype).* Carapace length 2.30; abdomen length 2.35. Carapace (Figs 1D, E; 2A–C) dark brown, with lighter and somewhat orange cephalic region,

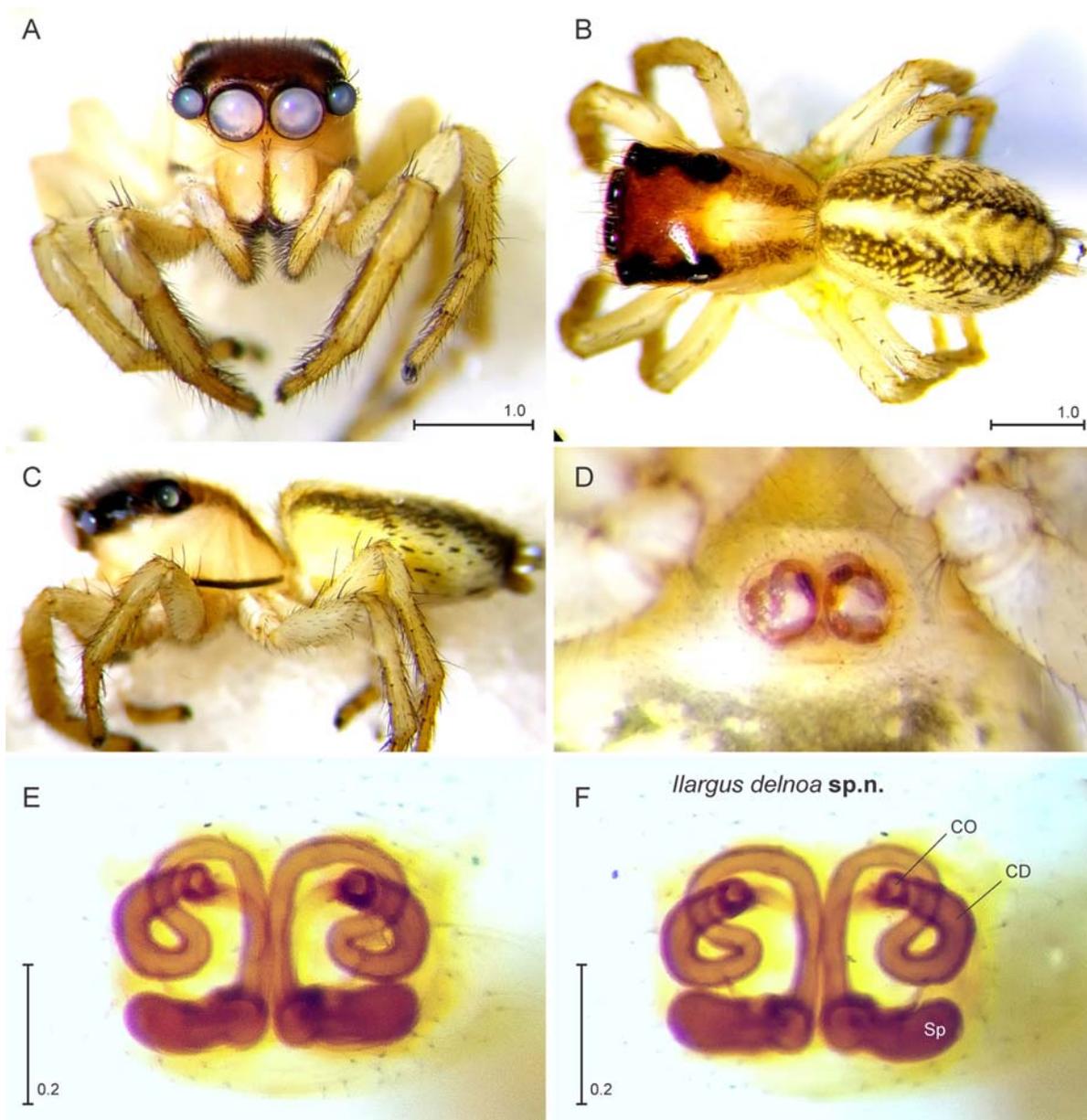


Fig. 3. The female of *Ilargus delnoa* sp.n., paratype (IBSI-Ara 1696): Habitus in frontal (A), dorsal (B) and lateral (C) views; epigyne in ventral view (D); same, cleared in ventral view (E); same, dorsal view (F).

Рис. 3. Самка *Ilargus delnoa* sp.n., паратип (IBSI-Ara 1696): Внешний вид, фронтально (A), дорсально (B) и латерально (C); эпигина вентрально (D); то же, очищено, вентрально (E); то же, дорсально (F).

fovea and thoracic slope clearer on the carapace midline, blackish eyes rim. Clypeus brown, with few brownish setae. Chelicerae pale yellow, vertical, with dense white setae at the base and middle of the paturon. One unidentate retro-marginal and two promarginal teeth. Palps with tibia and cymbium brown, other segments cream-coloured; cymbium somewhat orange. Bulb wide, embolus long and coiled for a little more than a circle, arising prolaterally (Fig. 2D, F, G). RTA long and thin, parallel to the axis of the palp. Legs pale, except the first pair with darker patella and tibia, tibia I notably covered with tufts of black hairs. Abdomen yellowish, with two lateral dark brown/blackish stripes running from its anterior to posterior margins (Figs 1D, E; 2B, C).

Female (paratype). Carapace length 2.30 abdomen length 2.61. Carapace pale, with darker and somewhat orange cephalic region (black in life), with two lateral dark brown narrow stripes running from its anterior to posterior margins (Figs 1F, E; 2A–C). Clypeus and chelicerae pale yellow, with few setae. Cheliceral teeth as in the male. Palps and legs pale yellow. Abdomen yellowish, its colour pattern as in the male except for the bands that are less distinct and the presence of chevrons between them (Figs 1F; 3B, C). Epigyne with large windows, median septum narrow, copulatory opening at the anterior margin of window. Spermatheca swollen (not spherical), long copulatory ducts lead to the spermathecae through two loops, spermathecae situated posteriorly (Fig. 3D–F).

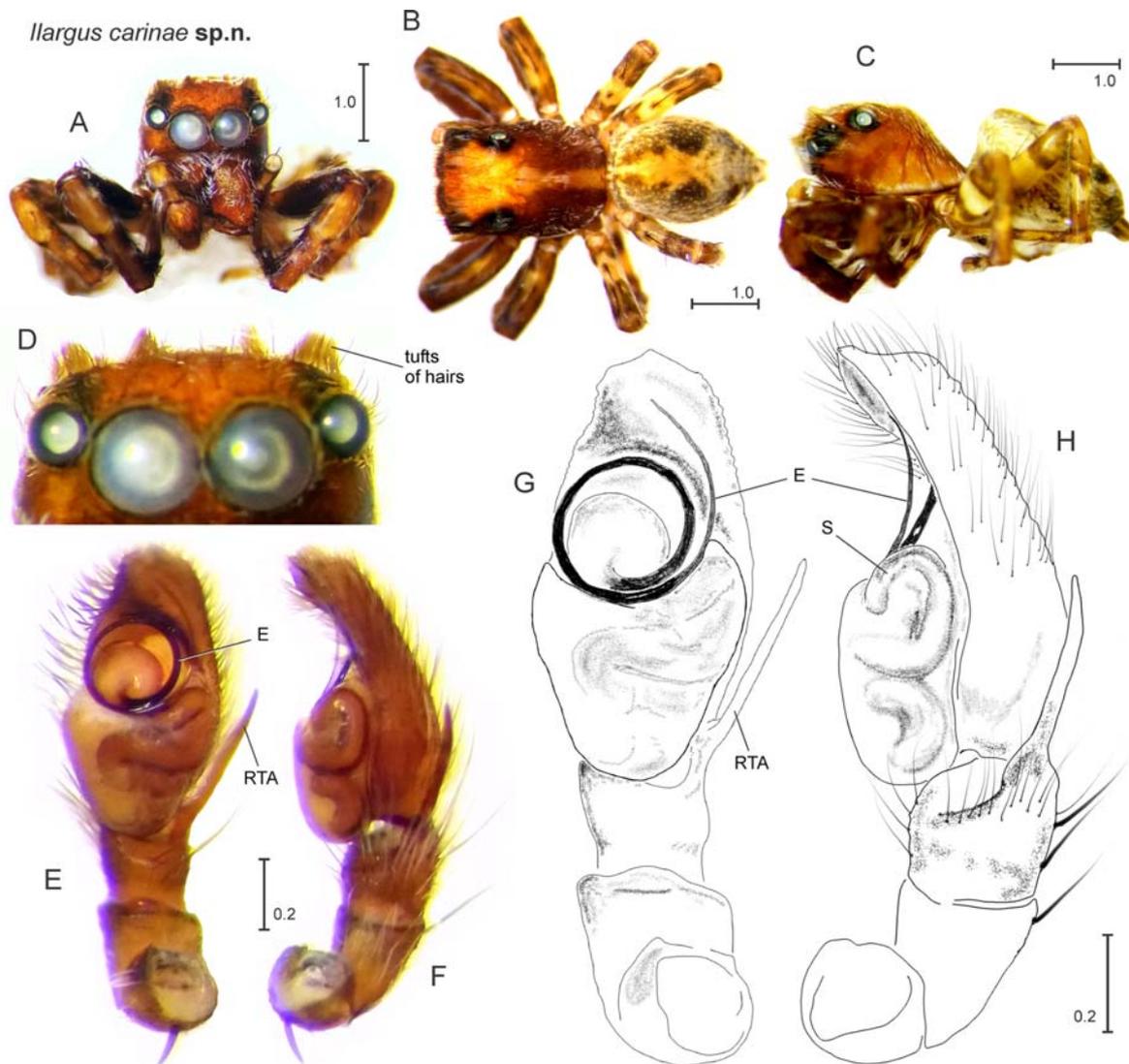


Fig. 4. The male of *Ilargus carinae* sp.n., holotype (IBSI-Ara 0346): Habitus in frontal (A), dorsal (B) and lateral (C) views; details of the cephalic region in frontal view (D); left palp in ventral (E) and retrolateral (F) views; same as E and F, detailed in drawings (G, H).

Рис. 4. Самец *Ilargus carinae* sp.n., голотип (IBSI-Ara 0346): Внешний вид, фронтально (A), дорсально (B) и латерально (C); детали строения грудной области фронтально (D); левая пальпа вентрально (E) и ретролатерально (F); прорисовка фото E и F (G, H).

HABITAT. The species seems to inhabit mountain rainforest areas, at about 1000 m a.s.l.; many specimens were collected from the vegetation at medium height.

DISTRIBUTION. The northwestern sector of Argentina (Fig. 5), with most records corresponding to the pedemontane forests and rainforests from Jujuy, Salta and Tucumán Provinces. As shown by Rubio & Acosta [2011], although the models were built up with selected climatic variables alone, the resulting prediction nicely redraws the Yungas eco-region which is defined by its vegetation physiognomy and composition.

OTHER MATERIAL. Argentina, Jujuy province, Manuel Belgrano, Route 4 between Termas and Yala (S24.15827°, W65.47956°), 3 ♂♂, 4 ♀♀ (IBSI-Ara 1712), 30.11.2021, C.E. Stolar coll.; Salta province, La Caldera (S24.50982°, W65.34483°), 1 ♂, 1 ♀ (IBSI-Ara 0380), sampling with G-Vac (garden-vacuum) on vegetation in Rubio G.'s doctoral thesis, 10.11.2006, G.D. Rubio

coll.; same locality and data, 2 ♂♂ (IBSI-Ara 0378) and 1 ♂, 1 ♀ (IBSI-Ara 0379), 19.03.2007, same coll.; San Lorenzo (S24.7214°, W65.5072°), 1 ♂ (IBSI-Ara 0377), sampling with G-Vac on vegetation, 10.11.2006, G.D. Rubio coll.; same locality, 1 ♂, 1 ♀ (IBSI-Ara 0382), same data; San Lorenzo, other site (S24.72007°, W65.51572°), 3 ♀♀ (IBSI-Ara 0381; tissue sample 4184), same samples with G-Vac, 19.03.2007, same coll.; Tucumán province, Cochuna, Río Cochuna Provincial Park (S27.32302°, W65.9244°), 1 ♂ (IBSI-Ara 0326; tissue sample 4183), 29.04.2011, G.D. Rubio & C.I. Argañaraz coll.; Alpachiri, Route 307 to Encalilla (S27.05678°, W65.67007°), 2 ♂♂ (IBSI-Ara 1683), 23.11.2021, C.E. Stolar coll.; Aconquija, Aconquija National Park (S27.28711°, W65.87135°), 3 ♂♂, 1 ♀ (IBSI-Ara 1677), 20.11.2021, C.E. Stolar & M. Herrera coll.; same locality, 11 ♂♂, 4 ♀♀ (IBSI-Ara 1688), 19.11.2021, same coll.

Ilargus carinae sp.n.
Figs 1G, H; 4.

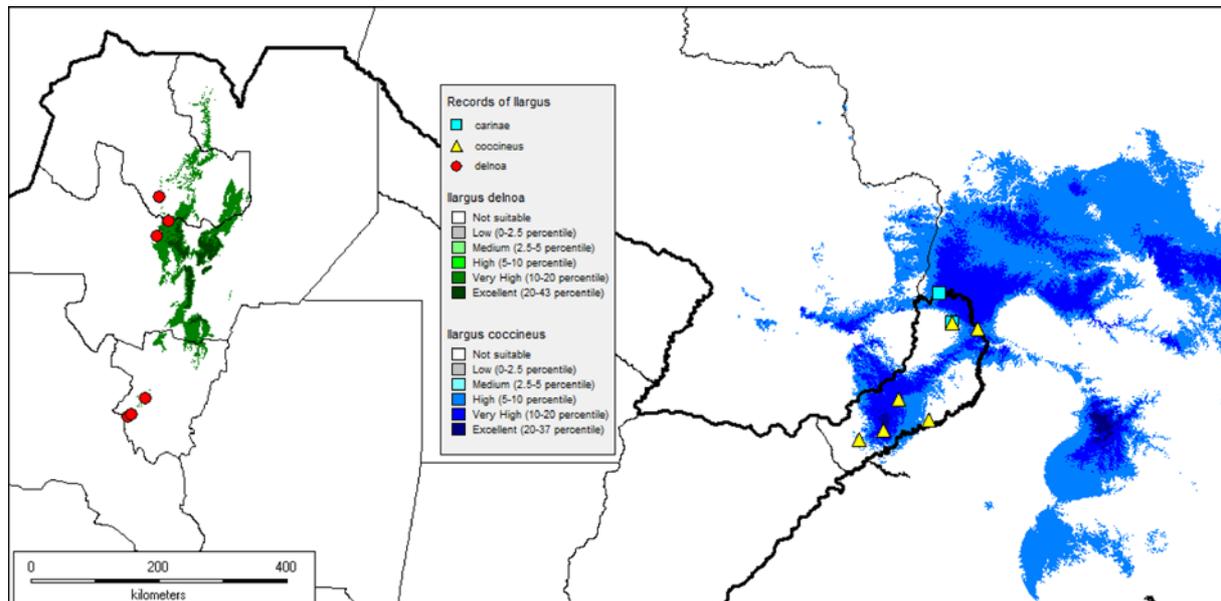


Fig. 5. Records of the *Ilargus* spiders in Argentina (red dots: *I. delnoa* sp.n.; turquoise squares: *I. carinae* sp.n.; yellow triangles: *I. coccoineus* Simon, 1901) and potential predictive range (green colored area for *I. delnoa* sp.n. and blue for *I. coccoineus*) in Argentina, Paraguay and Brazil. The darkest colour indicates the highest probability assigned by the Bioclim model.

Рис. 5. Находки пауков рода *Ilargus* в Аргентине (точки: *I. delnoa* sp.n.; квадратики: *I. carinae* sp.n.; треугольники: *I. coccoineus* Simon, 1901) и предполагаемые потенциальные ареалы (слева, зеленый для *I. delnoa* sp.n. и справа, синий для *I. coccoineus*) в Аргентине, Парагвае и Бразилии. Более темные оттенки указывают большую вероятность, согласно модели Bioclim.

TYPES. Holotype ♂ (IBSI-Ara 0346), Argentina, Misiones, General Manuel Belgrano, Urugua-i Wildlife Reserve (S25.974345°, W54.116330°; 261m a.s.l.), beating, 15 June 2009, G.D. Rubio. Paratypes: 1 ♂ (IBSI-Ara 0383; tissue sample 4182), together with the holotype, sampling with G-Vac, 26 November 2014, G.D. Rubio & C.I. Argañaraz.

ETYMOLOGY. The specific matronymic name is dedicated to our friend, Dr Carina I. Argañaraz, an arachnologist from Córdoba, Argentina.

DIAGNOSIS. In the shape of the tegulum with a reduced proximal lobe on its prolateral side (well-developed in other *Ilargus* species; cf. comparative illustrations in Metzner, 2022), *I. carinae* sp.n. is similar to *I. galianoae* Zhang et Maddison, 2012. The new species differs from *I. galianoae* and other described species in the position of the embolic loop, which is in a more or less vertical plane (Fig. 4E–H), and the presence of four conspicuous tufts of dark hairs on the anterior border of the cephalic region (Figs 1G; 4D).

DESCRIPTION. *Male (holotype).* Carapace length 2.50; abdomen length 2.39. Carapace brown, lighter in the middle and darker towards the sides, rings of black colouration on ALE and PLE, four conspicuous tufts of dark hairs on the anterior border of the cephalic region (Figs 1G, H; 4A–D), fovea light brown. Clypeus brown, with many white setae. Chelicerae brown, robust, diverging vertically, with numerous white setae scattered on the paturon. One unident retro-marginal and two promarginal teeth. Palps with tibia and cymbium brown, other segments lighter; cymbium orange, with dense dark hairs. Bulb wide; embolus long and coiled with one and a half turns, tip directed apically and prolaterally (Fig. 4E, G). RTA long and thin, not parallel to the palp axis (Fig. 4E–H). Legs brown, with spots, the first pair more homogeneously pigmented, dark, blackish on its prolateral side. Dorsum with a foliate pattern with dark and light

brown colouration (Fig. 4B); in lives specimens, with two posterior lateral white spots (Fig. 1H).

Female is unknown.

HABITAT. Specimens were collected from rainforest foliage at medium height.

DISTRIBUTION. Known from northeast Argentina, in Misiones Province; recorded only in two localities (Fig. 5), so a potential distribution model could not be built up.

OTHER MATERIAL. Argentina, Misiones province, General Manuel Belgrano, Urugua-i Wildlife Reserve (S25.974345°, W54.116330°), 1 ♂ (IBSI-Ara 0384), sampling with G-Vac on vegetation, 5.11.2013, G.D. Rubio & C.I. Argañaraz coll.

Ilargus coccoineus Simon, 1901 Fig. 1A–C.

Ilargus coccoineus Simon, 1901: 66 (lectotype ♂ from Caraça, Brazil, deposited in MNHN, not examined).

For a full set of references see World Spider Catalog [2022].

DIAGNOSIS. In having dorsal longitudinal dark and light stripes, *I. coccoineus* resembles *I. delnoa* sp.n. and *I. serratus* [Zhang, Maddison, 2012: figs 84, 85; 2015: figs 289, 290]. The males of these species have similar, wide and large palpal bulbs, and the females — similar epigyne windows with a median septum and relatively long-stretching CDs [Zhang, Maddison, 2012: figs 86, 91; 2015: figs 291, 295]. The male of *I. coccoineus* can be distinguished from both by having the long cylindrical RTA, with a slightly dilated and truncated apex which can also be bi-pointed (see fig. 292 in Zhang & Maddison [2015]), and two dorsal longitudinal red stripes on the carapace and dorsum (Fig. 1A, B). The female differs from that of *I. delnoa* sp.n. in having the shorter CDs, with one loop less at the beginning of its stretch (cf. Fig. 3E, F) and from *I. serratus* in the more elongated body and the absence of a swollen part at the

beginning of the CD; cf. Zhang & Maddison [2012: figs 84, 85, 91; 2015: figs 289, 290, 295].

DESCRIPTION. See Galiano [1963: 377], Braul *et al.* [1997: 144] and Edwards *et al.* [2005: 25]. Additional photographs of both sexes are given in Fig. 1A–C.

HABITAT. Specimens were collected from rainforest foliage at medium height.

DISTRIBUTION. Known from Brazil and Argentina (for Argentina see triangles in Fig. 5). A potential range of *I. coccineus* shows a match for the Atlantic forest ecoregion, with a notable extension in Brazil where this species has also been recorded.

MATERIAL. Argentina, Misiones province, General Manuel Belgrano, Urugua-í Wildlife Reserve (S25.97432°, W54.11627°), 1 ♀ (IBSI-Ara 0460; tissue sample 4181), beating samples on vegetation, 5.11.2013, G.D. Rubio & C.I. Argañaraz coll.; Oberá, near Los Helechos (S27.52394°, W55.09929°), 1 ♂ (IBSI-Ara 1653), G-Vac on forest, 26.11.2019, G.D. Rubio & C.E. Stolar coll.; same locality, other site (S27.52034°, W55.09204°), 1 ♂ (IBSI-Ara 1659), G-Vac on tea crop, 23.01.2020, G.D. Rubio & C.E. Stolar coll.; Leandro N. Alem, Cerro Azul Agricultural Experimental Station, reservation area (S27.66609°, W55.44290°), 1 ♂ (IBSI-Ara 1436), beating samples, 18.12.2019, C.E. Stolar & A. Toro.

Discussion

Within the tribe Euophryini, the similarity of copulatory organs in both females and males usually causes difficulties in their classification by taxonomists. Fortunately, the type species of *Ilargus* (*I. coccineus*) has well-defined characters, such as the palpal bulb large and wide, with a conspicuous proximal tegular lobe, the embolus long and coiled, the epigynal window with a median septum, and two spermathecae. These characteristics combined with the elongated body shape and typical colour pattern of the type species were reliably illustrated by Galiano [1963] and then Zhang & Maddison [2015], allowing us to have a useful reference point. However, the addition of species to the genus by Zhang & Maddison [2012: 15], based on molecular data, made the generic diagnosis broader and more confusing. In its present scope, the genus *Ilargus* can be split into two species groups, based on the body colouration of their species: viz., one group having light or colorful scales with longitudinal bands across their entire body (as in the type species, *I. serratus* and *I. delnoa* sp.n.), and the second group having foliage/chevron-like markings on the dorsum, to which *I. carinae* sp.n. can be safely assigned.

In Argentina, the diagnostic features of *Ilargus* are similar in many other Euophryini genera. A total of 42 species in 14 genera of the Euophryini have been described or recorded from Argentina, leaving alone numerous undescribed taxa, which are still under study. Yet, *I. coccineus*, *I. delnoa* and *I. carinae* are the only three species of the genus found to date in Argentina; all of them occur in the forest habitats of the north.

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Compliance with ethical standards

Conflict of interest: The authors declare that they have no conflict of interest.

Ethical approval: No ethical issues were raised during our research.

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