A NEW CAPILLARIID, PARACAPILLARIA KUNTZI SP. N. (NEMATODA: TRICHURIDAE), FROM COLUBRID SNAKES IN TAIWAN

F. MORAVEC and D. J. GIBSON

Institute of Parasitology, Czechoslovak Academy of Sciences, České Budějovice, and Department of Zoology, British Museum (Natural History), London

Abstract. Based on specimens deposited in the British Museum, a new capillarid species, Paracapillaria kuntzi sp. n., is described from the snake Liophis major from Taiwan. In addition to the type host, conspecific female nematodes were also found in the snake Zamenis dhumnades. The new species is characterized principally by small body measurements, the shape of the stichocytes, a comparatively short spicule (0.64 – 0.81 mm), the shape of the terminal vesicle and the posterior end of female body, the structure and size (0.083 – 0.087 x 0.636 – 0.645 mm) of the eggs and by a usually conspicuously elevated anterior vulvar lip in the females.

In the Helmintological Collection of the British Museum (Natural History) in London there were several vials containing the specimens of capillarid nematodes, designated as Capillaria sp., coming from three species of colubrid snakes (Liophis major, Zamenis dhumnades and Elaphe carinata) from Taiwan; no further details (e.g. localization in the host, locality, date of collecting) concerning the nematodes have been available. This material was collected in Taiwan by Dr. R. E. Kuntz (USA) and was donated to the collection of the British Museum by Prof. J. F. A. Sprent (Australia). A re-examination of these specimens has shown that the nematodes from L. major represent a new, hitherto undescribed species of the genus Paracapillaria Mendoza, 1933. Samples from the two other host species contained only female specimens. Nevertheless, those from Z. dhumnades can be assigned to the same species on the basis of the general metrical and morphological similarity of the females. A specific identification of females from E. carinata was not possible and these nematodes can be designated as only Paracapillaria sp.

The capillarids were stored in 80 % alcohol and for examination they were cleared in glycerine. In the following description measurements are given in millimetres.

Paracapillaria kuntzi sp. n. (Fig. 1)

The following description is based on specimens from L. major.

Description: Comparatively small nematodes; cuticle with fine longitudinal striation. Lateral bacillary bands present, not clearly visible. Head end narrow, rounded, oral papillae indistinct. Stichosome consisting of single row of 37 – 42 short stichocytes, their subdivision into transverse annuli indistinct; always 1 – 2 darker (more granular) stichocytes alternating with 1 lighter coloured stichocyte; nuclei of stichocytes large, their nucleoli containing several distinct corpuscles. Pair of small wing-like cells present at junction of oesophagus and intestine.

Male (10 specimens; measurements of holotype in brackets): Length of body 7.3 – 8.56 (8.77), maximum width 0.095 – 0.150 (0.150). Width of lateral bacillary bands 0.030 to 0.033 (—). Length of entire oesophagus 3.47 – 4.54 (4.00 – 50 % of body length) (4.00), of muscular oesophagus 0.273 – 0.312 (0.306), and of stichosome 3.17 – 4.23 (3.70), stichocytes 37 – 40 (39) in number. Distance of nerve ring from anterior extremity
0.075—0.105 (0.090). Spicule slender, well sclerotized, with rounded distal end; length 0.564—0.810 (0.798), width 0.009—0.012. Spicular sheath non-spinous, with dense transverse striations; length of evaginated sheath 0.110 [= its width 0.024 (=)]. Middle part of invaginated spicular sheath with many distinct transverse folds. Seminal vesicle oval, conspicuously short (length 0.090—0.135 (0.090)). Posterior end of body rounded, provided with short cuticular membrane forming bluntly rounded bursa; bursa supported by two wide dorso-lateral projections (rays) with somewhat expanded distal ends. One pair of large postanal papillae present at base of caudal projections. Cloacal opening subterminal; anterior lip of cloaca usually distinctly elevated. Length of tail including bursa 0.018—0.024 (0.021), that of bursa itself 0.006—0.009 (0.006). Female (7 specimens; measurements of allotype in brackets): Body length of gravid females 9.28—11.97 (11.97), maximum width 0.122—0.204 (0.204). Maximum width of lateral baccal bands 0.065 (=). Length of entire oesophagus 4.24—4.62 (38—45 % of body length) (4.53 (38 %)), of muscular oesophagus 0.294—0.518 (0.518), and of stichosome 3.93—4.33 (4.02); stichocytes 39—42 (41) in number. Stichocytes very short, their length slightly exceeding their width. Distance of nerve ring from anterior extremity 0.078—0.096 (0.096). Vulva normally situated at level of posterior end of oesophagus, rarely somewhat below this level (up to 0.075). Anterior lip of vulva usually distinctly elevated, often very markedly (Fig. 1 D), rarely only slightly elevated (Fig. 1 C). Eggs near vulva not in single file, but irregularly arranged in two rows. Mature eggs oval, with flat, slightly protruding polar plugs; egg shell two-layered, outer layer with irregular reticulate sculpturing on surface; content of eggs in uterus uncleaved. Polar plugs of young eggs conspicuously protruded. Length of mature eggs including polar plugs 0.081—0.087 (0.081—0.084), their width 0.036—0.042 (0.039—0.042), and thickness of their wall 0.004—0.005 (0.0045). Height of whole polar plug 0.009 (0.009), of its protruding part 0.003 (0.003), width of plug 0.009 (0.009). Posterior end of body distinctly tapered from level of posterior end of intestine (Fig. 1 G); length of rectum 0.141—0.177 (0.177). Anus subterminal; length of tail 0.015 (0.015); tail bluntly rounded. Posterior end of ovary approximately at level of junction of intestine and rectum.

Site: unknown (1 intestine).
Hosts: Snakes Liopeltis major (type host) and Zasenes shanmades (both fam. Colubridae).
Localities: Taiwan.

DISCUSSION
Although 13 nominal species of nematodes of the subfamily Capillarinae have so far been described from snakes, only the following 7 species can be considered valid according to a recent revision carried out by the first author of this paper (Moravec 1984, 1986). They all belong to the genus Paracapillaria, being P. longipesicula (Somsino, 1889), P. sononai (Parona, 1897), P. mabillianii (Parona, 1897), P. marinae (Travassos, 1914), P. cesarpinionii (Freitas et Lema, 1934), P. medusicaecaris (Ghadirian, 1988) and P. congoensis Moravec, 1986 (in press) (see Moravec 1984, 1986). Paracapillaria spp. from snakes constitute an independent subgenus Ophiocapillaria Moravec, 1989. However, the morphology of some of these species has hitherto been inadequately known.
Only three of the named species are noted as having a spicule distinctly shorter than 1 mm: these are P. modigliani from Indonesia, P. cesariparti (syn. C. amarali Freitas et Lent, 1983) from Brazil and P. madagascariensis from Madagascar. However, the last named species possesses, in contrast to P. kunzii sp. n., a conspicuously short spicule (only 0.055 mm long) and the length of its gravid females is approximately double that of the latter (21–23 mm). In the inadequately described species P. modigliani and P. cesariparti the length of spicule is 0.040–0.057 mm, thus resembling P. kunzii sp. n. somewhat. In addition, the size of body in all three species is much the same. Nevertheless, P. cesariparti can be distinguished from P. kunzii sp. n. by a different length ratio of the anterior (oesophageal) and the posterior parts of the body in females (approximately 1 : 3 versus 1 : 1.2–1.6), smaller eggs (0.040–0.057 x 0.022–0.024 mm as opposed to 0.081–0.087 x 0.039–0.042 mm) and also the geographical distribution of both these species (South America versus Eastern Asia) should be taken into account.

A comparison of P. kunzii sp. n. with P. modigliani is rather difficult due to a poor original description of the latter species, the type specimens of which are unfortunately lost. Some of its features (length of spicule 0.5 mm, elevated vulvar lips, similar ratio of oesophageal length to body length, size of eggs) indicate a resemblance to P. kunzii sp. n. but, according to the original description given by Parona (1887, 1898), the spicule of P. modigliani is not striated (in contrast to P. kunzii sp. n.) being allegedly covered by spines. However, the presence of spines on the spicular sheath of this species is improbable (see Moravec 1984, 1986). In spite of certain morphological differences between P. modigliani and P. kunzii sp. n. (presence of a striated spicular sheath, somewhat larger eggs and longer spicule in P. kunzii sp. n.), it is also necessary to turn our attention to the fact that both species are reported from different families (Crotalidae and Colubridae) from different geographical regions. A more detailed comparison between the two species will only be possible after a relevant redescription of P. modigliani, based on topotypic material, is available.

A new capillarid species, Capillaria ptyas, has recently been described by Wang (1982) from China (Fujian Province) from the gut of the snake Ptyas mucosa (fam. Colubridae). According to the length of its spicule (0.662–1.12 mm) this species also resembles P. kunzii sp. n. Despite the inadequate description of this species, Moravec (1984, 1986) synonymized C. ptyas with the widespread holarctic species Paracapillaria sonoinai (Parona, 1897). This morphologically and metrically variable species differs from P. kunzii sp. n. mainly in the shape of the stichocytes, which are very elongate, in the larger spicule, in the very elongate seminal vesicle, in the shape of the posterior end of female, which is not conspicuously tapered, and in the absence of an elevated vulvar lip.

Consequently, it is necessary to consider the nematodes from Liopeltis major as an independent species, for which we propose the name P. kunzii sp. n. Furthermore, the female nematodes from Zacoce dhumnades (BM NH Reg. Nos. 1984-3326-3331), both metrically and morphologically extremely similar to those from C. ptyas sp. n., can be assigned to the same species. On the other hand, the only available complete female from Elaphe carinata (BM NH Reg. Nos. 1984-3332-3333) has measurements similar to those of the females of P. kunzii sp. n. (body length 12.88 mm, oesophageal length 6.46 mm, number of stichocytes 43, size of eggs 0.075–0.081 x 0.036–0.050 mm) and notably an elevated anterior lip of the vulva, but its stichocytes are more elongate and divided into several traverse annuli. Since no males are available, we are designating it as Paracapillaria sp., although conspecificity with P. kunzii sp. n. cannot be excluded.

**REFERENCES**


MORAVEC, F., Revision of capillarid nematodes (subfamily Capillariinae) parasite in cold-blooded vertebrates. Prague, Institute of Parasitology, Czechoslovak Academy of Sciences, Ceské Budějovice, 1984. (In Czech.)

—, Review of capillarid nematodes (Capillariinae) parasite in amphibians and reptiles.

Received 22 November 1984.


**THE ABSENCE OF AN INTERACTION BETWEEN A MICROUTUS PENNSYLVANICUS DENSITY CYCLE AND DERMACENTOR VARIBILIS INFESTATION LEVELS**

During this period, the adult *D. variabilis* infestation rate for immatures to the exposed area contiguous to the *M. pennsylvanicus* study site, and at other sites on Cape Cod (McCaw et al., 1975; Doose, 1975; Knight, 1974). The level of spring tick infestation was correlated to the *M. pennsylvanicus* cycle. The spring adult tick cohorts enters activity during a period of low water stress. This results in maximum activity (McLoughlin, 1975; McCaw et al., 1975). The value for infestation level was taken from...