

Parasitic Nematodes obtained from *Niviventer eha* and *Mus* spp. (Murinae: Rodentia) captured in the Himalayas, Nepal

Mitsuhiko Asakawa^{1*}, Kazuhiro Koyasu², Masashi Harada³, Krishna C. Shrestha⁴,
Kazuyuki Mekada⁵, Kimiyuki Tsuchiya⁶, Sen-ichi Oda⁷, and Hideo Hasegawa⁸

¹ School of Veterinary Medicine, Rakuno Gakuen University, Ebetsu, Hokkaido, 069-8501 Japan

² School of Dentistry, Aichi-Gakuin University, Nagoya, 464-8650 Japan

³ Laboratory Animal Center, Osaka City University Medical School, Osaka, 545-8585 Japan

⁴ Department of Zoology, Pri-Chandra Campus, Kathmandu, Nepal.

⁵ School of Agricultural Sciences, Nagoya University, Nagoya, 464-8601 Japan.

⁶ Applied Biology Co., Ltd., Minami-Aoyama, Minato-ku, Tokyo 107-0062, Japan

⁷ Department of Zoology, Okayama University of Science, Okayama, 700-0005 Japan.

⁸ Department of Biology, Faculty of Medicine, Oita University, Hasama, Yufu, Oita 879-5593 Japan.

Abstract. As a part of zoogeographical research projects of the host-parasite relationship between the mammals and parasitic nematodes in the Himalayas, Nepal, the intestines of the total 43 individuals of 4 murine species, viz., *Niviventer eha* [abbreviated to Ne], *Rattus rattus*, *Mus cervicolor* [abbreviated to Mc] and *M. musculus* [abbreviated to Mm] were examined helminthologically, and *Heligmonoides* sp.1 [Ne] (occurrence of positive individuals /individuals examined:9/10), larval nematode [Ne] (1/10), *H. sp. 2* [Mc] (5/7), *H. afghanus* [Mm] (2/25) *Heligmosomoides neopolygyrus* [Ne] (6/10) and *Syphacia ohtaorium* [Mm] (3/25). These nematode species are new host and/or locality records in Nepal and /or each host species.

Key words: *Niviventer eha*, *Mus* spp., Nepal, parasitic nematodes

Introduction

As a part of zoogeographical research projects, we have studied the parasitic nematode fauna of Microtinae and Murinae (Muridae: Rodentia: Mammalia) in the Holarctic region (Asakawa, 1991, 1995), and reported the fauna of the genera *Apodemus* and *Microtus* captured in the Himalayas, Nepal, in the preceding paper (Asakawa *et al.*, 1997). Thereafter, several nematodes were obtained from the other murid hosts, namely, *Niviventer eha* and 2 species of the genus *Mus* that were collected in this region. In this paper, these nematodes were presented.

Materials and Methods

In March 17, 1991, March 10-18 and November 11-14, 1994, March 21-22 and November 27, 1996, and March 17, 1999, 10 individuals of *Niviventer eha*, 1 of *Rattus rattus*, 7 of *Mus cervicolor*, and 25 individuals of *M. musculus* were collected at 8 localities (Fig. 1, 1-8), i.e., Kathmandu (27° 30' N, 85° 20' E; altitude ca. 1300 m), Ghorepani (28° 25' N, 83° 42' E; altitude ca. 2800m; Myagdi District), Naya Pul (27° 25' N, 83° 13' E; altitude ca. 1100 m; Kaski District), Bhaisi Kharka (28° 15' N, 83° 50' E; altitude ca. 2300 m; Myagdi District), Banthanti (28° 23' N, 83° 43' E; altitude ca. 3300 m; Kaski District), Gorkha (28° 39' N, 84° 28' E; altitude

*Corresponding author: askam@rakuno.ac.jp

ca. 1200 m; Ghyampasha District), Trisuli Bazar (27° 40' N, 85° 10' E; altitude unknown; Nuwakot District), Shikha (28° 26' N, 83° 40' E; altitude ca. 1900 m; Myagdi District), in the Mimalayas, Nepal, and intestines of all murids were examined parasitologically.

The parasitic nematodes were fixed and preserved in 10 % formalin solution and cestodes were preserved in 70 % ethanol, and the specimens were examined microscopically in lacto-phenol solution. Some heligmosomid and heligmonellid nematodes were sectioned with a razor for observation of the synlophe (Durette-Desset, 1983). Measuring or drawing of these nematodes were done with the aid of a camera lucida, OLYMPUS Model BH2-DA. These specimens has been deposited in Wild Animal Medical Center, Rakuno Gakuen University, Hokkaido, Japan (Accession Number: WAMC-AS. 13921-13925).

Results and Discussion

Except for an individual of *N. eha*, an individual of *R. rattus*, 2 individuals of *M. cervicolor* and 20 individuals of *M. musculus*, 6 species of the parasitic nematodes were obtained from the total of 19 individuals of the murids of 3 species, namely, *Heligmosomoides neopolygyrus* Asakawa et Ohbayashi, 1986 (Heligmosomidae: Strongylida: Occurrence = 6) (Figs. 2-1 ~ -4), *Heligmonoides* sp.1 (Heligmonel-

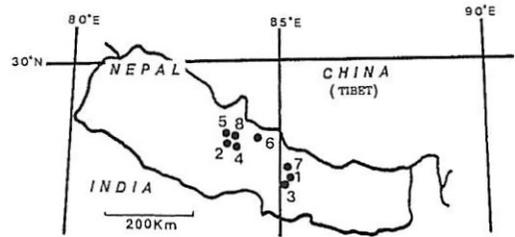


Fig. 1. Map showing collection points. 1-Kathmandu, 2-Ghorepani, 3-Naya Pul, 4-Bhaisi Kharka, 5-Banthanti, 6-Gorkha, 7-Trisuli, 8-Shikha.

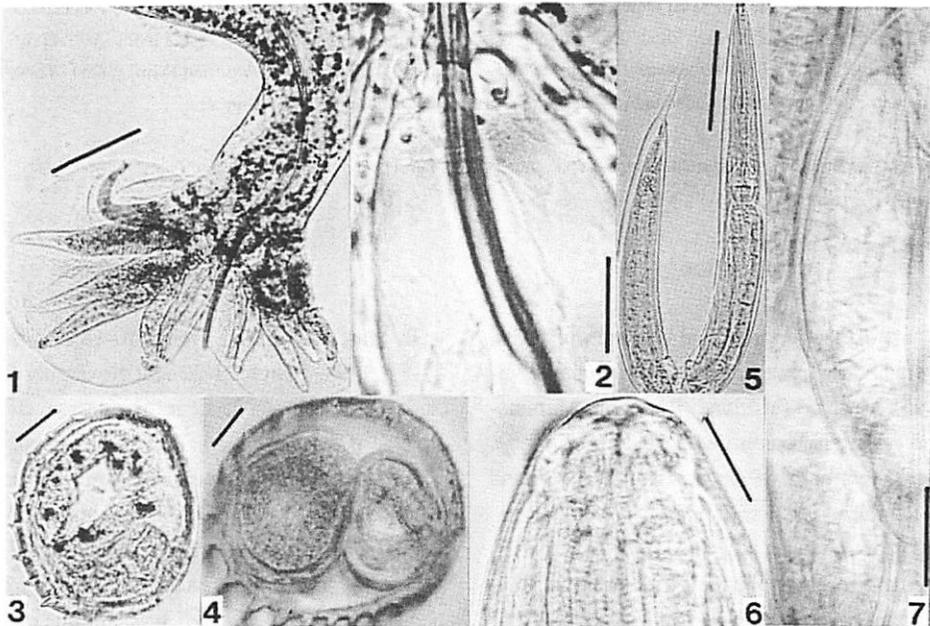


Fig. 2. Photos of *Heligmosomoides neopolygyrus* (1-4) and larval nematode (5) from *Niviventer eha*, and *Syphacia ohtaorum* (6 and 7) from *Mus musculus* in the Himalayas, Nepal. -1, bursa, ventral view (bar = 0.1 mm); -2, bases of externo-dorsal rays (bar = 0.025 mm); -3, cross-section of mid-body of male (bar = 0.025 mm); -4, cross-section of mid-body of female (bar = 0.025 mm); -5, larval nematode, left lateral view (bar = 0.1 mm); -6, anterior extremity of female (bar = 0.025 mm); -7, eggs in uterus (bar=0.025 mm).

lidae: Strongylida: Occurrence = 9) (Figs. 3-1 ~ -5) and larval nematode (Fam. unknown: Occurrence = 1) (Fig. 2-5) from *N. eha*, *Heligmonoides* sp. 2 (Occurrence = 5) (Figs. 3-6 ~ -9) from *M. cervicolor*; *Heligmonoides afghanus* (Tenora, 1969) (Occurrence = 2) and *Syphacia ohtaorum* Hasegawa, 1991 (Oxyuridae: Oxyurida: Occurrence = 3) (Figs. 2-6 and -7) from *M. musculus*. The genera *Heligmosomoides* and *Heligmonoides* were obtained from the small intestines, especially its anterior part, and *S. ohtaorum* was obtained from the large intestines, respectively.

Although *H. neopolygyrus* have been recorded

from the genus *Apodemus* including *A. gurkha* captured in Nepal (Asakawa, 1991; Asakawa & Tenora, 1996), it is the first record that *H. neopolygyrus* was obtained from *Niviventer eha*. Furthermore, there is no record that the genus *Heligmosomoides* parasitized the genus *Niviventer*, even though the nematode genus has been recorded from many species of the Muridae and Sciuridae (Durette-Desset, 1968; Asakawa, 1995).

Heligmonoides sp. 1 is similar to *H. alishanensis* which has been reported from *Niviventer confucianus* of Taiwan (Hasegawa, 1990) and *H. sp. 2* is

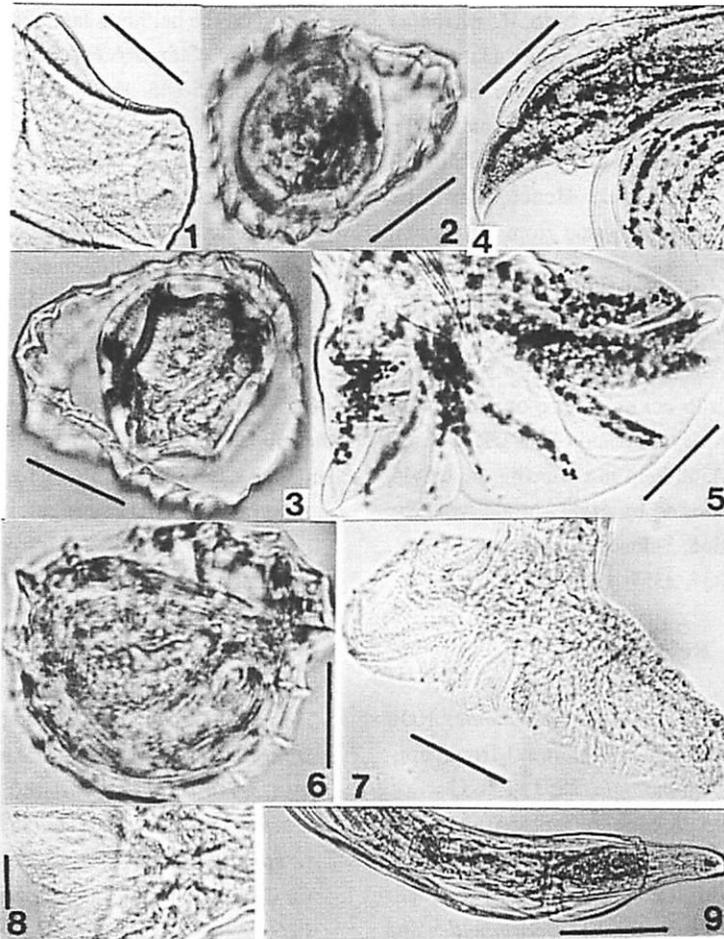


Fig. 3. Photos of *Heligmonoides* sp.1 (from -1 to -5) from *Niviventer eha* and *H. sp.2* (from -6 to -9) from *Mus cervicolor* in the Himalayas, Nepal. -1, anterior extremity (bar = 0.05 mm); -2, cross-section of mid-body of male (bar = 0.05 mm); -3, cross-section of mid-body of female (bar = 0.05 mm); -4 and -9, posterior extremity of female (bar = 0.1 mm); -5 and -7, bursa, ventral view (bar = 0.05 mm); -6, cross-section of mid-body of female (bar = 0.025 mm), -8, externo-dorsal and dorsal rays, ventral view (bar = 0.025 mm).

similar to *H. ryukyensis* which has been reported from *Mus musculus* and *M. caroli* on the Islands of Okinawa, Taiwan and Honshu and the southern part of Continental China (Hasegawa & Otsuru, 1982), but positive identifications will be done with the comparison of the other not yet described species (Asakawa et al, 1991, 1997; Hasegawa, 1999) of the genus *Heligmonoides* by Asakawa and his co-researches in future. On the other hand, *H. afghanus* was obtained from *Mus musculus* in Nepal (Hasegawa, 1999) and from the genera *Nesokia*, *Rattus* and *Meriones* in Afghanistan (Tenora, 1968; Durette-Desset, 1970), respectively.

S. ohtaorum also parasitizes both *M. musculus* and *M. caroli*, and has an extending over a large geographical area from the Inner Mongolia to the southern part of Continental China, Nepal, Taiwan and the Islands of Okinawa (Hasegawa, 1991, unpublished; Hasegawa & Asakawa, 1991). Hence, it is quite natural that the oxyurid was found from the present survey.

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