A NEW GENUS OF THE INTESTINAL NEMATODE,
LAGOSTRONGYLUS (HELIGMONELLIDAE)
FROM LAGOMORPHS:
A REVIEW OF RELATED GENERA OF SUBFAMILIES
HELIGMONELLINAE
AND BREVISTRIATINAE

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A new genus Lagostrongylus (Heligmonellidae: Nematoda) is proposed for Heligmonella leporis (SCHULZ, 1931) DURETTE-DESSET, 1971. The synlophe morphology of Lagostrongylus leporis (SCHULZ, 1931) comb. n. should be classified in the subfamily Brevistriatinae. Relationship of Lagostrongylus leporis and related genera belonging to Heligmonellidae are discussed.

Key words: Lagostrongylus gen. n., Heligmonella leporis, Brevistriatinae


FUKUMOTO et al. (1986) examined the three populations of H. leporis from different host species collected in Japan with respect to morphology of the synlophe, and identified that the synlophe characteristics were different from those of the genus Heligmonella MONNIG, 1927 defined by DURETTE-DESSET (1971, 1983). They recommended that the taxon H. leporis be identified in the subfamily Brevistriatinae.

Herein the authors proposed a new genus Lagostrongylus for Heligmonella leporis (SCHULZ, 1931) DURETTE-DESSET, 1971, and reviewed related genera in subfamilies Heligmonelliniae and Brevistriatinae (Heligmonellidae).

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Lagostrongylus gen. n.

Trichostrongyloidea, Heligmonellidae (SKRJABIN & SHIKHOBALOVA, 1952, tribe) DURETTE-DESSERT & CHABAUD, 1977, Brevistriatinae DURETTE-DESSERT, 1971. Synlophe consisting of 13 (or 12) cuticular ridges of different sizes with internal cuticularised skeleton. Ridges continuous. Seven ridges present dorsally and 6 ridges ventrally at midbody. The gradient in size of ridges is right to left dorsally. The axis of orientation of ridges is subfrontal to the sagittal axis. A small carene supported by two ridges on the left dorsal side of the body. Cephalic vesicle with fine annulations. Minute cervical papillae present. Lateral lobe of bursa symmetrical. Minute prebursal papillae present. Antero-ventral and postero-ventral rays with common trunk, and distal extremity of each extends to bursal margin. Bursal margin at region of postero-ventral rays protrudes. Antero-lateral rays turn anteriorly at distal extremity. Medio-lateral and postero-lateral rays with common trunk. Externodorsal rays arise one-third the distance from the proximal extremity of the dorsal ray symmetrically or asymmetrically, and distal end of rays does not extend to margin of bursa. Dorsal ray thick, with distal end divided into two branches and each branch bifurcated; inner branches extend to bursal margin. Spicules equal in length, long and slender. The distal end of spicules is slightly inflated and has a blunt end or a simple and sharp end. Gubernaculum present. Female monodelphic.

Type species: Lagostrongylus leporis (SCHULZ, 1931) gen. et comb. n.

Synonym: Longistriata leporis SCHULZ, 1931
Heligmonella leporis (SCHULZ, 1931) DURETTE-DESSERT, 1971
Longistriata leporis sensu YAMAGUTI, 1935

Host: Lepus timidus
Locality: Sakhalin, U. S. S. R.

Other hosts and localities: Lepus brachyurus brachyurus (YAMAGUTI, 1935; FUKUMOTO et al., 1986), Lepus timidus ainu (FUKUMOTO et al., 1986), Lepus brachyurus angustidens (YAGISAWA, 1978) and Pentalagus furnessi (KAMIYA et al., 1979; FUKUMOTO et al., 1983); Japan


L. indica (SINGH, 1968) [Syn. Longistriata indica SINGH, 1968=Heligmonella indica (SINGH, 1968) DURETTE-DESSERT, 1971]; Lepus ruficaudatus; India

According to the classification of the subfamily Brevistriatinae by DURETTE-DESSERT (1971, 1983), the morphological marks are: axis of orientation of ridges inclined more than 45° (67°–90°) from sagittal axis: carene absent, or, if present, dorsal ray divided in its posterior half: gradient in size of ridges lacking, or from right to left on dorsal
Figure 1  A Cross section (midbody) of female *Lagostrongylus leporis* (SCHULZ, 1931) comb. n. from *Pentalagus furnessi*  
(C: carene, d: dorsal, l: left, r: right, v: ventral)  
B Caudal end of male of *Lagostrongylus leporis* (SCHULZ, 1931) comb. n.
side or medio-lateral.

The 10 genera which have been identified in the subfamily Brevistriatinae at the present time are: *Brevistriata* TRAVASSOS, 1937; *Calypsostrongylus* SCHMIDT et al., 1967; *Quentinstrongylus* DURETTE-DESSERT, 1969; *Cordicauda* DURETTE-DESSERT, 1971; *Metheligmonella* DURETTE-DESSERT, 1971; *Paraheligmonina* DURETTE-DESSERT, 1971; *Srivastavanema* (SINGH, 1962) DURETTE-DESSERT & LIM BOO LIAT, 1975; *Fissicauda* DURETTE-DESSERT & KRISHNASAMY, 1976; *Kuala* DURETTE-DESSERT & KRISHNASAMY, 1976; *Macrostrongylus* ONG et al., 1983.

The genus *Lagostrongylus* is similar to *Paraheligmonina* in the following characteristics: (1) carene present; (2) dorsal ray divided distally; and (3) dorsal lobe not hypertrophied. But *Lagostrongylus* differs from *Paraheligmonina* as follows: (1) the axis of the orientation of ridges does not incline from the sagittal axis; (2) the structure of carene is small; and (3) there are few ridges (13 or 12 at midbody).

The history of classification of *Heligmonella leporis* (SCHULZ, 1931) DURETTE-DESSERT, 1971 and related species of the genus *Heligmonella* MÖNNIG, 1927

MÖNNIG (1927) described *Heligmonella spira* from the intestine of *Thryonomys swinderianus* collected in South Africa.

TRAVASSOS (1937) reviewed the family Trichostongylidae. In his monograph, the genus *Heligmonella* was not recognized, and he classified this taxon as belonging to the genus *Longistriata* of the subfamily Viannaiinae. *Heligmonella leporis* was also included in the genus *Longistriata*.

ORTLEPP (1939) recognized the name *Heligmonella* as one of the subgenera of the genus *Longistriata* for *H. spira*.

SKRJABIN & SHIKHORALOVA (1952) recognized the genus *Heligmonella* in the tribe Heligmonellea, subfamily Longistriatinae, family Heligmosomatidae, superfamily Trichostrongyloidea. They recognized eight species including *H. spira* in the genus *Heligmonella*, but *H. leporis* and *H. kurenzovi* were classified as belonging to the genus *Longistriata*.

YAMAGUTI (1961) recognized *Longistriata leporis* and *L. kurenzovi*. The genus *Heligmonella* was synonymized in *Longistriata*.

DURETTE-DESSERT and her colleagues classified the superfamily Trichostrongyloidea with respect to morphology of the synlophe and the phylogeny of hosts.

DURETTE-DESSERT (1969a) synonymized *Viannella africana* CLAPHAM, 1947 from *Thryonomys swinderianus* collected in South Rhodesia and Kenya with *Longistriata spira* (MÖNNIG, 1927)

DURETTE-DESSERT (1971) identified the family Heligmosomidae in the superfamily Trichostrongyloidea. The genus *Heligmonella* was classified in the subfamily Heli-
monellinae with the genera *Tricholinstowia* and *Paraheligmonella*. Five species were recognized in the genus *Heligmonella*, i.e., *H. spira*, *H. asymmetrica*, *H. leporis*, *H. kurenzovi* and *H. indica*.

**Duretta-Desset** (1974) described *Heligmonella dremomysi* from the intestine of *Dremomys lokriah* (Rodentia) collected in Nepal.

**Duretta-Desset** et al. (1975) found *Heligmonella limbooliati* from the intestine of *Trichys lipura* (Rodentia) collected in Malaysia.

In a review of the genus *Impalaia*, Gibbons et al. (1977) transferred *Impalaia dremomys* Yen, 1973 from *Dremomys rufigens rufigens* collected in Yunnan Province, China, to the genus *Heligmonella*. Therefore, *H. dremomysi* Duretta-Desset, 1974 became a homonym of Yen's species, and they proposed a new name *Heligmonella moreli* for the former.

**Duretta-Desset & Chabaud** (1977) proposed a new classification of the superfamily Trichostrongyloidea. In their systematics, the genus *Heligmonella* was included in the subfamily Heligmonellinae, family Heligmonellidae. Four genera were recognized in Heligmonellinae: *Heligmonella, Tricholinstowia, Paraheligmonella* and *Trichotravassosia*, and the following eight species were included in the genus *Heligmonella*: *H. spira*, *H. leporis*, *H. kurenzovi*, *H. indica*, *H. asymmetrica*, *H. limbooliati*, *H. dremomys* (Yen, 1973) Gibbons et al., 1977 and *H. moreli* Gibbons et al., 1977.

**Duretta-Desset & Chabaud** (1981) moved the genus *Xericola* from Brevistriatinae to the Heligmonellinae.

**Duretta-Desset** (1983) proposed a new genus *Sciuricola* in Heligmonellinae and she transferred *H. dremomys* and *H. moreli* to the genus *Sciuricola*. Therefore, at the present time, the following six genera are recognized in the Heligmonellinae: *Heligmonella, Tricholinstowia, Paraheligmonella, Xericola, Trichotravassosia* and *Sciuricola*, and the following six species are included in the genus *Heligmonella*: *H. spira*, *H. asymmetrica*, *H. leporis*, *H. kurenzovi*, *H. indica* and *H. limbooliati*.

**Fukumoto** et al. (1986) considered that *H. leporis* should be classified in the subfamily Brevistriatinae. The general morphology of the male bursa and the number of cuticular ridges of *Heligmonella kurenzovi* and *H. indica* is similar to that of *Lagostrongylus leporis*. The geographical distribution and the host species also suggest the similarity of these species. The authors also considered that *H. kurenzovi* and *H. indica* should be classified in the genus *Lagostrongylus*.

Relationship of the genus *Lagostrongylus* gen. n. and related genera within subfamilies

Brevistriatinae and Heligmonellinae

**Duretta-Desset** (1969b) described seven new species of the genus *Longistriata*, i.e., *L. atheruri*, *L. paratheruri*, *L. adami*, *L. paradami*, *L. asymmetrica*, *L. tcheprakovae
and *L. caillaudae* from one material of *Atherurus africanus* (Rodentia) collected in Congo.

Durette-Desset (1970a) also reported five new species of the genus *Longistriata*, i.e., *L. paratrifuricata*, *L. quartanuda*, *L. posterior*, *L. rara* and *L. mabokensis* from the sciurids, *Funisciurus lemniscatus* and *F. pyrrhopus*, collected in the Republic of Central Africa. And she redescribed *Heligmonina magna* from *Protoxerus stangeri* in Gabon and *Heligmonella streptocerca* from *F. lemniscatus* in the Central Africa.

Durette-Desset (1970b) reported three species of the genus *Longistriata*, i.e., *L. petteri*, *L. bainae* and *L. lemniscomys* from Muridae, *Hylomyscus stella*, *Steatomys opinus*, *Arvicanthis niloticus* and *Lemniscomys striatus*, collected in the Congo.

Durette-Desset (1971) reclassified these African heligmosome nematodes as *Heligmonella asymmetrica* (subfam. Heligmonellinae), and reported fourteen species of the genus *Paraheligmonina* (subfam. Brevistriatinae), i.e., *P. magna*, *P. adami*, *P. atheruri*, *P. caillaudae*, *P. mabokensis*, *P. opii*, *P. paracaillaudae*, *P. paradami*, *P. paratheruri*, *P. paratrifuricata*, *P. quartanuda*, *P. rara*, *P. streptocerca* and *P. tcheparakova*.

Durette-Desset et al. (1975) described *Heligmonella limbooliati* and three species of the genus *Cordicauda* (subfam. Brevistriatinae), i. e., *C. trichysi*, *C. malayensis* and *C. magnabursa* from the small intestine of *Trichys lipura* (Rodentia) collected in Malaysia.

Durette-Desset (1974) found *Xericola marocanus* from *Atlantoxerus getulus* in Morocco, North Africa. The genus *Xericola* has a small carene on the left dorsal side of the body and 14 ridges at midbody. She classified the genus *Xericola* as being between the genus *Heligmonella* (subfam. Heligmonellinae) and the genus *Paraheligmonina* (subfam. Brevistriatinae), and considered that the genus *Xericola* was the most primitive in the subfamily Brevistriatinae.

Durette-Desset (1981, 1983) reclassified the genus *Xericola* into the subfamily Heligmonellinae because the axis of orientation of ridges inclines about 45° to the sagittal axis.

Durette-Desset & Lim Boo Liat (1975) found *Srivastavanema* (Brevistriatinae) in petauristine rodents in Viet Nam. The genus *Srivastavanema* was classified as being between the genera *Heligmonella* and *Cordicauda-Brevistriata*.

The morphology of the genera *Paraheligmonina* and *Cordicauda* is closely related, especially in synlophe. The genus *Cordicauda* also differs from *Lagostrongylus* by: 1) dorsal ray divided proximally, 2) dorsal lobe hypertrophied and 3) well developed carene supported by two large ridges.

Durette-Desset et al. (1975) considered that *Paraheligmonina* and *Cordicauda* might have evolved from the common *Heligmonella* type nematode within the common ancestor of rodent hosts developed in Asia and Africa. According to this hypothesis, the relationship of the *Heligmonella-Xericola-Paraheligmonina* line in Africa and the
Heligmonella-Srivastavanema-Cordicauda and Brevistriata line in Asia might have evolved parallel within the evolution of hosts.

Durette-Desset & Lim Boo Liat (1975) also described that Heligmonella indica should be classified as being between Heligmonella and Srivastavanema in Asia, and they considered that Paraheligmonina gracilis also evolved in European Glis glis (Durette-Desset, 1969b).

The present study might supports the hypothesis of Durette-Desset in part. The authors considered that the genus Lagostrongylus is the most primitive genus in the subfamily Brevistriatinae (fig. 2).

**Figure 2** The relationships of genus Lagostrongylus and the related genera of the subfamilies Heligmonellinae and Brevistriatinae (Durette-Desset et al., 1975, modified)

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