

Redescription of *Eucoleus schvalovoj* (Nematoda: Capillariidae), an oesophageal parasite of the Eurasian otter, *Lutra lutra*, in Spain

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Abstract. *Eucoleus schvalovoj* Kontrimavichus, 1963 (Nematoda: Capillariidae) is redescribed. The original description of this species was brief and inadequate in that it was based on just a few specimens removed from the Eurasian otter, *Lutra lutra* (Linnaeus, 1758) in the Khabarovsk region, USSR. Detailed morphological study of several specimens of *E. schvalovoj* from the oesophagus of *L. lutra* from Spain revealed new characters, above all in males, and allows for a better characterisation of this species. Since its original description *E. schvalovoj* has only been recorded in Spain.

During the postmortem examination of several specimens of the Eurasian otter, *Lutra lutra* (Linnaeus, 1758), from Spain some nematodes of the genus *Eucoleus* Dujardin, 1845 were removed from the oesophageal lining of some animals. To date only two species of Capillariidae have been reported parasitising the oesophagus of carnivorous mammals, namely *Eucoleus schvalovoj* Kontrimavichus, 1963 and *Capillaria procyonis* Pence, 1975. The morphological characters of our specimens seemed to be consistent with *E. schvalovoj*, a species that has been only briefly and inadequately described. This species was first recorded in *L. lutra* from the Khabarovsk region, USSR and has only been recently reported in Spain (Feliu et al. 1995). We recently recovered a few properly fixed specimens of *E. schvalovoj*, which enabled us to undertake its redescription.

MATERIALS AND METHODS

The oesophagus of 36 specimens of *L. lutra* found dead on the road during the last decade throughout Spain were examined for helminth parasites. Most of these otters that were brought to our laboratory were frozen, though with delay after their deaths. This means that most nematodes were either broken or badly fixed when removed. Few other individuals were obtained from an otter that recently died in Asturias, which were used in undertaking the present redescription. The specimens were stored in 70% ethanol. Several males and gravid females were studied under the microscope as wet mounts in lactophenol. All measurements are given in micrometres unless otherwise stated, with the mean in parentheses. The figures were drawn with the aid of a camera lucida.

RESULTS

Eucoleus schvalovoj Kontrimavichus, 1963 Fig.1

Description. Small nematodes with cuticle transversely striated. Body slender, threadlike, tapering towards both ends, more so anteriorly. Head rounded, mouth porelike and oral papillae indistinct. Two lateral bacillary bands present, extending between levels of nerve-ring and cloaca or anus; bacillary bands wide in mid-region (Fig. 1C), but narrowing at both ends. Oesophagus with straight muscular part followed by stichosome (Fig. 1A). A barely visible nerve-ring encircles the muscular oesophagus, approximately at the border of its first and second fourths. Stichosome consisting of a single chain of 30-42 stichocytes (exact numbers could not be determined in some specimens); anterior stichocytes shorter than middle and posterior counterparts. The stichosome terminates anterior to the oesophago-intestinal junction, followed by a short, narrow portion of the oesophagus; two distinct glandular cells present at the level of the oesophago-intestinal junction (Fig. 1B). Anterior region shorter than posterior region of body. Female larger than male.

Male (9 specimens): Body length 7.2-8.3 mm (mean 7.7); maximum width 57-67 (61.0); maximal width of the cuticle 5-6 (5.3). Nerve-ring located 56-80 (68.5) from anterior extremity. Length of the entire oesophagus 2.2-3.1 mm (2.7), which represents 30.4-38.5% (35.3) of body length; that of the muscular part 225-295 (255.7); that of the stichosome 1.9-2.7 mm (2.4), consisting of 33-42 stichocytes being 55-90 (70.1) long. Portion of the oesophagus between the posterior border of the stichosome and the intestine 20.5-39 (29.6). Ratio of anterior to posterior body regions 1:1.6 to 1:2.3

(1:1.8). Spicule is a long translucent rod difficult to distinguish in many specimens (some spicular measurements were made after dissection of broken individuals). Spicule length 660-845 (724.2) which represents 8.6-10.2% (9.3) of body length. Spicule with proximal bevelled end, approximately 4-6 (4.8) wide, and with terminal rounded end (Figs. 1G,H). Spicular sheath length 580-730 (643.2). Covered by spines along its entire length, but more evident in a 85-120 (99.8) zone of the proximal part, which starts at 30-65 (45.1) from the proximal end. Posterior extremity blunt ending in two knoblike enlargements each bearing two pairs of papillae. Ventral papillae pair larger than dorsal pair. Cloaca situated within a concavity between the enlargements (Figs. 1D,E).

Female (10 specimens): Body length 9.1-11.3 mm (mean 9.8); maximum width 82-103 (90.8); maximal width of the cuticle 6-8 (7.4). Nerve-ring located 59-77 (69.3) from anterior extremity. Length of the entire oesophagus 3.0-3.6 mm (3.3), which represents 30.1-37.1 % (33.0) of body length; that of the muscular part 305-404 (347.1); that of the stichosome 2.7-3.2 mm (2.9), consisting of 30-36 stichocytes being 62-108 (88.7) long. Portion of the oesophagus between the posterior border of the stichosome and the intestine 23-41.6 (33.9). Ratio of anterior to posterior body regions 1:1.7 to 1:2.3 (1:2.0). Vulva not elevated or only anterior lip slightly elevated (Fig. 1B). Situated 35-72 (53.0) posterior to the end of the stichosome. Eggs in the uterus not numerous and arranged in one row at its anterior part. Mature eggs were unembryonated. Eggs with a network of ridges on surface and protruding polar plugs (Fig. 1I). Mature eggs, including polar plugs, 56-64.3 × 25.7-30.8 (59.5 × 27.7). Posterior end of the body rounded; anus subterminal (Fig. 1F).

Host: The Eurasian otter *Lutra lutra* (Linnaeus, 1758) (Carnivora: Mustelidae).

Site of infection: Oesophageal epithelium.

Locality: Esba river, Principado de Asturias, Spain (4 September 1998). However, *E. schvalovoj* is widespread throughout Spain. It has also been detected parasitising three more otters from Principado de Asturias, and several otters from various Spanish provinces [Cáceres (1), Cádiz (1), Ciudad Real (2), Guadalajara (1), Huelva (1), Pontevedra (2) and Sevilla (1)].

Prevalence and intensity: Of 36 otters examined, 13 harboured *E. schvalovoj* (36.1%). Mean intensity was 17 ± 15.5 (3-45 specimens).

Material studied: 9 males, 10 females and some broken adults. Voucher specimens (5 male and 5 female) are deposited in the Muséum d'Histoire Naturelle, Genève (reg. No. 25973 INVE) and in the Laboratori de Parasitologia, Departament de Microbiologia i Parasitologia Sanitàries, Facultat de Farmàcia, Universitat de Barcelona, Spain (reg. No. LL98090401-9).

DISCUSSION

The morphological characteristics of this nematode species justify its inclusion in the genus *Eucoleus* Dujardin, 1845, within the family Capillariidae Neveu-Lemaire, 1936. A large number of species of this genus have been reported in numerous mammalian hosts. Nevertheless, at present, only two species with oesophageal localisation are known in carnivorous mammals: *E. schvalovoj* and *Capillaria* (= *Eucoleus*) *procyonis*.

Eucoleus schvalovoj was poorly described by Kontrimavichus (1963) on the basis of a single male and a few females removed from three specimens of *L. lutra* from the Khabarovsk region. *E. schvalovoj* was not reported again until our earlier finding in Spain (Feliu et al. 1995), despite several faunistic studies conducted on the Eurasian otter in almost all its area of distribution (Schuster et al. 1988, Jefferies et al. 1990, Schierhorn et al. 1991, Shymalau et al. 1993 and Anisimova et al. 1996).

Capillaria procyonis was described by Pence (1975) as a new species parasitising the raccoon, *Procyon lotor* (Linnaeus, 1758) in Louisiana (USA). Butterworth and Beverley-Burton (1980) enlarged its distribution and host range on finding this nematode again in *P. lotor* and in the striped skunk, *Mephitis mephitis* (Schreber, 1776) in Canada. In the systematic arrangement of Capillariidae undertaken by Moravec (1982) *C. procyonis* was included in the genus *Eucoleus* (*E. procyonis* comb. n.). However, subsequent findings of this species (Snyder 1989, Richardson et al. 1992) were always referred to as *C. procyonis*. Snyder (1989) extended the location of this species to the epithelium of the tongue of a *P. lotor* from Illinois (USA).

When Pence (1975) distinguished *C. procyonis* from *E. schvalovoj*, it was pointed out that the supposed absence of a spicule in *E. schvalovoj* could simply reflect Kontrimavichus' failure to note its presence and that further examination of this species should be undertaken. The redescription of *E. schvalovoj* provided here does in fact reveal the presence of a spicule. Moreover, Kontrimavichus (1963) also indicated that the spicular sheath of the male was spinose only in a 125 µm portion, 395 µm from the distal ending. However, our description of the males shows a spinose spicular sheath over its entire length as occurring in *C. procyonis*, although the proximal portion is more evident.

While the aforementioned characteristics (presence of spicule and whole spinose spicular sheath) mean that *E. schvalovoj* and *C. procyonis* are morphologically more similar than it was originally believed on the basis of their descriptions, they are still easily distinguished by a number of features. First, these species differ in

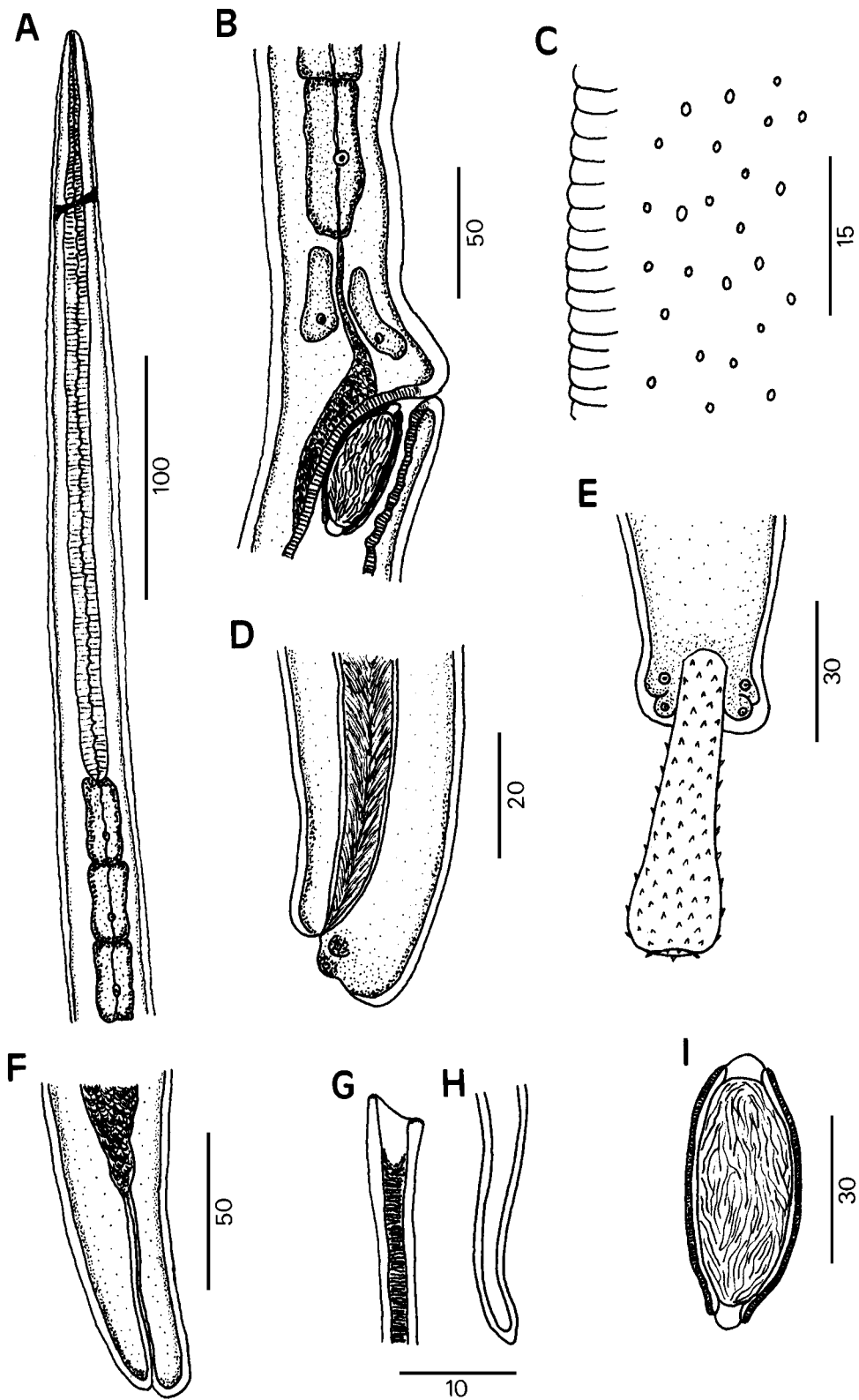


Fig. 1. *Eucoleus schvalovoj* Kontrimavichus, 1963. **A** – anterior extremity of a female; **B** – region of the vulva; **C** – bacillary band pores at mid-region; **D** – posterior end of a male, lateral view; **E** – posterior end of a male, ventral view; **F** – posterior end of a female, lateral view; **G**, **H** – anterior and posterior ends of the spicule; **I** – mature egg. Scale bars in μm .

their distribution and host types (*E. schvalovoj* has always been detected parasitising *L. lutra* in the Palaearctic region while *C. procyonis* has a Nearctic distribution and has never been found parasitising otters). Second, the two species present some distinctive morphological characters including: (1) smaller body measurements of *C. procyonis* [males: 4.9 to 7.56 mm (6.28); females: 7.25 to 11.78 mm (9.05)]; (2) different ratio of anterior to posterior body regions [1:2.5 to 1:3.4 (1:2.8) in males; 1:3.3 to 1:4.3 (1:3.6) in females] in *C. procyonis*; (3) vulva at the level of the oesophago-intestinal junction in *C. procyonis*; (4) shorter spicular sheath (mean 574 µm) and longer spicule (800 to 850 µm) in *C. procyonis*; and (5) different architecture of the shell of eggs (lightly striated in *C. procyonis*).

According to current data, *E. schvalovoj* is an oesophageal parasite exclusive to *L. lutra* with a distribution

restricted to both extremes of the Palaearctic region. The lack of reports of *E. schvalovoj* in virtually all studies performed in Europe is probably due to the difficulty of finding this small nematode, which is threaded into the stratified squamous epithelial lining of the oesophagus. We, therefore, believe that its distribution is probably wider than it currently seems.

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