

TRICHOSTRONGYLUS CRAMAЕ N. SP. (NEMATODA), A PARASITE OF BOB-WHITE QUAIL (*COLINUS VIRGINIANUS*)

M.-C. DURETTE-DESSET*, A. G. CHABAUD*, J. MOORE**

SUMMARY

Cram (1925, 1927) incorrectly identified as *T. pergracilis* (now a synonym of *T. tenuis*) what was in reality an undescribed species in *Colinus virginianus*.

Trichostrongylus cramae n. sp. is proposed for *T. pergracilis* sensu Cram, 1927 nec Cobbald, 1873 from *C. virginianus* from USA. It differs from *T. tenuis* (Mehlis in Creplin, 1846) as regards

the cuticular striation, the relative distances between the second, third and fourth bursal papillae and the configuration of the dorsal ray. Red grouse (*Lagopus scoticus*), the type host of *T. pergracilis*, was in fact found to be parasitized by *T. tenuis*, confirming the synonymy of *T. pergracilis* and *T. tenuis*.

RÉSUMÉ : *Trichostrongylus cramae* n. sp. (Nematoda) parasite de *Colinus virginianus*.

Cram (1925, 1927) a identifié par erreur comme étant *T. pergracilis*, maintenant considéré comme un synonyme de *T. tenuis*, ce qui était en réalité une espèce non décrite parasite de *Colinus virginianus*.

T. cramae n. sp. est proposé pour *T. pergracilis* sensu Cram, 1927 nec Cobbald, 1873, parasite de *C. virginianus* aux États-Unis.

Il se différencie de *T. tenuis* (Mehlis in Creplin, 1846) par la striation cuticulaire, les distances relatives entre les papilles bursales 2, 3 et 4, et par la configuration de la côte dorsale. *Lagopus scoticus*, l'hôte type de *T. pergracilis* est en fait parasité par *T. tenuis* ce qui confirme la synonymie de *T. pergracilis* et *T. tenuis*.

Cram (1925) recorded *Trichostrongylus pergracilis* (Cobbald, 1873) from *Colinus virginianus*. Subsequently, in her monograph on the nematodes of birds, Cram (1927) recog-

nized 2 species, namely *Trichostrongylus tenuis* (Mehlis in Creplin, 1846) from numerous birds and *T. pergracilis* from both *C. virginianus* and *Lagopus scoticus*. However, after having studied material from many different birds, including *Phasianus colchicus*, the type host of *T. tenuis* (as it had been settled by Stiles and Hassal, 1920), as well as material from *L. scoticus*, the type host of *T. pergracilis*, Cram and Wehr (1934) synonymized these 2 nematode species. This has been accepted widely by all subsequent authors and the difference between the trichostrongylid from *C. virginianus* and *T. tenuis* has been overlooked.

Material from *C. virginianus* that we studied corresponds to *T. pergracilis* sensu Cram (1927), and is different from *T. tenuis* that we examined from various European birds. In this paper a morphological comparison between them are made and a new species is proposed.

MATERIALS AND METHODS

Trichostrongylus tenuis from *L. scoticus* British Museum of Natural History (BMNH), n° 1914 1 7 55 74, *Perdix perdix* (BMNH), n° 1921, 7 19 19 33, and *P. colchicus* Commonwealth

* Laboratoire de Biologie Parasitaire, Helminthologie, Protistologie, associé au CNRS, Muséum National d'Histoire Naturelle, 61, rue Buffon, F 75231 Paris Cedex 05.

** Department of Biology, Fort Collins, Colorado State University, Colorado 80523, USA.

Since the species is North-American the paper was submitted to the *Journal of Parasitology*. It was rejected because one of the reviewers was « ...not convinced that evidence has been presented to justify the systematic decision ».

In the paper, 6 males from *Colinus* and 9 males from other birds were studied. The coincidence between the hosts and the three different characters we had selected to differentiate the species was perfect. Therefore we feel that it was unnecessary to study additional material as was mandated by the « expert ».

Furthermore, the figures by Eloise Cram were not « composite drawings » or « diagrammatic drawings » or scanning electron micrographs but true drawings made by a good specialist. The characteristics of the specimens studied by E. Cram are diagnostic and it is therefore unnecessary to examine the original specimens.

Accepté le : 10 décembre 1992.

Agricultural Bureaux St Albans (CAB), n° 1459, all from England and from *Pavo cristatus* collected in France by Neveu-Lemaire in 1936, Museum National d'Histoire Naturelle de Paris (MNHN), n° 4 MD, were studied. *Trichostrongylus cramae* n. sp. from *C. virginianus* Florida, is described.

Nomenclature of the rays is according to Chabaud *et al.* (1970). Measurements are in micrometers unless stated otherwise.

DESCRIPTION

Trichostrongylus tenuis (Mehlis in Creplin, 1846)

Worms from *P. cristatus*, *P. perdix*, *P. colchicus* and *L. scoticus* were consistent with the description of Cram (1927), Nagaty (1932) or Petrova (1991).

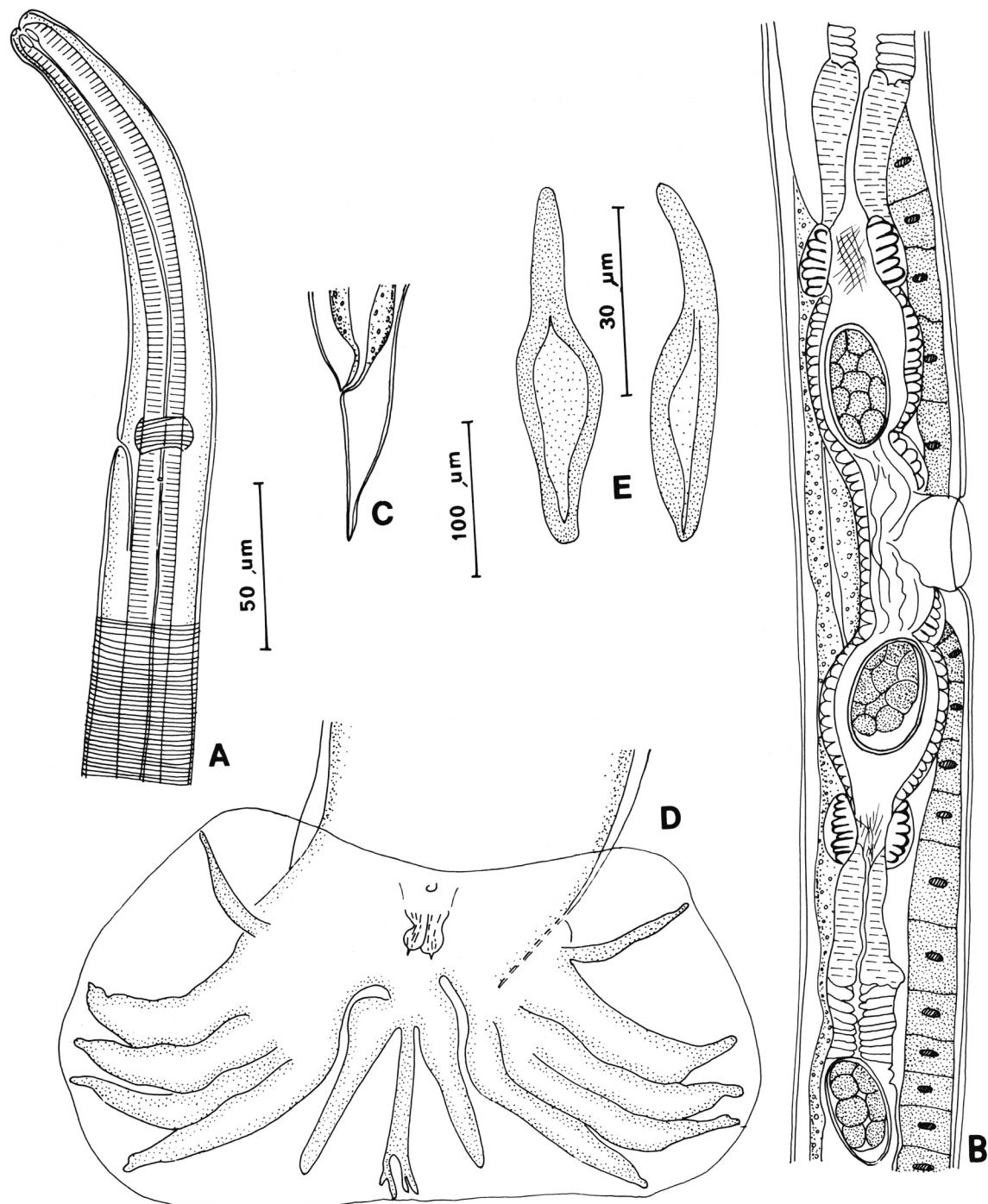


FIG. 1. — *T. tenuis* (A-D: from *Lagopus scoticus* E. from *Pavo cristatus*. A. Female, anterior end, lateral view showing cuticular striae behind excretory pore. B. Ovejector, lateral view. C. Female, tail, lateral view. D. Caudal bursa, ventral view. E. Gubernaculum, ventral and lateral views.

Characteristic transverse striae starting behind the excretory pore of both sexes, and covering three- to four-fifths of the body surface; it may give the worm a crenulated appearance in that region (Fig. 1A). A ventral view of the caudal bursa, the gubernaculum, the ovejector and the female posterior extremity are illustrated in Figure 1.

Position of the second, third and fourth bursal papillae (Fig. 1, D) are different to that seen in *T. cramaee* (Fig. 2, E). Ratio of distance between bursal papillae 3 and 4 to that between papillae 2 and 3 are 1:2.7 (range 1:2.2-1:3.5) in 5 specimens of *T. tenuis* from *L. scoticus* (Fig. 3, A-C), 1:3.1 (range 1:2.3-1:3.8) in 5 specimens

from *P. perdix* (Fig. 3, D-F) and 1:2.9 (range 1:2.2-1:3.9) in 6 specimens from *P. cristatus* (Fig. 3, G-I).

Dorsal ray branching near the apex (fig. 4, A-I), posterior to the origin of papilla 9. Configuration of the extero-dorsal and dorsal rays of 3 males from 3 different hosts is illustrated in Figure 4.

Trichostrongylus cramaee n. sp.

Syn. *T. pergracilis* (Cobbald, 1873) sensu Cram, 1927 pro parte. About 35-55 of cephalic region in front of excretory pore in the females bearing characteristic transverse striae (Fig. 2, A).

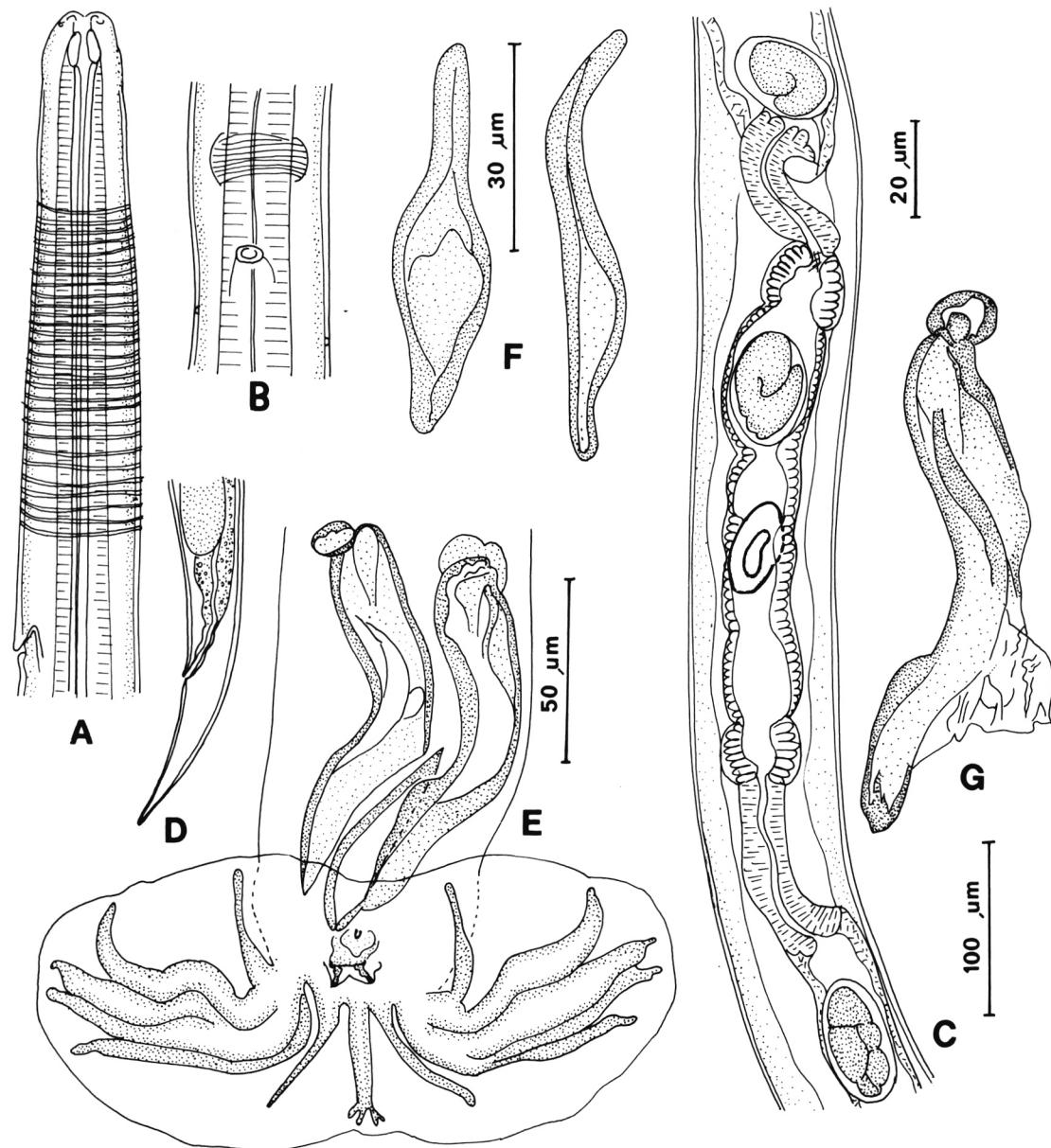


FIG. 2. — *T. cramaee* A. Female, anterior end, lateral view showing cuticular striae in front of excretory pore. B. Female, anterior end, ventral view, excretory pore and deirids. C. Ovejector, ventral view. D. Female, tail, lateral view. E. Caudal bursa, ventral view. F. Gubernaculum, ventral and lateral views. G. Right spicule, ventral view.

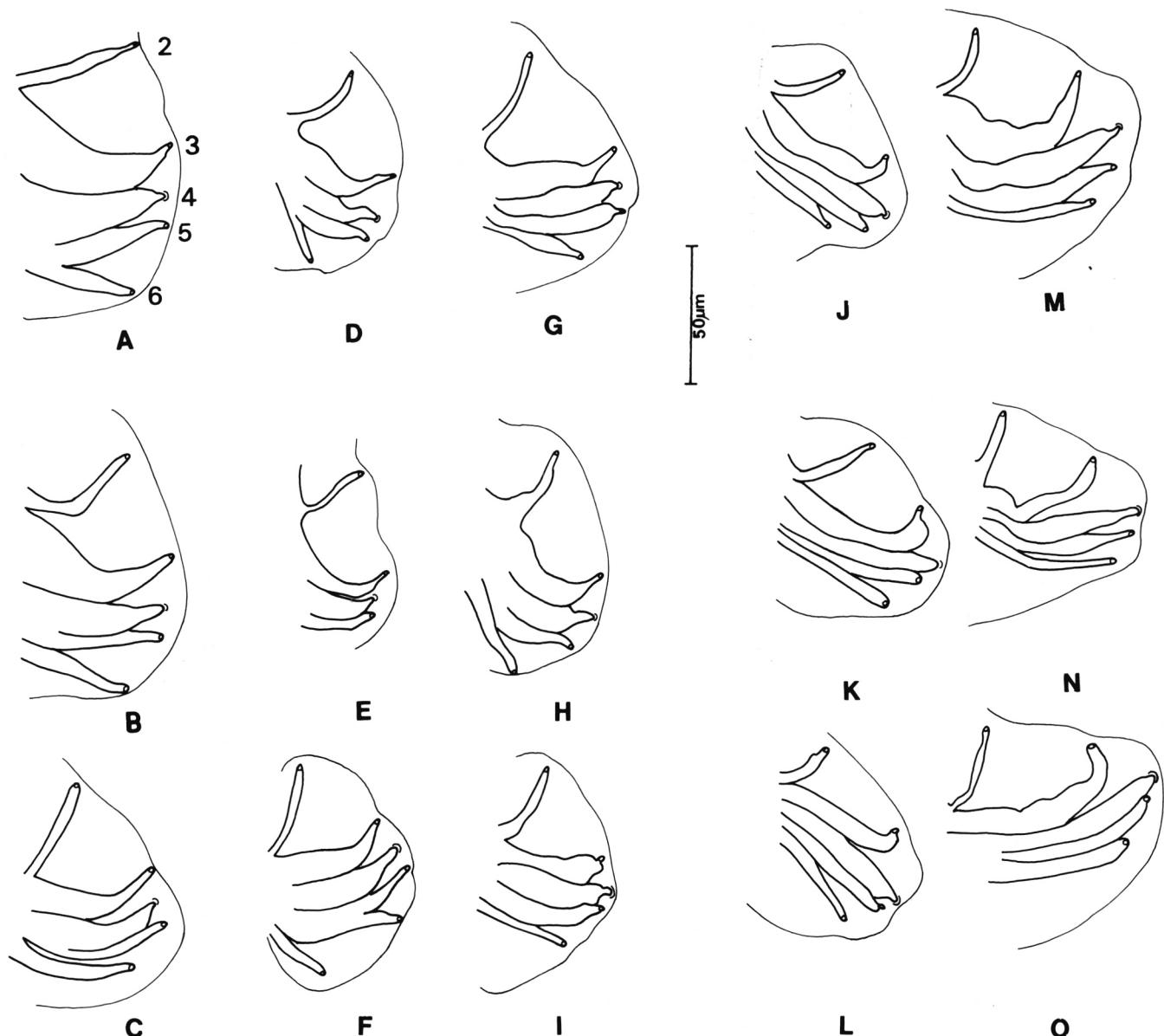


FIG. 3. — Positions of the ray papillae. A-C. *T. tenuis* in *Lagopus scoticus*. D-F. *T. tenuis* in *Perdix perdix*. G-I. *T. tenuis* in *Pavo cristatus*. J-O. *T. cramaee* in *Colinus virginianus*.

Ratio of distance between bursal papillae 3 and 4 to that between papillae 2 and 3 are 1:1.5 (range 1:1.3-1:1.7) (Fig. 3, J-O).

Dorsal ray branching before origin of papilla 9 (Fig. 4, J-N).

Holotype male: Body 4.4 mm long; width gradually increasing from 10 at the anterior end to 50 in front of the caudal bursa. Pronounced transverse striation. Nerve ring, excretory pore and deirids 112, 130 and 135 from the anterior end of the body, respectively; esophagus 680 long. Caudal bursa illustrated in Figure 2. Spicules thick, with smooth tips, 110 long. Gubernaculum 60 long

and 15 wide. Genital cone with rodlike papillae 7 and rounded papilla 0.

Allotype female: Body 7 mm long; width increasing from 10 at the anterior end to 50 in front of vulva. Pronounced transverse striation commencing 25 from anterior end and extending caudally for 45. Nerve ring, excretory pore and deirids 125, 145 and 155 from anterior end of body, respectively. Esophagus 680 long. Vulva as a simple transverse slit, situated in posterior fifth of body, 5.7 mm from anterior end. Didelphic. *Vagina vera* separating vestibule into 2 parts of about equal length; anterior branch 130 long and posterior branch 120 long. Anterior sphincter 28 × 40;

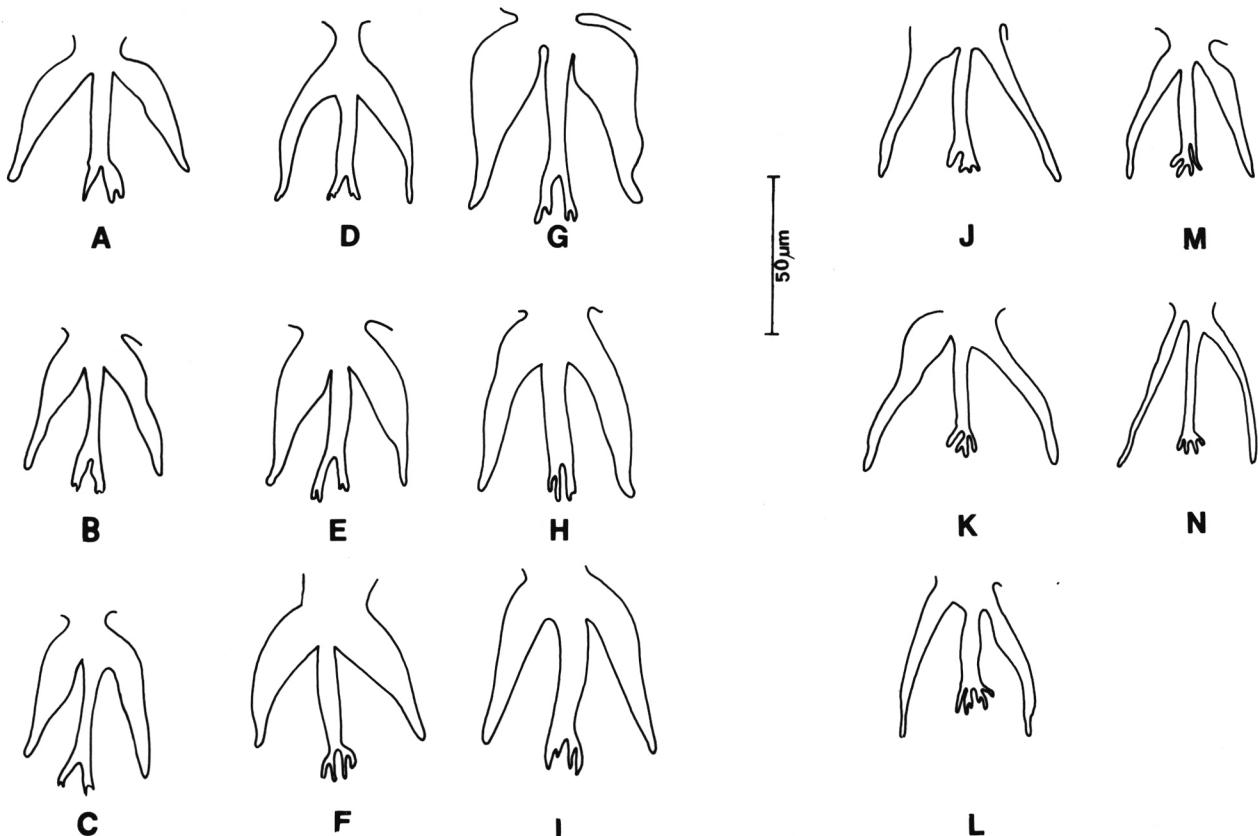


FIG. 4. — Dorsal ray division and origin of the 9th ray. A-C. *T. tenuis* in *Lagopus scoticus*. D-F. *T. tenuis* in *Perdix perdix*. G-I. *T. tenuis* in *Pavo cristatus*. J-N. *T. cramae* in *Colinus virginianus*.

anterior infundibulum 70 long; anterior uterus 750 long, containing 19 eggs. Posterior sphincter 30 × 40; posterior infundibulum 65 long; posterior uterus 750 long containing 18 eggs. Eggs ellipsoidal, thin-shelled and 70 × 30. Eggs near vulva containing morula-stage embryos. Tail 70 long and 22 wide at level of anus, and with a blunt tip (Fig. 2).

TAXONOMIC SUMMARY

Specimens deposited: Holotype male and allotype female (USNM) no. 82395; paratypes, 4 males and 6 females (MNHN) no. 3 MD.

Type host: *Colinus virginianus* (Linné, 1758).

Habitat: Cecum.

Locality: Florida, Leon County, Tail Timbers Research Station.

REMARKS

Morphometric characters are the same in the 2 species and they cannot be used for discrimination. From the above descriptions, it is apparent that at least 3 characteristics can be used to distinguish *T. tenuis* from *T. cramae*: the

portion of body surface covered by the transverse stria-
tions, the ratio of the distance between bursal papillae 3
and 4 to that between papillae 2 and 3, and the configura-
tion of dorsal ray.

The last characteristic was used in the dichotomous key proposed by Cram (1927); she illustrated the differences in the position of the bursal papillae, and named the specimens from *Colinus* and *Lagopus: pergracilis* and the specimens from others birds: *tenuis*. It is thus certain that she distinguished the 2 species. However the name *T. pergracilis* cannot be adopted again, because the type host, *L. scoticus*, is in fact parasitized by *T. tenuis*. Similarly, the name *Strongylus serratus* used by von Linstow (1876), is inappropriate because the type host, *Anser domesticus*, is also parasitized by *T. tenuis* (see Railliet, 1893). We therefore propose the name *Trichostrongylus cramae* n. sp. for the parasite from *Colinus virginianus*.

The present work was done and written independently of the experimental work, which will be published elsewhere.

Acknowledgments. — We wish to express our thanks to Dr D. I. Gibson and to Dr L. M. Gibbons for making the specimens of *Trichostrongylus tenuis* from *Lagopus scoticus*, *Perdix perdix*

and *Phasianus colchicus* available to us, to Pr J. Boomker, Medical University of Southern Africa, for the English translation to Dr. J. Doster, University of Georgia, Dr. M. Freehling, Colorado State University for collecting the specimens from Florida and R. Tcheprakoff for her technical collaboration.

LITERATURE CITED :

- Chabaud A. G., Puylaert F., Bain O., Petter A. J., Durette-Desset M.-C. : Remarques sur l'homologie entre les papilles cloacales des Rhabditides et les côtes dorales des Strongylida. *CR Acad. Sc. Paris*, 1970, 271, série D, 1771-1774.
- Cram E. B. : New records of economically important nematodes in birds. *J. Parasitol.*, 1925, 11, 113-114.
- Cram E. B. : Bird parasites of the nematode suborders Strongylata, Ascaridata and Spirurata. *Bull. US Nat. Mus.*, Washington, 1927, 140, xvii + 465.
- Cram E. B., Wehr E. E. : The status of species of *Trichostrongylus* of birds. *Parasitology*, 1934, 6, 335-339.
- Linstow O. : von Helminthologische Beobachtungen. *Archiv für Naturg.*, 1876, 42, J. 1(1), 1-18.
- Nagaty H. S. : The genus *Trichostrongylus* Looss, 1905. *Ann. Trop. Med. Parasit.*, 1932, 26, 457-518.
- Petrova K. : Redescription of *Trichostrongylus tenuis* (Melhis, 1846) in Bulgaria. *Helminthology*, 1991, 31, 50-55.
- Railliet A. : *Traité de Zoologie médicale et agricole*, 2^e édit. (fascicule 1), Paris, 1893, 1-736.
- Stiles C. W., Hassall A. : Index-catalogue of Medical and Veterinary Zoology. Roundworms. *US Public Health Service, Hygienic Laboratory Bull.*, 1920, 114, 1-886.