

A new species of *Aspiculuris* Schulz, 1924 (Nematoda, Heteroxynematidae) from the gray-sided vole, *Clethrionomys rufocanus* (Rodentia, Cricetidae), from Tianjin, China

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Abstract

Aspiculuris tianjinensis sp. nov. recovered from the intestine of *Clethrionomys rufocanus* from Tianjin, China is described and illustrated using light microscopy and scanning electron microscopy. The new species differs from congeners in the shape of the cervical alae, and the number and arrangement of caudal papillae.

Keywords

Aspiculuris tianjinensis sp. nov., *Clethrionomys rufocanus*, China, Tianjin

Introduction

Species of the genus *Aspiculuris* Schulz, 1924 are parasites of Muroidea (Rodentia). Currently it contains eighteen nominal species (Hugot 1980, Inglis *et al.* 1990, Falcón-Ordaz *et al.* 2010). However, the taxonomy and distribution of nematodes from rodents in China is poorly studied, and only one species of this genus, *Aspiculuris tetraptera* (Nitzsch, 1821), has been reported from Guiyang, China (Chin 1939). In the present study, we describe a new species of *Aspiculuris* from Tianjin, China.

Materials and methods

Three gray-sided vole, *Clethrionomys rufocanus* (Sundevall), were captured in the Mountain Baxian Nature Reserve, Tianjin, China. Nematodes collected from the intestine of *C. rufocanus* were washed in physiological saline, fixed in hot 4% formalin and then stored in 70% ethanol. For light microscopy, nematodes were cleared in lactophenol. Drawings were made with the aid of Nikon microscope drawing attachment. For scanning electron microscopy (SEM), specimens were fixed in 4% formaldehyde, post-fixed in 1% OsO₄, dehydrated through

an ethanol and acetone series, and then subjected to critical point drying. The specimens were coated with gold and examined with a Hitachi S-570 scanning electron microscope at an accelerating voltage of 15 KV. Measurements (minimum, maximum, followed by mean in parentheses) are given in micrometers, unless otherwise stated. Specimens have been deposited in the College of Life Sciences, Hebei Normal University (HBNU), Hebei Province, China.

Results

Aspiculuris tianjinensis sp. nov. (Figs 1 and 2)

Type host: *Clethrionomys rufocanus* (Sundevall, 1846) (Rodentia: Cricetidae).

Type locality: Mountain Baxian Nature Reserve, Tianjin, China (117°30'35"E, 117°36'24").

Site of infection: Intestine.

Type specimens: Holotype: male (HBNU-M1201); allotype: female (HBNU-M1202); paratypes: 4 males (HBNU-M1203) and 8 females (HBNU-M1204).

Etymology: The specific name refers to the municipality of the type locality.

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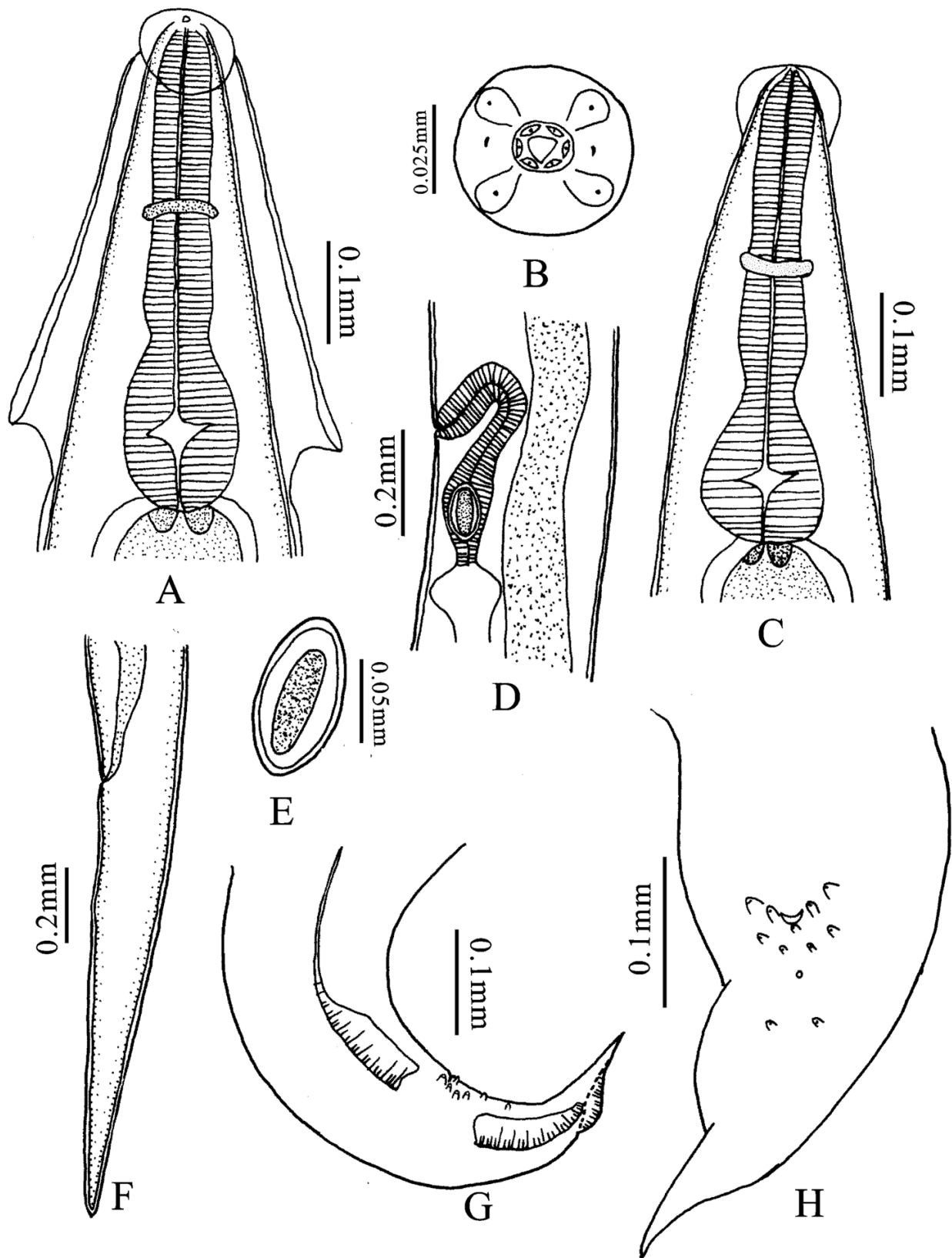


Fig. 1. *Aspicularis tianjinensis* sp. nov. **A.** Anterior end of male, ventral view. **B.** Cephalic extremity, en face view (reconstructed from scanning electron micrographs). **C.** Anterior end of female, lateral view. **D.** Vulval region of female, lateral view. **E.** Egg. **F.** Posterior end of female, lateral view. **G.** Posterior end of male, lateral view, showing arrangement of 3 alae on the tail. **H.** Detail of posterior end of male, showing arrangement of caudal papillae

Description

General: Medium sized nematodes. Body in both sexes with distinct cervical alae which beginning immediately posterior

to the anterior end of cephalic vesicle. Cervical alae abruptly interrupted at the level of oesophago-intestinal junction, forming an acute angle. Anterior end of the body with prominent, elaborate inflated region which forming cephalic vesicle.

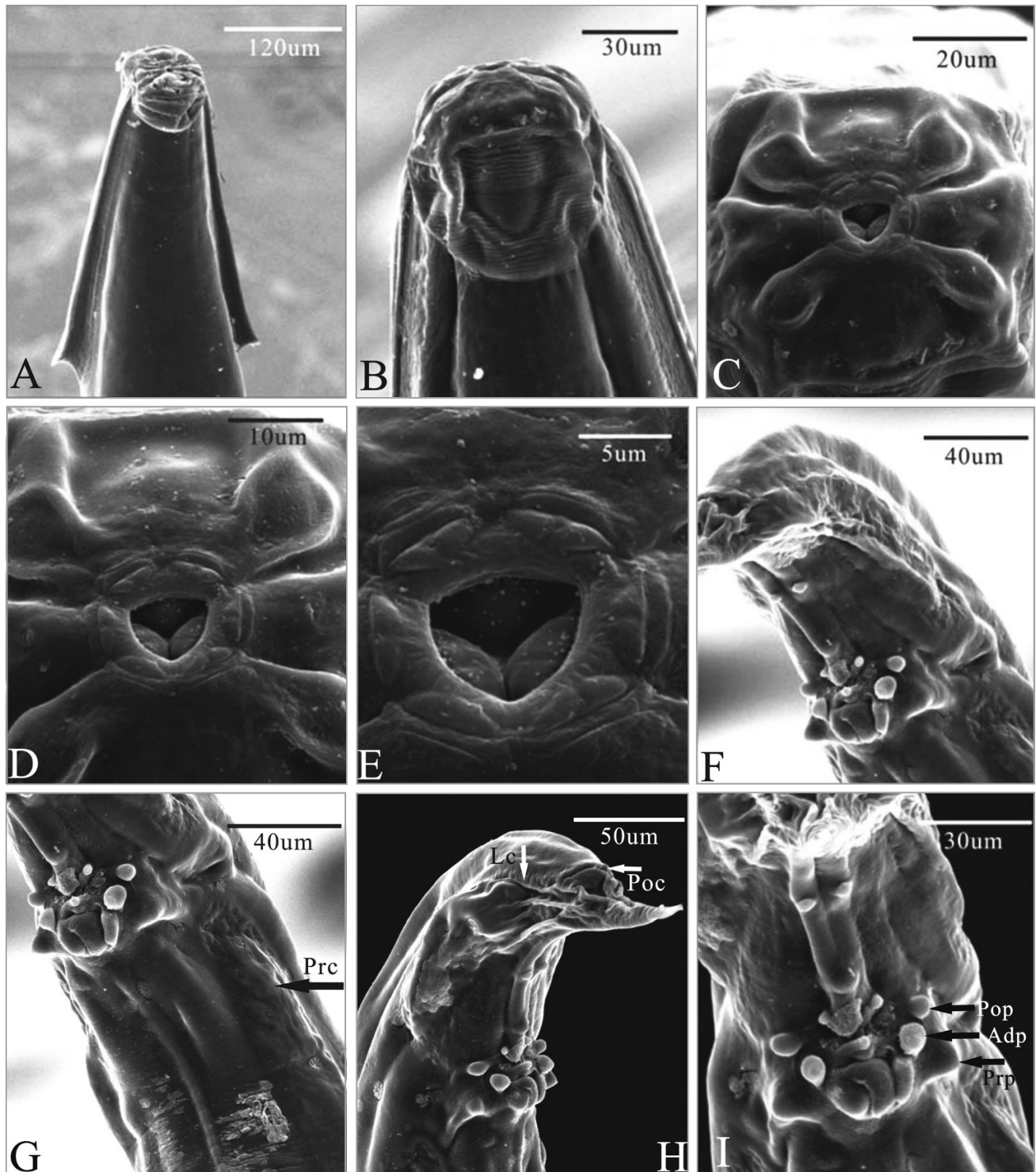


Fig. 2. SEM of *Aspicularis tianjinensis* sp. nov. **A.** Anterior end of male, ventral view. **B.** Cephalic end of female, ventral view. **C-E.** Cephalic end of male, en face view. **F-H.** Posterior end of male, subventral view. **I.** Posterior end of male, showing caudal papillae. **Abbreviations:** Prc – precloacal alae, Poc – postcloacal alae, Lc – lateral caudal alae, Prp – precloacal papillae, Adp – adcloacal papillae, Pop – postcloacal papillae

Mouth opening small, triangular, surrounded by 6 lip-like elevations each with small sessile papilla. 4 single, large cephalic papillae are dorso- and ventro-lateral in position; two lateral amphids located in same circle.

Male (based on 7 mature specimens). Body length 3.69–5.12 (4.69) mm; maximum width 204–388 (307). Cephalic vesicle 69–78 (72) long, 88–122 (104) wide. Oesophagus with bulb 343–397 (384) long; bulb 74–142 (122) long, 59–123 (98) wide. Nerve ring 116–133 (123) and excretory pore 0.93–1.03 (1.01) mm from anterior end, respectively. Cervical alae begin 54–59 (57) from anterior end, 284–338 (308) long, 34–49 (44) wide. Tail of male curved ventrally with pointed tip, possessing 3 pairs of caudal alae: posterior alae (postcloacal alae) smallest, at end of tail; lateral caudal alae larger; and anterior alae (precloacal alae) largest. Distance from cloaca to precloacal alae 41–60 (51); to post-cloacal alae 133–145 (121); to lateral alae 36–60 (50). Tail 181–245 (220) long, 12 caudal papillae arranged as follows: 1 pair precloacal; 1 pair adcloacal; single small median postcloacal papilla close to posterior margin of cloaca; 2 pairs postcloacal (one sublateral and one subvental), single large median papilla follows immediately, 1 subventral pair midway between cloaca and end of tail.

Female (based on 12 mature specimens). Body length 5.38–7.00 (6.46) mm; maximum width 282–447 (352). Cephalic vesicle 88–93 (90) long, 113–162 (127) wide. Oesophagus with bulb 417–480 (461) long; bulb 123–167 (152) long, 88–137 (118) wide. Nerve ring 121–157 (134) and excretory pore 1.09–1.23 (1.17) mm from anterior end, respectively. Cervical alae begin 29–39 (36) from anterior end; 382–441 (425) long and 34–64 (53) wide. Vulva pre-equatorial, 2.07–2.43 (2.27) mm from anterior end. Ovejector 392–466 (429) long. Tail 0.92–1.14 (1.05) mm long. Eggs 92–96 (94) long, 51–58 (54) wide.

Remarks

To date, 18 species of the genus *Aspiculuris* have been reported worldwide (see Falcón-Ordaz *et al.* 2010). Quentin (1975) separated the members of *Aspiculuris* into 2 groups based on the outline shape of the cervical alae. The first group is characterized by having cervical alae that are abruptly interrupted with the posterior ends pointed including *A. tetraptera* (Nitzsch, 1821); *A. dinnicki* Schulz, 1927; *A. schulzi* Popov et Nasarova, 1930; *A. kazakstanica* Nasarova et Sweschikova, 1930; *A. americana* Erickson, 1938; *A. lahoreica* Akhtar, 1955; *A. pakistanica* Akhtar, 1955; *A. tschertkowi* Tarzhimanova, 1969; *A. azerbaijanica* Tarzhimanova, 1969; *A. arianica* Erhardova-Kotrla et Daniel, 1970; *A. rysavyi* Erhardova-Kotrla et Daniel, 1970; *A. versterae* Hugot, 1980; *A. huascaensis* Falcón-Ordaz, Polido-Flores et Monks, 2010. The second group has rounded rather than pointed posterior ends to the cervical alae, and consists of *A. asiatica* Schulz, 1927; *A. africana* Quentin, 1966; *A. ratti* Johnston, 1970; *A. witenbergi* Quentin, 1975; and *A. shikoloveta* Inglis, Harris et Lewis, 1990.

The new species most closely resembles species included in the first group by having cervical alae terminating abruptly. However, it can be distinguished from *A. americana*, *A. lahoreica*, *A. pakistanica*, *A. rysavyi*, *A. tschertkowi*, and *A. versterae* by the posterior end of the cervical alae forming an acute angle (absent in the remaining species). *A. tianjinensis* sp. nov. differs from *A. schulzi*, *A. arianica* in the cervical alae reaching the oesophago-intestinal junction instead of ending anterior to the oesophageal bulb, and in the number of caudal papillae (12 vs 7, 10). The new species differs from *A. tetraptera* by having the cervical alae extending to the oesophago-intestinal junction versus the cervical alae extending to the middle-length of oesophageal bulb; likewise the number of caudal papillae of the new species is smaller than that of *A. tetraptera* (12 vs 14). *A. tianjinensis* sp. nov. is very similar to *A. dinnicki*, *A. kazakstanica* in the shape of the caudal alae, but differs from the latter in the number of caudal papillae (12 vs 10, 9, respectively). The new species cannot be compared with *A. azerbaijanica* because the male of this species is unknown. Finally, the new species resembles *A. huascaensis* in the number of caudal papillae, however, it can be distinguished from *A. huascaensis* in the arrangement of single median papilla (a single median postcloacal papilla is present in the new species vs a single precloacal papilla in the latter), and in the cervical alae extending to the oesophago-intestinal junction instead of extending to the mid-level of oesophageal bulb.

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