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

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**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 *Heligmosomoides* 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 ohtaorum* [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.

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**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...
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 Himalayas, 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 synlophes (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-
Heliomonoidea: 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: Oxyuridae: 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

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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 *Heligmosomoides* 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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**References**


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