

Department of Zoology
Panjab University
Chandigarh. India

ON NEMATODES OF SOME LIVE-STOCK ANIMALS IN INDIA.
PART II

by

GUPTA, N. K.; KALIA, D. C.

SUMMARY

This paper deals with the taxonomic study of 16 Indian species of Nematodes namely: *Cylicocyclus nassatum* (Looss, 1900) Erschow, 1939 (Trichonematidae Witenberg, 1925); *C. radiatum* (Looss, 1900) Erschow 1939; *C. insigne* (Boulenger, 1917) Erschow, 1939; *Trichostrongylus colubiformis* (Giles, 1892) Ransom, 1911 (Trichostrongylidae Leiper, 1912); *T. axei* (Cobbold, 1879) Railliet et Henry, 1909; *T. probolurus* (Railliet, 1896) Looss, 1905; *T. longispicularis* Gordon, 1933; *Mecistocirrus digitatus* (Linstow, 1906) Railliet et Henry, 1912 (Trichostrongylidae Leiper, 1912); *Haemoncus contortus* (Rud., 1803) Cobbold, 1898 (Trichostrongylidae Leiper, 1912) *H. similis* Travassos, 1914; *H. longistipes* Railliet et Henry, 1909; *Delafondia vulgaris* (Looss, 1900) Skrjabin, 1933 (Strongylidae Baird, 1853); *Alfortia edentata* (Looss, 1900) Skrjabin, 1933 (Strongylidae Baird, 1853); *Buncostomum trigonocephalum* (Rudolphi, 1808) Railliet, 1902 (Ancylostomatidae Nicoll, 1927); *B. phlebotomum* (Railliet, 1900) Lane, 1917; *B. bovis* Maplestone, 1931. The parasites were collected by visiting various cattle and horse abattoirs at Mathura, Agra and Jammu.

DESCRIPTION

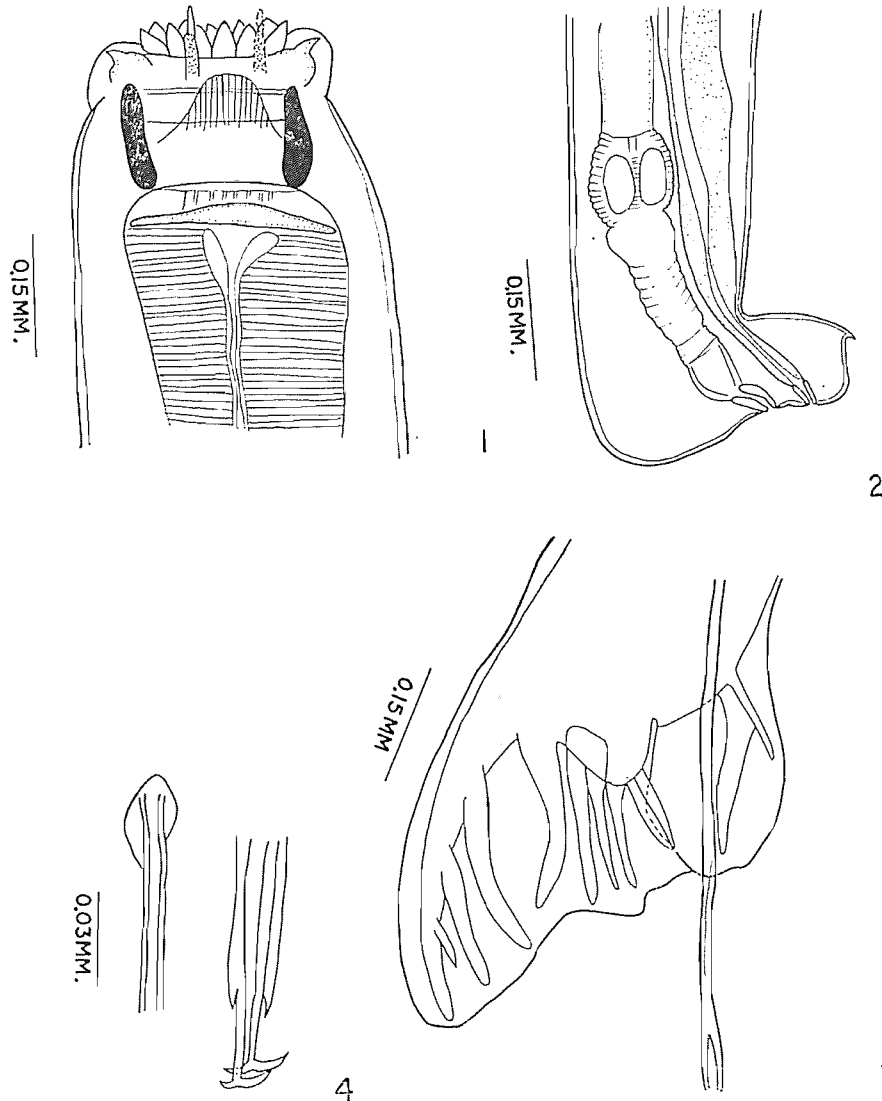
Family Trichonematidae Witenberg, 1925
Subfamily Trichonematinae Railliet, 1916
Tribe Trichonematea Papoya, 1952
Genus *Cylicocyclus* (Ihle, 1922) Erschow, 1939

(Recibido el 31-VIII-1977).

REV. IBER. PARASITOL. Vol. 38 (1-2), 1978.

Syn. *Cyathostomum nassatum* Looss, 1910; *Cylichnostomum nassatum* (Looss, 1900) Looss, 1902; *Cylicostomum nassatum* Gedoelst, 1903; *C. (Cylicocyclus) nassatum* (Looss, 1900) Ihle, 1922; *C. nassatum* var. *parvum* Yorke et Macfie, 1918; *Trichonema nassatum* (Looss, 1900); *T. ashworthi* Le Roux, 1924; *Cylicocyclus bulbiferum* Chaves, 1930.

(Figs. 1-4)



Figs. 1-4.—*Cylicocyclus nassatum* (Looss, 1900) Erschow, 1939. 1, anterior region of female, lateral view. 2, posterior region of female, lateral view. 3, bursa of male, lateral view. 4, proximal and distal ends of spicules, lateral view.

Description based on three male and two female specimens. Buccal capsule broader than long with additional appendages on the in-side wall; elements of external leaf crown, conspicuous and 16-18 in number; lateral cephalic papillae more prominent; caudal end of female slightly bent dorsally; spicules bipartite at the distal ends.

Male: Body 7.82-8.43 (5.5-9.0) long with 0.288-0.4 (0.33-0.37) in maximum thickness; buccal capsule $28-36 \times 56-64 \mu$; nerve ring and excretory pore 0.2-0.224 and 0.248-0.256 behind the anterior end respectively; oesophagus 0.368-0.4 (0.485-0.620) long; bursa $0.443-0.48 \times 0.4-0.544$; spicules equal, slender, each bipartite at its distal end and 1.392-1.408 (1.22-1.32) long.

Female: Body 8.87-9.39 (7-12.5) long with 0.32-0.336 (0.24-0.67) in maximum thickness; buccal capsule $40 \times 60-68 \mu$; nerve ring and excretory pore 0.224-0.255 and 0.272 behind the anterior end respectively; oesophagus 0.416-0.448 (0.5-0.8) long; tail bent dorsally, 0.104-0.12 (0.15-0.25) long; vulva 0.064-0.068 (0.1-0.17) in front of anus, eggs $80-84 \times 48 \mu$ ($80-84 \times 45 \mu$).

Host *Equus caballus* (*Equus asinus*, *E. zebra* and mule)

Location Colon

Locality Jammu, India (Cosmopolitan)

Cylicocyclus radiatum [Looss, 1900] Erschow, 1939

Syn. *Cyathostomum radiatum* Looss, 1900; *Cylicostomum radiatum* Looss, 1902; *C. (Cylicocyclus) radiatum* Ihle, 1922; *Trichonema prionodes* (Kotlan, 1921); *Trichonema radiatum* (Looss, 1900)

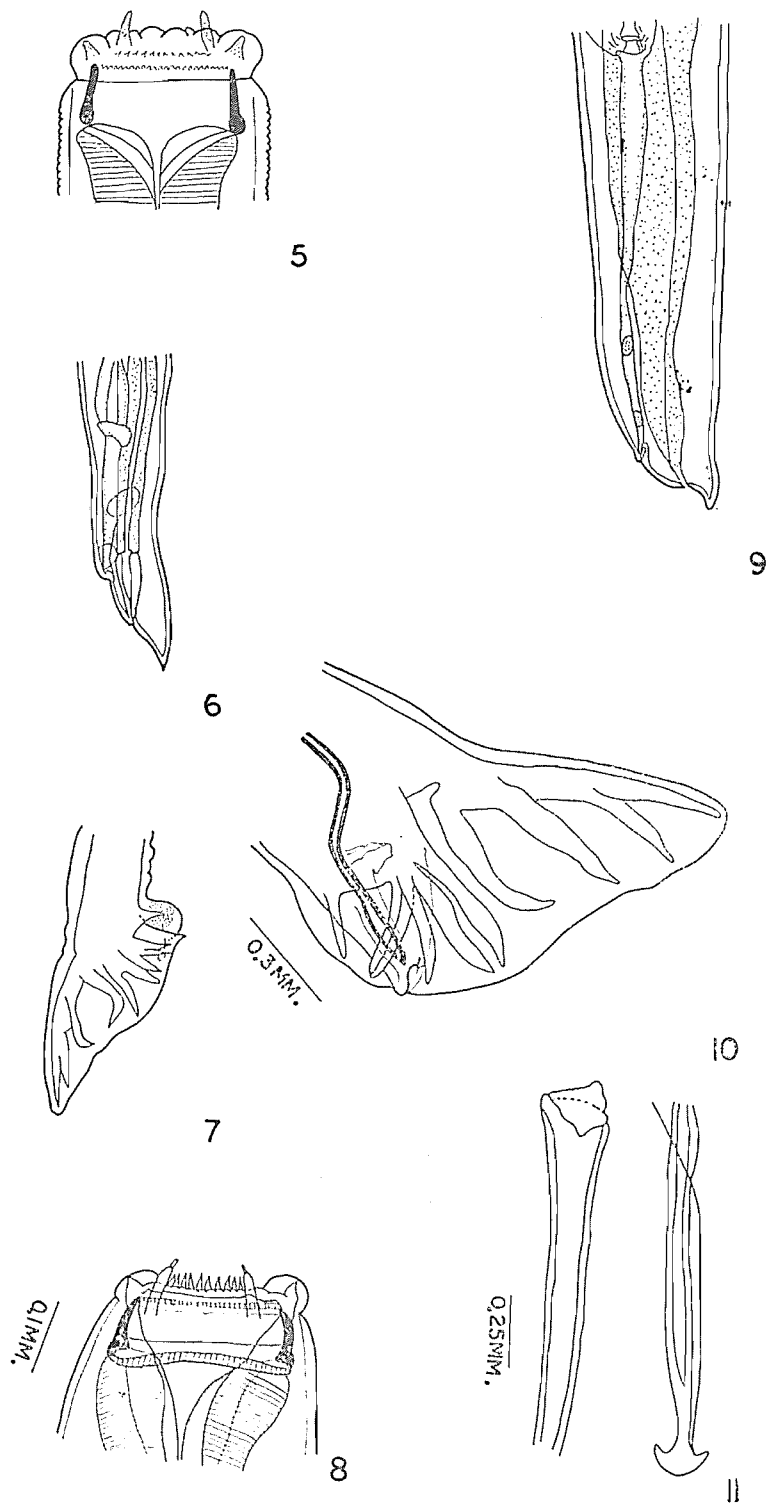
(Figs. 5-7)

None of the branches of dorsal ray bears any additional appendage.

Male: Body 10-11.5 long; oesophagus 0.8-0.91; spicules 1.7-1.8 long.

Female: Body 11.5-13.0 long; oesophagus 0.9-1.0 long; tail 0.2-0.27 long; vulva 0.2-0.28 in front of anus; eggs $95 \times 48 \mu$.

1. All the measurements are in mms unless otherwise indicated.
2. Observations given in brackets are from literature.



Figs. 5-7.—*Cylicocyclus radiatum* (Looss, 1900) Erschow 1939. 5, anterior region of worm, lateral view. 6, posterior region of female, lateral view. 7, bursa of male, lateral view.

Figs. 8-11.—*Cylicocyclus insigne* (Boulenger, 1917) Erschow, 1939. 8, anterior region of worm, lateral view. 9, posterior region of female, lateral view. 10, bursa of male, lateral view. 11, proximal and distal ends of spicule.

Host *Equus caballus*, *E. asinus* and mule
Location Colon and Intestine
Locality India (Africa, Europe, Turkey, Indonesia, Siberia, Panama, Puerto Rico Alberta N. & S. América)

Cylicocyclus insigne (Boulenger, 1917) Erschow, 1939

Syn. *Cylichnostomum insigne* Boulenger, 1917; *Cylicostomum zebrae* Boulenger, 1920; *Cylicostomum insigne* (Boulenger 1917) Boulenger, 1921; *C. (Cylicocyclus) insigne* (Boulenger 1917) Ihle, 1922; *Trichonema insigne* (Boulenger, 1917).

(Figs. 8-11)

External leaf crown has 38 elements; distal end of fused spicule spade shaped.

Male: Body 13 long; buccal capsule $81 \times 162 \mu$; oesophagus 0.81 long; spicules 3.24 long.

Female: Body 15 long; buccal capsule $81 \times 178 \mu$; oesophagus 0.82 long; tail 0.243 long; vulva 0.243 from anus; eggs elliptical, $92 \times 55 \mu$.

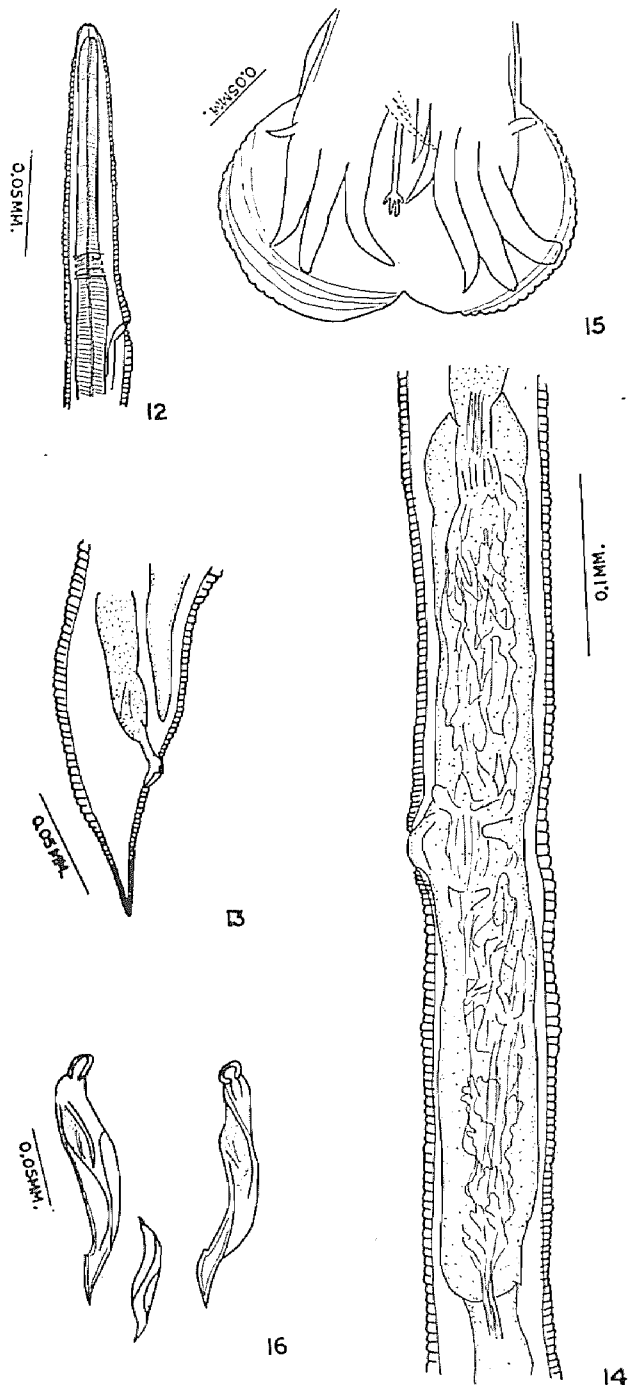
Host *Equus caballus*, *E. zebra* and mule
Location Colon and Intestine
Locality India (Cosmopolitan)

Family Trichostrongylidae Leiper, 1912
Subfamily Trichostrongylinae Leiper, 1908
Genus *Trichostrongylus* Looss, 1905

Trichostrongylus colubriformis (Giles, 1892) Ransom, 1911

Syn. *Trichostrongylus instabilis* (Railliet, 1893);
Trichostrongylus delicatus Hall, 1916; - Nagaty, 1932
Strongylus subtilis Looss, 1895

(Figs. 12 - 16)



Figs. 12-16.—*Trichostrongylus colubriformis* (Giles, 1892) Ransow, 1911. 12, anterior region of female, lateral view. 13, posterior region of female, lateral view. 14, vulvar region of female, lateral view. 15, bursa of male, dorsal view. 16, spicules and gubernaculum of male, dorsal view.

Description based on single male and 9 female specimens. Body fine thread like; female tail tapering gradually to a point; male with brown coloured spicules.

Male: Body 7.03 (4.5-7.7) long with 0.076 in maximum thickness; diameter of head $11.6\ \mu$; oesophagus 0.76 long; nerve ring and excretory pore 0.126 and 0.154 respectively behind the anterior end of body; bursa relatively large, deeply notched, forming lateral lobes with a small dorsal lobe and annulated strongly; spicules somewhat unequal, left $154\ \mu$ (136-171 μ) and right $140\ \mu$ (123-154 μ) long, ventral barb clearly demarcated, $37.3\ \mu$ from distal end of each spicule; accessory piece $79.3\ \mu$ long, canoe-shaped in dorso-ventral view and 'S' shaped laterally.

Female: Body 6.365-7.068 (5.0-8.6) long, 0.076-0.114 in maximum thickness; head diameter $11.6-14\ \mu$; oesophagus 0.722-0.893 long; nerve ring and excretory pore 0.126-0.13 and 0.154, respectively behind the anterior end of body; tail $60-74\ \mu$ (66-92 μ) long, conical and pointed; vulva 1.216-1.482 in front of posterior end, with a form of longitudinal slit of raised borders, lacking definite lips; ovijectors, formed of two divergent uteri, 0.456-0.532 (0.4-0.5) long; eggs $51-93 \times 23-42\ \mu$ (79-101 $\times$ 39-47 μ).

Host *Bos indicus* (*Ovis*, *Capra*, *Camelus*, *Macaca*, *Gazella*, *Capreolus*)

Location Small intestine

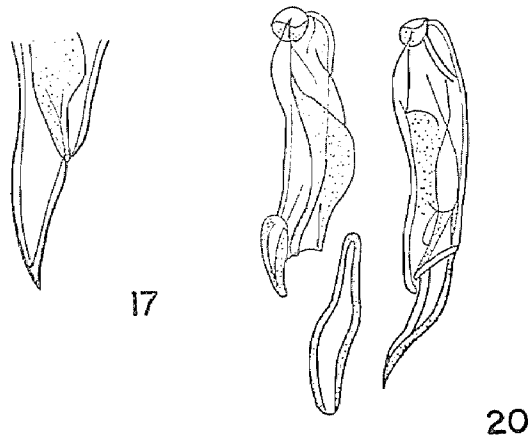
Locality Mathura, India (Cosmopolitan).

Trichostrongylus axei (Cobbold, 1879) Railliet et Henry, 1909

Syn. *Strongylus gracilis* Mac Fadyean, 1896; - Wetzel, 1933; *Strongylus tenuissimus* Mazzanti, 1891; - Le Roux, 1924

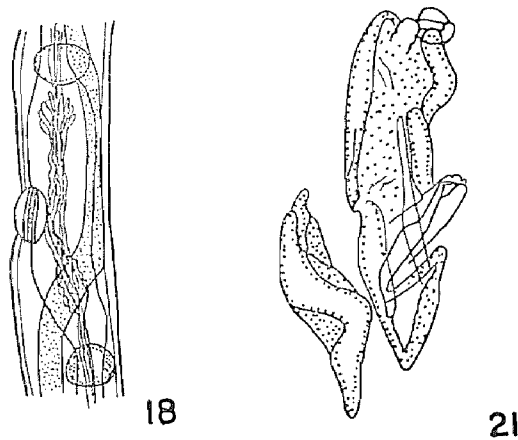
(Figs. 17-20)

Male: Body 2.3-6.0 long and $50-60\ \mu$ wide; bursa without separate dorsal lobe; spicules dark brown and dissimilar, left and right $96-123\ \mu$ and $74-96\ \mu$ respectively; accessory piece $52-61\ \mu$.



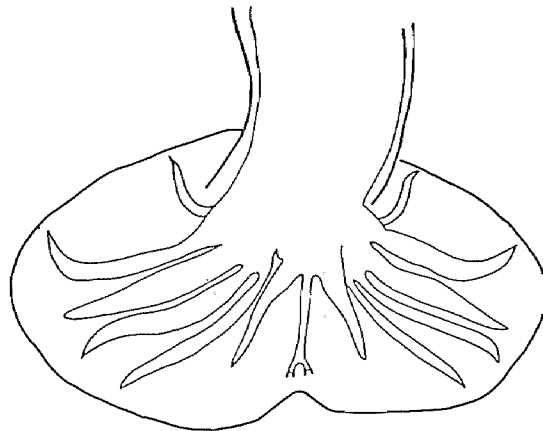
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Figs. 17-20.—*Trichostrongylus axei* (Cobbold, 1879) Railliet et Henry, 1909. 17, posterior region of female, lateral view. 18, vulvar region of female, lateral view. 19, bursa of male, dorsal view. 20, spicules and gubernaculum, dorsal view.

Fig. 21.—*Trichostrongylus probolurus* (Railliet, 1896) Looss, 1905; spicules and gubernaculum, dorsal view.

Female: Body 3.2-8.0 long and 55-70 μ wide; tail 61-71 μ long; vulva in the posterior sixth of body; ovijectors 202-281 μ long, not so well developed as in other species.

Host *Bos indicus*, *Equus caballus*, *Ovis aries*
Capra hircus, *Equus asinus*

Location Abomasum

Locality India (Cosmopolitan)

Trichostrongylus probolurus (Railliet, 1896) Looss, 1905

(Fig. 21)

Male: Body 4.5-5.8 long; spicules, equal and robust, 125-190 μ ; long; accessory piece 73-83 $\times$ 16-18 μ .

Female: Body 4.5-6.9 long; tail 35-55 μ ; ovijectors 375 μ ; eggs 76-83 $\times$ 43-48 μ (Court, 1945), 68-77 $\times$ 33-38 μ (Bhalerao, 1942) or 80-100 $\times$ 40-60 μ (Steward, 1950)

Host *Camelus*, *Ovis*, *Capra*, *Gazella*

Location Duodenum

Locality India (Russia, Africa, Australia, China, Mangolia)

Trichostrongylus longispicularis Gordon, 1933

(Figs. 22 - 24)

Male: Body 3.5-7.5 long; bursa with a small dorsal lobe; spicules long and slender, right 136-193 μ and left 139-200 μ long (168-187 μ with a mean of 176 μ and 180-200 μ with a mean of 186 μ , respectively according to Sommerville, 1956; accessory piece 71 - 110 μ long (85-110 μ with a mean of 94 μ , according to Sommerville, 1956).

Female: Female in indistinguishable from that of *T. Colubriformis*.

Host *Bos indicus*, *Ovis aries*

Location Small intestine

Locality India (Australia, Netherlands, England, USSR, Perú, USA).

Family Trichostrongylidae Leiper, 1912
 Subfamily Mecistocirrinae Skrjabin et Orloff, 1934
 Genus *Mecistocirrus* Railliet et Henry, 1912

Mecistocirrus digitatus (Linstow, 1906) Railliet et Henry, 1912

Syn. *Strongylus fordii* Daniels, 1908; *Strongylus gibsoni* Stephens, 1909; *M. digitatus javanica* Salm. 1918; *Mecistocirrus tagumai* Morishita, 1922; *M. sheateri* (Smit, 1922) Skrjabin et Orloff, 1934

(Figs. 25 - 30)

Description based on 5 female and 6 male specimens. Body light brown in colour and finely striated throughout its length; buccal cavity small but with a stout dorsal tooth; cephalic and cervical papillae conspicuous; nerve ring and excretory pore situated anteriorly to cervical papillae; oesophagus club shaped.

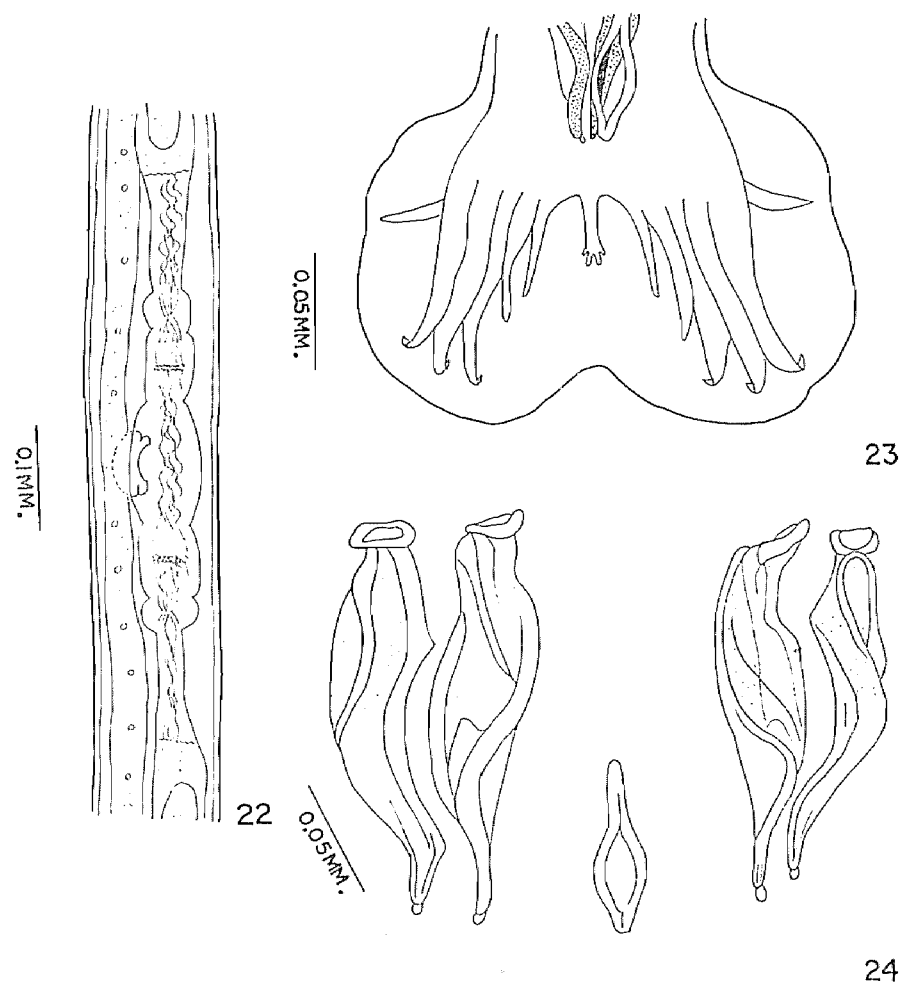
Male: Body 26.0-29.0 (16-28) long and 0.361-0.399 (0.35-0.52) in maximum thickness; cuticular striations $4.6\ \mu$ apart; dorsal tooth $18.66\ \mu$ long; cervical papillae $0.494-0.551$ from cephalic end; nerve ring and excretory pore $0.35-0.39$ and $0.354-0.406$ respectively behind the anterior end; oesophagus $1.349-1.957$ long; bursa $1.017-1.140$ long with the prebursal papillae $19\ \mu$ below the bursal notch, bursal annulations $93\ \mu$ apart; spicules equal, $5.415-5.890$ ($3.8-7.0$) long.

Female: Body $32.6-34.2$ ($19-40$) long with $0.589-0.646$ ($0.38-0.8$) in maximum thickness; cuticular striations $4.6\ \mu$ apart; dorsal tooth $18.6\ \mu$ long; cervical spine $0.494-0.513$ behind the cephalic end; nerve ring and excretory pore 0.397 and 0.406 respectively behind the anterior end; oesophagus $2.033-2.052$ long; tail conical, $0.133-0.228$ ($0.21-0.52$) long with caudal papillae $65-79\ \mu$ in front of the tail end; vulva $0.589-0.894$ ($0.56-0.95$) in front of posterior end of body; ovijectors long, posterior branch of uterus running parallel to the anterior one, after bending; eggs $102-108 \times 54-58.3\ \mu$ ($95-122 \times 50-55\ \mu$).

Host *Bos indicus* (*Bos*, *Ovis aries*, *Capra hircus*, *Bos bubalus*, *Bison bison*)

Location Abomasum

Locality Calicut, India (China, Taiwan, Indonesia, Philippines, Ceylon, Japan, USSR).



Figs. 22-24.—*Trichostrongylus longispicularis* Gordon, 1933. 22, vulvar region of female, lateral view. 23, bursa of male, dorsal view. 24, spicules and gubernaculum, dorsal view

Family Trichostrongylidae Leiper, 1912
Subfamily Haemoncinae Skrjabin et Schulz, 1952
Genus *Haemoncus* Cobbold, 1898

Haemoncus contortus [Rud., 1803] Cobbold, 1898

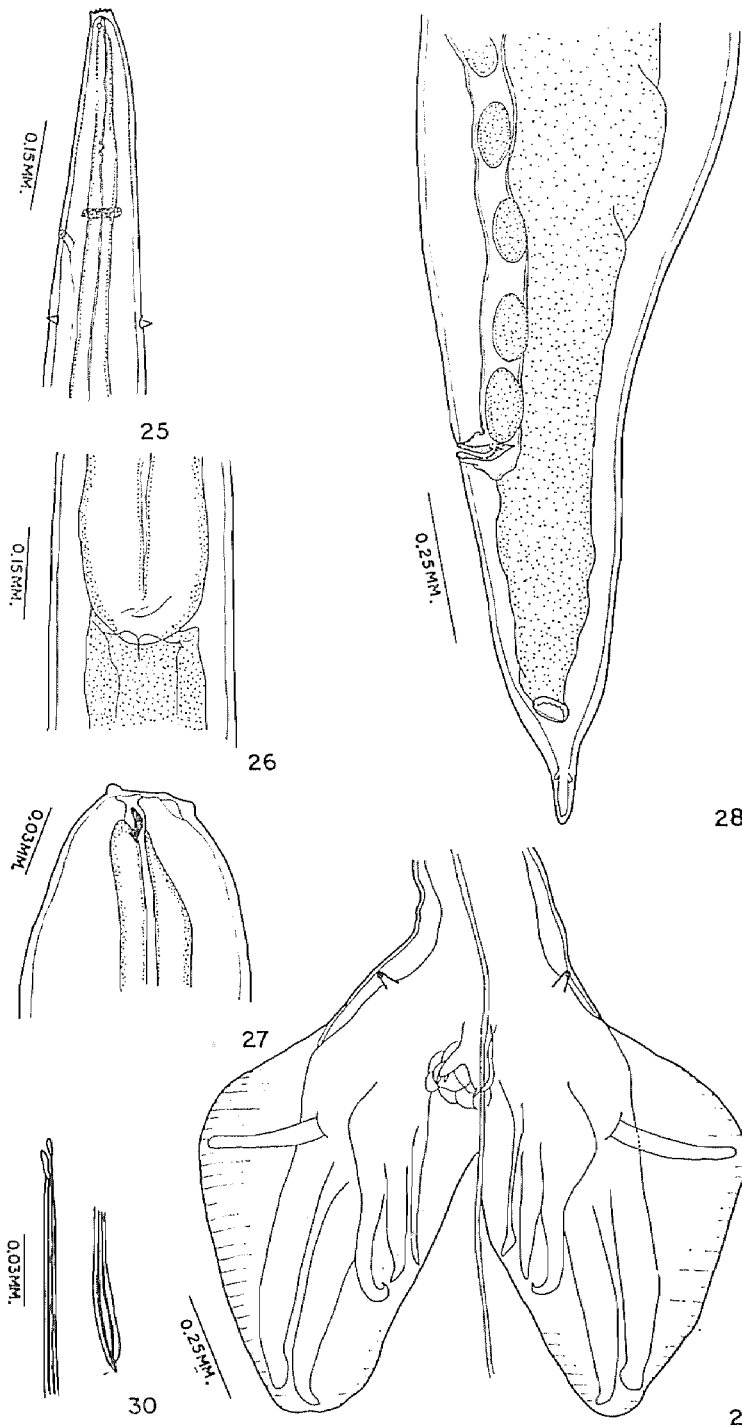
Syn. *Strongylus ammonis* Rud., 1819; *S. filicollis* of Molin, 1861; *Filaria denticulata* of Simmonds, 1881; *Abomesi ovis* Simmonds, 1881; *Strongylus placei* Place, 1893; *Strongylus haemonchus* Stewart, 1912 *Haemonchus atectus* Lebedew, 1929; *H. pseudocontortus* Lebedew, 1929; *H. fuhrmanni* Kamensky, 1929; *H. cervinus* Baylis et Daubney, 1922; *H. bovis* Roetti, 1940.

(Figs. 31-35)

Description based on 3 female and 2 male specimens. Body tapering at the tips; buccal cavity small, with a slender dorsal tooth; head papillae inconspicuous; cervical papillae prominent; nerve ring ahead of cervical papillae; oesophagus club shaped; barb of left spicule at about 0.01-0.02 from the tip.

Male: Body 11.8-12.0 (10-20) in length and 0.245-0.266 (0.4) in maximum thickness; head 23.3 μ in diameter; buccal tooth 9.33 μ long; nerve ring and cervical papillae 0.21-0.252 and 0.361-0.388 (0.3) respectively behind the anterior end; oesophagus 1.216-1.387 long; symmetrical lateral lobes of bursa 0.456-0.494 long, with a sub-median dorsal lobe; spicules 0.427-0.437 (less than 0.44) long and dark brown in colour, the spicule barbs 14-14.2 μ (24 μ) in left and 32.6-42 μ (44 μ) in height, from the respective distal tips; accessory piece 210 μ (200 μ), fusiform and thickened laterally.

Female: Body 16.0-19.50 (18-30) long with 0.245-0.323 (0.5) in maximum width; head diameter 38 μ ; buccal tooth 9.33 μ long; nerve ring and cervical papillae 0.233-0.275 and 0.361-0.38 (0.3) respectively behind the cephalic end; oesophagus 1.216-1.387 long; tail 0.323-0.342 (0.4-0.63), slender and sharply pointed; caudal papillae 70-121 μ from the tail end; vulva 2.527-3.4 (3-4) in front of posterior end with 0.665-0.769 long lingular flap of vulva; eggs 60.6-88.6 $\times$ 37.6-42 μ .



Figs. 25-30.—*Mecistocirrus digitatus* (Linstow, 1906) Railliet et Henry, 1912. 25, anterior oesophageal region of female, lateral view. 27, anterior extremity (enlarged), lateral view. 28, posterior region of female, lateral view. 29, bursa of male, dorsal view. 30, proximal and distal ends of spicules.

Host *Bos indicus* (*Ovis*, *Capra*, *Bos*, *Ovibos*, *Cervus*, *Citellus*, *Odocoileus*, *Gazella*, *Capreolus*, *Homo sapiens*, *Antidorcas*, *Rangifer*, *Damaliscus*)

Location Abdomasum

Locality Madras, India (Cosmopolitan)

Haemoncus similis Travassos, 1914

(Figs. 36-37)

Spicules of male not more than 0.5 long with barb of left spicule at about 0.04-0.06 from the tip.

Male: Body 8-12 long; spicules 0.310-0.380 long; borbs 45-68 μ and 63-74 μ from distal ends, in left and right spicules respectively and ending in small buttons; gubernaculum 148-210 $\times$ 25-30 μ .

Female: Body 12-17 long; tail 0.17-0.32 long; vulva 2.0-3.2 in front of posterior end of the body, situated on a conical elevation; eggs 64-82 $\times$ 39-49 μ with a mean of 71 $\times$ 44 μ (Shorb, 1939) or 50-80 $\times$ 32-54 μ (Donald, 1963).

Host *Bos indicus*, *Ovis aries*

Location Abomasum

Locality India (North and South America, Puerto Rico, Korea, Europe, Africa, Fiji).

Haemoncus longistipes Railliet and Henry, 1909

Spicules of male more than 0.6 long.

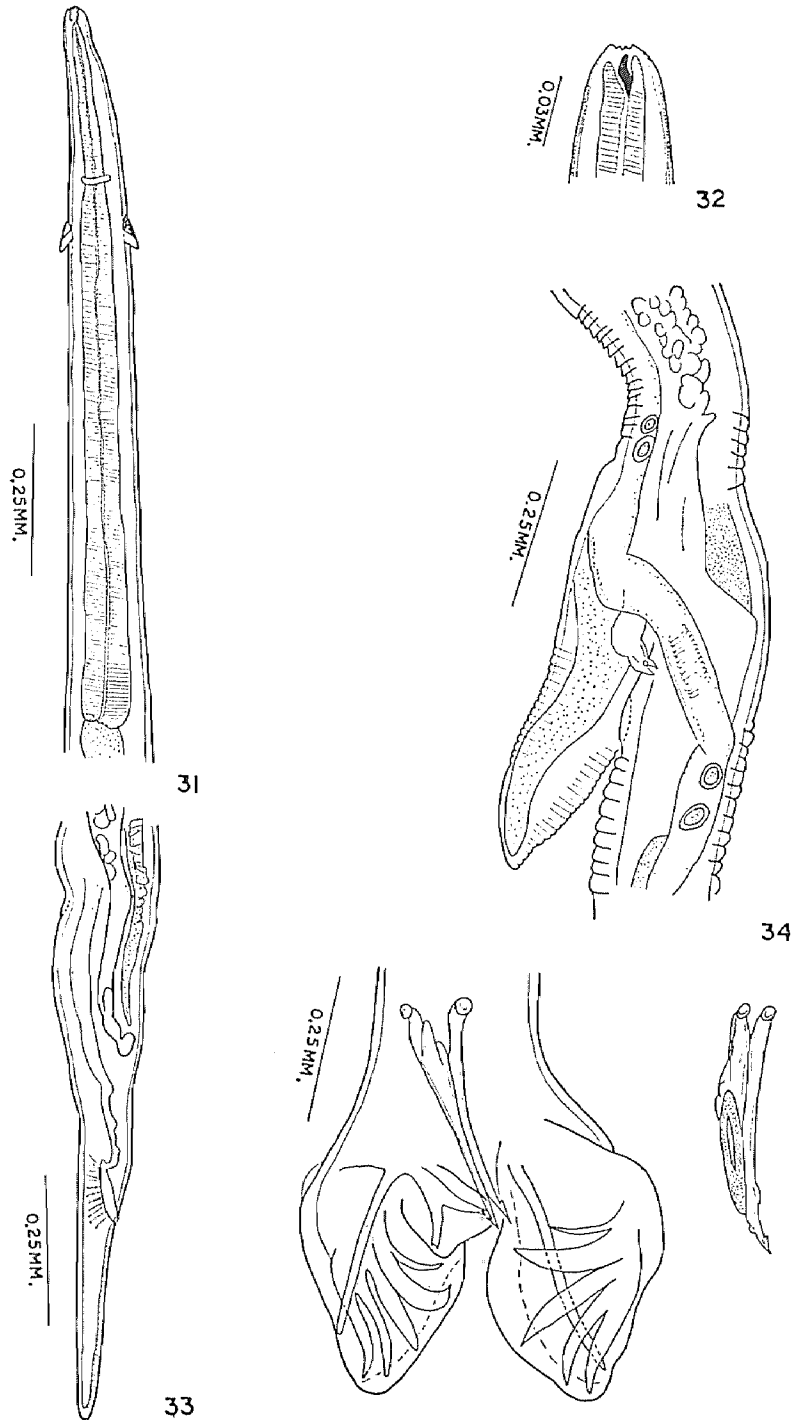
Male: Body 18-28 long; spicules 0.534 - 0.664 long with barbs 80-100 μ and 30-40 μ away respectively of right and left spicules; gubernaculum 250-380 μ .

Female: Body 26-39 long; tail 0.389-0.61 long; uncovered vulva 5.1-7.2 in front of posterior end; eggs 60-80 $\times$ 38-50 μ with a mean of 70 $\times$ 45 μ (Steward, 1950) or 69-50 μ (Dutt and Sahai, 1966).

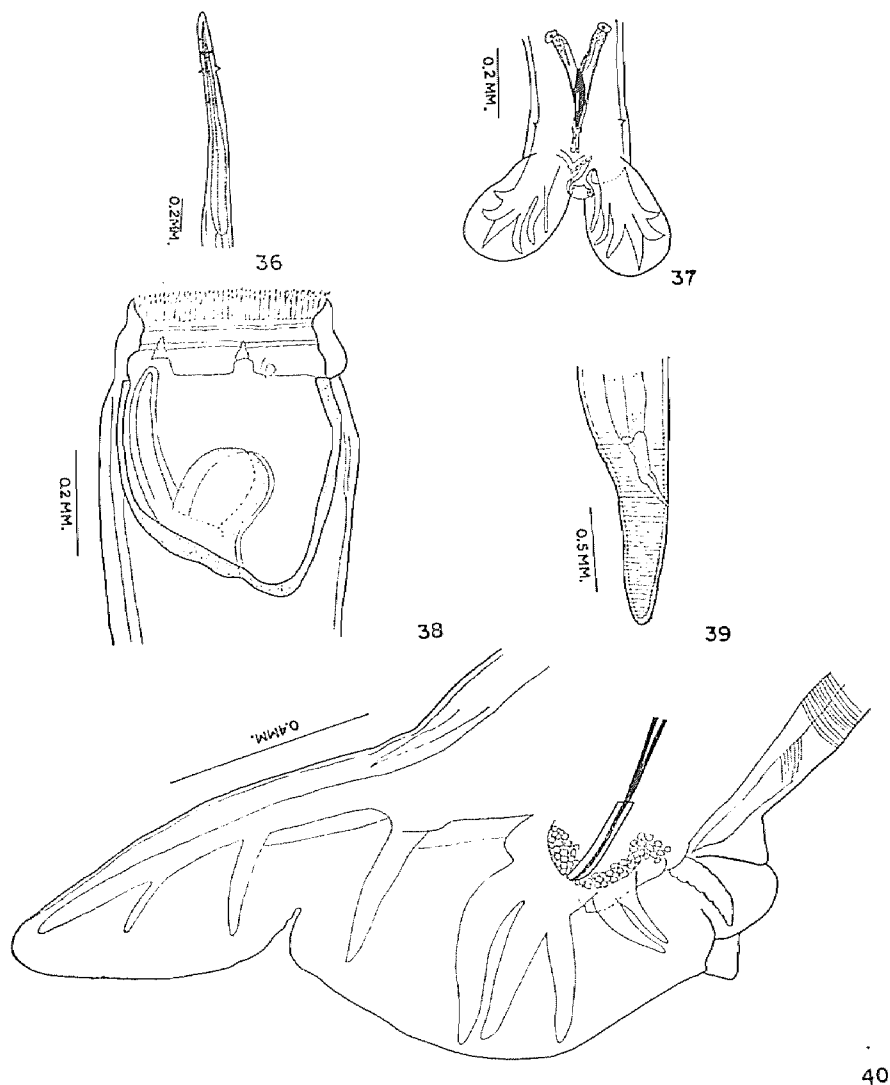
Host *Camelus dromedarius*, *Ovis aries*

Location Abomasum

Locality India (Asia, Africa)



Figs. 31-35.—*Haemoncus contortus* (Rud, 1803) Cobbold, 1898. 31, anterior region, lateral view. 32, anterior extremity (enlarged), lateral view. 33, posterior region of female, lateral view. 34, vulvar region of female, lateral view. 35, bursa, spicules and gubernaculum of male.



Figs. 36-37.—*Haemoncus similis* Travassos, 1914. 36, anterior region lateral view. 37, bursa, spicules and gubernaculum of male.
Figs. 38-40.—*Delafondia vulgaris* (Looss, 1900) Skrj., 1933. 38, anterior region, lateral view. 39, posterior region of female, lateral view. 40, bursa of male, lateral view.

Family Strongylidae Baird, 1853
Subfamily Strongylinae Railliet, 1893
Genus *Delafondia* (Railliet, 1923) Skrj., 1933

Delafondia vulgaris (Looss, 1900) Skrj., 1933

Syn. *Sclerostomum bidentatum* Sticker, 1901

(Figs. 38-40)

Description based on 7 male and 8 female specimens. Head directed forward and not marked off from the body; buccal capsule cup shaped; subventral teeth lacking but the sub dorsal teeth large, two, rounded anteriorly and arising by bifurcation of single process at the base of dorsal gutter; elements of external leaf crown fringed; cuticular striations 4.6μ apart.

Male: Body 14.3 - 15.7 (11-16) long and 0.589-0.665 (0.75-0.95) in maximum thickness; buccal capsule $0.589-0.722 \times 0.361-0.418$ ($0.466 - 0.53 \times 0.56 - 0.6$); nerve ring 1.045-1.216 behind anterior end; oesophagus 1.444-1.538 long; bursa 0.646-0.76 long and 1.026-1.33 broad, its dorsal ray branched and 0.684-0.836 (0.55-0.6) in length; spicules equal and slender, 1.615 - 1.805 long; gubernaculum 0.19-0.228 long.

Female: Body 18-22 (20-25) long with 0.836-1.083 (1.0-1.4) in maximum thickness; buccal capsule $0.703-0.741 \times 0.457-0.57$ ($0.466-0.53 \times 0.56-0.6$); nerve ring 1.235-1.349 behind the anterior end; oesophagus 1.71-1.919 long; tail 0.608-1.331 in length; vulva 5.89-6.933 (8-9) in front of caudal end; eggs $74-79 \times 37-42 \mu$ ($83-93 \times 48-52 \mu$).

Host *Equus caballus* (*E. asinus*)

Location Caecum

Locality Jammu, India (Cosmopolitan)

Family Strongylidae Baird, 1853
Subfamily Strongylinae Railliet, 1893
Genus *Alfortia* (Railliet, 1923) Skrj., 1933

Alfortia edentata (Looss, 1900) Skrj., 1933

(Figs. 41-42)

Head marked off from the body by constriction; buccal capsule cup-shaped, narrow at its base; teeth absent.

*Male: Body 23-28 long and 1.3-1.5 in maximum thickness; buccal capsule $0.8-1.1 \times 0.08-0.12$; oesophagus 1.8 long; dorsal ray of bursa $0.4-0.475$ long; spicules 1.9-2.2 long.

Female: Description based on 8 specimens. Body $34.8-36.4 \times 1.691-2.052$ ($33-44 \times 1.6-2.2$); buccal capsule $1.195-1.368 \times 1.14-1.273$ ($0.8-1.1 \times 0.8-1.2$); external leaf crown elements numerous, pointed and projecting $0.285-0.3$ away from buccal cavity; tail $0.390-0.456$ ($0.45-0.6$); vulva $9.215-10.165$ (9-10) in front of caudal extremity; eggs $64-84 \times 42-46 \mu$ ($78-88 \times 48-52$ w).

Host *Equus caballus* (*Equus asinus*)
Location Caecum
Locality Jammu, India (Cosmopolitan)

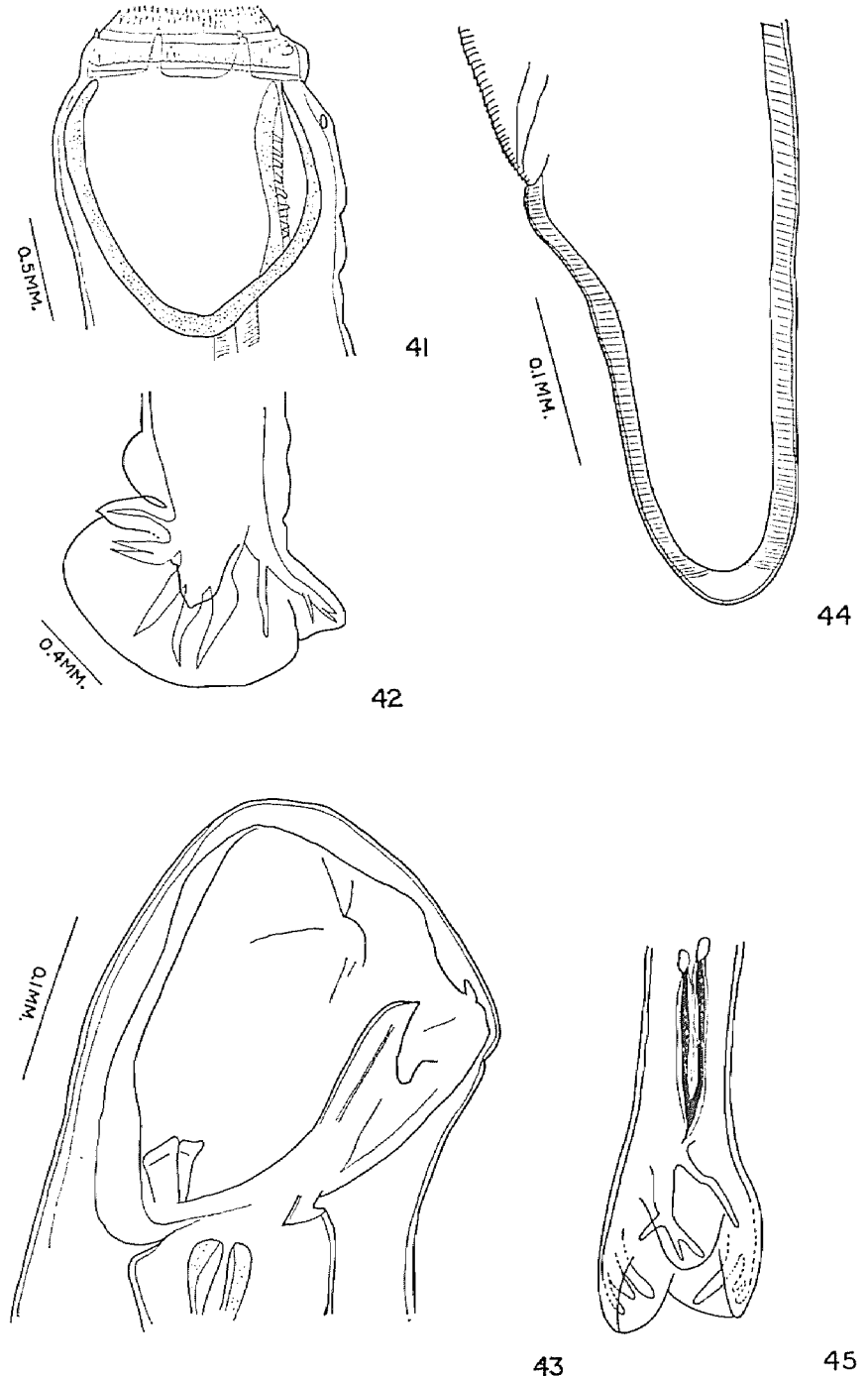
Family Ancylostomatidae Nicoll, 1927
Subfamily Bunostominae Looss, 1911
Genus *Bunostomum* Railliet, 1902

Bunostomum trigonocephalum (Rud., 1908) Railliet, 1902

Syn. *Sclerostoma hypostomum* (Rud., 1819); *Monodontus wedlii* Molin, 1861; *Dochimius cernuus* (Crepl., 1829) partim; *Bunostomum kasinathi* Lane, 1917.

(Figs. 43-45)

* From literature.



Figs. 41-42.—*Alfortia edentata* (Looss, 1900) Skrj., 1933. 41, anterior region lateral view. 42, bursa of male, lateral view
Figs. 43-45.—*Bunostomum trigonocephalum* (Rud., 1808) Railliet, 1902. 43, anterior region, lateral view. 44, posterior region of female, lateral view. 45, bursa of male, dorsal view.

Body bent dorsally at anterior end; dorsal border of dorsal tooth longer than the distance from its tip to the mouth opening; cervical and caudal papillae present; cuticular striations $4.6\ \mu$ apart; tail bluntly rounded; maximum thickness of body just anterior to vulva.

* Male: Body 12-17 long; spicules slightly twisted and 0.6-0.64 in length.

Female: Description based on 8 specimens. Body 15-17.2 (19-26) long and 0.475-0.513 in maximum thickness; buccal capsule 0.186-0.238 and 0.196-0.205, long and dorso-ventrally wide respectively; cervical papillae 0.627-0.741 behind the anterior end; oesophagus 1.254-1.368 long; tail 0.233-0.261 (0.25-0.275); caudal papillae 0.065-0.079 in front of tail end; vulva 6.0-7.0 (5.5-8) behind cephalic end; eggs $65.3-79.3 \times 32.6-42\ \mu$ (89×51 or $92 \times 46\ \mu$).

Host *Bos indicus* (*Ovis*, *Capra*, *Bos*)

Location Small intestine

Locality Mathura, India (Cosmopolitan)

Bunostomum phlebotomum (Railliet, 1900) Lane, 1917.

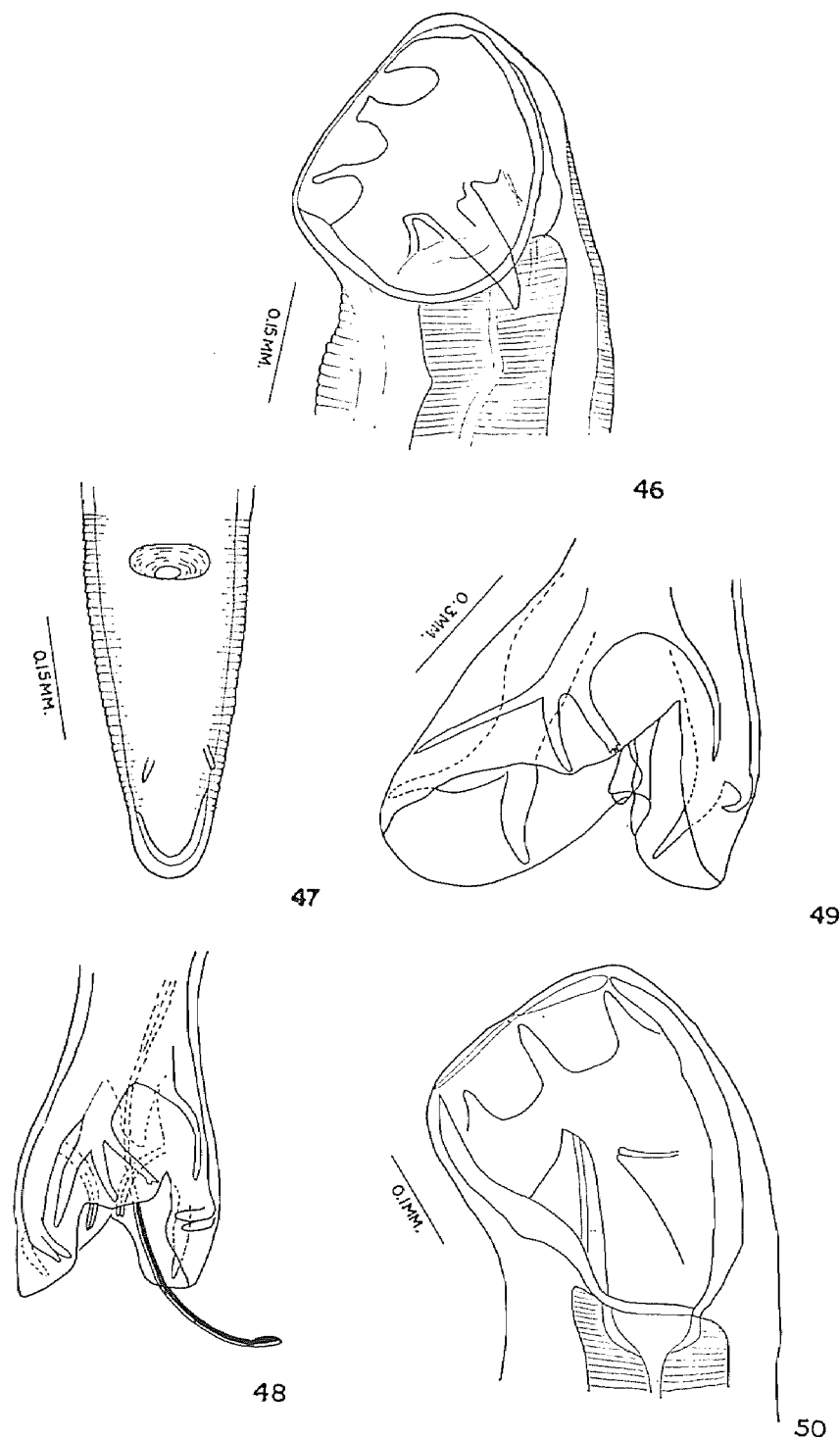
Syn. *Ancylostomum bovis* Stroese, 1894; *Strongylus radiatus* Rud., 1803; of Schneider, 1866.

(Figs. 46-48)

Anterior end of body bent dorsally; buccal capsule large, infundibular with a dorsal tooth along which runs a dorsal gutter; dorsal tooth relatively short, with its dorsal border shorter than the distance between its tip to the mouth opening; subventral lancets present; caudal papillae present.

*Male: Body 10-12 long and $470-475\ \mu$ in maximum width; spicules, filiform, 3.5-4.0 in length.

Female: Description based on 8 specimens. Body 14-20.5 (16-19) long and 0.722-0.912 in maximum width; buccal capsule 0.304-0.323 long with 0.285-0.304 and 0.304-0.342 in transverse and dorsoventral diameters respectively; oesophagus 2.375-2.945 long; nerve ring and excretory pore 0.494-0.874 and 0.684-0.95 respectively behind the cephalic end; cuticular striations of body $9.33-11.66\ \mu$ apart; tail 0.245-0.399 (0.4-0.5) in



Figs. 46-48.—*Bunostomum phlebotomum* (Railliet, 1900) Lane, 1917. 46, anterior region, lateral view. 47, posterior region of female, ventral view. 48, bursa of male, dorsal view.

Figs. 49-50.—*Bunostomum bovis* Maplestone, 1931. 49, bursa of male, dorsoventral view. 50, anterior region, lateral view

length; caudal papillae 0.092 in front of tail end; vulva 5.5-10.0 behind the anterior end in front of middle of body; vagina long and sinuous; eggs 84-102 × 46.67-60.66 μ (69-120 × 31-73 μ).

Host *Bos indicus* (*Bos*, *Ovis*)

Location Small intestine

Locality Mathura, India (Cosmopolitan)

Bunostomum bovis Maplestone, 1931

(Figs. 49-50)

Buccal capsule elongate; dorsal border of dorsal tooth shorter than the distance from its tip to mouth opening; sub-ventral lancets one pair, long and pointed; cuticle coarsely striated; both sexes 15-16 long with 0.5 in maximum thickness.

Male: Spicules 4.5 long, slender and tapering with fine striaght points, latter fused and surrounded by membrane sheath.

Female: Tail 0.34 long with a blunt tip; vulva 8.5 in front of posterior end, vagina short; eggs 72-76 × 44-46 μ .

Host *Bos indicus*, *Ovis aries*

Location Abomasum

Locality India.

RESUMEN

Este trabajo comprende el estudio taxonómico de ocho especies de nematodos parásitos de animales domésticos, pertenecientes a siete géneros y cuatro familias.

Se incluyen también otras siete especies de nematodos de la India procedentes de hospedadores similares.

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