

Redescription of *Monodontella giraffae* Yorke et Maplestone, 1926 (Nematoda, Ancylostomatidae) from a giraffe, *Giraffa camelopardalis*, from Zoo in China, with a discussion on the taxonomic status of *Monodontella*

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Abstract

Monodontella giraffae Yorke et Maplestone, 1926 was collected from the biliary duct of liver of a dead giraffe, *Giraffa camelopardalis* (Linnaeus) from the Tianjin Zoo, Tianjin, China. A redescription of this species was made using light microscopy and scanning electron microscopy (SEM). The lateral alae and the detailed structures of the spicules and genital cone were observed for the first time by SEM. The taxonomic status of the genus is discussed.

Keywords

Nematoda, Ancylostomatidae, *Monodontella giraffae*, *Giraffa camelopardalis*

Introduction

Yorke and Maplestone (1926) erected a new genus, *Monodontella* for a species of nematode collected from giraffes, *Giraffa camelopardalis* (Linnaeus), named *Monodontella giraffae* Yorke et Maplestone, 1926. Travassos (1929) regarded *Monodontella* as a synonym of *Monodontus* Molin, 1861. Subsequently, most authors have agreed with the opinion of Travassos (McIntosh 1935, Travassos 1937, Chitwood and Jordan 1965, Lichtenfels 1980, Kalia and Gupta 1983), while others have regarded *Monodontella* as a valid genus (Skryabin *et al.* 1952, Yamaguti 1961). However, this species was poorly described, and has not been previously reported from China. In the present study, *Monodontella giraffae* is redescribed from the type host, *Giraffa camelopardalis*, from the Tianjin Zoo, China, by light microscopy and scanning electron microscopy, and the validity of this genus is discussed.

Materials and methods

Nematodes (43 males and 34 females) were collected from the biliary duct of liver of a dead giraffe, *Giraffa camelopardalis* (Linnaeus) at Tianjin Zoo, Tianjin, China in December 1980. After washing in physiological saline, the specimens were

fixed in hot 4% formalin, and stored in 70% ethanol until they were studied. For light microscopy examination, nematodes were cleared in lactophenol. Drawings were made with the aid of Nikon microscope drawing attachment. For scanning electron microscopy (SEM) studies, specimens were post-fixed in 1% OsO₄, dehydrated through ethanol series and acetone, 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

Monodontella giraffae Yorke et Maplestone, 1926 (Figs 1 and 2)

Body long and reddish, and cuticle with striations. Anterior extremity bent dorsally. Oral opening rounded. Buccal capsule well-developed, funnel-shaped, with two semilunar ventral cutting plates at oral margin, large dorsal cone projecting into

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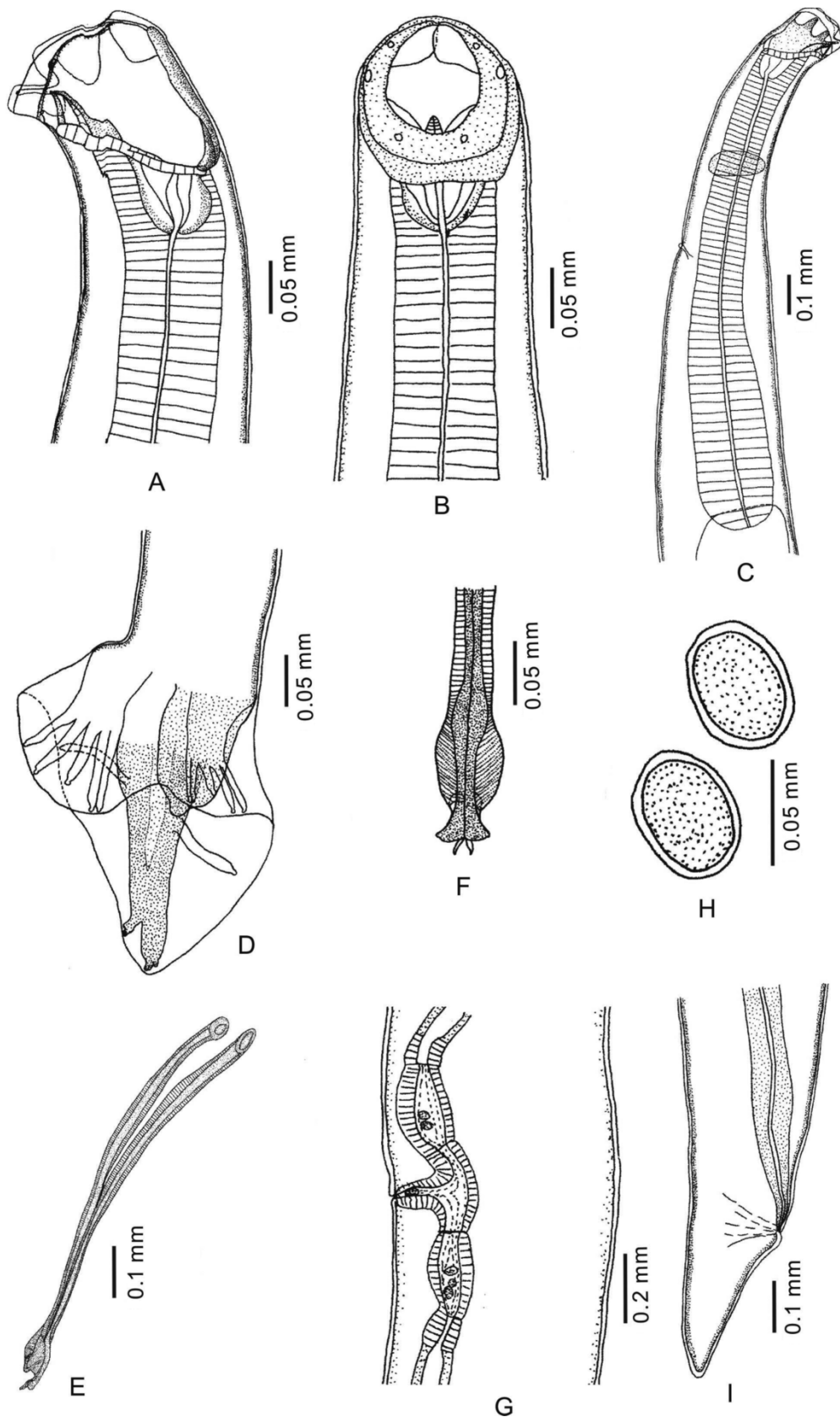


Fig. 1. *Monodontella giraffae* Yorke et Maplestone, 1926. **A.** Cephalic end of male, lateral view. **B.** Cephalic end of male, dorsal view. **C.** Anterior end of male, lateral view. **D.** Posterior end of male, ventral view. **E.** Spicules, lateral view. **F.** Distal end of spicules, ventral view. **G.** Vulva region of female, lateral view. **H.** Eggs. **I.** Posterior end of female, lateral view

buccal capsule; ventral or subventral lancets absent. Buccal rim with a pair of lateral amphids, a pair of subventral and a pair of subdorsal cephalic papillae. Oesophageal funnel cup-shaped, oesophagus club-shaped. Nerve ring located at ante-

rior part of oesophagus, excretory pore and cervical papillae posterior to nerve ring. Lateral alae narrow, originating just anterior to cervical papillae and extending to posterior part of body in both male and female.

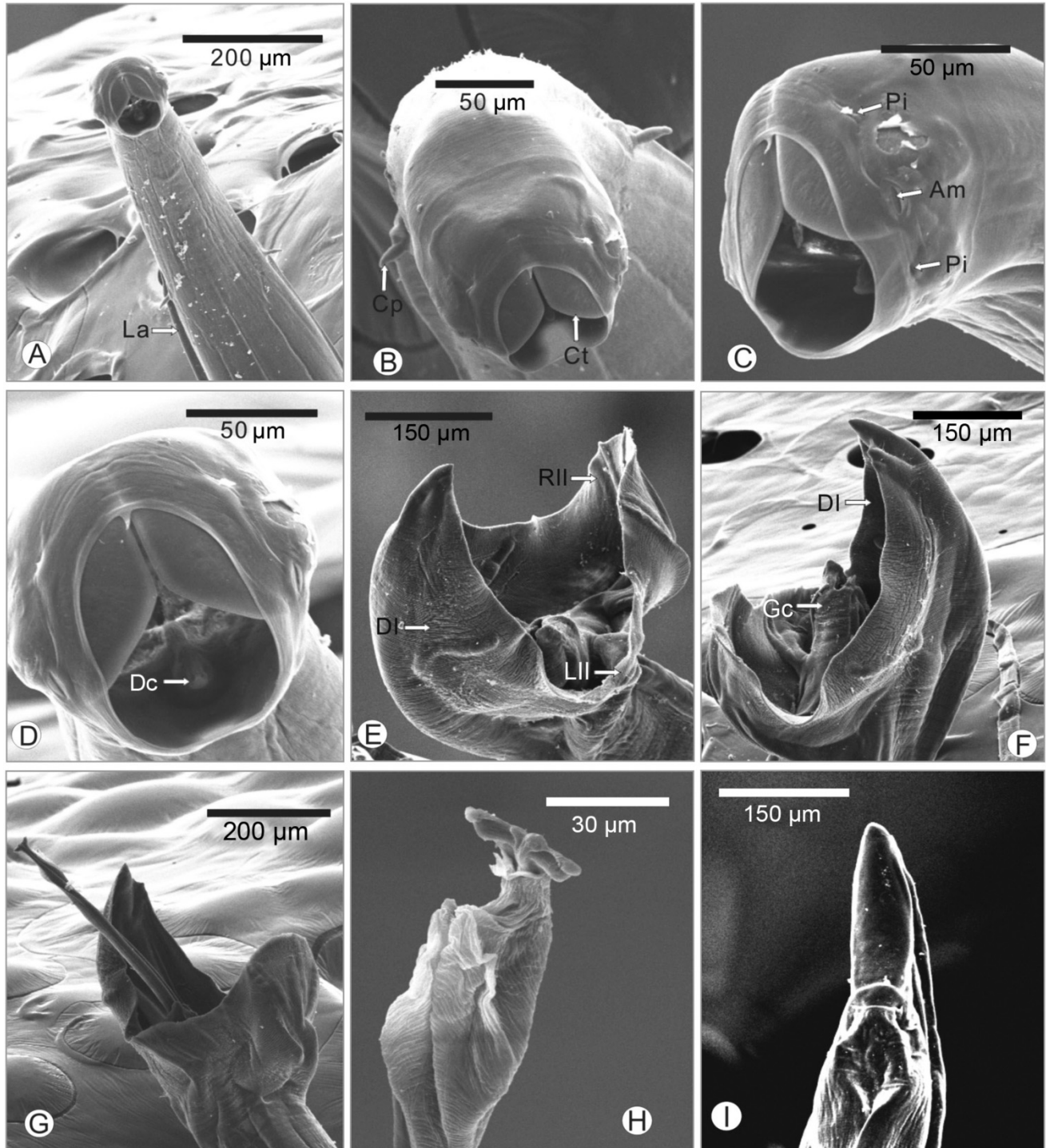


Fig. 2. SEM of *Monodontella giraffae* Yorke et Maplestone, 1926. **A.** Anterior end of body, dorsal view. **B.** Cephalic extremity, ventral view. **C.** Cephalic extremity, lateral view. **D.** Cephalic extremity, en face view. **E.** and **F.** Copulatory bursa, lateral view. **G.** Posterior end of male, ventro-lateral view. **H.** Distal end of spicules, lateral view. **I.** Posterior end of female, ventral view. **Abbreviations:** Am – amphid, Cp – cervical papillae, Ct – cutting plate, Dc – dorsal cone, DI – dorsal lobe, Gc – genital cone, La – lateral alae, LII – left lateral lobe, Pi – papilla, RII – right lateral lobe

Male (based on 10 adult specimens): Body 13.70–15.50 (14.35) mm long, maximum width 380–440 (400), 250–310 (280) anterior to bursa, 220–300 (270) wide at posterior end of oesophagus. Buccal capsule 200 long, 80 wide. Oesophagus 1.15–1.45 (1.29) mm long, 160–240 (200) wide. Oesophageal funnel 50–60 (51) long. Nerve ring 500–670 (570) from anterior end; excretory pore 650–750 (700) from anterior end and cervical papillae 700–780 (740) from anterior end. Copulatory bursa with divided lobes; left and right lobes asymmetrical, left lobe smaller than right lobe. Lateral and dorsal lobes fused, joined ventrally. Dorsal lobe longer than lateral lobes. Right and left ventral and lateral rays of similar shape, but right rays relatively larger than left rays. Ventral and lateral rays arising from a large common trunk. Ventro-ventral and latero-ventral rays parallel for entire length. Lateral rays separated at their base; externo-lateral ray shorter than medio-lateral and postero-lateral rays. Externo-dorsal and dorsal rays arising from a common trunk. Right externo-dorsal ray arising at a higher level than left externo-dorsal ray on dorsal trunk. Distal end of externo-dorsal rays papilliform. Dorsal ray divided into two branches at its termination. Right branch smaller than left, each with three projections, two internal projections digitate, external projection knob-shaped. Genital cone long, cylindrical. Dermal collar well-developed on ventral side of genital cone. Appendages of genital cone paired, finger-shaped formations. Spicules slender, equal in length, 820–920 (860) long, each with striated ala; ala expanded near distal end of spicule, then sharply narrowed, forming fan-shaped structure. Distal tip of spicule expanded externally, forming foot-shaped projection.

Female (based on 10 adult specimens): Body 17.79–19.97 (18.94) mm long, maximum width 510–770 (580). Buccal capsule 200 long, 70 wide. Oesophagus 1.41–1.65 (1.46) mm long, 210–300 (240) wide. Oesophageal funnel 50–70 (60) long. Nerve ring 550–650 (590) from anterior end; excretory pore 750–820 (770) from anterior end and cervical papillae 780–870 (820) from anterior end. Vulva without salient lips, located slightly anterior to the middle of the body, 9.22–11.39 (10.27) mm from posterior end. Ovijector T-shaped, 870–950 (850) long, vestibule as long as sphincter, infundibulum only half as long as sphincter. Female tail conical, 320–350 (330) long. Eggs ellipsoidal with thin shell, 49–69 (63) long, 28–44 (36) wide.

Host: *Giraffa camelopardalis* (Linnaeus).

Site of infection: biliary duct of liver.

Locality: Tianjin Zoo (117°2'E; 39°13'N), Tianjin, People's Republic of China.

Voucher specimens: 10 males (HBNU 0901) and 10 females (HBNU 0902) have been deposited in the College of Life Sciences, Hebei Normal University.

Remarks: Yorke and Mapleston (1926) gave a briefly descriptions of *Monodontella giraffae*. Unfortunately, they confused lateral rays with dorsal ray (see McIntosh 1935). Frank (1963) described the eggs, third stage larvae and adult, especially gave more detailed illustrations of bursa which showed correctly the lateral rays and dorsal ray. The present specimens are belonging to *Monodontella giraffae* in general

characters such as body size, buccal capsule without ventral or subventral lancets, and the structure of the copulatory bursa. However, the lateral alae, detailed structures of the spicules and the genital cone were observed for the first time by SEM in the present study. This species is reported for the first time from China.

Discussion

Monodontella Yorke and Mapleston, 1926 has been regarded a synonym of *Monodontus* by different authors (Travassos 1929, 1937; McIntosh 1935; Chitwood and Jordan, 1965; Lichtenfels 1980; Kalia and Gupta 1983). Up to now, eight species of the genus *Monodontus* have been described (see Kalia and Gupta 1983). These species can be placed in two distinct groups, *M. giraffae* and the remaining seven species. *M. giraffae* can be distinguished easily from other species of the genus *Monodontus* by lacking ventral or subventral lancets in the buccal capsule, and in the dorsal ray of bursa which is divided only at its distal tip. The lancets of buccal capsule and shape of dorsal ray are of generic importance, and can be distinguished *Monodontella* from *Monodontus*. In addition, the species of *Monodontella* is a parasite of Giraffidae whereas the species of *Monodontus* are parasites of rodents, suids and cervids. Therefore, we consider *Monodontella* to be a valid genus.

Rep (1963) reviewed the classification of Ancylostomidae, using 17 characters for differentiation of genera. He recognized *Monodontella* as a valid genus; however, refused using the name *Monodontus*, removed *Monodontus aguiari* Travassos, 1937 and *M. nefastus* Travassos, 1937 into the genus *Monodontella*. We cannot agree with the opinion of Rep because *Monodontus* is a widely accepted genus. It is different from *Bunostomum* by the dorsal lobe larger than lateral lobes, it can be distinguished from *Gaigeria* by having asymmetrical instead of symmetrical bursa. *Monodontella* differs from *Monodontus* by the absence of lancets of buccal capsule and dorsal ray divided at distal end. *Monodontella* is just including the type species.

Monodontella Yorke et Mapleston, 1926

Diagnosis: Ancylostomatoidea, Ancylostomatidae, Bunostominae. Anterior extremity bent dorsally. Oral opening rounded. Buccal capsule well-developed, funnel-shaped, with two semilunar ventral cutting plates at oral margin, large dorsal cone projecting into buccal capsule; ventral or subventral lancets absent. Oesophageal funnel cup-shaped, oesophagus club-shaped. Male: Copulatory bursa asymmetrical, right lateral lobe larger than the left. Dorsal lobe longer than lateral lobes. Externo-dorsal and dorsal rays arising from a common trunk. Right externo-dorsal ray arising at a higher level than left externo-dorsal ray on dorsal trunk. Dorsal ray divided into two branches at its termination. Right branch smaller than left, each

with three projections. Spicules equal, and alate fused distally. Female: Tail conical, vulva slightly in front of middle of body. Parasites of Giraffidae (giraffes and okapis).

Type and only species: *Monodontella giraffae* Yorke et Maplestone, 1926

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