A NEW GENUS OF CAPILLARIIDS FROM BIRDS, ORNITHOCAPILLARIA GEN. N. (NEMATODA: CAPILLARIIDAE)

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Abstract. A new genus, Ornithocapillaria gen. n., belonging to the family Capillariidae and subfamily Baruscapillarinae is described and its diagnosis is given. The type species of the genus is Ornithocapillaria acrupunctata (Linstow, 1873) comb. n., other species are O. cephalocon (Keir, 1863) comb. n. and O. quisica (Read, 1849) comb. n., and O. pisum (Radcliffe, 1819) comb. n. The new genus is characterized by a relatively large membranous pseudobursa, shape of processes supporting pseudobursa, and presence of a cuspal appendage in female. It includes only species parasitic in the intestine of birds of the orders Passeriformes, Falconiformes, Strigiformes, and Piciformes.

In a new system of the family Capillariidae, Moravec (1982) advanced a right and reasonable generic differentiation basing mainly on the structure of caudal end in male. In the author's concept the capillarids were arranged in 16 genera, those of birds in seven genera. Until 1988, the number of genera of the family Capillariidae increased to 22 (cf. Moravec et al. 1987), but no one of the established genera involved species parasitic in birds. During a revision of capillarids parasitizing birds of the Palaearctic region and literary sources on a world scale it was found that four species were very closely related and possessed morphological characteristics differentiating them from the remaining species of this family. Therefore a new genus, Tridenscapillaria, with the type species T. tridens (Dujardin, 1845) was established for this group (Baruš and Sergeeva 1990) in the subfamily Capillariinae. Our opinion on the species spectrum of capillarids parasitizing birds in the Palaearctic region and evidently belonging to the genera Capillaria Zeder, 1800, Eucoleus Dujardin, 1845, and Echinocloëus Lopéz-Neyra, 1947 was published in two revising papers (Baruš and Sergeeva 1989a, b).

Our studies of a large collection of nematodes belonging after Moravec (1982) to the genus Baruscapillaria (including only parasites of birds and mammals) showed that the species B. acrupunctata (Linstow, 1873) Moravec, 1982 and at least three other species morphologically did not conform to the diagnosis of this genus. The four species are very closely related and possess morphological characters separating them from all remaining species of Capillariidae. Also in the present system of 23 genera of this family their characters are so different that we find it suitable to establish for them a new systematic category at the generic level — Ornithocapillaria gen. n.

I. DIAGNOSIS OF THE GENUS ORNITHOCAPILLARIA GEN. N.

Capillariidae — Baruscapillarinae: Caudal laterial also in male absent; wide and long membranous pseudobursa developed. Tail end of male protruding laterally into a process divided into a blunt dorsal branch and ventral branch with papilla. One well sclerotized spicule present, its proximal part being attached to the inner wall of cloaca. Spicule shaft unarmed, without spines, situated inside cloaca. Stichosome consisting
of one row of stichocytes. Four bacillary bands present: dorsal, ventral and two lateral. Vulva of female always with a rather long tubular vulval appendage. Outer egg envelopes having a characteristic structure.

Parasites of the digestive tract (intestine) of birds of the orders Passeriformes, Falconiformes, Strigiformes, and Piciformes.

Type species: Ornithocapillaria ovopunctata (Linstow, 1873) comb. n.
Typical host: Sturnus vulgaris L.

Terra typica: Europe (see López-Neyra 1947).

Other species: Ornithocapillaria cylindrica (Mechet, 1883) comb. n., O. querci (Rodolphi, 1819) comb. n.

II. SYSTEMATICAL NOTES AND DIFFERENTIATION OF THE NEW GENUS ORNITHOCAPILLARIA

According to Moravek (1982) the known species of capillarid parasites in birds were divided into 7 genera recently supplanted by a new genus Tridenscapillaria Baruš and Sergeeva, 1990 (see Baruš and Sergeeva 1990). The differentiation of the new genus Ornithocapillaria is based on the system from our collection described in previous papers by Baruš (1978), Giebultowicz and Giebultowicz (Cuba) and by Baruš and Daniel (1979) from Prunella collaris caprimulgus and localization in the host: small intestine.

Syntype: Tridenscapillaria ovopunctata Linstow, 1873; Capillaria ovopunctata (Linstow, 1873) Travassos, 1915; Barušcapsillaria ovopunctata (Linstow, 1873) Moravek, 1998; Capillaria columbca var. straeli Cunnion, 1939; Capillaria inflata (Rodolphi, 1819) in López-Neyra (1947); Barušcapsillaria Distribution: Holartic region, recorded also in the northern part of the Neotropic region (Cuba).

Biological: The embryonal development of eggs of Ornithocapillaria (Baruš and Sergeeva 1989a). According to our concept, this subfamily consists of nine genera and five of them include species parasitic in birds - Capillaria, Enucleus, Echinocloes, Pterothominz, and Tridenscapillaria.

The new genus Ornithocapillaria established by us evidently belongs to the subfamily Baruscapillarinaceae, which according to Lomakin and Romaslov (1987) comprised the following 10 genera: Barušcapsillaria Moravek, 1982 (type genus); Paracapillaria Lomakin, 1983; Pseudocapillaria Freitas, 1959; Linsecus Dujardin, 1845; Pearsonema Freitas and Lomakin, 1960; Ansonchotea López-Neyra, 1947; Calodinium Dujardin, 1845; Capillostrogonioidea Freitas et Leng, 1935; Geogtea Freitas, 1959, and Pseudocapillaridodes Moravec and Csehovg, 1982. In our concept, this subfamily consists of 9 genera. The differentiation of the new genus Ornithocapillaria from the other cells genera of Baruscapillarinaceae is unambiguous and simple. It differs from the genera Ansonchotea, Calodinium, and Geogtea in the absence of lateral cuticular arise, from Pseudocapillaria, Paracapillaria, Linsecus, Pearsonema, Capillostrogonioidea, and Pseudocapillaridodes (which have some very small pseudobursae) in markedly larger cuticular pseudobursae and shape of caudal processes in males, from Paracapillaria, Pseudocapillaria, and Pseudocapillaridodes in the presence of cephalopores in the cells (it is absent in these three genera). The differentiation of Ornithocapillaria from Barušcapillaria deserves a special attention. The genus Barušcapillaria correctly includes a comprehensive group of species in our opinion, these are 18 valid taxons parasitic in birds with a marked uniform morphology of male pseudobursae and without the vulval appendage in females. The principle differentiating characteristic between Ornithocapillaria and Barušcapillaria is the shape of processes on the posterior end of male body. They are distinctly rounded and more caudally orientated in Barušcapillaria species, while in the species of the genus Ornithocapillaria, they are conical and more laterally orientated. Also the relative size of membranous pseudobursae in males is larger in Ornithocapillaria (width 0.058–0.072, length 0.038–0.050) than in Barušcapillaria (width 0.020–0.050, length 0.015–0.033). Compared to the above-mentioned genera of the subfamily Baruscapillarinaceae, the genus Ornithocapillaria is characterized also by the fact that it includes only species parasitizing in the digestive tract of birds. The other species parasitize colubroid vertebrates (Paracapillaria, Capillostrogonioidea, Geogtea, Pseudocapillaridodes), mammals (Calodinium, and Ansonchotea) the range of definitive hosts, according to Moravec (1982), is wider (other orders and classes of colubroid and warmblooded vertebrates). These reasons led us to the conclusion that the genus Ornithocapillaria should be established as a new systematical category in the subfamily Baruscapillarinaceae.

III. REDESCRIPTION OF THE TYPE SPECIES OF THE GENUS ORNITHOCAPILLARIA

Ornithocapillaria ovopunctata (Linstow, 1873) comb. n.

Fig. 1

The redescription is based on original materials (3 males and 4 females) from Sturnus vulgaris (from the Svisloch Baltic territory) and Pouter rosem (from Tashkistan) and ressecussion of material of nests from four different species (Travassos and Giebultowicz 1965) from Cuba, Chasmatophorus limifrons (Cuba) and by Baruš and Daniel (1979) from Prunella collaris caprimulgus and localization in the host: small intestine.

Description (measurements in mm): Four bacillary bands (two side lateral and narrow dorsal and ventral) present in both male and female. Lateral 0.007–0.010, width 0.007–0.010. Male body length 6.0–9.5, width 0.020–0.027 at level of oesophagus and 0.057 to 0.060 level of stichosome end. Head end rounded and narrow, 0.006–0.008 wide. Stichosome 2.7–4.3 long, consisting of 27–35 rectangular stichocytes arranged in one longitudinal row. Stichocytes of different sizes in different parts of stichosome, but always longer than wide. Stichocytes at stichosome end 0.027–0.050 long and 0.040 to 0.050 wide. First stichocyte situated 0.39–0.45 from anterior end of body end of body. Stichosome terminated by two oval cells measuring 0.027–0.027 × 0.017 to 0.020.

Caudal end of male slightly widened and surrounded by a well developed membranous pseudobursa, 0.058–0.072 wide and 0.038–0.050 long in dorsal portion. Pseudobursae supported by two processes (one on each side) divided into blunt dorsal branch and ventral branch with conical process (orientated laterally). Dorsal process measuring 0.015–0.017 × 0.007 to 0.009. Spicule sheath unarm. with distinct transverse undulation and situated
inside cloaca. Muscular sphincter situated between cloaca and seminal canal. Intestine opening into cloaca below the junction of cloaca and seminal canal. Cloacal opening in form of transverse slit situated on ventral side of body at level of upper margin of supporting processes of pseudobursae.

[Diagram of the structure of the organ being described.]

Fig. 1. Ornithocoeplusplus osopunctatus (Listow, 1873) comb. n. from the host Starus vulgaris L. A — pseudobursa (ventral view); B — pseudobursa (lateral view); C — proximal end of spicule; D — distribution and shape of stichocytes; E — region of proximal end of spicule; F — vulva region (lateral view); G — cells of basillary band (a — lateral view; b — apical view); H — basillary bands (general view); I — egg. Original.

Spicule tubular, spherical in section, sclerotized. 0.56—1.18 long and of identical width along its whole length except 0.023—0.030 wide proximal end. Distal end bent in form of hook. Distal end of spicule 0.006—0.007 wide, proximal end attached to inner wall of cloaca. Long muscle — retractor running from the inner wall of cloaca and attached to body wall above the junction of seminal canal and cloaca.

Note: The shape of the spicule distal end has been discussed in several papers. Unfortunately, it is not known whether the presence of a hook on the end of spicule was mentioned in the original description by Listow (1873). However, López-Neyra (1947) recorded the presence of this character already in his redescriptions of C. inflexum (= C. osopunctatus). The same opinion were also Baruš and Daniel (1976). In Wakenlin’s opinion the spicule is less sclerotized on one side of its distal end which gives it the appearance of a hook (Wakenlin 1966). Of the same opinion were also Baruš and Garrido (1968), and Acosta et al. (1981). In Wakenlin’s opinion the spicule is less sclerotized on one side of its distal end which gives it the appearance of a hook (Wakenlin 1966). Of the same opinion were also Baruš and Daniel (1976). We have therefore examined in detail the males from the type host Starus vulgaris and always found a distinct hook on the distal end of spicule (Fig. 2) on the lateral side of posterior end of male body (see also Baruš and Garrido 1968, p. 188, Fig. 4 C). In the dorsoventral position, the hook blends with the remaining part of the spicule and makes the appearance of a widened rounded distal end. In our opinion the presence of the hook-like ending of the distal part of spicule should be considered a characteristic feature of Ornithocoeplusplus osopunctatus.

Fig. 2. Ornithocoeplusplus osopunctatus (Listow, 1873) comb. n. — distal end of spicule after different authors and our material. A — after Boyd (1951); B — after Baruš and Garrido (1968); C — after Wakenlin (1966); D, E — after Acosta et al. (1981); F, G, H — original (lateral, dorsal and ventral views).

Female body length 12.6—15.2, width 0.017—0.027 at level of oesophageus end, 0.006—0.037 at level of stichosome end, and 0.070—0.087 at level of vulva. Head end narrowed and rounded, 0.006—0.008 wide. Stichosome 3.2—6.4 long, consisting of 36—43 stichocytes of the same shape as in male, arranged in one row. Stichosome terminated by two oval cells measuring 0.025—0.036 × 0.026—0.042. First stichocyte 0.38—0.50 from anterior end of body. Size of stichocytes 0.090—0.150 × 0.050—0.055 at the end of stichosome. Tail end rounded, body width at its level 0.037—0.030. Vagina straight, short, with muscular walls. Vulva situated behind stichosome end and forming a distinct, almost tubular process, 0.10—0.15 long and 0.058—0.055 wide. Eggs oval, with low plugs and poles. Plugs 0.002—0.003 high. Eggs measuring 0.050—0.055 × 0.029—0.032, with markedly punctate or grooved surface.

Taxonomic notes to O. osopunctata: Rudolph (1819) described the taxon under the name Trichosoma inflexum. The description is only fragmentary and was included in the monograph on bird capillarids by Madisen (1845). Wakenlin (1966) pointed out that the taxon cannot be identified on the basis of the original description, that already Bremer (1824) published illustrations of males and females, and that Diesing (1861) synonymized T. inflexum with T. tardi Rudolph, 1819. It should be noted that Travassos (1915) transcribed T. inflexa to the genus Capillaria and López-Neyra (1947) redescribed C. inflexa on the basis of material from Monticola solitarius and Turdus philomelos from the vicinity of Granada. He synonymized both the taxon with Calodium ornatum Dujardin, 1845 (= Capillaria ornata), from the host Anthus pratensis and Trichosoma tardi Rudolph, 1819. The validity of C. inflexa was recognized also by Skrjabin et al. (1957). We agree with the opinion of Wakenlin (1966) that the validity of this taxon cannot be confirmed on the basis
IV. OTHER SPECIES OF THE GENUS ORNITHOCAPILLARIA

In addition to the type species *O. ovopunctata* we assign to this genus another three previously described species conforming to the generic diagnosis.

1. *Ornithocapillaria cylindrica* (Eberth, 1863) comb. n.

This species was originally described by Eberth (1864) under the name *Trichosomum cylindricum* on the basis of females recovered from *Buteo buteo*. Travassos (1915) placed it to the genus Capillaria. Moravee (1982) did not include it to any of the Capillariidae genera. It is necessary to stress, however, that for a long time this species has been known only from the original description and mentioned only in monographs and lists (Travassos 1915, Yorke and Maplestone 1926, López-Neyra 1947, Skrjabin et al. 1957). Eberth's description (ex Freitas and Almeida 1939) contained only data on its location (oesophagus), its host (*Buteo vulgaria = B. buteo*), on the length of the female (6 mm), the width of the gut (0.054 mm), the location of the anus (terminal), the presence of bacillary bands and a vulval bell-shaped appendage (pictured). The males of this species are not known and the author did not mention the locality of this finding.

Baruš (1969) studied numerous specimens of capillarids from *Falco sparverius sparrowoides* from Cuba. The typical tubular to bell-shaped vulval appendage was found in all females. The males distinctly differed in their morphology and measurements from all known members of the genus Capillaria (in the wide concept of this genus valid at that time). In spite of the differences in the situation of anus in females and localization in the definitive host, Baruš (1969) identified these nematodes as a taxon *C. cylindrica* (Eberth, 1863) and made its detailed redescription. He analyzed all capillarid species parasitizing hosts of the order Falconiformes (see Baruš 1964, 1966b) taking the presence of the vulval appendage in females and the morphological dissimilarity of this taxon for the main characters justifying its validity. He compared with this species also his previous finding of capillarid females from the intestine of the same host and identified them as *Capillaria* (see Baruš 1966a).

![Fig. 3. Ornithocapillaria cylindrica (Eberth, 1863) comb. n. from the host Falco sparverius sparrowoides Vigors.](image)

0.05mm

![Fig. 4.](image)

We assign to this species also the females possessing the vulval appendage which were recovered from *Strix aluco* (Strigiformes) in Czechoslovakia (see Baruš 1966b). On the basis of a detailed knowledge of the morphology of this taxon (see Baruš 1969) we arrived at the conclusion that it belongs to the new genus described by us. The male has a wide and long membranous pseudobursa supported by two papillae on each side, which conforms to the generic diagnosis. The same concerns the presence of the vulval appendage in female, absence of praeabursal lateral alae in male, unarmed spicule sheath, and sclerotized spicule. Consequently, this taxon can be included in *Ornithocapillaria* as *O. cylindrica* (Eberth, 1863) comb. n. with the following synonyms: *Trichosoma cylindricum* Eberth, 1863; *Capillaria cylindrica* (Eberth, 1863) Travassos, 1915; *Capillaria cylindrica* (Eberth, 1863) sensu Baruš (1969); *Capillaria* sp. Baruš (1966a); *Capillaria* sp. Baruš (1966b).

2. *Ornithocapillaria quiscali* (Read, 1949) comb. n.

This species was originally described by Read (1949) on the basis of specimens recovered from the small intestine of *Quiscalus quiscula aeneus* (Passeriformes) from the USA. Skrjabin et al. (1957) left it in the original genus Capillaria, but Moravee (1982) transferred it to the newly established genus Barušocapillaria. Mawson (1956) and Wakelin (1966) regarded *C. quiscali* as a synonym of *O. ovopunctata*. In our opinion, these two taxa are relative, but fully valid. The original description by Read (1949) enables an easy differentiation of the two species. *C. quiscali* (= *O.
3. **Ornithocapillaria picorum** (Rudolphi, 1819) comb. n.

This species was originally described by Rudolphi (1819) under the name *Trichosoma picorum* on the basis of incomplete male specimens recovered from the intestine of *Picus canus*, *Pica viridis*, and *Dendrocopos major* (from Europe). **Travassos** (1915) placed it in the genus *Capillaria*. López-Neyra (1947) and Skrjabin et al. (1957) left it in this genus and added a short description of the male fragments after Rudolphi (1819). Moravec (1982) transferred it to the genus *Pseudocapillaria*. DuJardin (1845) expressed some doubts about the validity of this species and supposed that on the basis of the female morphology it could be regarded as a synonym of *Trichosomum resectum* (= *Baruscapillaria corororum*) or *Trichosomum angustum* (nomen nudum in Travassos opinion). López-Neyra (1947) supported the validity of *C. picorum* with regard to its host (*Piciformes*).

**Baruš** (1966b) found nematode female which he identified as *C. picorum* (from *Pica viridis, Dendrocopos major* and *Dryocopus martius* from Czechoslovakia). He described in detail this material and similarly as López-Neyra (1947) came to the conclusion that *C. picorum* cannot be regarded as a synonym of the species mentioned by DuJardin (1845). In his concept it is most probably a valid taxon whose females always possess the characteristic vulval appendage. He assigned to this species also the material determined by Rybaký (1957) as *Capillaria caudina* from *Dryocopus martius* from Czechoslovakia. There was another record of this species in Europe: Chiriac et al. (1972) found *C. picorum* in hosts of the order Piciformes in Rumania, but they did not give its description and illustration. Outside the Palaearctic region this species was found and described by Leidy (1856) under the name *Trichosoma picorum* from the host Mexican Flicker (= *Colaptes mexicanus*). Stossich (1890) supposed that it was identical with "Rudolphi's species". It should be stressed that Travassos (1915) divided it into two forms, European and American, according to their geographic records. He left the name *C. picorum* for the taxon described by Rudolphi (1819) (after transfer to the genus *Capillaria*), but proposed a new name, **Capillaria leidylia** Travassos, 1915, for the taxon described by Leidy (1856). As to the problem of validity of the two species, we are of the same opinion as Walton (1823) who considered them identical and recognized the only taxon *C. picorum* (Rudolphi, 1819) Travassos, 1915. It should be noted that the species *Capillaria longistriata*, originally described by Walton (1823) from *Colaptes auratus lutescens* (USA — Illinois) evidently morphologically differs from *C. picorum* (praebursae also in male are present and vulval appendage in female is absent) and is therefore not discussed in the present paper (it belongs to another genus). However, we consider it important to stress these differences, since López-Neyra (1947) expressed the presumption about the possible synonymy of *C. leidylia* and *C. longistriata*. We do not find significant the zoogeographical difference stressed by López-Neyra (1947) in case of these two species (*C. picorum* versus *C. leidylia*).

As to the generic classification of "C. picorum", which Moravec (1982) assigned to the genus *Pseudocapillaria*, it requires further evaluation. Sergeeva (1986) pointed out that the morphology of capillarids parasite in birds does not conform to the diagnosis of *Pseudocapillaria* in which they were included. This concerns also "C. picorum". However, a detailed morphology of male pseudobursa is still unknown, and this makes it impossible to decide exactly whether this species belongs to the genus *Baruscapillaria* or to the new genus *Ornithocapillaria*. Due to the presence of a large tubular vulval appendage in all females in our material (which is a marked...
morphological character) it can be supposed that this taxon belongs to Ornithocapillaria. Females of the genus Baruscapillaria parasitizing do not possess this vulval appendage.

In our concept, the synonymy of Ornithocapillaria picorum (Rudolphi, 1819) comb. nov. is as follows: Trichosoma picorum Rudolphi, 1819; Capillaria picorum (Rudolphi, 1819); Pseudocapillaria picorum (Rudolphi, 1819); Mora-
vec, 1982; Capillaria candidaforma sensu Rychel (1957); Trichosoma picorum Leidy, 1868; Capillaria leidyi Travassos, 1915; Trichosoma picorum Leidy, 1866, nec Rudolphi, 1819.

KEY TO THE DETERMINATION OF SPECIES OF THE GENUS ORNITHOCAPILLARIA

1. Spicule up to 1.2 mm long, with hook-like distal end. Parasites of birds of the — Spicule up to 1 mm long or longer; order Passeriformes... O. oocapillata distal end of spicule straight, markedly rounded or pointed. Parasites of birds of the orders Picaeformes, Falconiformes, and Strigiformes (in Neotropic region also Passeriformes)

2. Vulval appendage of female markedly tubular to slightly bell-shaped, of approximately the same width along its whole length, always longer than wide. Parasites of birds of the orders Picaeformes, Falconiformes, and Strigiformes... 3 — Vulval appendage of female with a wide cuticular base, in form of a narrow tube. Cuticular swellings in the vulva thicker than the vulval appendage proper. Parasites of birds of the order Passeriformes

3. Parasites of the order Picaeformes. Spicule more than 1 mm (1.0–1.6 mm) long... O. picorum

4. Parasites of birds of the order Falconiformes. Spicule less than 1 mm (0.8–0.9 mm) long... O. cylindraca

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