

## New pseudoscorpion species (Pseudoscorpiones: Hesperolpiidae) from Lima City, Peru

### Nueva especie de pseudoscorpión (Pseudoscorpiones: Hesperolpiidae) de la ciudad de Lima, Perú

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#### Abstract

This study describes and illustrates a new species of arachnid, the pseudoscorpion *Stenolpium sayrii* sp. nov., collected at Pucllana, an archaeological site in the city of Lima, Peru. With this description, the total number of known *Stenolpium* species worldwide reaches eight, and in Peru specifically, it increases to seven. The discovery of this new species in Peru's most populous city serves as an exemplar highlighting the extensive scope for further research on Peruvian fauna in general, particularly on its arachnids.

#### Resumen

En este trabajo, una nueva especie de arácnido, el pseudoscorpión *Stenolpium sayrii* sp. nov., colectada en Pucllana, sitio arqueológico de la ciudad de Lima, Perú, es descrita e ilustrada. Con esta descripción, el número de especies conocidas de *Stenolpium* en el mundo asciende a ocho en total y para el Perú a siete. El descubrimiento de esta nueva especie en la ciudad más poblada del Perú es un ejemplo de lo mucho que falta investigar sobre la fauna peruana en general y sobre sus arácnidos en particular.

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#### Keywords:

Peruvian Coastal Desert, urban wildlife, arachnids, taxonomy, biodiversity.

#### Palabras clave:

Desierto costero peruano, fauna urbana, arácnidos, taxonomía, biodiversidad.

## Introduction

During a series of fauna evaluations carried out in 2021 at Pucllana, an archaeological site in the city of Lima, Peru, a new species of arachnid was recorded and assigned to a pseudoscorpion of the genus *Stenolpium* Beier, 1955.

The genus *Stenolpium* is endemic to the South American Pacific coasts and belongs to the family Hesperolpiidae Hoff, 1964, which is distributed mainly in xeric environments (Harvey & Leng 2008, Barba 2020); this family includes 12 genera and 93 species (World Pseudoscorpiones Catalog 2022). Prior to this study, seven species of *Stenolpium* have been described: *S. asperum* Beier, 1954; *S. fasciculatum* Mahnert, 1984; *S. insulanum* Beier, 1978; *S. mediocre* Beier, 1959; *S. peruanum* Beier, 1955; *S. robustum* Beier, 1959 and *S. rossi* Beier, 1959. Five of these species have been recorded only in Peru; the only ones not endemic to Peru are *S. insulanum*, endemic to the Galapagos Is-

lands, and *S. asperum*, recorded in Peru and Chile (World Pseudoscorpiones Catalog 2022). To date, a total of 44 species of pseudoscorpions have been recorded in Peru (World Pseudoscorpiones Catalog 2022).

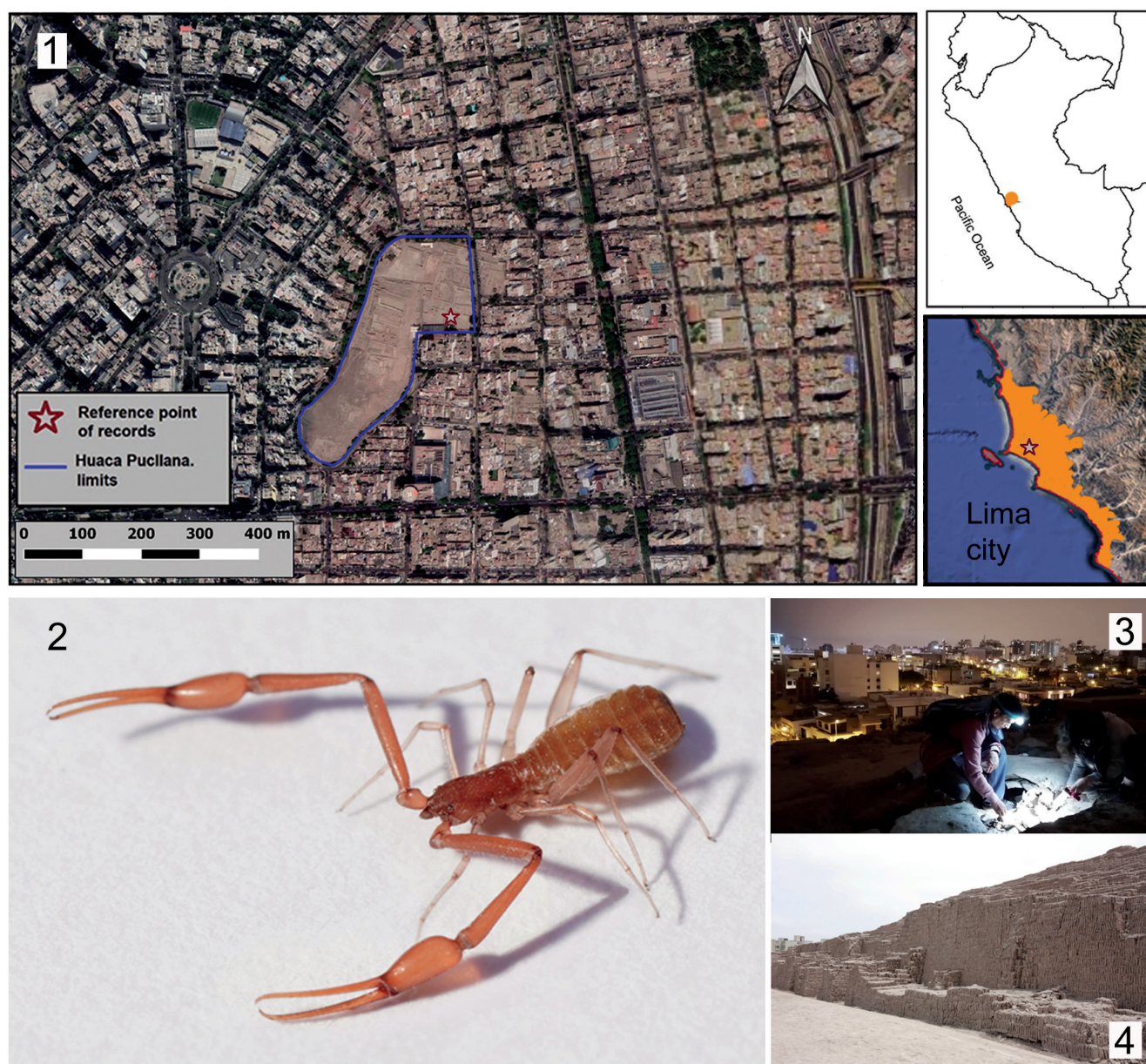
In the present paper, *Stenolpium sayrii* sp. nov. is described from Pucllana, based on male and female specimens. This finding is surprising given that Pucllana is located in an urban neighborhood of Lima, the capital of Peru, which, with more than 10 million inhabitants, is the most populated Peruvian city.

## Material and methods

Pucllana is a pre-Columbian archaeological site of the Lima culture, dating approximately from 200 to 700 AD. It is built with mud bricks in an area located in Lima city, in the district of Miraflores, and has a surface of 6.07 ha surrounded by streets, parks and houses (Fig. 1).

The specimens reviewed in this work were searched at night, with flashlights, for three nights per month, from 20:00 to 23:00 hours each night, throughout the entire year 2021. During each evaluation night, approximately 70% of the archaeological site was covered. Only adult specimens were captured. The specimens were collected with the help of tweezers, stored in vials with 70% ethanol and deposited in the entomological collection of the Natural History Museum of San Marcos University. The specimens, including a single male, were not cleared for examination.

Terminology and measurements followed Chamberlin (1931) with the modifications proposed by Harvey (1992) for the trichobothria and Judson (2007) for the chelicerae. The abbreviations used for the trichobothria were: *b* = basal; *sb* = sub-basal; *st* = sub-terminal; *t* = terminal; *ib* = interior basal; *isb* = interior sub-basal; *ist* = interior sub-terminal; *it* = interior terminal; *eb* = exterior



**Figures 1–4.** Distribution, habitat and habitus of the new species. 1: Map of the species' known distribution. 2: Habitus of an adult female of *Stenolpium sayrii* sp. nov. 3: Working team at Pucllana, Miraflores, Lima. 4: View of the habitat. Photographs: 3 Eddy Diaz; 2, 4 Daniel Cossios.

basal; *esb* = exterior sub-basal; *est* = exterior sub-terminal; and, *et* = exterior terminal. Abbreviations used for the cheliceral setae were: *is* = interior seta; *ls* = laminar seta; *es* = exterior seta; *bs* = basal seta; *sbs* = subbasal seta; *gs* = galeal seta.

Illustrations were made using a stereomicroscope (Euromex, model Nexius Zoom) and a camera lucida. Digital images of fixed specimens were taken under visible light, using a camera (Euromex, model CMEX 18 Pro) attached to the same stereomicroscope, and the stacked images were processed with Helicon Focus 3.10.3 (<http://helicon.com.usa/heliconfocus/>). Images of a live specimen were taken with a digital camera Sony alpha 6400. Measurements were obtained following the methodology of Botero-Trujillo et al. (2017) and are expressed in millimetres.

## Taxonomy and descriptions

FAMILY HESPEROLPIIDAE HOFF, 1964

### Genus *Stenolpium* Beier, 1955

**Type species.** *Stenolpium peruanum* Beier, 1955, by original designation.

The new species is placed in *Stenolpium* because it has the typical characteristics of the genus, e.g., 1) granulated carapace and pedipalps; 2) trichobothria arrangement characterized by a fixed finger with eight trichobothria: *ib* dorsally placed, *ist* prolaterally placed, all others retrolaterally placed; *eb*, *esb*, *ib* and *isb* in the basal portion of the finger, *est*, *ist*, *it* and *et* at the distal portion; movable finger with four trichobothria, all externally placed; 3) a tactile seta on the pedipalpal femur; and 4) pedipalp having a cylindrical and elongated femur, patella slightly conical, hand dorsally triangular and broad, fingers slender and elongated compared to the hand.

### *Stenolpium sayrii* sp. nov.

(Figs 2, 5-18; Table 1)

**Type material.** Holotype male (MUSM-ENT 0516779): Peru, Lima city (department and province of Lima), Miraflores district, Huaca Pucllana (Figs 1-2), [12°06'38"S, 77°02'00"W], 105 m elevation, 11 April 2021, E.D. Cossios coll. Paratypes: 2 females (MUSM-ENT 0516780), Huaca Pucllana (13 April 2021), E.D. Cossios coll.

**Etymology.** The specific name is a patronym for Sayri Cossios Veillon, who helped find the specimens described here.

**Diagnosis.** *Stenolpium sayrii* sp. nov. differs from *S. asperum*, *S. insulanum*, *S. mediocre*, *S. peruanum*, *S. robustum* and *S. rossi* by having a putative sensory organ formed by multiple short setae on the pedipalpal movable finger, by the trichobothria arrangement with *st* very close to *t*, and *ist-it-et* distal with respect to *t*, and much more elongated legs and pedipalps (Table 1).

**Table 1.** Pedipalpal femur length of the eight known *Stenolpium* species.

Species	Pedipalpal femur length (mm)	Reference
<i>S. sayrii</i> sp. nov.	1.87–2.55	This paper
<i>S. asperum</i>	0.94–1.55	Beier 1954
<i>S. insulanum</i>	0.62–0.74	Manhert 2014
<i>S. fasciculatum</i>	1.22	Manhert 1984
<i>S. mediocre</i>	0.77	Beier 1959
<i>S. peruanum</i>	0.70	Beier 1955
<i>S. robustum</i>	0.94–0.97	Beier 1959
<i>S. rossi</i>	1.12	Beier 1959

*Stenolpium fasciculatum* is the species most similar to *S. sayrii* sp. nov., both having the sensory organ on the pedipalpal movable finger, the same trichobothria arrangement and elongated appendages; however, these two species can be distinguished because *S. sayrii* has more elongated pedipalps and legs (Table 2), as well as an anteromedial furrow on the carapace and a different carapace chaetotaxy.

**Carapace** (Figs. 6, 9). Finely granular, 2.14 times longer than broad, with anteriomedian transverse furrow, posterior margin elevated, and lateral margins depressed at the medial region. A total of 20 setae, including six on anterior margin, four on posterior margin, two preocular setae at each side and one seta between each pair of eyes. Cucullus elongated, with sinuous anterior margin.

**Chelicera** (Fig. 10). Hand with five setae, all of them without setulae; fixed finger with five teeth and lamina externa; movable finger with one subdistal seta; serrula exterior with 24 lamellae; serrula interior with 17 lamellae. Galea 0.09 mm long, without rami (Figs. 10, 13). Rallum with three blades (Fig. 14).

**Pedipalps** (Figs. 11–12). Coxae with distal ends visible next to the cucullus and eyes from a dorsal view (Fig. 6), laterally granulated and with eight ventral setae. Trochanter, femur, and patella finely granulated. Femur cylindrical, with a tactile seta (trichobothria) dorsally placed on the first quarter of its length, patella slightly conical. Hand finely granulated only on its mesal portion, chelal fingers smooth. Trochanter 1.58, femur 6.23, patella 6.00 times longer than wide; pedicel about 1/5 the entire length of patella; chela (with pedicel) 4.46, chela (without pedicel) 4.26 times longer than wide, movable finger 1.72 times longer than hand (without pedicel). Fixed chelal finger with eight trichobothria: *ib* dorsally placed, close to the base; *ist* prolaterally placed; *eb*, *esb*, *isb*, *est*, *it* and *et* retrolaterally placed; *eb*, *esb* and *isb* grouped at the base, *est*, *ist*, *it* and *et* in the distal portion of the finger; *ist*, *it* and *et* placed distally to *t*. Movable chelal finger with four trichobothria, all retrolaterally placed: *b* and *sb* close to the base, *st* and *t* on the distal portion; distally close to *t*, a depression with many short setae (Fig. 12), probably a sensory organ, is found. Venom apparatus present in both fingers; venom ducts long,

**Table 2.** Measurements (in mm) of *Stenolpium sayrii* sp. nov. and *Stenolpium fasciculatum*. Data for *S. fasciculatum* from Manhart 1984. l = length, b = breadth, d = depth. Description of the male holotype. Color in vivo (Fig. 5). Carapace, chelicerae, and pedipalps reddish brown, abdomen yellowish, legs reddish, lighter than carapace. Color in ethanol: same as in life.

Measurement	Stenolpium sayrii sp.nov.			Stenolpium fasciculatum
	Male Holotype	Female Paratypes		Male
		A	B	
Body length <sup>1</sup>	3.97	6.36	5.69	-
Carapace l-b	1.41/0.74	1.88/0.87	1.93/0.9	1.13/0.62
Pedipalp trochanter l-b	0.71/0.45	0.67/0.36	0.74/0.52	-
Pedipalp femur l-d	1.87/0.30	2.18/0.30	2.55/0.36	1.22/0.25
Pedipalp patella l-d	1.86/0.31	1.87/0.32	2.16/0.39	1.14/0.26
Pedichel of the pedipalp patella, length	0.34	0.32	0.31	-
Pedipalp chela (with pedichel) l-b	3.35/0.75	3.66/0.71	4.41/0.89	2.27/0.54
Pedichel of the pedipalp chela, length	0.15	0.15	0.21	0.12
Hand length (w/o pedichel)	1.19	1.22	1.45	0.77
Movable finger length	2.05	2.29	2.70	1.5
Leg I trochanter l-b	0.31/0.23	0.31/0.23	0.41/0.31	-
Leg I femur l-d	0.95/0.12	1.07/0.18	1.25/0.18	0.6/0.12
Leg I patella l-d	0.43/0.13	0.37/0.17	0.53/0.17	0.29/0.11
Leg I tibia l-d	0.96/0.07	1.07/0.09	1.20/0.08	0.55/0.07
Leg I basitarsus l-d	0.49/0.06	0.49/0.08	0.60/0.07	0.55/0.06
Leg I telotarsus l-d	0.30/0.04	0.32/0.05	0.36/0.05	0.25/0.04
Leg IV trochanter l-b	0.49/0.26	0.54/0.22	0.66/0.29	-
Leg IV femur+patella l-d	1.54/0.25	1.58/0.23	1.87/0.24	1.05/0.28
Leg IV tibia l-d	1.47/0.11	1.56/0.13	1.88/0.12	0.93/0.10
Leg IV basitarsus l-d	0.68/0.08	0.65/0.08	0.68/0.10	0.42/0.07
Leg IV telotarsus <sup>2</sup> l-d	0.39/0.06	0.40/0.08	0.43/0.08	0.30/0.06

<sup>1</sup>Without chelicerae.

<sup>2</sup>Without claws.

reaching *est* in the fixed finger and surpassing *st* in movable finger. Fixed chelal finger with 59 teeth, more elongated on the distal part of the finger. Mobile finger with 11 clearly distinguishable teeth in the distal third of the finger and a large number of teeth in the rest, rounded in the proximal third and fused together and barely distinguishable in the middle of the finger.

**Abdomen.** Tergal chaetotaxy (I–XI): 6/6/6/8/8/8/8/9/8/6/8, the outermost seta on each side of the sternite XI is very long (trichobothria); sternal chaetotaxy (IV–XI): 9/13/14/10/8/10/12/8; anal cone with two dorsal and two ventral setae. Male genital area (Figs. 8, 17): sternite II with 23 scattered setae on the anterior portion and 25 setae on the central part of the posterior border; sternite III with anteromedian groove flanked by one small seta on each side, and 12 setae on the posterior margin.

**Legs.** Coxal chaetotaxy (I–IV): 15/21/17/19. Leg I (Fig. 15): femur 7.92, patella 3.31, tibia 13.71, basitarsus 8.17, telotarsus 7.50 times longer than deep, femur 2.21 times longer than patella, basitarsus 1.63 times longer than telotarsus. Leg IV (Fig. 16): femur + patella 6.16 times longer than deep; tibia 13.36, basitarsus 8.5, telotarsus 6.5 times longer than deep; basitarsus 1.74 times

longer than telotarsus; tibia with one distal tactile seta, basitarsus with one proximal and one distal tactile setae, telotarsus with one distal tactile seta; arolium not divided, longer than the slender and simple claws.

**Description of Females (paratypes)** (Fig. 2). Same color as the male. Other morphological characters also same as the male, except the following:

**Carapace.** 2.14–2.16 times longer than broad.

**Pedipalps.** Trochanter 1.42–1.86, femur 7.08–7.27, patella 5.54–5.84, chela (with pedichel) 4.95–5.15, chela (without pedichel) 4.72–4.94 times longer than wide, movable finger 1.86–1.88 times longer than hand (without pedichel). Fixed chelal finger with 57 teeth.

**Abdomen.** Tergal chaetotaxy (I–XI): 7-8/4-6/8/8/8/8-10/8-10/9-10/8/7-9/8; sternal chaetotaxy (IV–XI): 8-10/12/10-12/11-12/9-10/10/10/8; anal cone with two dorsal and two ventral setae. Female genital area (Figs. 7, 18): sternite II with 8-18 scattered setae; sternite III with a row of 8-10 setae on the posterior margin.

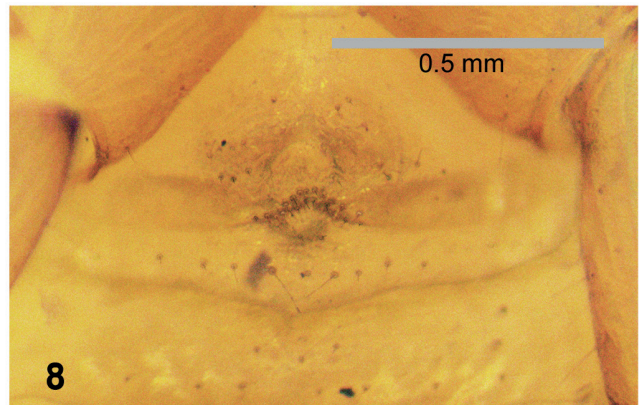
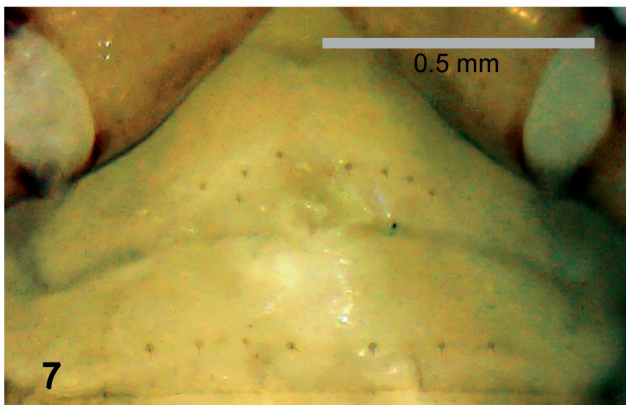
**Legs.** Coxal chaetotaxy (I–IV): 12-14/17-20/16-17/18-20. Leg I: femur 5.94–6.94, patella 2.18–3.12, tibia 11.89–15.0, basitarsus 6.12–8.57, telotarsus 6.4–7.2

times longer than deep, femur 2.36–2.89 times longer than patella, basitarsus 1.53–1.67 times longer than telotarsus. Leg IV: femur + patella 6.87–7.79 times longer than deep; tibia 12.0–15.67, basitarsus 6.8–8.12, telotarsus 5.0–5.37 times longer than deep; basitarsus 1.58–1.62 times longer than telotarsus.

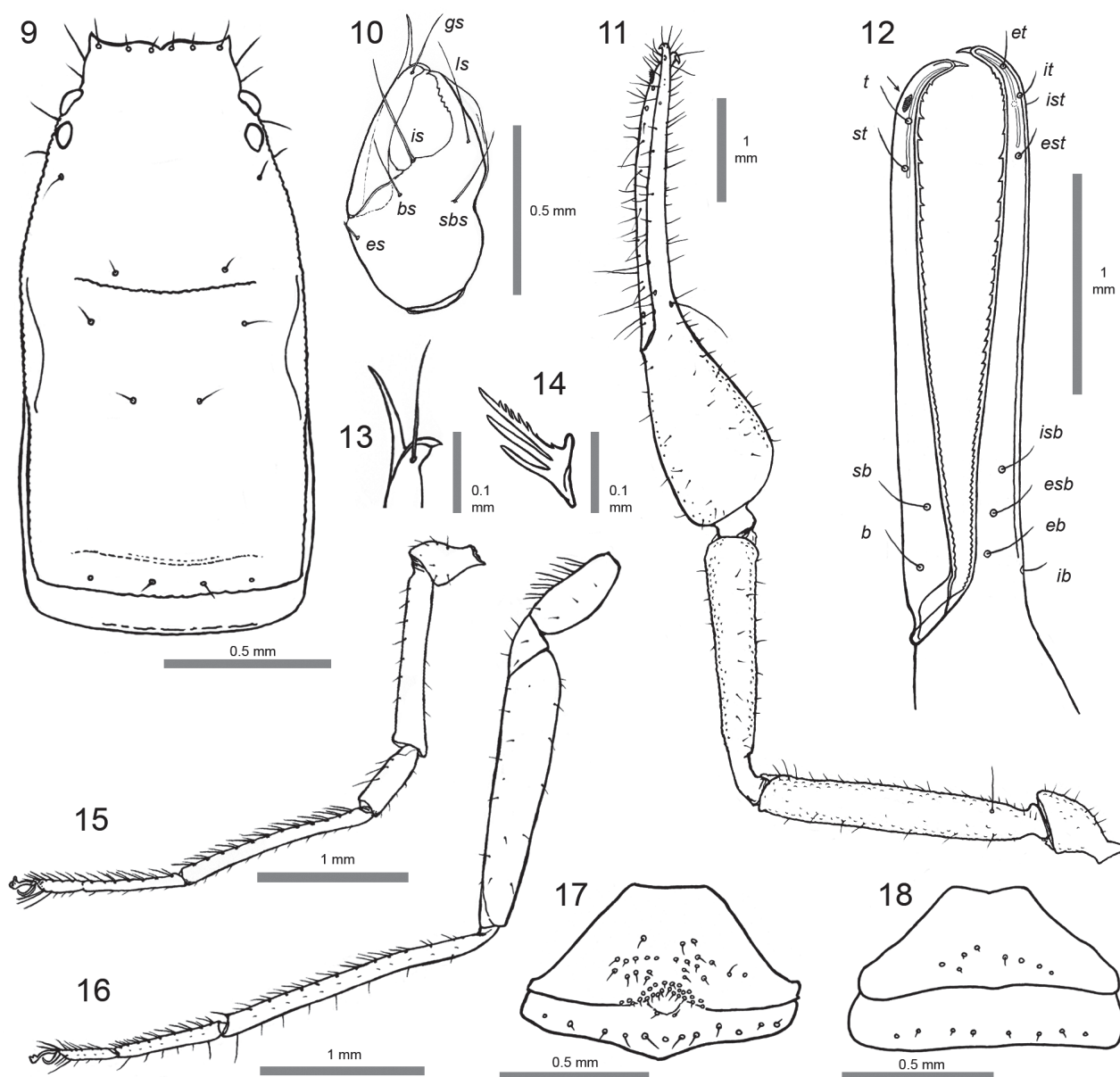
**Measurements.** Table 2 shows measurements of the male holotype, the female paratypes and a male of *Stenolpium fasciculatum*.

**Variation.** Variation of some measurements is shown in Table 2. No significant variation in other characters was observed.

**Distribution.** This species is known only from the type locality, which, according to Morrone (2001), is located in the Coastal Peruvian Desert biogeographical province, in the Andean Region.



Figures 5–8. *Stenolpium sayrii* sp. nov. dorsal aspect, prosoma and genital area. 5, 6, 8: Male holotype. 7: Female paratype.



**Figures 9–18.** *Stenolpium sayrii* sp. nov. holotype male (10–16), female (18). 9: Carapace, dorsal view. 10: Left chelicera, dorsal view. 11: Left pedipalp, dorsal view. 12: Left chelal fingers, retrolateral view. 13: Distal part of the movable finger of the left chelicera, showing the galea and the galeal seta. 14: Rallum of the left chelicera. 15: Left leg I, retrolateral view. 16: Left leg IV, retrolateral view. 17: Male genitalia area showing sternites II and III. 18: Female genitalia area showing sternites II and III. The arrow on Fig. 12 shows the putative sensory organ on pedipalpal movable finger.

**Comments.** Pucllana is characterized by a very arid environment with a soil and stone substrate, very different from the surrounding sites made up of cement surfaces and parks with vegetation and irrigation. The author searched for the species described here in some parks near Pucllana, without success. However, *Stenolpium sayrii* sp. nov. is probably present in other arid environments, such as other archaeological sites or in the periphery of Lima city.

The species most closely resembling *Stenolpium sayrii* sp. nov. is *S. fasciculatum*. *Stenolpium fasciculatum* has been documented from a single specimen discovered in Chiclayo (Manhert 1984), a location situated over 600 km north of Pucllana. Chiclayo, po-

sitioned in the Peruvian coast, features an arid environment similar in climate and substrate to the habitat where *S. sayrii* sp. nov. was discovered. To the best of author's knowledge, no records of *Stenolpium* pseudoscorpions have been published on the Peruvian central coast since 1959 (Roewer 1959), although they appear to be relatively common species at some sites (personal observation). These observations suggest that the lack of records of this genus in the Peruvian coast is mainly due to the lack of inventories, and not to the absence or rarity of these animals. Additional field works will help to discover a higher diversity of species in arid environments along the desert coast of Peru, in particular between Lima and Chiclayo, where at least two species of *Stenolpium* occur.

With the description of this species, the number of pseudoscorpions of the genus *Stenolpium* reaches to eight, seven of these recorded in Peru.

The discovery of this new species in the most populated Peruvian city is an example of how much research remains to be done on Peruvian fauna in general and on its arachnids in particular.

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