



## A new orb-weaving spider from the Argentinean flooding pampas grasses: *Aculepeira morenoae* new species (Araneae, Araneidae)

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### Abstract

A new species of the orb-weaving spider genus *Aculepeira* Chamberling & Ivie 1942, *A. morenoae* new species, is described and illustrated based on male and female specimens from the Argentinean natural flooding pampas grasses.

**Key words:** flooding grasses, new species, orb-weavers, spider taxonomy

### Introduction

The spider genus *Aculepeira* Chamberlin & Ivie, 1942 (Araneidae) has an extensive distribution and comprises 23 species (Platnick 2012). Most of them occur in the New World (14 species), and the rest in Europe and Asia. Two species, *A. carbonarioides* (Keyserling 1892) and *A. packardi* (Thorell 1875), are widespread in the Holarctic region (Platnick 2012). Currently, only six species of *Aculepeira* are known from South America, of which three have found in Argentina *A. albovittata* (Mello-Leitão 1941), *A. travassosi* (Soares & Camargo 1948) and *A. vittata* (Gerschman & Schiapelli 1948), which is the southernmost distributed representative of the genus (Platnick 2012, Levi 1991).

Females of *Aculepeira* are recognized by the presence of an epigynum with a pointed scape, whose tip lacks the pocket that typifies the scape of the *Araneus*; males have a palp with a median apophysis bearing two filiform appendages (flagellae) on its proximal end, which are believed homologous to those found in the closely related *Metepeira* and *Kaira* (Levi 1977, 1991, 1993). A large boat shaped to disc-shaped conductor in ventral view is also shared with *Metepeira* (Levi 1977). Also, the structure of the copulatory organ is similar to that of *Araneus*, the conductor sits on the rim of the tegulum behind the median apophysis, there is no paramedian apophysis, and terminal and subterminal apophyses are present (Levi 1977, 1991). Even though Neotropical species of *Aculepeira* lack the ventral median white band found in the Holarctic *Aculepeira* and the above mentioned genera, they differ from those by having an oval, elongate, egg-shaped abdomen (Levi 1977, 1991).

Extensive taxonomic revisions of American *Aculepeira* were published by Herbert W. Levi, first in 1977 for the Nearctic species (including some Palearctic species), and finally in 1991 for the Neotropical and Mexican species. Driven by these revisions, subsequent contributions gradually provided new species to the knowledge of this spider group (Tanikawa 1994, Zhu & Wang 1995, Álvares *et al.* 2005, Guo & Zhang 2010).

As mentioned above, *Aculepeira* is a genus relatively well revised, but there are few studies concerning South American species, which increases the importance of contributions with detailed species descriptions from southern areas where there are diverse ecosystems but little known species (three in Argentina). Taxonomic papers should not be all or nothing; although not in a monographic context, single species description can be carried out to complement existing monographs, with the aim of expanding those revisions.

In a recent survey of the spider fauna from Campos del Tuyú National Park, in Eastern Buenos Aires, males and females of *Aculepeira* were observed and collected on its webs on flooding pampas grasses (*Paspalum* sp.), near of coastal lagoons. The examination of the specimens shows that, besides to have the mentioned diagnostic

characters of this genus, they do not fit with any other previously described species. In this contribution we describe and illustrate this new species.

## Methods

Morphological terms and format of description follow in general Levi (1991) and Argañaraz & Rubio (2011). Female genitalia were examined after digestion in a hot 10–20% KOH solution. Expansion of the male palp was made placing the piece in a 10% KOH solution for some minutes and then transferring it to distilled water several times, until full expansion. Temporary preparations were analyzed using a Olympus® BH-2 compound microscope. Photographs of the preserved specimens and sexual structures were taken with a Leica® DFC295 digital camera attached to a Leica® M205A stereomicroscope, and multi-focal images composed with LAS v.3.7 software of Leica®. For scanning electron microscopy observations (SEM), one male palp was dehydrated in a graded ethanol series (80–100%), critical point dried, and Au-Pd coated. SEM micrographs were taken under high vacuum with a FEI XL30 TMP (FEI, www.fei.com). All measurements are expressed in millimeters. Abbreviations are the standard for arachnology. Specimens examined were deposited at the arachnological collection of Museo Argentino de Ciencias Naturales “Bernardino Rivadavia” (MACN-Ar, C. Scioscia & M. Ramírez).

## Taxonomy

### Araneidae Clerck, 1757

#### *Aculepeira* Chamberlin & Ivie, 1942

##### *Aculepeira morenoae* new species

(Figs 1–32)

**Type material.** Holotype female (MACN-Ar 28655; temporary preparation GDR-0245) from Campos del Tuyú National Park (36°21'24.3"S, 56°51'38.7"W, 5m.a.s.l.), General Lavalle, Buenos Aires Province, ARGENTINA, 24–26 March 2012, G. Rubio, L. Piacentini and M. Izquierdo coll. Paratypes: same data, one male (MACN-Ar 28656; temporary preparation GDR-0244), one male (MACN-Ar 28657; temporary preparation GDR-0242), one female (MACN-Ar 28658; temporary preparation GDR-0247, LNP-4192[tissue sample]), one female and two immatures (MACN-Ar 28659; temporary preparation GDR-0243).

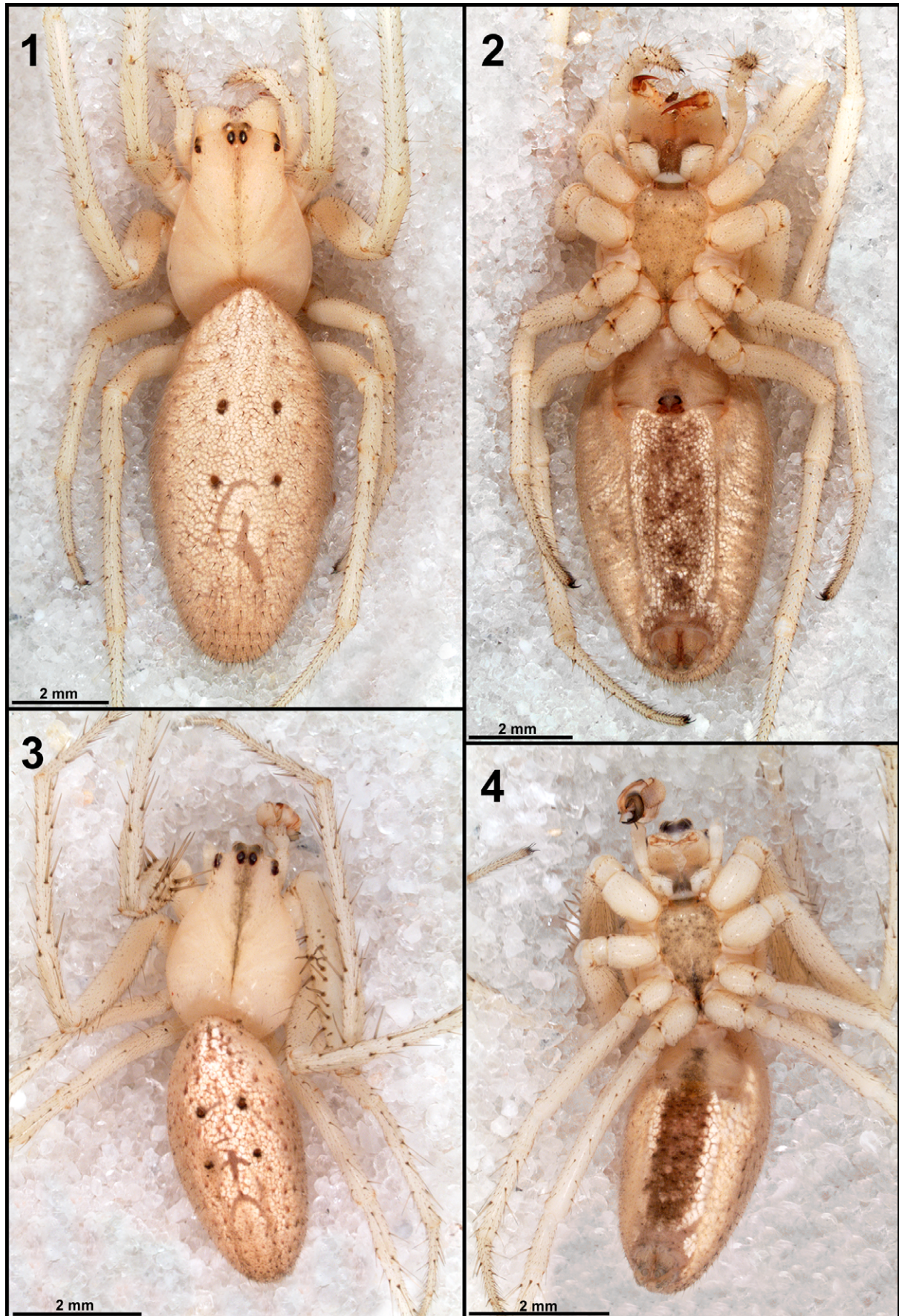
**Note.** The female was selected as holotype because in the revisions of American *Aculepeira* the 86% of species have female holotypes, and the greatest diversity of shapes is illustrated in the epigyna (see Levi 1991), thus provides more accurate diagnostic comparisons than males.

**Etymology.** The specific name is a patronymic in honor to Dr. Claudia E. Moreno, ecologist of Universidad Autónoma del Estado de Hidalgo, Mexico.

**Diagnosis.** Female and male of *A. morenoae* n. sp. (Figs 1–4, 7–9) resembles *A. albovittata* in having an elongate abdomen and a triangle-shaped scape (Levi 1991: figs 560, 562), and a sickle-shaped terminal apophysis respectively (Levi 1991: figs 563) (Figs 14, 16–22, 27); also, male resembles *A. angeloi* Álvares, Loyola & De Maria 2005 by having median apophysis with a similar dentate structure in its retrolateral end (Álvares *et al.* 2005: fig 1) (Figs 14–20, 28–30). *Aculepeira morenoae* n. sp. can be easily distinguished from similar species by having a uniform colored abdomen in dorsal view (present in both sexes, figures 1, 3), scape ending gradually toward a shorter tip (long in *A. albovittata*) (Figs 7–9), lateral plates converging dorsally on the median plate (a different shaped and not convergent in *A. albovittata*) (figure 10; compare with fig 561 –Levi 1991), males with irregular rows of 9–12 strong spines in prolateral side of femur I (six in *A. albovittata*) (Figs 3, 6), and by a particular arrangement of six (three large and three small) teeth on the retrolateral side of median apophysis (Figs 26–30).

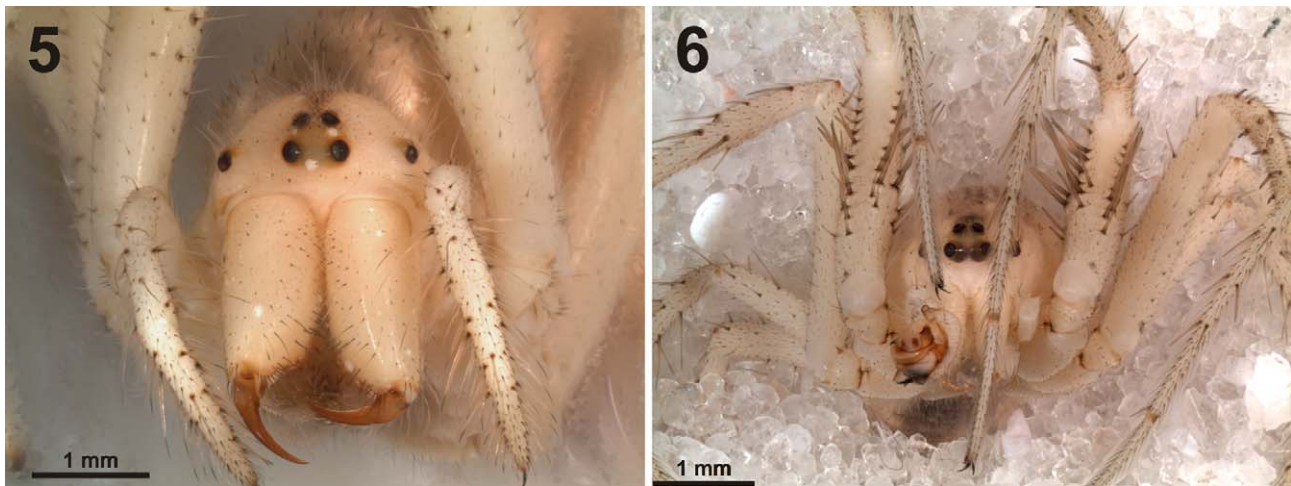
**Description.** Female (holotype): Carapace yellowish, with a blackish longitudinal strip starting near the posterior eyes towards the thoracic groove (Figs 1, 5). Four to six setae behind lateral eyes. Eye sizes and interdistances: anterior median eye (AME) 0.14, anterior lateral eye (ALE) 0.10, posterior median eye (PME) 0.12, posterior lateral eye (PLE) 0.09, AME-PME 0.23, AME-ALE 0.42, AME-PLE 0.57, PME-ALE 0.54, PME-PLE





FIGURES 1–4. *Aculepeira morenoae* n. sp., habitus. 1–2, female holotype (1, dorsal; 2, ventral). 3–4, male paratype (3, dorsal; 4, ventral).





FIGURES 5–6. *Aculepeira morenoae* n. sp., frontal view. 5, female holotype. 6, male paratype.

0.55, ALE-PLE 0.07. Chelicerae pale yellow with four smaller retromarginal teeth and four larger promarginal teeth (Figs 2, 5); sternum with irregular dark spots, coxae light yellow (Fig 2). Legs pale yellow. Tibia and metatarsus I–IV with macrosetae. Abdomen elongate oval, pale yellow dorsally with four black spots forming a square, and irregularly distributed guanine dots (Fig 1). Venter of abdomen with a median dark brown band slightly bordered by a white strip on each side, spinnerets brown, and the rest of venter pale yellow, without median white band (Fig 2). Epigynum (Figs 7–10) with triangular scape, pointed at tip; median plate wider than long; lateral plate converging dorsally on the median plate; spermathecae spherical; fertilization ducts relatively straight, dorsally directed; copulatory ducts in ventral posterior position with spermathecae (Fig 11–12). Total length 11.18; carapace length 4.55, width 3.22; sternum length 2.24, width 1.54; abdomen length 7.80, width 4.20. Leg formula I/II/IV/III. Leg lengths (I/II/III/IV): femur 4.58/4.55/3.15/4.06; patella 2.10/2.03/1.33/1.75; tibia 4.83/4.35/2.10/3.81; metatarsus 4.55/3.85/2.06/3.71; tarsus 1.78/1.61/0.98/1.09; total leg 17.84/16.39/9.62/14.42.

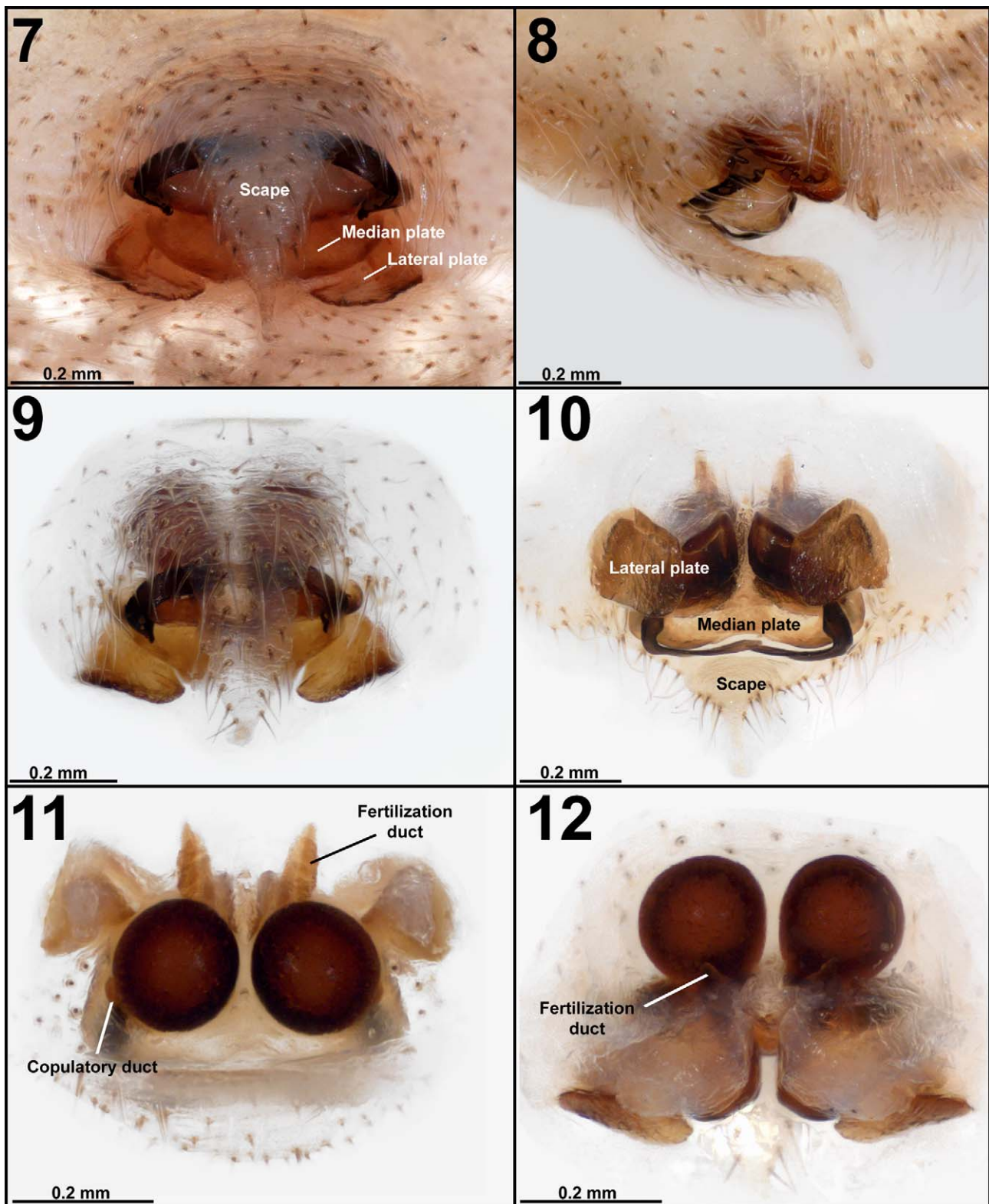
Male (paratype MACN-Ar 28656): Coloration as in the female except as noted (Figs 3–4). With some macrosetae instead setae (unlike the female) behind lateral eyes. Eye sizes and interdistances: AME 0.09, ALE 0.075, PME 0.09, PLE 0.075, AME-PME 0.21, AME-ALE 0.21, AME-PLE 0.33, PME-ALE 0.33, PME-PLE 0.33, ALE-PLE 0.06. Chelicerae with four small promarginal teeth. Coxa I without hook. Tibia and metatarsus I–IV with macrosetae. Ventral side of femur I with three approximately irregular rows of 9–12 strong spines. Abdomen shape and color as in the female, but ventrally more pigmented. Palp segments pale yellow, bulb gray to reddish-yellow (Figs 6, 13–15); broad terminal apophysis, long embolus visible, membranous conductor; bilobed median apophysis bearing two slender flagellae on its prolateral end, and six (three large and three small) teeth on retrolateral side (Figs 13–30). Total length 7.00; carapace length 3.15, width 2.26; sternum length 1.24, width 0.81; abdomen length 4.13, width 2.17. Leg formula as in the female. Leg lengths (I/II/III/IV): femur 3.99/3.57/2.38/2.87; patella 1.40/1.40/0.70/1.05; tibia 3.57/3.01/1.50/2.59; metatarsus 3.85/2.87/1.40/2.73; tarsus 1.54/1.12/0.77/0.91; total leg 14.35/11.97/6.75/10.15.

Variation. Females: total length 9.49–11.18; carapace length 4.06–4.55, width 2.73–3.22; abdomen length 6.65–7.80, width 3.08–4.20; one female has three teeth in retromargin of the chelicerae. Males: carapace width 2.20–2.26; abdomen length 4.13–4.27, width 2.10–2.17.

**Natural history.** These spiders build a complete orb-web at one meter height on the grasses, where they inhabit in sympatry with *Larinia tucuman* Harrod, Levi & Leibensperger 1991. Periodically flooded areas in sectors near to the coastal lagoons are the natural habitat of *A. morenoae*, where the "espartillar" of *Spartina densiflora*, *Sarcocornia perennis* ("cangrejal"), and *Cortaderia selloana* (large pampa grass) are dominant (Figs 31–32). The spiders were collected both during night and day resting at the hub of their webs.

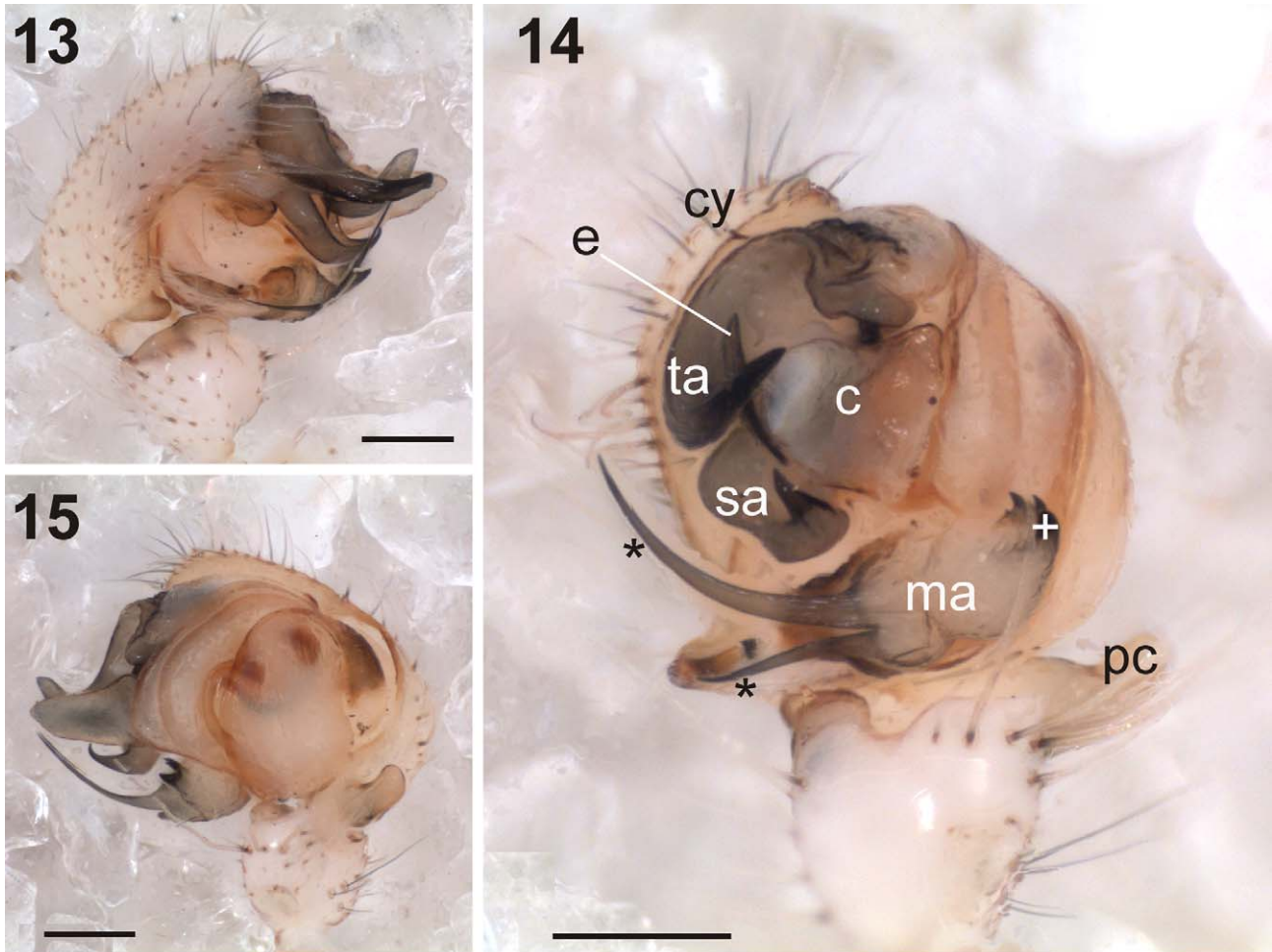
**Distribution.** Only known from the type locality. No additional material was found in the MACN collection, despite having done extensive samplings in Buenos Aires province. A potential explanation for this may be offered by the reduced geographic range of the natural flooding pampas grasses (Bilenca & Miñarro 2004) where the specimens were found. A similar situation/distribution is observed and reported for the uloborid spider *Sybotia atlantica* Grismado 2001.

**Material examined for comparison.** *Aculepeira albovittata* (Mello-Leitão 1941: 214, f. 20) (Holotype female from ARGENTINA: Santa Fe, Caraguatay, November 1939, Birabén coll., deposited in the arachnid collection of Museo de La Plata—MLP 15150).



**FIGURES 7–12.** *Aculepeira morenoae* n. sp., female genitalia. 7–9, epigynum (7, ventral; 8, lateral; 9, digested ventral). 10–12, digested vulva (10, posterior; 11, anterior; 12, dorsal).

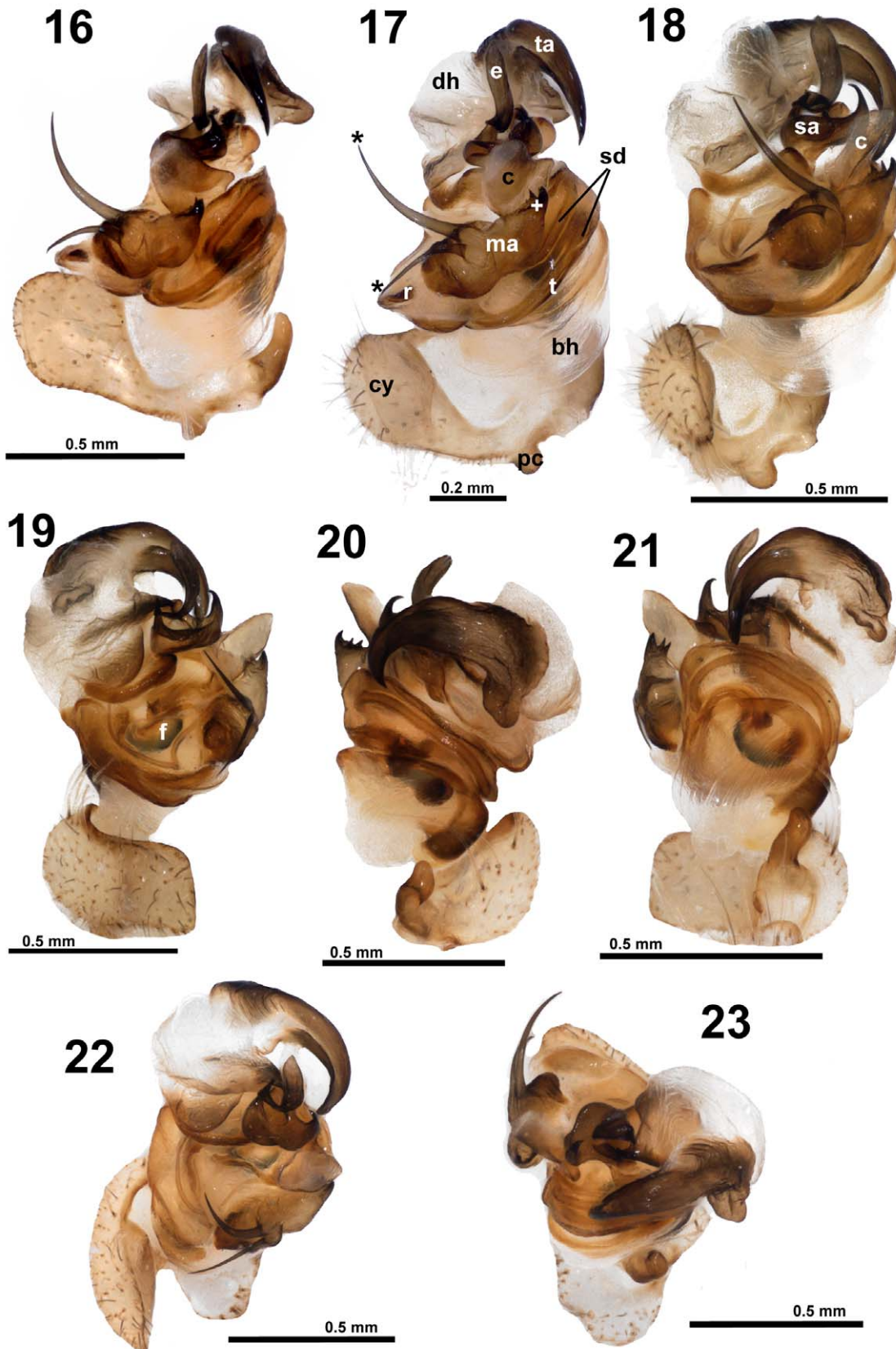




**FIGURES 13–15.** *Aculepeira morenoae* n. sp., left palp. 13, prolateral; 14, ventral; 15, retrolateral. (c = conductor; cy = cymbium; e = embolus; ma = median apophysis; pc = paracymbium; sa = subterminal apophysis; ta = terminal apophysis; \* = flagellae of ma; + = dentate end of ma). Scale bars: 0.2 mm.

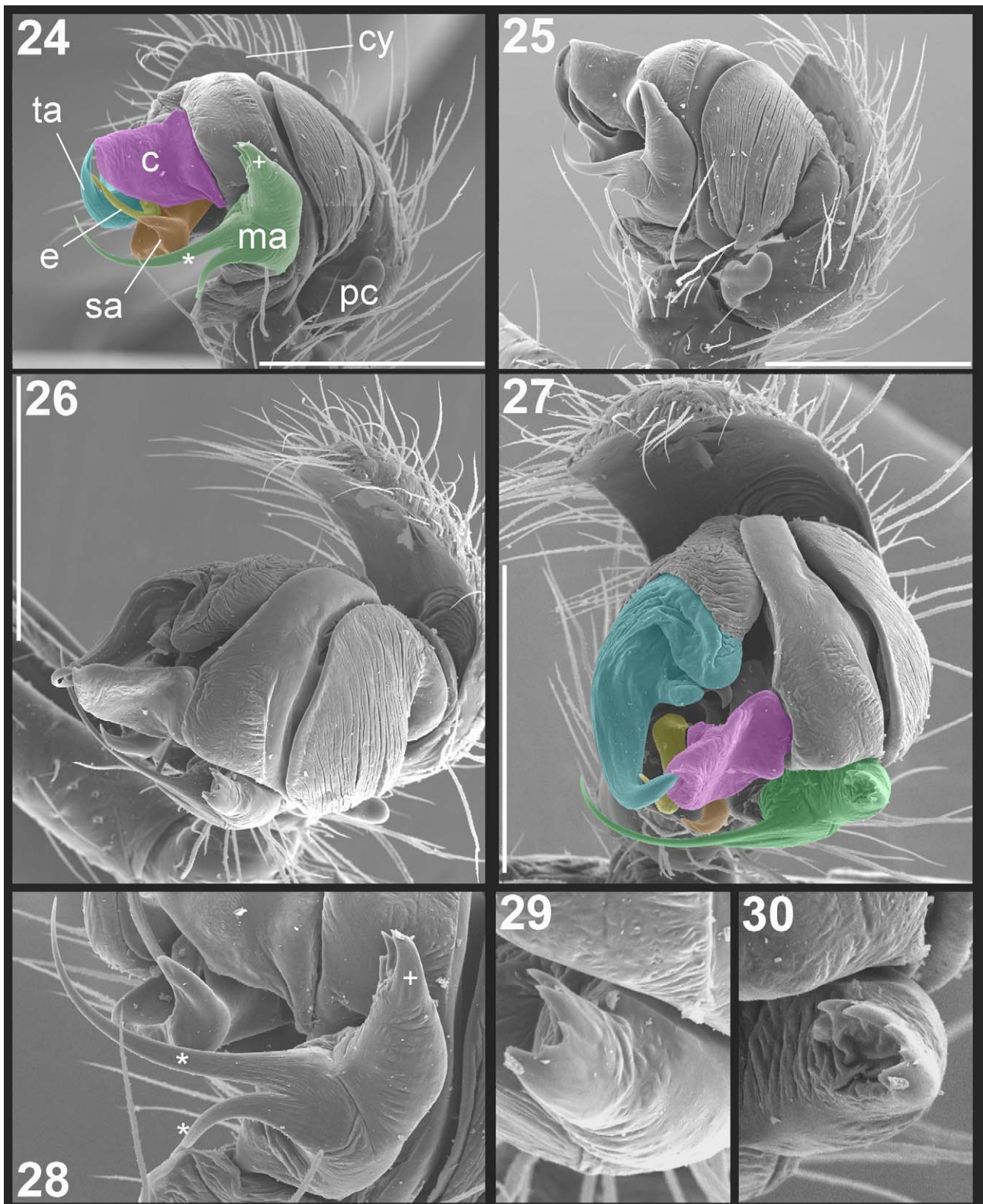
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**FIGURES 16–23.** *Aculepeira morenoae* n. sp., expanded left palp. 16–18, ventral from different angle; 19, prolateral; 20, retrolateral; 21, retrolateral-basal; 22, prolateral-apical; 23, apical. (bh = basal hematodocha; c = conductor; cy = cymbium; dh = distal hematodocha; e = embolus; f = fundus; ma = median apophysis; pc = paracymbium; r = radix; sa = subterminal apophysis; sd = sperm duct; t = tegulum; ta = terminal apophysis; \* = flagellae of ma; + = dentate end of ma).





**FIGURES 24–30.** *Aculepeira morenoae* n. sp., left palp SEM. 24, retrolateral-ventral; 25, retrolateral; 26, dorsal; 27, apical; 28–30, close up views (28, median apophysis; 29–30, dentate end of median apophysis. (c = conductor; cy = cymbium; e = embolus; ma = median apophysis; pc = paracymbium; sa = subterminal apophysis; ta = terminal apophysis; \* = flagellae of ma; + = dentate end of ma). Scale bars: 0.5 mm



31



32



**FIGURES 31–32.** Flooding pampas grasses in Campos del Tuyú National Park, Buenos Aires, habitat of *Aculepeira morenoae* n. sp. 31, panoramic view looking northeast; 32, grasses where spiders inhabit.

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