

## **TETRAMERES (TETRAMERES) MEGAPHASMIATA N. SP. (NEMATODA: TETRAMERIDAE), A PARASITE OF THE TWO-BANDED PLOVER, CHARADRIUS FALKLANDICUS, AND WHITE-RUMPED SANDPIPER, CALIDRIS FUSCICOLLIS, FROM PATAGONIA, ARGENTINA**

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**ABSTRACT:** *Tetrameres (Tetrameres) megaphasmidiata* n. sp. is described from the proventriculus of the two-banded plover, *Charadrius falklandicus*, and the white-rumped sandpiper, *Calidris fuscicollis*, from Patagonia, Argentina. The new species shares with *T. (T.) nouveli*, *T. (T.) paradisea*, *T. (T.) prozeskyi*, *T. paraaraliensis*, *T. (T.) cladorhynchi*, and *T. lobybicus* the absence of the right spicule and the presence of 4 rows of somatic spines. *Tetrameres (T.) megaphasmidiata* n. sp. differs from the first 4 species mainly by its longer left spicule. The new species can be distinguished from *T. (T.) cladorhynchi* by the extension of the lateral alae, the number and arrangement of the caudal papillae, and the absence of polar filaments in the eggs. *Tetrameres lobybicus* differs from the new species by having shorter rows of dorsal spines and a different number and arrangement of the caudal papillae. This report is the first record of a species of *Tetrameres* in *C. falklandicus* and *C. fuscicollis*.

There are few reports of species of *Tetrameres* (Creplin, 1846) (Nematoda: Tetrameridae) from Argentina. Unidentified females from *Coscoroba coscoroba* (Molina) (Anatidae) and *Phoenicopterus chilensis* Molina (Phoenicopteridae) were found by Boero and Led (1968), and the only nominate species are *T. (T.) tinamicola* Pence, Mollhagen and Prestwood, 1975 from *Eudromia elegans* Geoffroy (Tinamidae) (Pence et al., 1975), and *T. (Gynaecophila) aspacula* Digiani, 2000 from *Plegadis chihi* (Vieillot) (Threskiornithidae) (Digiani, 2000). Here, we describe a new species of *Tetrameres (Tetrameres)* Creplin, 1846 from migratory shorebirds in Patagonia, Argentina.

### **MATERIALS AND METHODS**

In April 1999, 1 specimen of two-banded plover (*Charadrius falklandicus* Latham, 1790) and 7 white-rumped sandpipers (*Calidris fuscicollis* Vieillot, 1819) were found dead at Fracasso Beach (42°25'S, 64°07'W), San José Gulf, Argentina, and were examined for helminths. Nematodes were removed from the proventriculus and fixed in 4% formalin, preserved in 70% alcohol, and cleared in glycerine-alcohol for examination. Specimens for scanning electron microscopy (SEM) were dehydrated in an ethanol series, dried by the critical point technique in amyl acetate, coated with gold, and examined in a JEOL JSM T100 microscope. Drawings were made with the aid of a camera lucida or were outlined from SEM micrographs. Measurements are in micrometers, except where otherwise indicated; those of the holotype are followed by those of the paratypes in parentheses. Subgeneric classification of the nematodes follows that proposed by Mollhagen (1976) and used by Mawson (1979), Bergan et al. (1994), and Digiani (2000).

### **DESCRIPTION**

***Tetrameres (Tetrameres) megaphasmidiata* n. sp.**  
(Figs. 1–16)

**Male** (based on holotype and 2 paratypes): Cuticle with fine transverse striations. Lateral alae weak, extending from anterior extremity to

level of cloaca. Total length 2.03 (1.94, 2.00) mm. Maximum width 88 (88, 98). Mouth surrounded by 2 lateral trilobate pseudolabia, lips absent. Teeth not observed. Pair of large cephalic papillae, outlet of amphid at base of each pseudolabium. Buccal capsule 15 (14, 12) long, 8 (10, 9) wide. Muscular esophagus 145 (125, 145) long; glandular esophagus 328 (253, 280) long. Nerve ring and excretory pore at 135 (110, 105) and 130 (in 1 paratype) from anterior end, respectively. Deirids simple, 78 (77, 77) from anterior end, located at level of spines 5–7. Cuticular spines in 4 rows; 1 dorsal, 1 ventral to each of lateral alae beginning at end of buccal capsule. Dorsal rows of spines ending at 160 (100, 140) anterior to cloaca, ventral rows continuous to posterior end. Spines large, articulated, with disclike bases. Anterior spines 15 (13, 14), midbody spines 11 (11, 13), posterior spines 11 (12, 12) long. Distance between spines 37 (30, 30) at anterior extremity (between spines 6 and 7), 58 (42, 50) at midbody, 16 (26, 28) at posterior extremity (between precloacal spines 5 and 6 starting from the cloaca). Somatic papillae at level of 13th ventral pair of precloacal spines starting from the cloaca, only seen with SEM. Left spicule 1.11 (0.96, 1.22) mm long; proximal portion of spicule cylindrical, 32 (42, 35) long, remainder of length guttered, tapering distally. Right spicule absent. Cloacal aperture strongly protruded. Tail 98 (120, 130) long, dorsally or ventrally curved. Postcloacal spines continuous, identical in appearance to precloacal spines, arranged in 6 subventral, 2 lateral pairs; latter at level of fourth and fifth subventral pairs. Postcloacal spines followed by large, conspicuous, foliaceous phasmids.

**Female** (1 specimen measured, unless otherwise stated): Gravid females 1.41–1.67 mm long, 1.01–1.10 mm wide (n = 3). Anterior extremity 176 long, includes muscular esophagus and proximal part of glandular esophagus. Buccal capsule rounded, 12 in diameter. Length of muscular esophagus 118. Glandular esophagus 722 long. Intestine saccular, brown. Posterior extremity 310 long, usually hidden between body folds because of excessive development of rest of body. Vulva inconspicuous, 225 from posterior end. Tail very short, broad, conical, 150 long, with simple, pointed tip. Egg oval, 43–46 long, 25–27 wide, without polar filaments, containing fully developed larva.

### **Taxonomic summary**

**Type host:** *Charadrius falklandicus* Latham, 1790 (Charadriiformes: Charadriidae). Common name: two-banded plover.

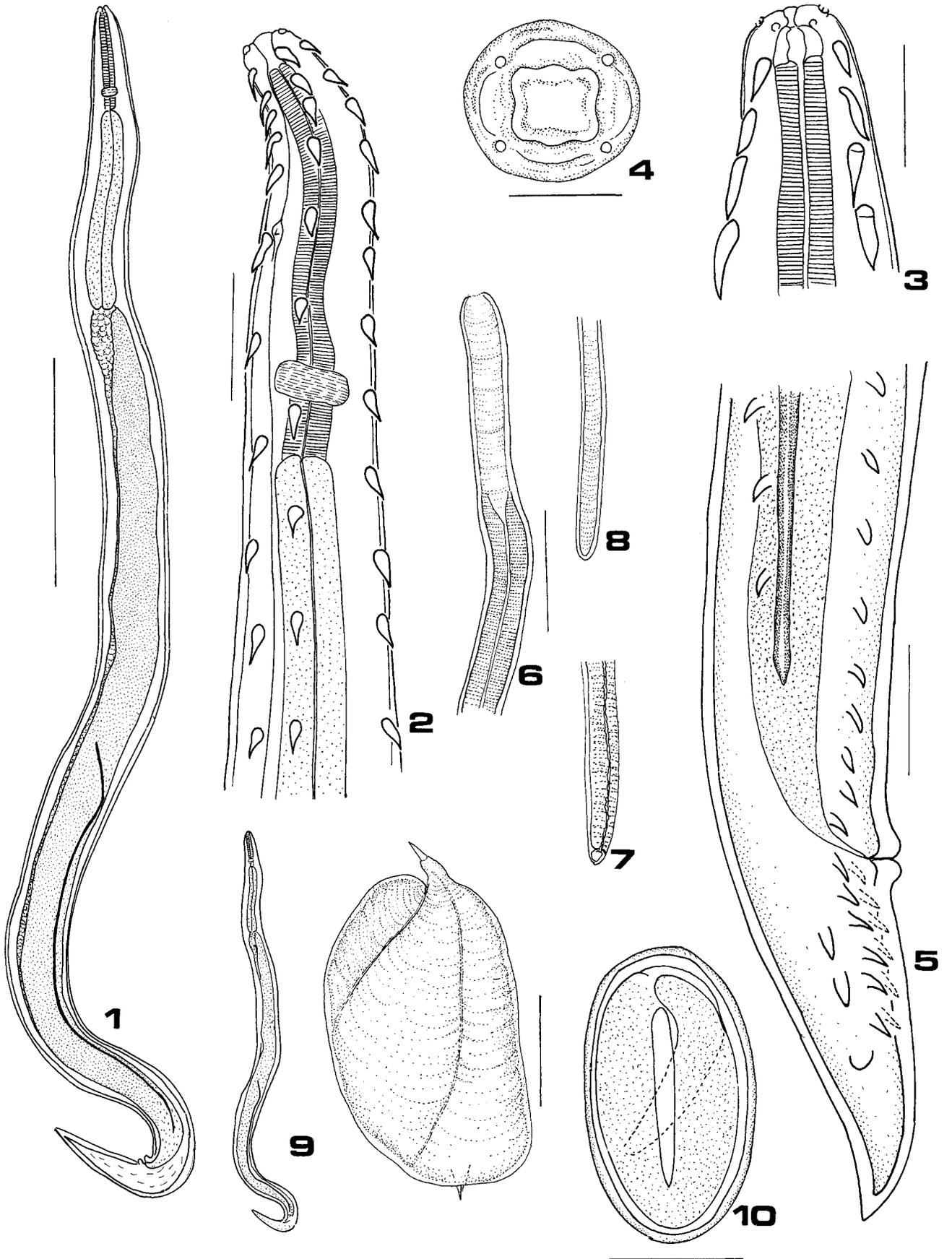
**Site of infection:** Proventriculus. Females within the glands, males free in the lumen.

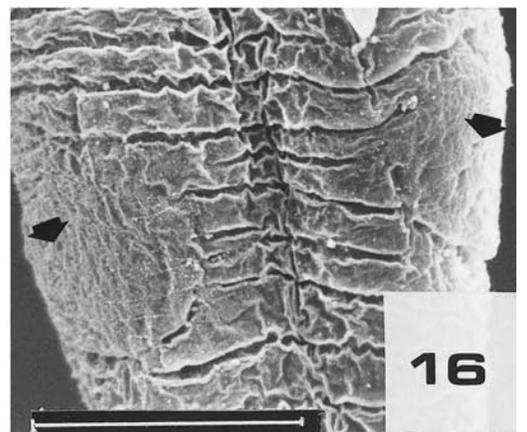
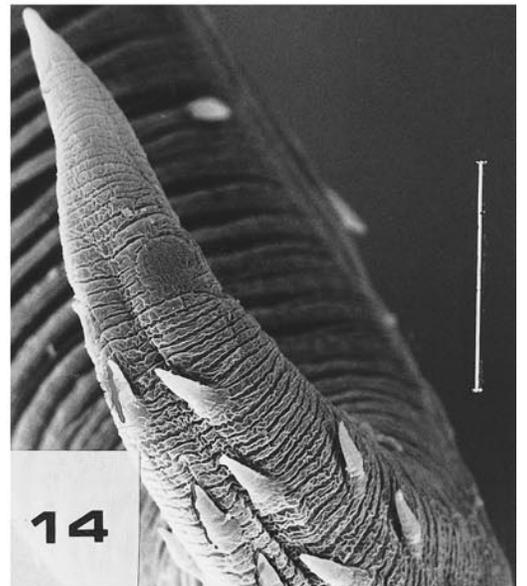
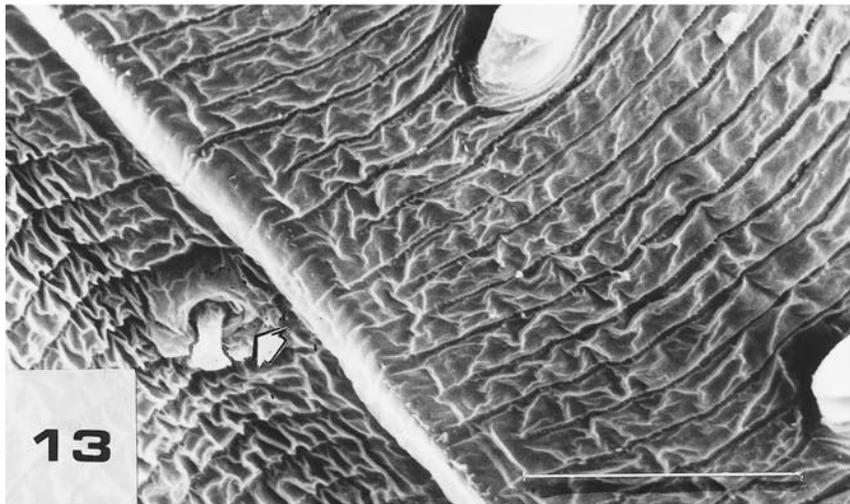
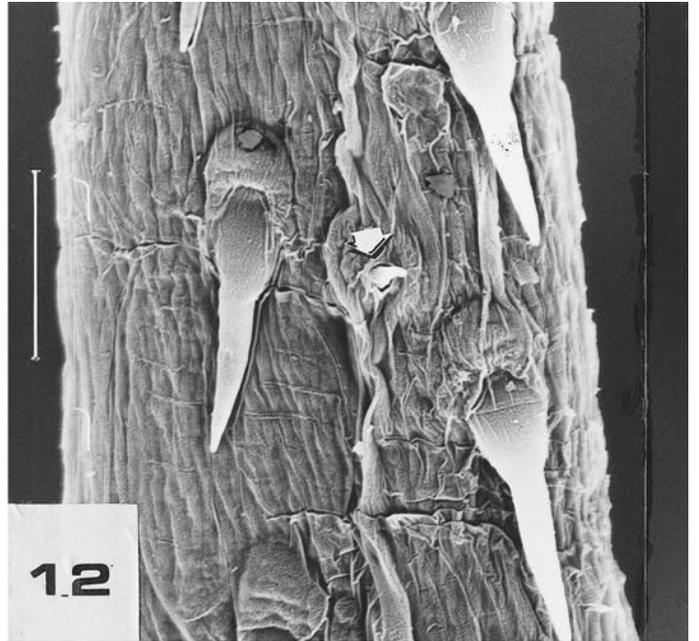
**Type locality:** Fracasso Beach (42°25'S, 64°07'W), San José Gulf, province of Chubut, Argentina.

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FIGURES 1–10. *Tetrameres (Tetrameres) megaphasmidiata* n. sp. **1.** Male, general view, spines omitted. Bar = 500  $\mu$ m. **2.** Anterior extremity of male, lateral view. Bar = 50  $\mu$ m. **3.** Anterior extremity of male, ventral view. Bar = 20  $\mu$ m. **4.** Apical view of male. Bar = 10  $\mu$ m. **5.** Posterior extremity of male, lateral view. Bar = 50  $\mu$ m. **6.** Left spicule, proximal end. Bar = 20  $\mu$ m. **7.** Left spicule, distal end, ventral view. Bar = 20  $\mu$ m. **8.** Left spicule, distal end, lateral view. Bar = 20  $\mu$ m. **9.** Comparative size of male and female. Bar = 500  $\mu$ m. **10.** Egg. Bar = 20  $\mu$ m.





*Specimens deposited:* Holotype (male) 4614, allotype (female) 4615 and paratypes (1 male, 1 female) 4616; voucher specimens (1 male) 4618 in the Helminthological Collection of Museo de La Plata (CHMLP), La Plata, Argentina.

*Etymology:* The specific epithet *megaphasmidiata* refers to the large and conspicuous phasmids.

*Other material studied* (5 males, measurements given as mean followed by range in parentheses): Total length 2.10 (1.94–2.20) mm. Maximum width 85 (77–95). Buccal capsule 11 (10–11) long, 6 (6–7) wide. Length of muscular esophagus 133 (125–145). Glandular esophagus 331 (293–370) long. Nerve ring and excretory pore at 131 (122–140) and 128 (n = 1) from anterior end, respectively. Deirids at 90 (65–115) from anterior end. Dorsal rows of spines ending at 113 (90–140) anterior to cloaca. Anterior spines 15 (13–16), midbody spines 12 (11–13), posterior spines 12 (11–12) long. Distance between spines 19 (15–23) at anterior extremity, 36 (22–44) at midbody, 32 (29–38) at posterior extremity. Left spicule 794 (730–830) long, proximal cylindrical portion 41 (32–50) long. Tail straight, 130 (128–133) long.

#### Taxonomic summary

*Host:* *Calidris fuscicollis* Vieillot, 1819 (Charadriiformes: Scolopacidae). Common name: white-rumped sandpiper.

*Site of infection:* Proventriculus.

*Locality:* Fracasso Beach (42°25'S, 64°07'W), San José Gulf, province of Chubut, Argentina.

*Specimens deposited:* Four males 4617 in the CHMLP, La Plata, Argentina.

#### Remarks

Species of *Tetrameres* that, after Mollhagen (1976), lack labia and possess only 1 spicule are *T. nouveli* (Seurat, 1914), *T. paradisea* Ortlepp, 1932, *T. prozeskyi* Ortlepp, 1964, and *T. cladorhynchi* Mawson, 1968. Other species for which the description does not include an apical view and that share the absence of the right spicule are *T. lobibycis* Mawson, 1968 and *T. paraaraliensis* Oschmarin, 1956. Our new species is different from the aforementioned species in the following ways. *Tetrameres nouveli* has a different number and arrangement of postcloacal papillae (3 or 4 pairs subventral, 2 or 3 sublateral) (Seurat, 1914), shorter left spicule (312–587), and eggs with polar filaments; *T. paradisea* possesses much shorter dorsal rows of spines, ending at 94–155 from the anterior end, caudal papillae arranged in 3/3 pairs, and shorter left spicule (504–626) (Mollhagen, 1976); *T. prozeskyi* presents a constriction anterior to the nerve ring, different number and arrangement of postcloacal papillae (3/0, 3/3, 4/1, 4/2), and shorter left spicule (230–260) (Mollhagen, 1976); *T. cladorhynchi* presents a different extension of the lateral alae (starting posterior to the deirids and ending at the midlevel of the tail), caudal spines arranged in 3/3 pairs, and eggs with polar filaments (Mawson, 1968); *T. lobibycis* possesses dorsal rows of spines ending at the level of the nerve ring and caudal papillae arranged in 6 subventral pairs (Mawson, 1968); *T. paraaraliensis* has a shorter left spicule (405–420) (Mollhagen, 1976). From these comparisons, we conclude that the nematodes recovered from *Charadrius falklandicus* and *Calidris fuscicollis* in Patagonia, Argentina, represent a new species of *Tetrameres*.

#### DISCUSSION

This report is the first record of a member of *Tetrameres* in *Charadrius falklandicus* and *Calidris fuscicollis*.

The somatic papillae observed in *Tetrameres (T.) megaphasmidiata* n. sp. were previously reported by Digiani (2000) from *T. (Gynaecophila) aspicula* Digiani, 2000, with similar position and identical appearance. These paired structures, with apparently both tactile and secretory function, may be more common than previously reported in members of *Tetrameres* because they are difficult to see with a light microscope, especially when somatic spines are large. Digiani (2000) described these papillae and discussed the homology of these structures to other paired somatic papillae observed in nematodes of the Ascaridida–Spirurida group (Chabaud and Bain, 1994), such as postdeirids and centrids. Confirmation of somatic papillae, postdeirids, and centrids as homologous structures requires detailed ultrastructural, physiological, and ontogenetic studies.

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FIGURES 11–16. *Tetrameres (Tetrameres) megaphasmidiata* n. sp. **11**. Anterior extremity of male, lateral view. Bar = 50  $\mu$ m. **12**. Detail of deirid (arrow) and somatic spines. Bar = 10  $\mu$ m. **13**. Detail of somatic papilla (arrow) and lateral ala. Bar = 10  $\mu$ m. **14**. Posterior extremity of male showing postcloacal spines and phasmids. Bar = 30  $\mu$ m. **15**. Posterior extremity of male showing postcloacal spines and end of lateral alae (arrow). Bar = 30  $\mu$ m. **16**. Detail of phasmids (arrows in phasmidial pores). Bar = 10  $\mu$ m.