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Water mites of a high-altitude thermal spring in the Chilean Andes (Acari: Hydrachnidia), with the description of a new *Thermacarus* species (Acari: Hydrachnidia: Thermacaridae)

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Abstract

New data are presented of water mites from a thermal spring in the high Andes of Chile. Three species have been found, i.e. *Thermacarus chilensis* n. sp., *Hydryphantes thermalis* Cook and *Wandesia chechoi* Cook.

Key words Systematics, new species, *Hydryphantes*, *Wandesia*.

Introduction

Schwoerbel (1987) published the results of a visit to a thermal spring some 66 km north of San Pedro de Atacama, called the geyser El Tatio. These thermal springs lie at an altitude of 4350 m asl. He collected two species of water mites, i.e. *Thermacarus nevadensis* Marshall, 1928 and *Wandesia thermalis* (Viets, 1938). The first species lived at temperatures between 33,9-43,1 °C, the latter species was found at lower temperatures between 28 and 33,9 °C.

Later on, Martin & Schwoerbel (2002) re-identified Schwoerbel's material, and assigned the *Thermacarus* to a new species, i.e. *T. andinus* Martin & Schwoerbel, 2002. This description was also based on newly collected material from Bolivia.

In this paper we described a new *Thermacarus* species from a hot spring in Chile in the National Park Lauca in the far north, near the Bolivian border. This spring lies at an altitude of 4463 m. Moreover, two more species were collected in this spring, i.e. a *Wandesia* and a *Hydryphantes*.

Material and methods

All material is collected by the senior author. The following abbreviations have been used: Ac-1- first acetabula; Cx-I – first coxae; H – height; IV-leg-4-5 – fourth and fifth segments of fourth leg; L – length;

P-1 – first palp segment; MHNS = Museo Nacional de Historia Natural de Chile, Santiago; RMNH = Naturalis Biodiversity Center, Leiden; W – width. Numbers are given as males/females/deutonymphs. All measurements are in μm .

Systematics

Family Thermacaridae Sokolow

Genus *Thermacarus* Sokolow, 1927

Species of the genus *Thermacarus* are typical inhabitants of thermal springs. Sokolow (1927) described the first species of the genus, i.e. *T. thermobius* Sokolow, 1927, from a hot spring in Baikal Lake area. Later on, two more species were described from North America, i.e. *T. nevadensis* Marshall, 1928 and *T. minutus* Mitchell, 1963, and the fourth species is *T. andinus* from Chile and Bolivia. Below we describe the fifth *Thermacarus* species.

Thermacarus chilensis n. sp.

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Figs. 1–3

Material examined. Holotype female, thermal spring Las Cuevas, National Park Lauca, Chile, 18°10.201 S 69°25.859 W, alt. 4463 m asl, 13 December 2023, dissected and slide mounted (MHNS). Paratypes: two males, 4 females, (MHNS), three males, four females (RMNH), same data as holotype, one male dissected and slide mounted (RMNH).

Material for comparison. *Thermacarus andinus*, 36/44/12, geysir El Tatio Chile, approximately at 22°20'5.37" S 68°00'46.75" W, 16 January 1983, leg. J. Schwoerbel (partly RMNH, partly SMF).

Diagnosis. Number of lateral acetabula between 25–29 pairs in female and 17–28 pairs in male; IV-leg-6 of male stocky; sclerotized valves of female ovipositor stocky; dorsal idiosoma length in female between 1588 and 1859 in female and between 1367 and 1744 in male.

Description. Female (holotype; in parentheses measurements of some paratypes). Integument rugose. Idiosoma dorsally 1859 (1588–1789) long and 1160 (1025–1507) wide, ventrally (till tip of camerostome) 1719 (1668–1930) long. Dorsal shield covering nearly complete dorsum, with an indistinct line visible caused by thickening of the sclerotization. Dorsum with a medial eye and posterolaterally of the median eye a pair of postocularia. Dorsum and venter without glandularia but accompanying setae present. Coxae in two groups, anterior coxae forming a camerostome. Coxae with stiff setae, those along margin of gnathosomal bay longer than setae on coxae. Gnathosomal bay 269 long; distance from the tip of camerostome to posterior margin of Cx-IV 1091.

Genital field lying between Cx-III and Cx-IV, with 25–29 pairs of acetabula along lateral margin and 8–10 pairs of acetabula along medial margin. Ovipositor a long retractible tube, about 1020 long, distally with a pair of relatively short sclerotized valves (Fig. 1E), 275 long. Valves 366 (243–280) long and 341 (162–186) wide, L/H 1.07 (1.3–1.6).

Palp as illustrated in Figure 2B: dorsal length/height (ratio given in parentheses): P1, 70/114 (0.61); P2, 202/156 (1.29); P3, 90/125 (0.72); P4, 222/96 (2.3); P5, 77/39 (1.96). Gnathosoma 769 long. Chelicera 622 long, basal segment 500 long, claw 146 long.

Dorsal lengths of I-leg-1-5: 334, 197, 250, 242, 198; I-L-5 height 84, length/height ratio 2.35; dorsal lengths of II-leg-1-5: 381, 206, 275, 350, 344; dorsal lengths of III-leg-1-5: 344, 188, 313, 406, 388; dorsal lengths of IV-leg-1-6: 281, 356, 269, 200, 503, 406.

Male (slide mounted paratype; in parentheses measurements of other paratypes). Idiosoma dorsally 1744 (1367–1628) long and 1213 (905–1085) wide, ventrally (till tip of camerostome) 1794 (1487–1729) long. Gnathosomal bay 294 long; distance from the tip of Cx-I to posterior margin of Cx-IV, 1214. Genital field 381 long and 350 wide, located posterior to Cx-IV with 17–28 pairs of acetabula along lateral margin and 8 pairs of acetabula along medial margin. Ejaculatory complex (Fig. 3B) with distinct cella proximalis, 481 long.

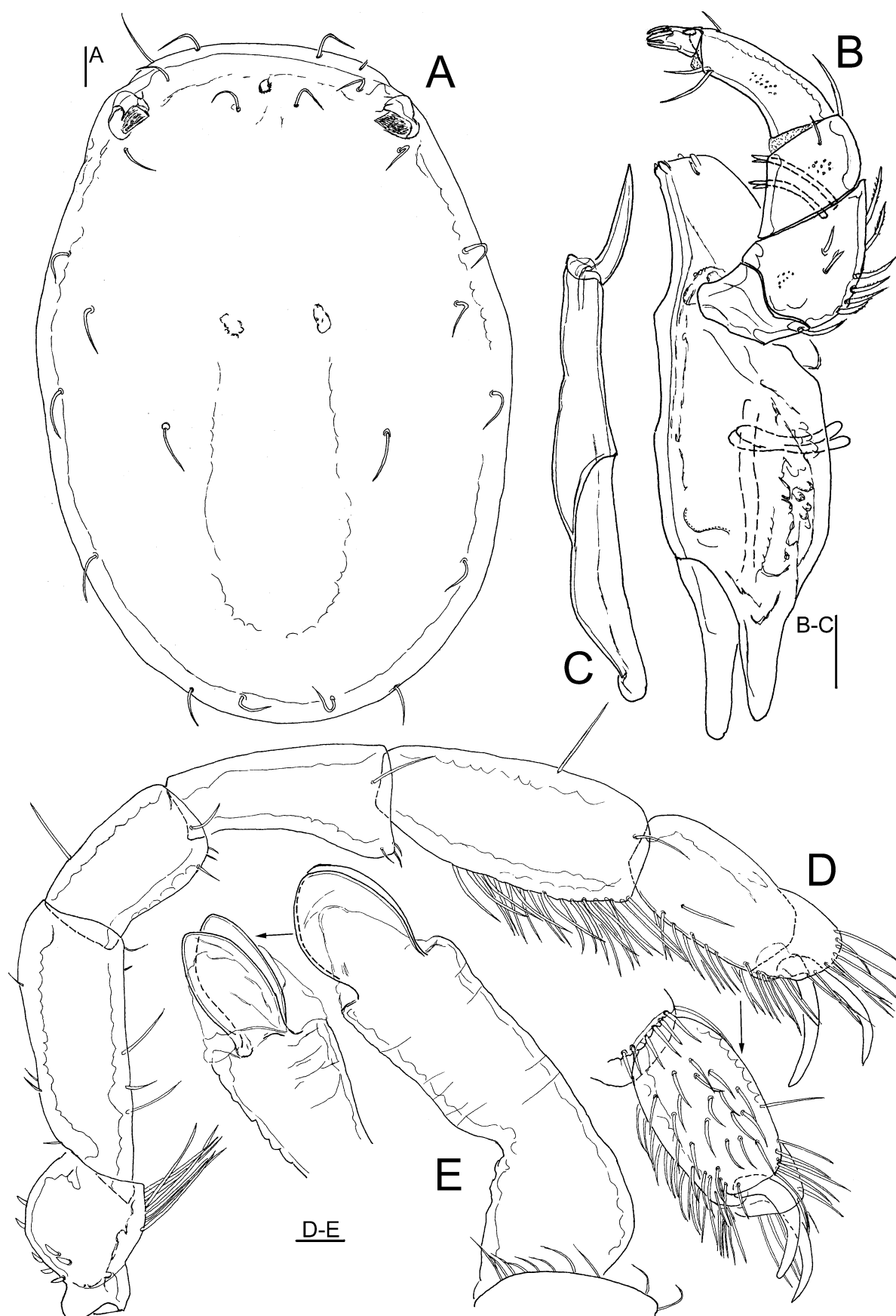


Figure 1. *Thermacarus chilensis* n. sp. (A-D, ♂ paratype; E, ♀ holotype): A – dorsal shield; B – palp and capitulum; C – chelicera; D – IV-leg (inset: IV-leg-6); E – ovipositor (inset: terminal part of ovipositor). Scale bars = 100 µm.



Figure 2. *Thermacarus chilensis* n. sp., ♀ holotype: A – ventral shield; B – palp (P1 lacking). Scale bars = 100 µm.

Palp as illustrated in Figure 1B: dorsal length/height (ratio given in parentheses): P1, 69/113 (0.61); P2, 209/156 (1.34); P3, 95/134 (0.71); P4, 216/93 (2.31); P5, 73/32 (2.3). Capitulum 791 long. Chelicera (Fig. 1C) 738 long, basal segment 575 long, claw 169 long.

Dorsal lengths of I-leg-1-5: 369, 219, 294, 275, 221; I-leg-5 height 86, length/height ratio 2.57; dorsal lengths of II-leg-1-5: 313, 225, 330, 378, 363; dorsal lengths of III-leg-1-5: 275, 200, 350, 469, 437; dorsal lengths of IV-leg-1-6 (Fig. 1D): 347, 540, 344, 456, 572, 475.

Etymology. Named for its occurrence in Chile.

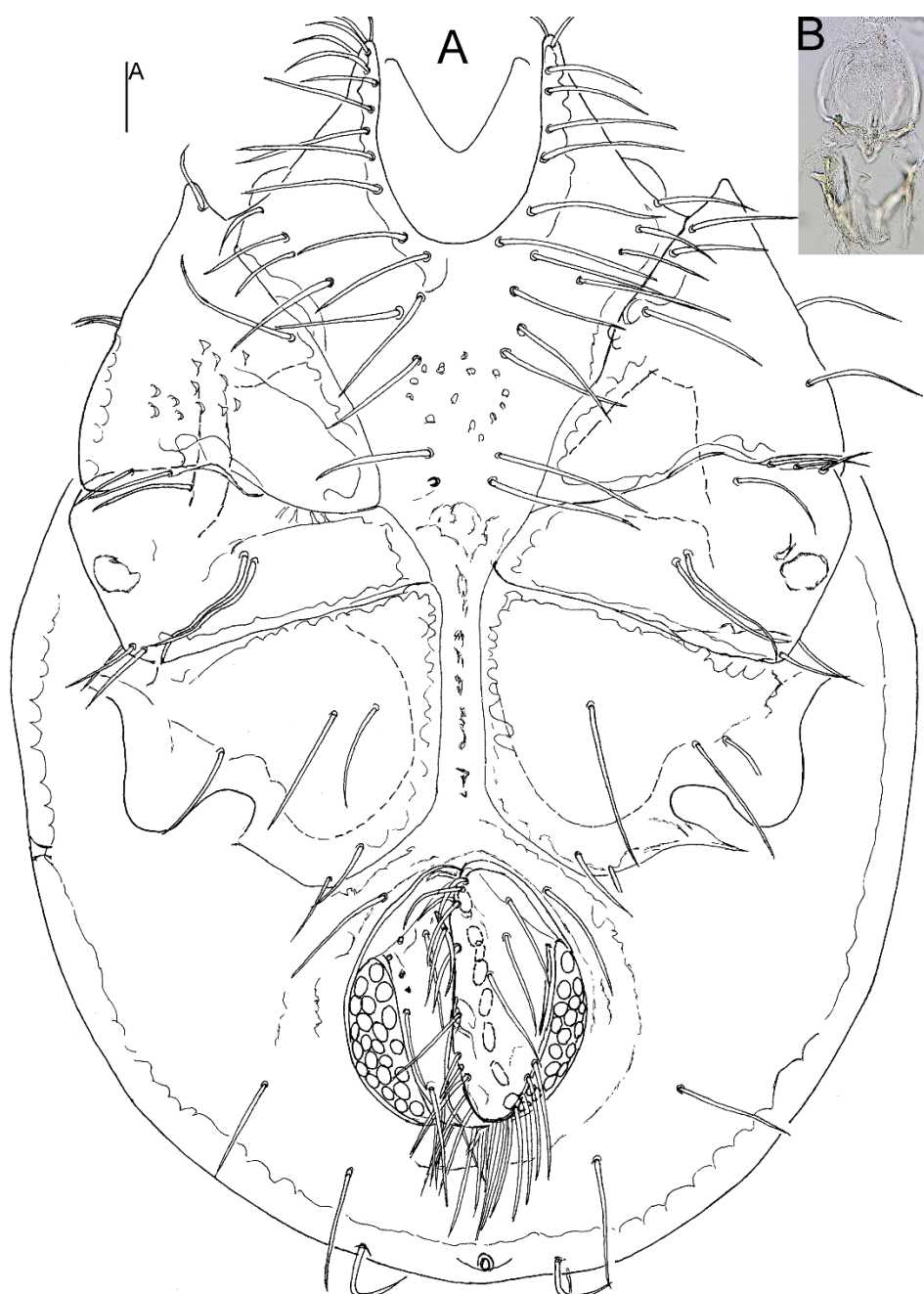


Figure 3. *Thermacarus chilensis* n. sp., ♂ holotype: A – ventral shield; B – photograph of ejaculatory complex. Scale bar = 100 μ m.

Discussion. The new species is most close to *T. andinus*, but differs in a number of characters. The number of lateral acetabula is much less in the new species compared to *T. andinus*. The latter species has 40-60 acetabula (female) and 35-50 (male), in the new species there are 25-28 (female) and 17-29 (male) acetabula. The female of the new species differs in the ovipositor, the sclerotized distal valves are shorter and wider compared to *T. andinus*, which has more elongated valves. L/H of valves in the new species is 1.3-1.6, in *andinus* 1.8-2.9 (n=4). IV-leg-6 of the male of the new species is less elongate compared to *T. andinus*. Finally, the new species is smaller than *T. andinus* (in parentheses the size of *andinus*): L dorsal female 1588-1859 (2122-2808), male 1367-1744 (2278-2605).

The dorsal lines on the dorsum as illustrated by Martin & Schwoerbel (2002) are indistinct lines caused by thickening of the sclerotization. The two rounded structures on the dorsal shield of *T. andinus* are very likely areas without idiosoma pores.

Distribution. Chile, known only from a thermal spring (Figs. 4A-B) in National Park Lauca in the far north, near the Bolivian border.

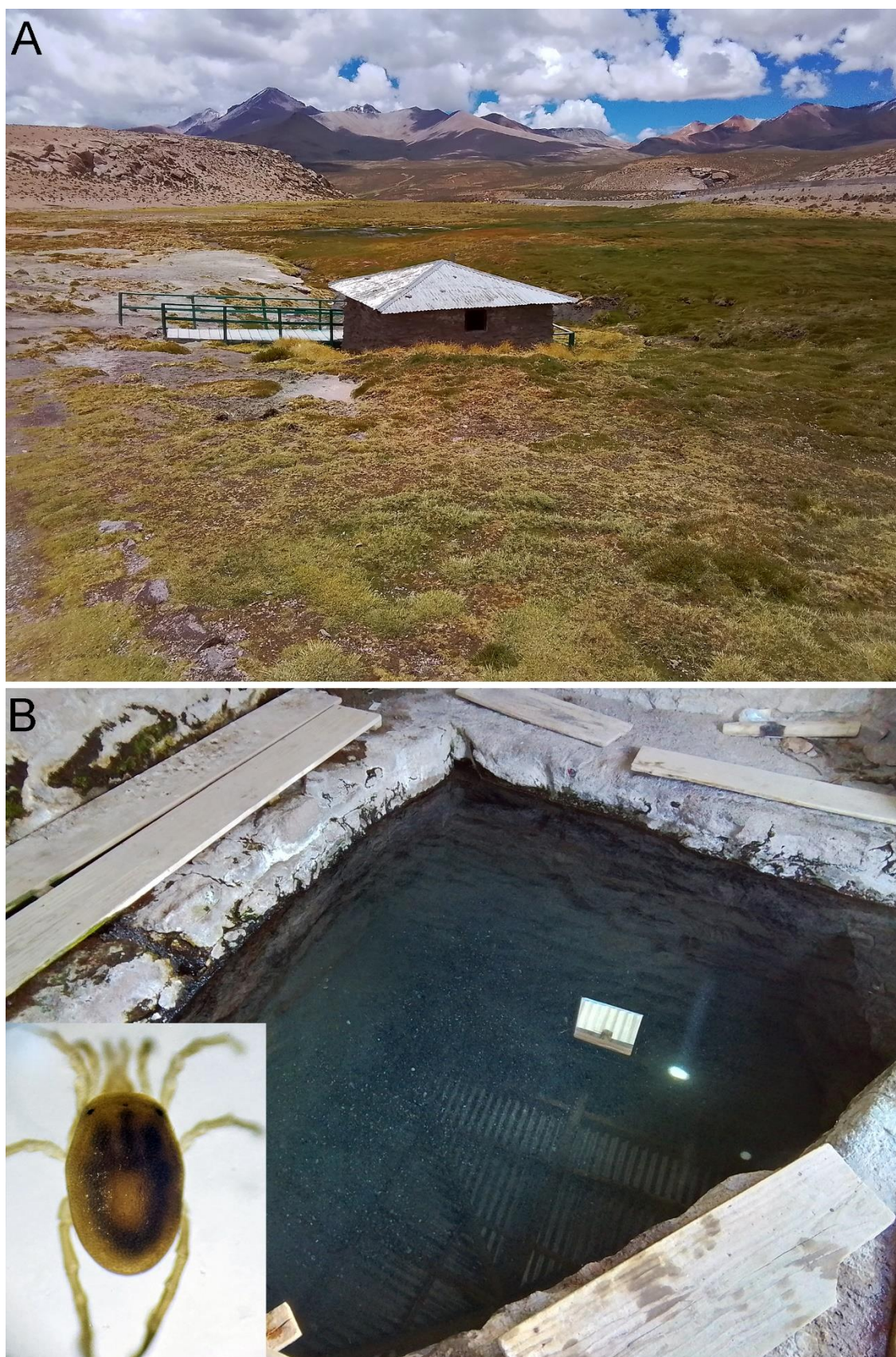


Figure 4. Photographs of thermal spring Las Cuevas, Chile. A – spring area; B – spring source (inset – specimen of *Thermacaruss chilensis* n. sp.). Photos by H. Smit.

Family Hydryphantidae Piersig
Subfamily Hydryphantinae Piersig

Genus *Hydryphantes* Koch, 1841

***Hydryphantes thermalis* Cook, 1988**

Material examined. 1♀, thermal spring Las Cuevas, national park Lauca, Chile, 18°10.201 S 69°25.859 W, alt. 4463 m asl, 13 December 2023 (RMNH).

Distribution. Thus far only known from the type locality in Nuble Province, Chile, a thermal spring with temperatures between 30 and 35 °C (Cook 1988). This Termas de Chillan lies at an altitude of 1600 m above sea level.

Subfamily Wandesiinae Schwoerbel

Genus *Wandesia* Schechtel, 1912

***Wandesia chechoi* Cook, 1988**

Material examined. 1♀, thermal spring Las Cuevas, national park Lauca, Chile, 18°10.201 S 69°25.859 W, alt. 4463 m asl, 13 December 2023 (RMNH).

Distribution. Thus far only known from the type locality, i.e. the Termas de Chillan (see above). Martin & Schwoerbel (2002) reported *Wandesia thermalis* (Viets, 1938) from the geysir El Tatio. The latter species is known from North America, and we think, therefore, that this species belongs to *W. chechoi* as well. Unfortunately we were unable to find the specimen.

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References

- Cook, D.R. (1988) Water mites from Chile. *Memoirs of the American Entomological Institute*, 42, 1-356.
- Martin, P. & Schwoerbel J. (2002) *Thermacarus andinus* n. sp., a South American water mite (Acari: Hydrachnidia: Thermacaridae) with a remarkable host-parasite association. *Zoologischer Anzeiger*, 241, 67–79. <https://doi.org/10.1078/0044-5231-00013>
- Schwoerbel, J. (1987) Rheophile Wassermilben (Acari: Hydrachnellae) aus Chile. 3. Arten aus Thermalgewässern. *Archiv für Hydrobiologie*, 110, 399–407.
- Sokolow, I. I. (1927) *Thermacarus thermobius* n. gen. n. sp. eine Hydracarine aus heißer Quelle. *Zoologischer Anzeiger*, 73, 11–20.