

**ELAEOPHORA ELAPHI n. sp. (FILARIOIDEA : ONCHOCERCIDAE)  
PARASITE OF THE RED DEER (*CERVUS ELAPHUS*).**

**With a key of species of the genus *Elaeophora***

S. HERNANDEZ RODRIGUEZ, F. MARTINEZ GOMEZ,  
P. GUTIERREZ PALOMINO

**SUMMARY.** We described a new species of nematode filarioid (Onchocercidae) parasiting the hepatic vessels of the red deer *Cervus elaphus*. This new species is characterized by the number and disposition of the papillae on the genital area of the male, and the presence and characteristics of an « area rugosa » situated just in front of the ventral impar papilla. We discussed this new species, giving a key to the identification of all the known species of the genus *Elaeophora*.

***Elaeophora elaphi* n. sp. (Filarioidea : Onchocercidae) parasite du cerf *Cervus elaphus*. Avec une clé des espèces du genre *Elaeophora***

**RÉSUMÉ.** On décrit une nouvelle espèce de nématode Filarioidea (Onchocercidae : Onchocercinae) parasite des vaisseaux hépatiques du cerf *Cervus elaphus*, caractérisée par le nombre et la disposition des papilles de la zone génitale du mâle, et par l'existence d'une « area rugosa », située juste devant une grande papille précloacal impaire.

On discute cette nouvelle espèce, en la comparant à toutes celles du genre *Elaeophora* et on joint ci-contre un clef pour l'identification des espèces de ce genre.

---

## Introduction

In Spain there are only a few references to parasites of the red deer, in spite of the abundance of these animals in many areas of the country.

All these references (Martinez Gomez *et al.*, 1979), (Hernandez *et al.*, 1980) and (Rojo and Cordero, 1981), are very recent, indicating a growing interest in the parasitosis of the wild life. So, this work is a contribution, describing a new species of nematode parasiting *Cervus elaphus*.

---

Department of Parasitology and Parasitic Diseases, Faculty of Veterinary Science, University of Cordoba,  
14071 Cordoba, Spain.

Accepté le 21 janvier 1985.

## Material and methods

The nematodes studied were obtained from the hepatic vessels of an adult red deer, hunted in « Sierra Morena » (Córdoba, Spain) the 27th of February, 1979.

The complete digestive tract, with the liver, was transported to our laboratory, and examined according to routine parasitological techniques. The obtained individuals were washed in saline solution and fixed and conserved in glycerine-alcohol. Before studying under the optic microscope, they were cleared in lactophenol.

In order to study the characteristic of the cephalic end, we cut the anterior part of one of the nematode, to be apically observed at the microscope.

In order to observe all the characteristic of the ventral side of the caudal end of the male, we dissected and mounted the posterior extremity of the male. Microfilariae were obtained by dissection of the uterus of one female.

## Results

We obtained the following specimens : one whole male and the fragments of a second one, and five whole females and parts of a sixth female.

These specimens constitute the type-serie, and are marked with the label « HA 861 *Elaeophora elaphi*, serie tipo ». They are deposited in the « Parasite Collection of the Department of Parasitology, Veterinary Faculty, University of Córdoba, Córdoba, Spain ». The study of the male was made from the only whole specimen, constituting the holotype of the new species. One of the five studied females, whose measurements were near to the mean of all the studied population is considered as the female holotype. Both male allotype and female holotype are conserved separately from the type-serie and labeled « Ha 861, *Elaeophora elaphi*. Tipos ».

*Elaeophora elaphi* n. sp. : Description.

Host : *Cervus elaphus* (Red deer).

Localization : Hepatic vessels.

Geographic distribution : Zone of the « Sierra Morena », in the municipal district of Córdoba (Spain).

## Description

Filarioidea, Onchocercidae, Onchocercinae. Large nematodes, white yellowish, with thick, smooth cuticle. Cephalic end rounded, with a very small oral opening and a rudimentary buccal cavity.

Sessile cervical papilla, not projecting from the cuticle. All the anterior region of the nematode is progressively tapered from the deirids.

Oesophagus clearly divided in two parts : one muscular, anterior and one larger posterior, glandular.

In the fixed specimen, the caudal end of the male is coiled, and that of the female is « S » shaped.

**Mâle** (allotype) (*Fig. 1. — B,C,D,F,I,J*).

*Measurements* : Length, 77 mm ; width, 0'549 mm. Distance from the deirids to the anterior end, 0.450 mm. Ibid, from the nervous ring, 0.278 mm. Length of the œsophagus, 2.171 mm. Length of the glandular region of the œsophagus, 1.614 mm. Tail, 0.135 mm. Left spicule, 0.360 mm. Right spicule, 0.150 mm.

There are no caudal alae. Three pairs of precloacal papillae, situated ventrolaterally. One of them is near to the cloaca, separated from the other grouped pairs of papillae. Furthermore, there is a large and noticeable impair papilla in the ventral line, and a pair of lateral papillae, near to the anterior margin of the cloaca.

Behind the cloaca there are two pairs of papillae in the ventral side, a third pair of small papillae in the distal part of the tail, and an impair ventral papilla, situated on the right side of the nematode, between the postcloacal papillae and the cloaca.

Spicules unequal : the left larger one presenting two different parts, one anterior, wider, measuring 0.17 mm, and one posterior, narrower and arch shaped, measuring 0.19 mm.

The most characteristic feature of the male is the presence of an « area rugosa » in the ventral side, measuring 6 mm from the large precloacal impair papilla. This area is formed by rough transverse protuberances of the cuticle, with transverse striations. These protuberances of the cuticle are nearer to one another in the proximal part of the « area » than in the distal one.

**Female** (Measurements, in *table I*) (*Fig. 1. — A,E,K,L*).

*DESCRIPTION* (Holotype). Length, 102 mm ; width, 0.842 mm. Distance from the cervical papilla to the anterior end, 0.450 mm. Ibid, from the nervous ring, 0.278 mm. Length of the œsophagus, 2.071 mm. Length of the glandular region of the œsophagus, 1.536 mm. Distance from the vulva to the anterior end, 1.614 mm. Tail, length, 0.157 mm and width, 0.099 mm.

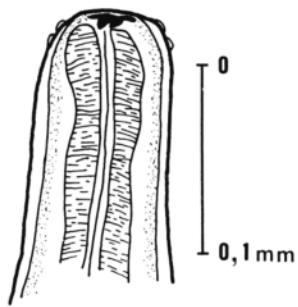
Vulva placed in the œsophagic region, in the last third of the glandular portion. The vulvar opening is transverse, and it is not projected from the body surface. The vagina has a very thick, muscular wall, with a club shaped dilatation in the anterior part. The tail is long, and presents a pair of papillae in the posterior part.

**Microfilariae** (*Fig. 1. — G,H*).

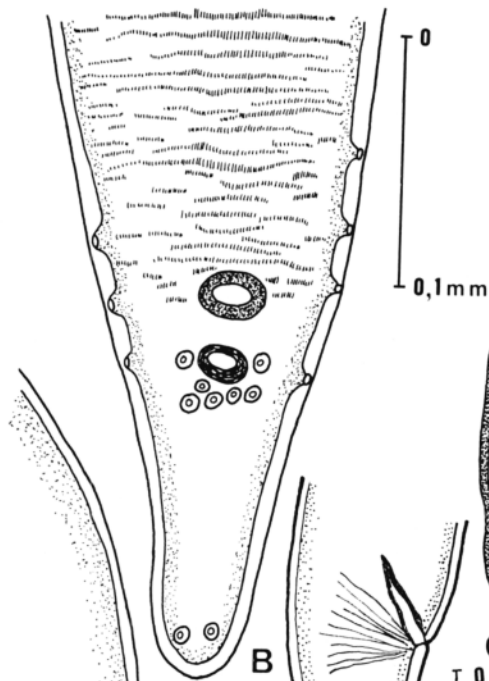
The description of the microfilariae is made from specimens taken by dissection of the uterus.

The microfilariae is sheathed, with their extremities symmetrically rounded. In a lateral view, the cephalic end of the larvae is rounded, but in a ventral view, we observed a small lateral hook, projected from the body. The total length is 0.225 mm.

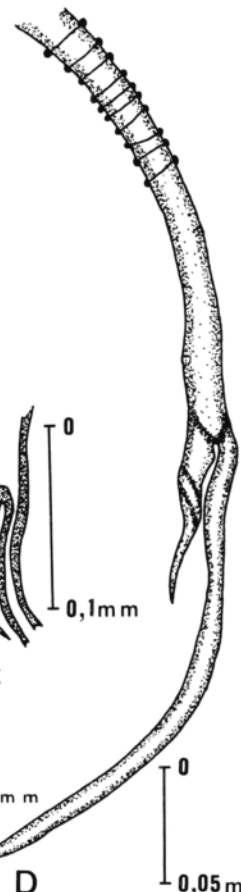
The excretory pore is open 0.068 mm from the anterior end of the larval body, and the excretory cell is very noticeable. The anal pore is open 0.05 mm, from the caudal end. The first rectal cell is the largest one, and appears to be separated from all the other rectal cells. The tail is narrowed and « S » shaped.



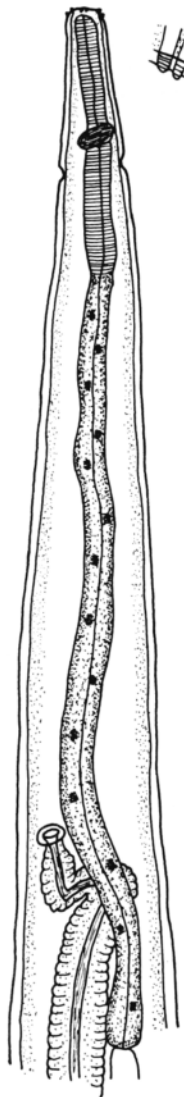
A



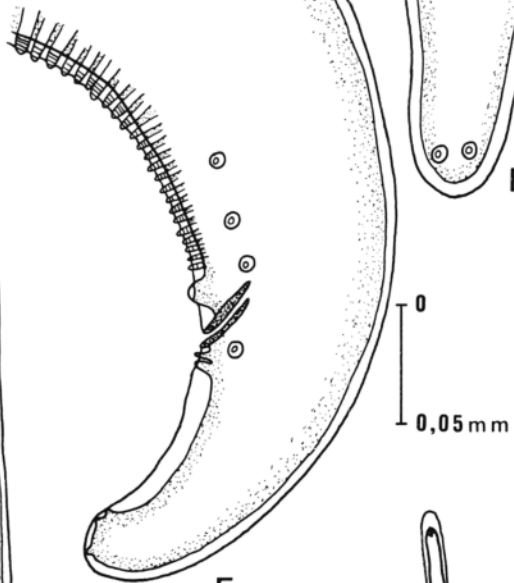
B



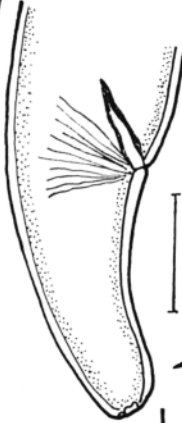
C



D



E



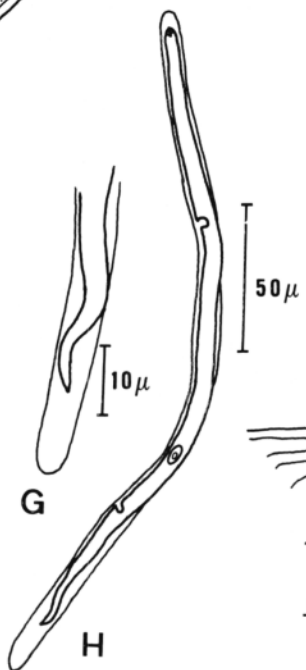
F



G



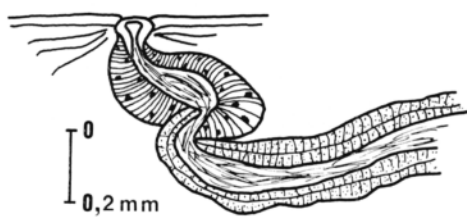
H



I



J



K

TABLE I. — Measurements of *Elaeophora elaphi* females (in mm).

	Holo-type	Para-type 1	Para-type 2	Para-type 3	Para-type 4	Mean
Length	102	91	105	109	105	102,4
Width	0.842	0.793	1.049	0.999	0.864	0.909
Dist. Cervical papillae/Anterior end	0.450	0.471	0.464	0.442	0.321	0.429
Dist. Nervous ring/Anterior end	0.278	0.249	0.285	0.271	0.285	0.273
Length of the oesophagus	2.071	1.928	2.821	2.149	2.071	2.208
Length of the muscular oesophagus	0.535	0.557	0.635	0.571	0.549	0.569
Distance vulva/Anterior end	1.614	1.785	2.006	1.821	1.642	1.773
Length of the tail	0.157	0.148	0.178	0.214	0.192	0.177
Width of the tail in the basis	0.099	0.114	0.107	0.200	0.121	0.128

## Discussion

In the present genus *Elaeophora* Railliet, Henry, 1912, are included all the species of the former genus *Alcefilaria* Oshmarin, Belous, 1951 and *Cordophilus* Monning, 1926, refer to Bain, Haesevoets (1974) and Anderson, Bain (1976). These species are *E. poeli* (Vryburg, 1897), Railliet, Henry, 1912; *E. schneideri* Wehr, Dikmans, 1935, *E. sagittus* (Linstow, 1907), Anderson, Bain, 1976 and *E. abramovi* (Oshmarin, Belous, 1951), Anderson, Bain, 1976.

The genus *Elaeophora* « sensu » Anderson, Bain (1976), is characterized by the oral opening morphology, numbers of the cephalic papillae form and size of the spicules, the caudal end of the females and the acuminate aspect of the anterior end of both male and female. Our specimens are undoubtedly of this genus, but their morphological characteristics are quite different from those of the previously described species, so we consider our species as a new one, nominated *E. elaphi* with attention to the scientific name of their host, the red deer *Cervus elaphus*.

In discussing *E. elaphi* with all the other species of the genus, *E. poeli* is considerably larger than *E. elaphi*, and they has no "area rugosa" and is localized in the aorta of cattle.

We compare *E. elaphi* with *E. schneideri* according to the description of this species made by Hibler, Adcock (1968). *E. schneideri* presents three very noticeable protuberances in the caudal end not existing in *E. elaphi*. *E. schneideri* is a parasite of the carotid artery of sheep and Cervidae.

FIG. 1. — A-L. — *Elaeophora elaphi* n. sp. A : Anterior extremity of the female ; B : Postero-ventral extremity of the male ; C : Medial-ventral detail of the left spicule ; D : Left spicule ; E : Anterior portion of the female ; F : Posterolateral extremity of the male ; G : Posterior extremity of the microfilariae ; H : Microfilariae ; I : Right spicule, lateral view ; J : Right spicule, ventral view ; K : Detail of the vulva. L : Posterior region of female, lateral view.

The females of *E. sagittus* have shorter tails than the females of *E. elaphi*. The vulvar opening of the former is situated in the medial part of the muscular oesophagus. The male tail is more rounded in *E. sagittus*, and shows 3-4 pairs of postcloacal papillae and 2 pairs of precloacal papillae. Both males and females are localized in heart muscle cysts, in cattle. The microfilariae tail is folded, but *E. elaphi* microfilariae have an "S" shaped tail.

The last species of the genus, *E. abramovi*, presents some similarities with our new species: it is situated in the hepatic vessels of the elk (*Alces alces*) and both have more or less, the same shape and size. But there are big differences in the number and disposition of the genital papillae and in the characteristics of the "area rugosa".

Oshmarin, Belous (1951) described the species as *Alceffilaria abramovi*, with only 1 pair of precloacal papillae immediately before the cloaca. *E. elaphi* has 3-4 pairs of precloacal papillae plus one impair, large and precloacal. *E. abramovi* has 1 pair of postcloacal papillae and *E. elaphi* has 2 pairs plus one impair postcloacal papillae.

The "area rugosa" of *E. elaphi* is larger than the "area rugosa" of *E. abramovi*, and begins immediately behind the impair papilla. The distance between the transverse protuberances of the "area rugosa" is smaller in *E. elaphi* than in *E. abramovi*.

Gubanov (1964) described *E. abramovi* from *Rangifer tarandus* and *Cervus elaphus*. The specimens were of the same morphology as the description of Oshmarin, Belous and therefore showed a different papillae pattern with respect to the new species.

### Key of species of the genus *Elaeophora*

- 1 (8) Males with "area rugosa" precloacal and ventral.
- 2 (7) Males with an impair, large and precloacal papilla.
- 3 (4) Males and females with three protuberances at the caudal end. Vulvar opening at the level of the muscular oesophagus. Parasites of the carotid arterie of sheep and cervids ..... *E. schneideri*.
- 4 (3) Without three protuberances at the caudal end.
- 5 (6) 3-4 pairs of postcloacal and 2 pairs of precloacal papillae. Vulvar opening at the level of the muscular oesophagus. Tail of the microfilariae is folded. Parasites in cysts in the heart muscles of cattle ..... *E. sagittus*.
- 6 (5) 2 pairs of postcloacal and 3-4 pairs of precloacal papillae. Vulvar opening in the posterior part of the glandular oesophagus. Tail of the microfilariae "S" shaped. Parasites of the hepatic vessels of the red deer ..... *E. elaphi*.
- 7 (2) Without impair precloacal papilla. Vulvar opening in the anterior part of the glandular oesophagus. Parasites of the hepatic vessels of elks ..... *E. abramovi*.
- 8 (1) Without "area rugosa". Parasites of the aorta of cattle ..... *E. poeli*.

---

*Note added in proof.* After sending the manuscript of this work, we had found several specimens of filarioids nematodes from hepatic portal vein of a sheep necropsied in our department. Those nematodes, both males and females, showed the same morphology of those previously described in this paper as *Elaeophora elaphi*. So, *Ovis aries* ought to be added as a new host to *E. elaphi*.

## REFERENCES

- ANDERSON R. C., BAIN O. : CIH Keys to the nematode parasites of vertebrates. (Anderson, Chabaud, Willmott, eds) CAB. Farnham Royal Bucks, England, 1976.
- BAIN O., HAESVOETS E. : Affinités entre deux filaires de l'appareil circulatoire, l'une parasite de bovidés, l'autre de cervidés : *Cordophilus sagittus* (Linstow, 1907) et *C. abramovi* (Oshmarin et Belous, 1951). Nov. Comb. Ann. Parasitol. Hum. Comp., 1974, 49, 119-122.
- GUBANOV, N. M. : Helminth fauna of economically important mammals in Yakut A.S.S.R. Izdatel'svo Nauka, Moscow, 1964, 164 p.
- HERNANDEZ S., MARTINEZ F., CALERO R., MORENO T., NAVARRETE I. : Parásitos del ciervo (*Cervus elaphus*) en Córdoba. Primera relación. Rev. Ibérica Parasitol., 1980, 40, 93-106.
- HIBLER C. P., ADCOCK J. L. : Redescription of *Elaeophora schneideri* Wehr and Dikmans, 1935 (Nematoda : Filarioidea). Parasitol., 1968, 54, 1095-1098.
- LOPEZ-NEYRA C. : Revisión de la superfamilia Filarioidea (Weinland, 1858) Rev. Ibérica Parasitol., 1956, 16, 3-212.
- MARTINEZ F., HERNANDEZ S., ACOSTA I. : Parásitos del ciervo *Cervus elaphus*. II Descripción de *Trichuris guevarai* n. sp. Rev. Ibérica Parasitol., 1979, 39, 19-28.
- OSHMARIN P. G., BELOUS E. V. : Notes on the Filariae of wild animals. Trudy Gel mint. Lab. Akad. Nauk. SSSR, 1951, 5, 121-127.
- ROJO F., CORDERO M. : *Spiculoptera spiculoptera* Guschanskaya, 1931 en *Cervus elaphus* L. en León. Trabajos del Departamento de Patología Infecciosa y Parasitaria. (Cordero del Campillo, ed.) Gráficas Summa, Oviedo., 1954-1979, 41-47.
-