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Research article

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Description of *Cervidellus hueckeswagensis* sp. nov. and *Stegelleta waltrautae* sp. nov. (Nematoda: Rhabditida: Cephalobidae) from the Atacama Desert in Chile

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Abstract. Despite being the driest desert on earth, some areas of the Atacama receive precipitation and harbour a diverse fauna and flora. Two new nematode species are described from the more humid regions of the Atacama Desert. *Cervidellus hueckeswagensis* sp. nov. was discovered in several high-altitude locations along the west slopes of the Andes. It is most similar to *C. caucetensis* and *C. vinciguerrae* in the shape of the labial probolae and to *C. bifidihastatus*, *C. hamatus*, *C. doorsselaeri* and *C. capraeolus* in the shape of the cephalic probolae, being uniquely characterised by having asymmetrically triangular lips with 6–7 tines and bifurcated labial probolae without additional tines or swellings. *Stegelleta waltrautae* sp. nov. was found in the coastal sand dunes. It is most similar to *S. tuarua* in having a large number of longitudinal lines and lateral alae with five incisures but differing in the shape of the cephalic probolae and distinctly protruding vulva.

Keywords. Atacama, *Cervidellus*, *Stegelleta*, morphology, taxonomy.

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Introduction

With its remarkable geological history, the Atacama Desert is one of the most extreme places on earth. Some areas have barely been affected by erosion for millions of years (Dunai *et al.* 2005). Due to the fact that it is surrounded by the Coastal Cordillera and the Andean Cordillera, which form a two-sided rain barrier, the Atacama Desert is the driest non-polar desert on earth (Houston *et al.* 2003). For most organisms, this environment is not inhabitable; however, some groups such as Nematoda have adapted to these harsh circumstances (Stewart 1989; De Ley *et al.* 1999; Villegas *et al.* 2025). The peculiarity of life in desert soils is especially striking, since every organism needs water for metabolic processes. However, there are some groups of nematodes, which apparently have perfectly adapted to these seemingly impossible living conditions (Adams *et al.* 2007; Edgington *et al.* 2011). Additionally, the absence of water also induces an increase of ion concentration in the soil, which ultimately leads to the emergence of obscure microhabitats, such as small hypersaline or very alkaline crevices, which hardly form in other conditions and can be in very close proximity to each other (Uma *et al.* 2020; Villegas *et al.* 2025). With that in mind, the question arises what nematode species manage to live in the soil of the Atacama and what adaptations they employ.

It is well known that nematodes of the family Cephalobidae Filipjev, 1934 often dominate desert soils thanks to their anhydrobiotic capabilities (Stewart 1989); thus, it is of high interest to further investigate the presence and distribution of this group of nematodes in the Atacama Desert. In this paper, we present descriptions of two new species belonging to the genera *Cervidellus* Thorne, 1937 and *Stegelleta* Thorne, 1938 (Cephalobidae) from desert soils from the Tarapaca and the Atacama regions in northern Chile.

Material and methods

Soil samples were collected in multiple localities across the Atacama Desert during 2022–2024. Nematodes were recovered from soil samples using a modified tray extraction technique. Some specimens were immediately preserved in 4% formaldehyde solution, while others were barcoded as described in Villegas *et al.* (2025). For light microscopy, specimens were relaxed by heat, fixed in cold 4% formaldehyde solution, transferred to pure glycerine by a slow evaporation method and mounted on permanent slides in glycerine with paraffin wax as support for the coverslip. Morphometric characters applied herein are as defined for Cephalobidae in De Ley *et al.* (1999), terminology of the labial and cephalic region and stoma terminology follows Holovachov *et al.* (2009). Type specimens are deposited in the invertebrate collections of the Department of Zoology, Swedish Museum of Natural History, Stockholm, Sweden (SMNH).

Results

Taxonomy

Phylum Nematoda Diesing, 1861
Class Chromadorea Inglis, 1983
Order Rhabditida Chitwood, 1933
Family Cephalobidae Filipjev, 1934
Genus *Cervidellus* Thorne, 1937

Cervidellus hueckeswagensis sp. nov.

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Figs 1–3, 7A–F, Tables 1–2

Diagnosis

Cervidellus hueckeswagensis sp. nov. is characterized by a body length of 488–539 μm in females; cuticle with longitudinal incisures; lateral alae with five incisures extending to tail tip; three pairs of asymmetrical lips, pairs of lips separated by V-shaped primary axils with two triangular-acute guarding processes, and each lip asymmetrically triangular with 6–7 tines along its margin; three labial probolae, each bifurcated at one level, at about half of their length; labial probolae lacking additional tines or swellings; pharyngeal corpus 2.1–3.4 \times as long as isthmus; excretory pore at corpus/isthmus level; vulva continuous with body contour; spermatheca 7–15 μm long; and post-vulval uterine sac 12–32 μm long.

Etymology

The specific epithet is derived from the hometown ('Hückeswagen') of the first author.

Type material

Holotype

CHILE • ♀; Tarapacá Region, Tamarugal Province; 20°34.883' S, 68°46.517' W; 4056 m a.s.l.; 4 Oct. 2022; O. Holovachov, L. Villegas, L. Pettrich, A.-M. Waldvogel and P. Schiffer leg.; soil, sample code ALT.22.10 (Fig. 7A–B); SMNH Type-9945; SMNH.

Paratypes

CHILE • 6 ♀♀; same data as for holotype; SMNH Type-9945; SMNH.

Other material examined

CHILE • 7 ♀♀; Tarapacá Region, Tamarugal Province; 20°20.383' S, 68°58.517' W; 4196 m a.s.l.; 3 Oct. 2022; O. Holovachov, L. Villegas, L. Pettrich, A.-M. Waldvogel and P. Schiffer leg.; soil under *Azorella compacta* Phil., sample code ALT.22.08 (Fig. 7E–F); SMNH.

Associated molecular data

CHILE • 1 ♀; Tarapacá Region, Tamarugal Province; 20°20.150' S, 69°02.567' W; 3886 m a.s.l.; 3 Oct. 2022; O. Holovachov, L. Villegas, L. Pettrich, A.-M. Waldvogel and P. Schiffer leg.; soil under unidentified bush, sample code ALT.22.04; GenBank no: PQ587598 (18S) • 1 ♀; Antofagasta Region, El Loa Province; 23°30.967' S, 67°50.933' W; 3830 m a.s.l.; 9 Oct. 2022; Holovachov, A.-M. Waldvogel, L. Schiffer and P. Schiffer leg.; soil under dead cactus, sample code EPT.22.3830; GenBank no: PQ587809.

Description

Adult

Body variably curved ventrad upon fixation (fixed without applying heat). Cuticle coarsely annulated, annuli 2–2.5 μm wide at midbody. Longitudinal incisures present, giving cuticle tiled appearance. Lateral alae start at level of procorpus, and expand to five incisures at metacarpus / isthmus, extending to tail tip. Lip region slightly offset, with six labial and four cephalic papillae. Amphid opening relatively small, oval, located at base of each lateral lip. Three pairs of asymmetrical lips, one dorsal and two ventrolateral. Pairs of lips separated by V-shaped primary axils with two triangular-acute guarding processes. Secondary axils V-shaped, without guarding processes. Each lip asymmetrically triangular with 6–7 elongate-triangular tines along its margin: 2–3 tines facing primary axil, one long tine pointing forward, and three long tines facing secondary axil (Fig. 3). Three labial probolae bifurcated at about half of their length; prongs slender, curved towards each other, without secondary tines or bifurcations. Basal knobs or ridges absent. Stoma about as long as lip region diameter. Cheilorhabdia irregular in latero-median view; metastegostom with large dorsal denticle. Pharynx cephaloboid. Pharyngeal corpus fusiform; isthmus well demarcated from corpus; basal bulb oval with well-developed grinder. Nerve ring

surrounding metacarpus but poorly visible in most specimens. Excretory pore at level of corpus-isthmus junction. Deirids at level with isthmus or basal bulb.

Female

Reproductive system monodelphic, prodelphic, in dextral position relative to intestine. Ovary reflexed posteriorly at oviduct, straight posterior to vulva. Vulva continuouing with body contour. Spermatheca weakly developed, often hard to recognize. Post-vulval uterine sac usually small, equal to one vulval body diameter. Tail conoid with 14–16 ventral annuli, and terminus minutely rounded. Phasmids located at about 30–56% of tail length.

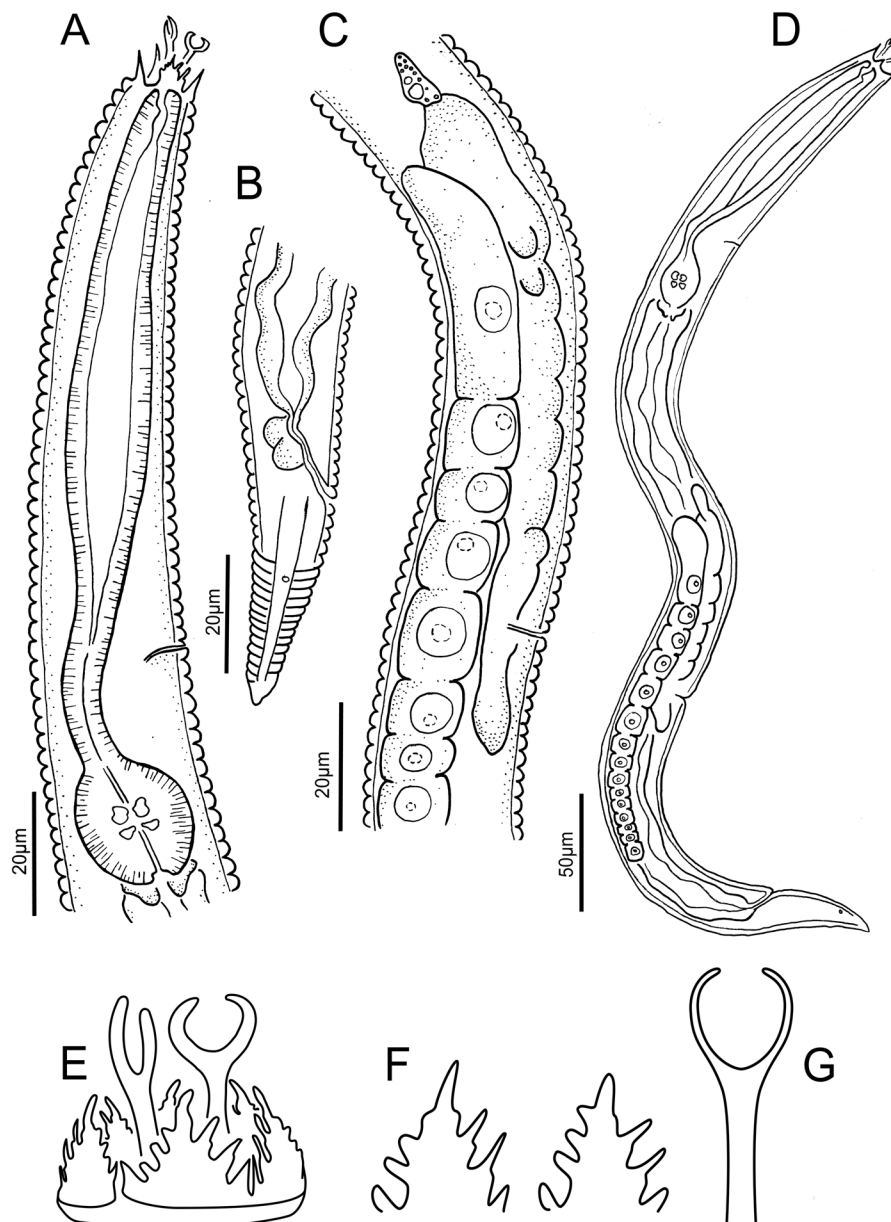


Fig. 1. *Cervidellus hueckeswagensis* sp. nov. **A–D.** Holotype, ♀ (SMNH Type-9945). **A.** Pharyngeal region. **B.** Tail. **C.** Reproductive system. **D.** Entire female. **E–G.** Schematic illustration of the details of the head region, combined based on several individual nematodes. **E.** Anterior end, surface view. **F.** Cephalic probolae. **G.** Labial probola.



Fig. 2. *Cervidellus hueckeswagensis* sp. nov. **A.** Holotype, ♀ (SMNH Type-9945), anterior pharyngeal region. **B–L.** Female paratypes (SMNH Type-9945). **B, J.** Post-vulval uterine sac (arrows). **C, F.** Caudal region. **D.** Oocytes in uterus. **E, K.** Vulva and post-vulval uterine sac (arrows). **G–H, L.** Spermatheca (arrows). **I.** Posterior pharyngeal region (arrow points at excretory canal). Scale bars = 10 µm.

Male

Not found. Species is possibly asexual.

Differential diagnosis

Cervidellus hueckeswagensis sp. nov. from Chile is most similar to *C. caucetensis* Holovachov, Boström & De Ley, 2011 and *C. vinciguerrae* Clausi, 1998 in the shape of the labial probolae (bifurcated at about middle of their length and with slender, curved inwardly prongs slender, without secondary tines or bifurcations), and to *C. bifidihastatus* Abolafia & Robles, 2024, *C. hamatus* Thorne, 1937, *C. doorsselaeri* (De Clerk & De Ley, 1990) Boström & De Ley 1996 and *C. capraeolus* (De Ley, Geraert & Coomans, 1990) Boström & De Ley 1996 in the shape of the cephalic probolae (asymmetrically triangular with multiple tines), see Table 2 for more details.

The new species differs from *C. caucetensis* in the shape of cephalic probolae and larger number of tines (6–7 vs 4) the mode of reproduction (asexual vs sexual) and the length of the spermatheca (7–15 μm vs 24–35 μm); *C. vinciguerrae* in the shape of the cephalic probolae and the larger number of tines (6–7 vs 5), the mode of reproduction (asexual vs sexual) and the length of the spermatheca (7–15 μm vs 27–40 μm); *C. bifidihastatus* in the shape of the labial probolae (without vs with backwardly directed spur-like processes), a different number and shape of tines on the cephalic probolae (two-three tines facing the primary axil, one long tine pointing forward, and three long tines facing the secondary axil vs four small rounded tines facing the primary axil, one rounded tine facing forward, and three larger rounded tines facing the secondary axil), the mode of reproduction (asexual vs sexual) and the length of the spermatheca (7–15 μm vs 16–19 μm); *C. hamatus* in the shape of the labial probolae (without vs with bifurcation), a different number and shape of tines on the cephalic probolae (2–3 tines facing the

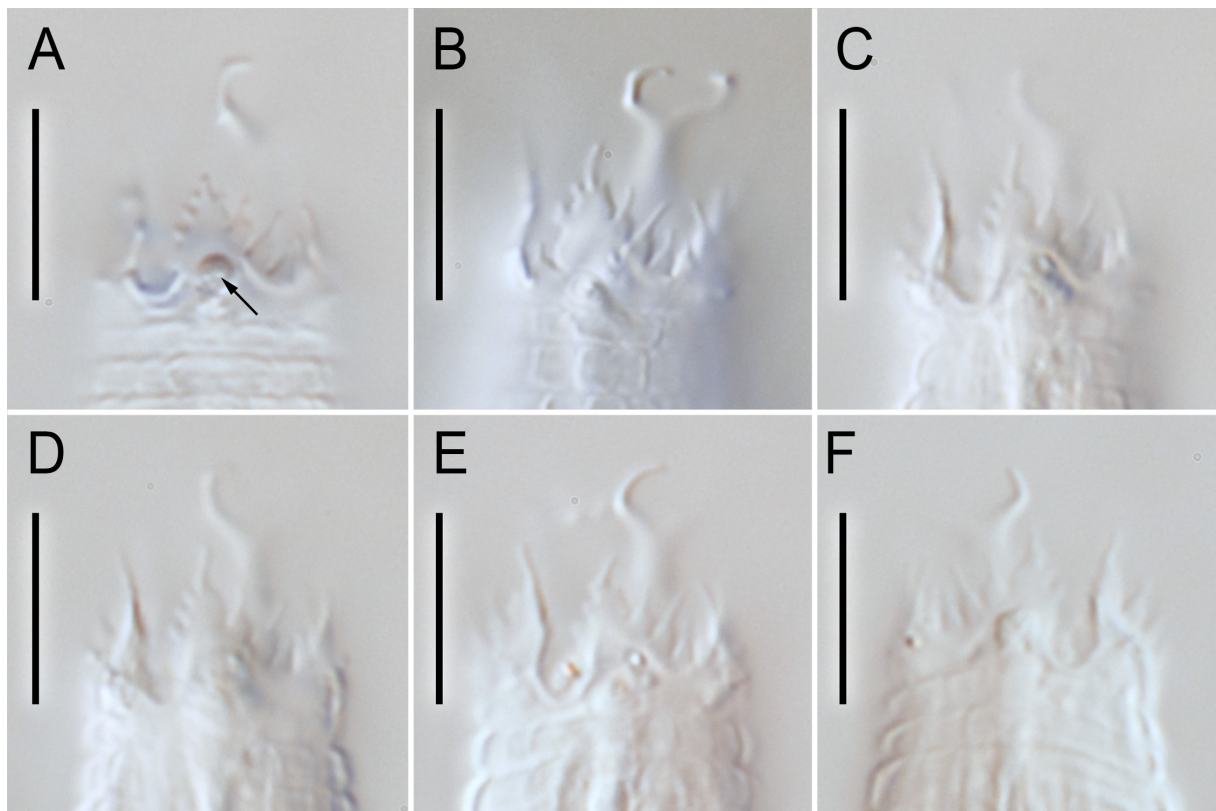


Fig. 3. *Cervidellus hueckeswagensis* sp. nov., female paratypes (SMNH Type-9945). **A–E.** Anterior end, lateral view, right side (arrow shows amphid). **F.** Anterior end, lateral view, left side. Scale bars = 10 μm .

Table 1. Morphometrics of *Cervidellus hueckeswagensis* sp. nov. Measurements in μm (presented as mean), \pm s.d. and (range).

	Holotype	Paratypes
no. & sex	♀	9 ♀♀ (incl. holotype)
body length	509	505 \pm 15 (488–539)
body diameter	28	27.0 \pm 1.7 (24–30)
pharynx length	141	145 \pm 6 (134–152)
tail length	38	35.0 \pm 2.7 (31–39)
anal or cloacal body diameter	15	16.0 \pm 1.6 (14–19)
vulva or testis	317	322 \pm 13 (306–350)
V-A/T	7.3	8.2 \pm 0.8 (7.3–9.3)
a	18.5	18.6 \pm 1.1 (16.8–20.6)
b	3.6	3.5 \pm 0.2 (3.3–3.7)
c	13.4	14.4 \pm 1.0 (13.2–16.0)
c'	2.5	2.2 \pm 0.3 (1.8–2.7)
V or T (%)	62.2	63.7 \pm 1.3 (61.8–65.6)
lip region diameter	12	12.0 \pm 0.7 (11.0–13.0)
stoma length	8	9.0 \pm 0.6 (8.0–10.0)
corpus length	78	75.0 \pm 3.3 (68–79)
isthmus length	29	30.0 \pm 3.2 (23–35)
bulb length	20	22.0 \pm 1.9 (20–26)
bulb diameter	17	18.0 \pm 1.2 (16–20)
corpus/isthmus ratio	2.7	2.5 \pm 0.4 (2.1–3.4)
excretory pore from ant. end	114	109 \pm 8 (99–119)
deirid from ant. end	122	120 \pm 5 (110–127)
EP (% of pharynx)	80.5	74.9 \pm 5.8 (65.0–81.8)
DEI (% of pharynx)	86.3	82.8 \pm 4.6 (72.7–88.2)
vagina	12	10.2 \pm 1.3 (7.5–12.5)
spermatheca or spicule length	12	11.0 \pm 2.7 (7.0–15.0)
PUS or gubernaculum length	32	18.0 \pm 7.5 (12.0–32.0)
PUS/VBD	1.2	0.7 \pm 0.3 (0.4–1.2)
rectum	19	17.0 \pm 2.2 (14.0–22.0)
rectum/ABD	1.2	1.1 \pm 0.1 (0.9–1.3)
phasmid	15.9	15.0 \pm 2.4 (11.0–19.0)
phasmid (% of tail)	41.8	41.9 \pm 7.0 (30.2–56.0)

primary axil, one long tine pointing forward, and three long tines facing the secondary axil vs three small tines facing the primary axil, no tine pointing forward and three large tines facing the secondary axil) and the length of the spermatheca (7–15 μm vs 16–37 μm); *C. doorsselaeri* in the shape of the labial probolae (without vs with bifurcation) and a different number and shape of tines on the cephalic probolae (two-three tines facing the primary axil, one long tine pointing forward, and three long tines facing the

Table 2. Selected diagnostic characters of the anterior body end of species of the genus *Cervidellus* Thorne, 1937.

species	labial probolae	lips	cephalic probolae
<i>C. alutus</i> (Siddiqi, 1993)	bifurcated at two levels	symmetrical	guarding process and four tines
<i>C. baujardi</i> Mounport, Boström & Villenave, 2002	simple, digitate	asymmetrical	guarding process and five tines
<i>C. bifidihastatus</i> Abolafia & Robles, 2024	bifurcated at two levels	asymmetrical	guarding process and eight tines
<i>C. capraeolus</i> (De Ley, Geraert & Coomans, 1990)	bifurcated at two levels, with prongs	asymmetrical	guarding process and eight tines
<i>C. caucetensis</i> Holovachov, Boström & De Ley, 2011	bifurcated	asymmetrical	guarding process and four tines
<i>C. cervus</i> (Thorne, 1925)	bifurcated at two levels, with prongs	symmetrical	guarding process and four tines
<i>C. doorsseiaeri</i> (De Clerk & De Ley, 1990)	bifurcated at two levels, with basal tines	asymmetrical	guarding process and eight tines
<i>C. hamatus</i> Thorne, 1937	bifurcated at two levels	asymmetrical	guarding process and six tines
<i>C. hueckeswagensis</i> sp. nov.	bifurcated	asymmetrical	guarding process and six to seven tines
<i>C. neftasiensis</i> Boström, 1986	bifurcated	symmetrical	guarding process and four tines
<i>C. psammophilus</i> Orselli & Vinciguerra, 2002	bifurcated at two levels	symmetrical	guarding process and four tines
<i>C. spitzbergensis</i> Boström, 1987	bifurcated at two levels, with prongs	symmetrical	guarding process and four tines
<i>C. vinciguerrae</i> Clausi, 1998	bifurcated	asymmetrical	guarding process and five tines
<i>C. vexilliger</i> (de Man, 1880)	bifurcated	symmetrical	guarding process and four tines

secondary axil vs two round tines facing the primary axil, three tines pointing forward and one rounded and two acute tines facing the secondary axil); *C. capraeolus* in the shape of labial probolae (without vs with bifurcation and additional processes), different number and shape of tines on the cephalic probolae (2–3 tines facing the primary axil, one long tine pointing forward, and three long tines facing the secondary axil vs two round tines facing the primary axil, two tines pointing forward and four tines facing the secondary axil) and the length of the post-vulval uterine sac (12–32 µm vs 4–6 µm).

Genus *Stegellela* Thorne, 1938

Stegellela waltrautae sp. nov.

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Figs 4–6, 7G–H, Tables 3–4

Diagnosis

Stegellela waltrautae sp. nov. is characterized by a body length of 531–631 µm in females and 576–583 µm in males; cuticle divided by longitudinal incisures into about 30 irregular ridges; lateral alae with five incisures extending to tail terminus; three pairs of asymmetrical lips, pairs of lips separated by U-shaped primary axils without guarding processes, and asymmetrically trapezoidal lips with two elongate-triangular tines along margin: one longer tine facing the primary axil and one shorter tine facing secondary axil; three labial probolae each bifurcated at about half of their length; prongs slender, apically curved towards each other, without secondary tines or bifurcations; pharyngeal corpus 3.1–4.7 × as long as isthmus; nerve ring and excretory pore at isthmus/basal bulb level; vulva convex with less thickened anterior vulval lip and more thickened posterior vulval lip; spermatheca 28.0–36.0 µm long; and post-vulval uterine sac 25.0–39.0 µm long.

Etymology

The new species is named in honor of the first author's grandmother, who recently passed away.

Type material

Holotype

CHILE • ♀; Atacama Region, Copiapo Province, Totoral; 27°47.633' S, 71°02.867' W; 189 m a.s.l.; 3 Oct. 2023; O. Holovachov and P. Schiffer leg.; dune area, soil under a cactus, sample code TDT.23.14 (Fig. 7G–H); SMNH Type-9946; SMNH.

Paratypes

CHILE • 4 ♀♀, 2 ♂♂; same collection data as for holotype; SMNH Type-9946; SMNH.

Description

Adult

Body straight or slightly curved ventrad upon fixation (fixed without applying heat). Cuticle coarsely annulated, annuli 2.5–3.0 µm wide at midbody. Distinct longitudinal incisures present, giving cuticle tiled appearance, cuticular blocks with rounded corners, arranged in about 30 irregular longitudinal ridges (in addition to lateral alae). Lateral alae start with three incisures at level of metacarpus and expands to five incisures at level with deirid, extending to tail terminus in both sexes. Lip region continuous, with six labial and four cephalic papillae. Amphid opening relatively small, oval, located at the base of each lateral lip. Three pairs of asymmetrical lips, one dorsal and two ventrolateral. Pairs of lips separated by U-shaped primary axils without guarding processes. Secondary axils U- or V-shaped without guarding processes. Each lip asymmetrically trapezoidal with two elongate-triangular tines along margin: one longer tine facing primary axil and one shorter tine facing secondary axil. Three labial probolae, bifurcated at about half of their length; prongs slender, apically curved towards each other, without secondary tines or bifurcations. Longitudinal swellings or ridges absent. Stoma slightly longer than lip region diameter. Cheilorhabdia bacilliform in latero-median view; metastegostom with small dorsal denticle. Pharynx cephaloboid. Pharyngeal corpus cylindrical; isthmus less well demarcated from corpus; basal bulb oval with well-developed grinder. Nerve ring surrounding isthmus. Excretory pore at level of isthmus-bulb junction. Deirids at level with basal bulb.

Female

Reproductive system monodelphic, prodelphic, in dextral position relative to intestine. Ovary reflexed posteriorly at oviduct, straight or with two flexures posterior to vulva. Vulval region convex, well pronounced with less thickened anterior vulval lip and more thickened posterior vulval lip. Spermatheca well developed. Post-vulval uterine sac usually small, about equal to one vulval body diameter. Tail conoid with 14–15 ventral annuli, and rounded tip. Phasmids located at about 32–42% of tail length.

Male

Reproductive system monorchic, dextral in position; testis usually reflexed ventrad anteriorly. Spicules paired and symmetrical, curved ventrad; with oval manubrium and subcylindrical, gradually narrowing

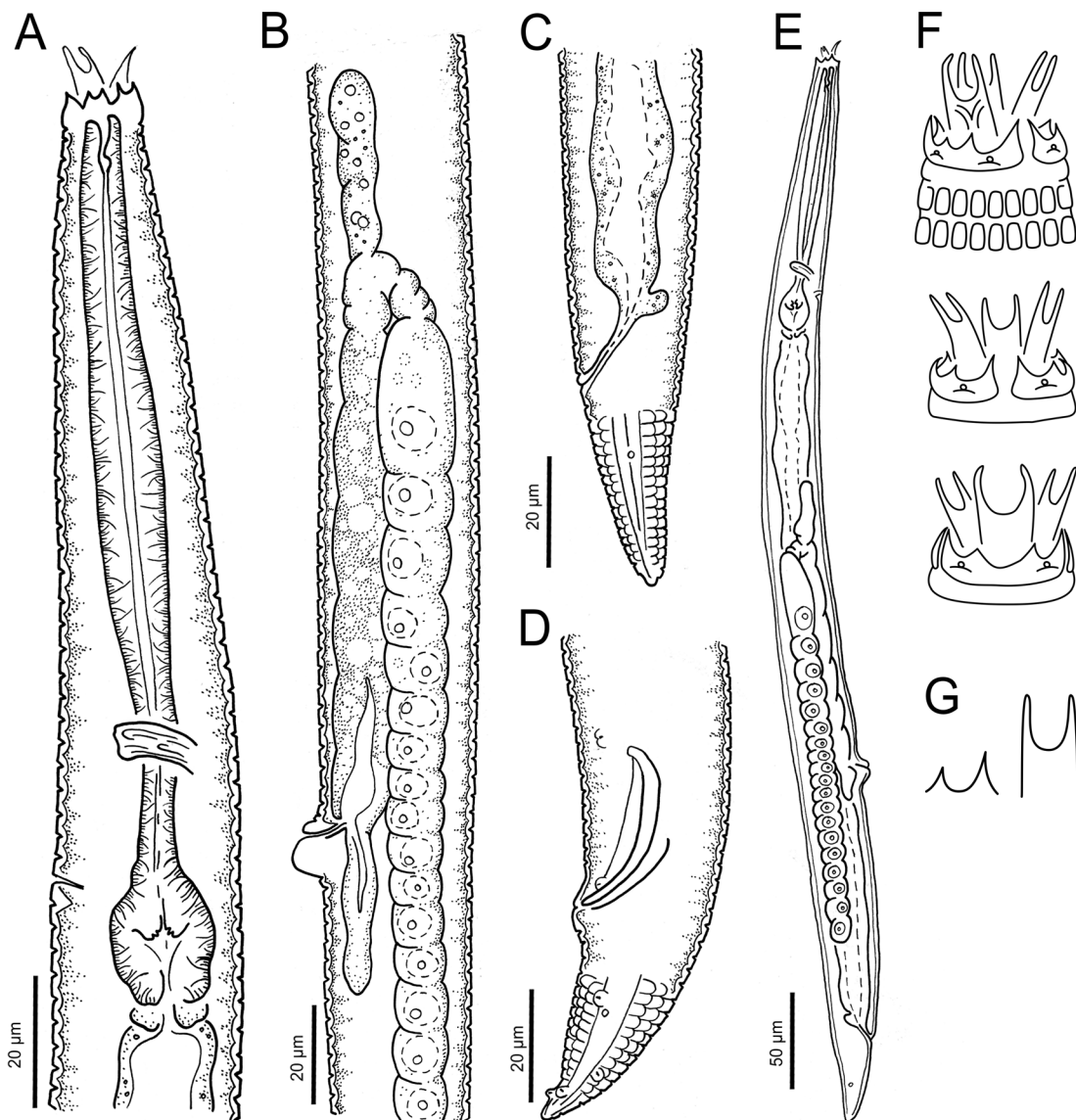


Fig. 4. *Stegelleta waltrautae* sp. nov. **A–C.** Holotype, ♀ (SMNH Type-9946). **A.** Pharyngeal region. **B.** Reproductive system. **C.** Caudal region. **D.** Paratype, ♂ (SMNH Type-9946), caudal region. **E.** Paratype, ♀ (SMNH Type-9946), entire specimen. **F–G.** Schematic illustration of the details of the head region, combined based on several individual nematodes. **F.** Anterior end, surface view. **G.** Cephalic and labial probolae.

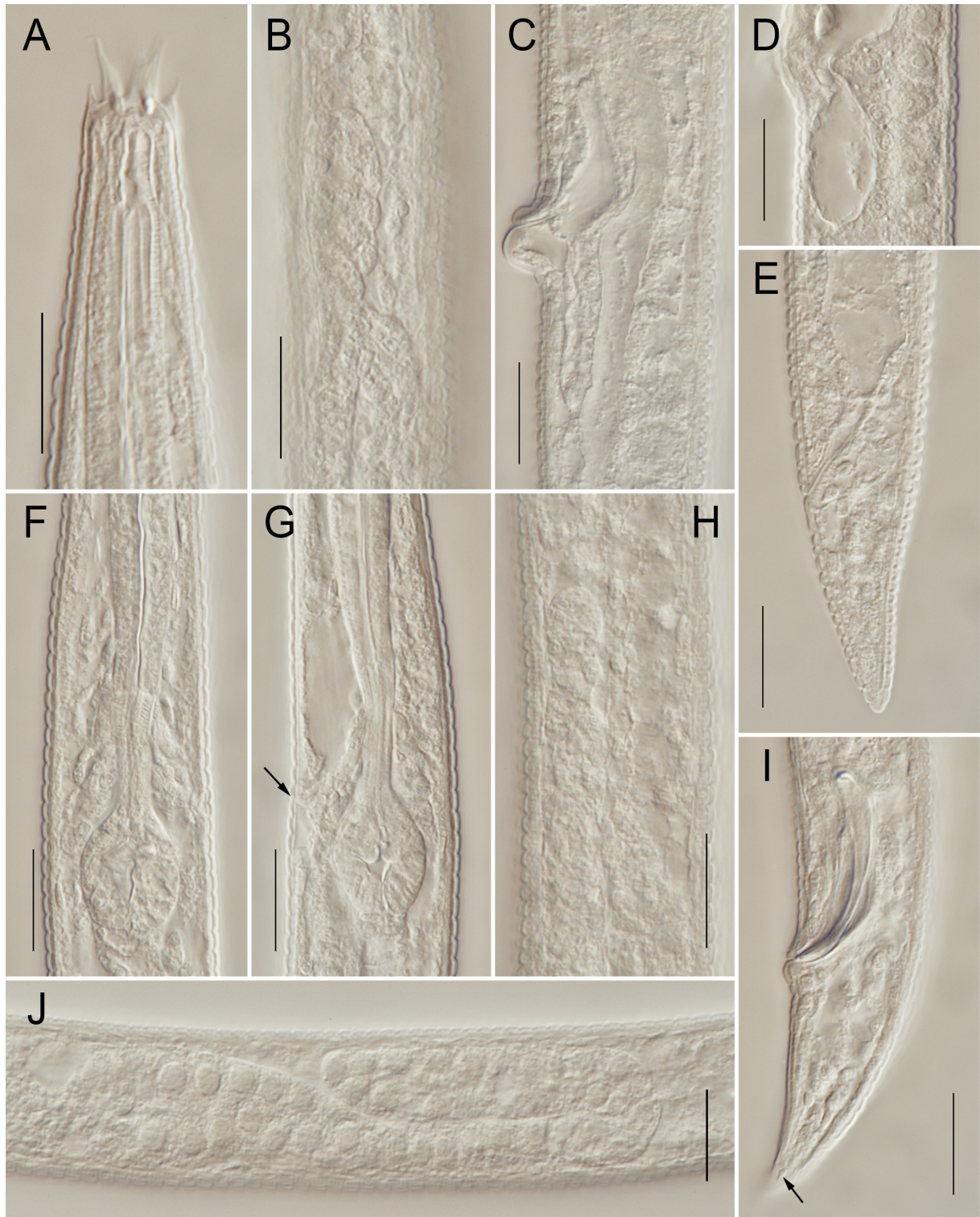


Fig. 5. *Stegelletta waltrautae* sp. nov. **A–B, D, F, H.** Female paratypes (SMNH Type-9946). **C, E.** Holotype, ♀ (SMNH Type-9946). **G, I–J.** Male paratypes (SMNH Type-9946). **A.** Anterior pharyngeal region. **B, H.** Spermatheca. **C.** Vulva with post-vulval uterine sac. **D.** Post-vulval uterine sac. **E.** Caudal region. **F–G.** Posterior pharyngeal region (arrow points at excretory pore). **I.** Caudal region (arrow points at lateral papilla). **J.** Testis. Scale bars = 20 μm .

shaft. Gubernaculum curved plate. Genital papillae distributed as follows: two pairs of subventral precloacal papillae (33–35 μm and 79–80 μm from cloacal aperture, respectively) and one subventral pair at level of cloacal aperture; single midventral papilla on anterior cloacal lip; one caudal pair subventrally few annuli posterior to cloacal aperture, second caudal pair laterally at mid-tail very close to the phasmids and three more pairs (one subdorsal, one subventral and one lateral) near tail terminus. Phasmids located at about 33–40% of tail length. Tail conoid with short bluntly rounded mucro.

Differential diagnosis

Stegelleta waltrautae sp. nov. from Chile is most similar to *S. tuarua* Yeates, 1967 in having a large number of longitudinal lines (rows of cuticular blocks) and in having lateral alae (filed) with five incisures, thus differing from the remaining six species of the genus (Table 4; Boström & Holovachov 2014). The new species, however, differs from *S. tuarua* in the shape of the cephalic probolae (with two acute tines vs single tine in *S. tuarua*) and distinctly protruding vulva (vs continuous with body contour).

Discussion

Unfortunately, not much is known about the species richness, abundance and composition of the nematode community in the central Atacama Desert because publications on this topic are still rather scarce (Villegas *et al.* 2025). In the regions of Iquique and Arica, across three different sampling periods and locations, a total of approximately 50 different phytophagous species were found in the past (Jimenez Roco 1974). Later, eight different plant-parasitic species were identified, which were proven to be associated with cultivated plants in the Iquique Province (Jimenez Roco 1979). These regions, however,

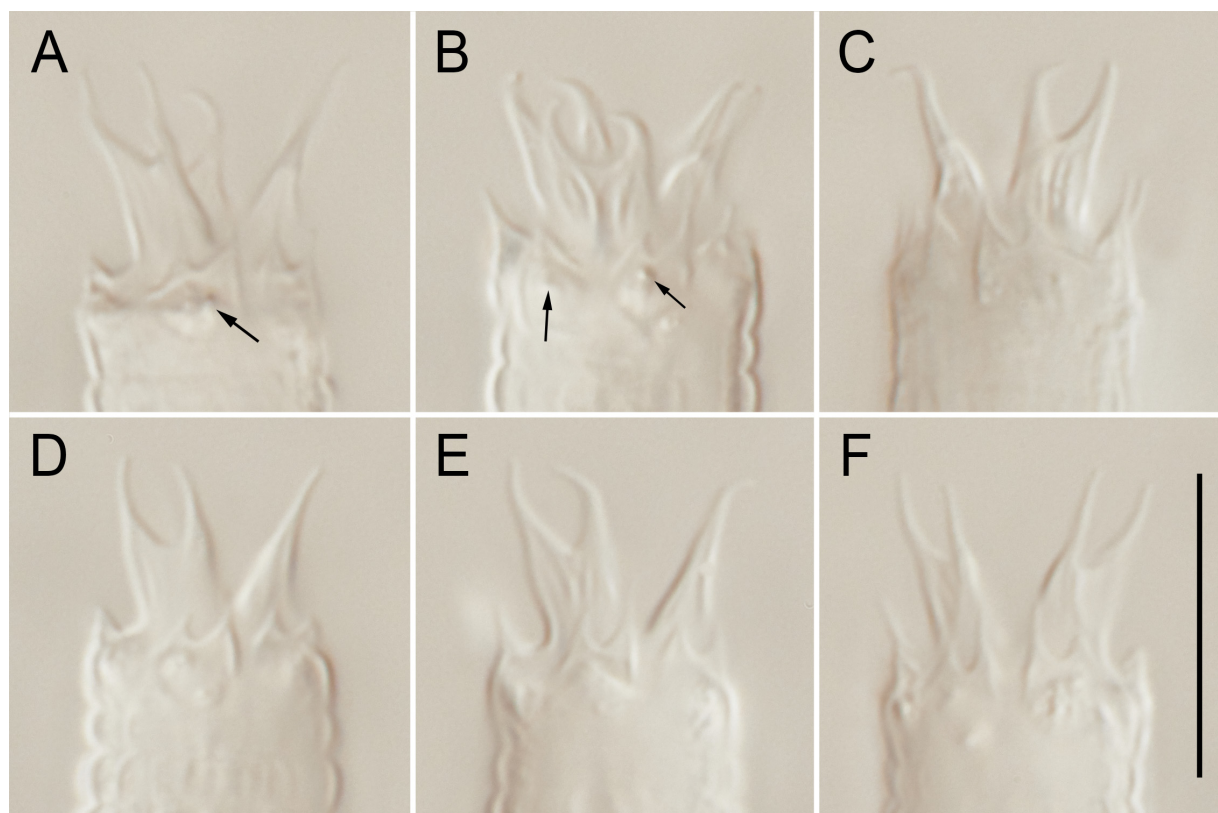


Fig. 6. *Stegelleta waltrautae* sp. nov. **A.** Holotype, ♀ (SMNH Type-9946). **B.** Paratype, ♂ (SMNH Type-9946). **C–F.** Female paratypes (SMNH Type-9946). **A–F.** Anterior end, views from different sides (arrows show papillae). Scale bar = 10 μm .

Table 3. Morphometrics of *Stegelleta waltrautae* sp. nov. Measurements in μm (presented as mean), \pm s.d. and (range).

	Holotype	Paratypes	
no. & sex	♀	5 ♀♀ (incl. holotype)	2 ♂♂
body length	587	570 \pm 36 (531–631)	580 \pm 3 (576–583)
body diameter	33	31.0 \pm 1.9 (29–33)	28.0 \pm 0.7 (28–29)
pharynx length	148	153 \pm 5 (148–162)	152 \pm 3 (149–155)
tail length	36	37.0 \pm 3.2 (33–43)	43.0 \pm 2.1 (41–46)
anal or cloacal body diameter	19	19.0 \pm 0.3 (18.5–19.0)	21.0 \pm 0.7 (20.5–22.0)
vulva or testis	404	391 \pm 22 (369–428)	NA
V-A/T	10.3	9.6 \pm 0.8 (8.9–10.8)	NA
a	17.7	18.5 \pm 0.5 (17.7–19.1)	20.5 \pm 0.4 (20.1–20.9)
b	4.0	3.7 \pm 0.2 (3.5–4.0)	3.8 \pm 0.1 (3.8–3.9)
c	16.3	15.4 \pm 1.1 (14.4–17.2)	13.3 \pm 0.6 (12.8–13.9)
c'	1.9	1.9 \pm 0.2 (1.7–2.3)	2.0 \pm 0.2 (1.9–2.2)
V or T (%)	68.8	68.6 \pm 0.6 (67.8–69.5)	NA
lip region diameter	12	12.0 \pm 0.8 (11.0–13.0)	11.0 \pm 0.3 (11.0–12.0)
stoma length	12	13.0 \pm 0.8 (12.0–14.0)	13.0 \pm 0.3 (12.0–13.0)
corpus length	87	88 \pm 4 (82–92)	83 \pm 1 (83–84)
isthmus length	25	21.0 \pm 2.1 (19.0–25.0)	25.0 \pm 2.1 (23–27)
bulb length	21	22.0 \pm 1.5 (21.0–25.0)	21.0 \pm 0.7 (21.0–22.0)
bulb diameter	17	18.0 \pm 1.4 (17.0–19.0)	17.0 \pm 0.7 (16.0–17.0)
corpus/isthmus ratio	3.5	4.2 \pm 0.4 (3.5–4.7)	3.4 \pm 0.3 (3.1–3.7)
nerve ring from ant. end	115	114 \pm 4 (107–119)	110 \pm 2 (108–112)
excretory pore from ant. end	132	137 \pm 8 (130–152)	138 \pm 7 (131–145)
deirid from ant. end	147	142 \pm 3.1 (139–147)	145 \pm 5 (140–150)
NR (% of pharynx)	77.2	75.5 \pm 23.3 (72.1–77.9)	72.3 \pm 3.1 (69.3–75.5)
EP (% of pharynx)	88.8	90.1 \pm 2.8 (85.5–93.6)	90.6 \pm 2.7 (88.0–93.3)
DEI (% of pharynx)	99.1	94.1 \pm 3.0 (91.4–99.1)	95.2 \pm 1.2 (94.0–96.4)
vagina	16	12.4 \pm 2.0 (10.5–16.0)	NA
spermatheca or spicule length	35	32.0 \pm 3.1 (28.0–36.0)	35.0 \pm 0.7 (35.0–36.0)
PUS or gubernaculum length	39	29.0 \pm 5.2 (25.0–39.0)	20 \pm 1 (19–21)
PUS/VBD	1.2	0.9 \pm 0.1 (0.8–1.2)	NA
rectum	18	17.0 \pm 1.5 (15.0–19.0)	NA
rectum/ABD	0.9	0.9 \pm 0.1 (0.8–1.0)	NA
phasmid	13.8	13.0 \pm 0.6 (12.0–14.0)	16.0 \pm 0.7 (15.0–17.0)
phasmid (% of tail)	38.5	36.0 \pm 3.4 (32.0–42.0)	37 \pm 3.3 (33.0–40.0)

are located north of the central Atacama Region, sometimes at higher altitudes or near the coast, usually associated with crop production and therefore experience much more natural precipitation or are actively watered. Besides phytophagous nematodes, there are also a few occasions, where entomopathogens and gastrointestinal parasites of rodents were observed (Edgington *et al.* 2011; Bellusci *et al.* 2025).

Enrique Gadea decided to investigate the nematofauna in the central Atacama Region by looking at moss-associated nematodes at high altitudes and found only eight different species across four families, with *Plectus* and *Dorylaimus* being the most dominant genera (Gadea 1960).

With this in mind, there are few to no taxonomic publications about the bacterivore nematofauna in the soil of the Atacama Desert, even though it was shown that they can appear in rather high numbers

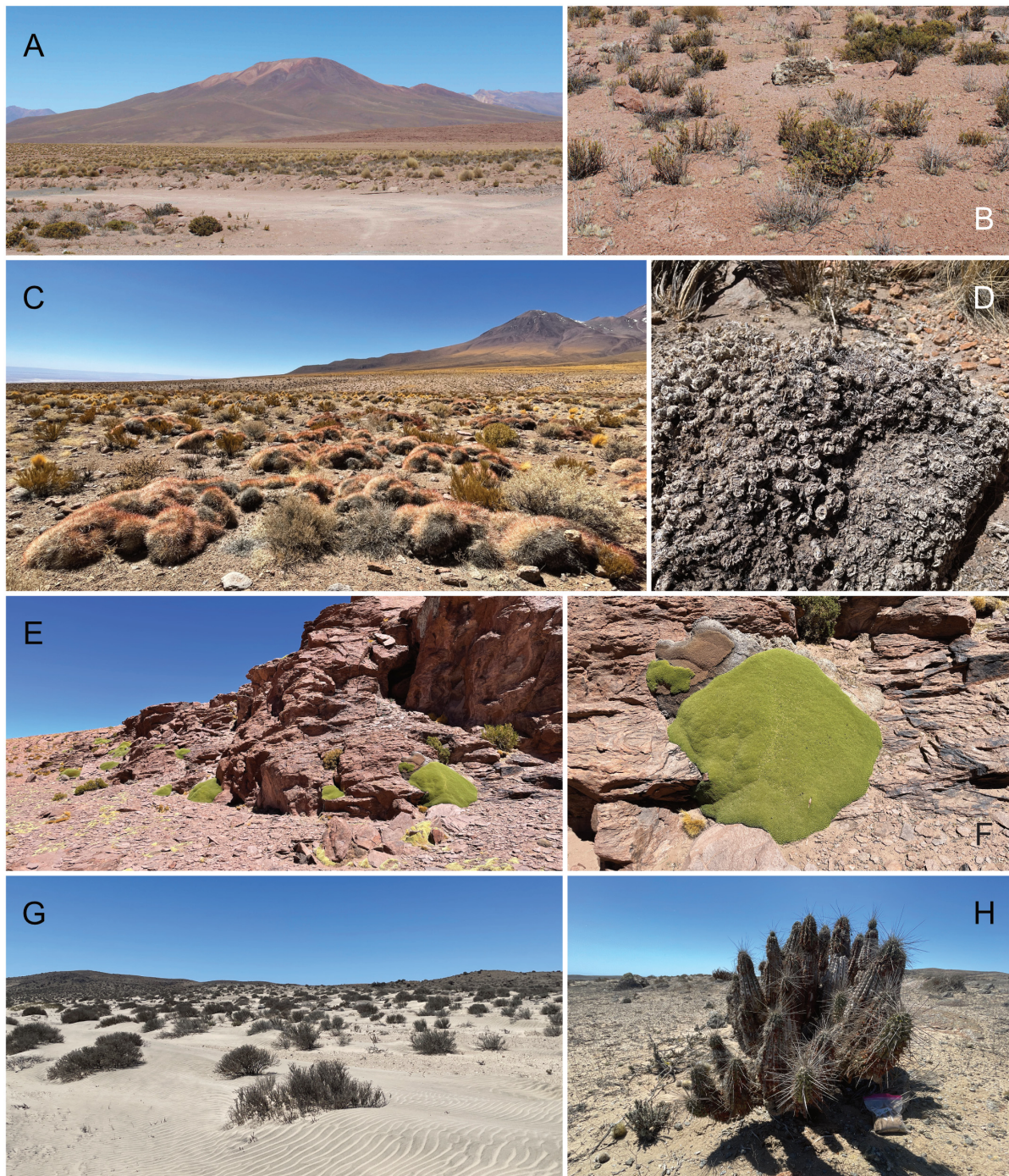


Fig. 7. Habitats. **A–F.** Sampling sites of *Cervidellus hueckeswagensis* sp. nov. **A–B.** ALT.22.0. **C–D.** EPT.22.3830. **E–F.** ALT.22.08. **G–H.** Sampling site of *Stegelleta waltrautae* sp. nov., TDT.23.14.

Table 4. Selected diagnostic characters of species of the genus *Stegelleta* Thorne, 1938.

species	lateral alae incisures	longitudinal rows of cuticle	labial probolae	cephalic probolae
<i>S. arenaria</i> Boström & Holovachov, 2012	three	24–26	bifurcated	absent
<i>S. georgica</i> Bagaturija, 1973	three	22	bifurcated	absent
<i>S. iketaia</i> Yeates, 1967	three	?	bifurcated at two levels	absent
<i>S. incisa</i> (Thorne, 1937)	three	16	bifurcated	absent
<i>S. laterocornuta</i> Boström & Holovachov, 2014	three	16	bifurcated	only lateral lips with one tine, each
<i>S. ophioglossa</i> Andrassy, 1967	three	12–16	bifurcated	absent
<i>S. tuarua</i> Yeates, 1967	five	> 40	biacute	all six lips with one tine each
<i>S. waltrautae</i> sp. nov.	five	> 30	bifurcated	all six lips with two tines each

and are important in terms of formation of soil and sediment, nutrient cycling, carbon sequestration and population control of bacteria and therefore regulate the entire food web (Ferris 2010). It is also noteworthy that bacterivore soil nematodes often show the highest abundance near plants because bacteria rely on moisture for their metabolism as well, which is highest in the plant rhizosphere (Aguilera *et al.* 1999; Pen-Mouratov *et al.* 2008; Vandegehuchte *et al.* 2015).

We just begin to comprehend the extent of how high the species richness of Cephalobidae in the Atacama Desert really is, with recent studies showing a high genetic diversity (Caro-Valenzuela 2024; Villegas *et al.* 2025). As a contribution to the progress in this topic, we described two new species, but many more remain to be described. The occurrence of bisexual and strictly parthenogenetic species even within the same genus is very interesting, as well, and might give evolutionary explanations on the success in extreme environments. These species can serve as models to study not only anhydrobiosis and how it provides completely new possibilities for survival strategies in extreme conditions but also geographical parthenogenesis, which is already established for *Panagrolaimus* (Villegas *et al.* 2025).

Describing more nematodes in the central region of the Atacama Desert will shed light on the formation of fauna and species evolution in this enigmatic habitat. Learning more about the taxonomy of the nematode communities in the Atacama Desert will ultimately help us to better understand how and which species are able to withstand the hyperarid climate, what it takes to inhabit this extreme environment, and will also help to clarify soil food web dynamics.

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