

SYSTEMATIC STUDIES ON SOME MORE NEMATODES
FROM THE UNNAMED COLLECTIONS OF THE
ZOOLOGICAL SURVEY OF INDIA

By

T. D. SOOTA and Y. CHATURVEDI

Zoological Survey of India, Calcutta

(With 3 text-figs.)

INTRODUCTION

While working on the unnamed collections of the Zoological Survey of India, the authors came across some nematodes, which, on examination, have been found to belong to 18 species of 14 genera of 11 families. The collection is small but interesting as it brings to light some hitherto unrecorded variations and form new host and locality records. The material is dealt with below.

We are thankful to Dr. A. P. Kapur, Director, Zoological Survey of India, Calcutta, for the kind encouragement in the completion of this paper.

SYSTEMATIC ACCOUNT

Order STRONGYLIDEA Diesing

Family CYATHOSTOMIDAE Yamaguti

Subfamily OESOPHAGOSTOMINAE Railliet

Oesophagostomum dentatum (Rud., 1803) Molin, 1861

1803. *Strongylus dentatus* Rudolphi, *Arch. Zool. u. Zoot.*, 3(2):1.

Material.—Two ♂♂, Z.S.I. Reg. No. W 7036/1, host—pig, locality—Hyderabad (Andhra Pradesh).

Male.—Body 5.7-6.2* long and 0.3-0.33 wide ; cervical groove 0.17-0.18 away from anterior end ; external leaf crown consisting of nine and internal of eighteen small elements ; oesophagus 0.55-0.66 long ; spicules 0.88-0.99 long ; accessory piece 0.11 long ; bursal rays arranged in typical manner.

*All measurements are in millimeters.

Remarks.—The present specimens differ from the earlier descriptions in the spicules being smaller.

***Oesophagostomum columbianum* (Curtice, 1890)**

Stossich, 1899

1890. *Oesophagostoma columbianum* Curtice, *Agric. J.*: 16.

Material.—Several ♂♂ & ♀♀, Z.S.I. Reg. Nos. W 7016-35/1, host—goat, location—large intestine, localities—Jodhpur (Rajasthan), Bareilly (Uttar Pradesh), and Calcutta (West Bengal).

Male.—Body 14.3-15.3 long and 0.44-0.46 wide; cervical groove 0.22-0.24 away from anterior end and cervical papillae situated just behind it; external leaf crown consisting of 22-24 and internal of 42-47 elements; oesophagus 0.88-0.94 long; spicules 0.77-0.83 long; accessory piece 0.077-0.099 long; bursal rays arranged in typical manner.

Female.—Body 18.0-20.9 long and 0.44-0.52 wide; cervical groove 0.24-0.27 away from anterior end; tail 0.44-0.5 long; vulva 1.2-1.3 away from posterior end; eggs 0.055-0.088 × 0.044-0.055 in diameter.

Remarks.—The present specimens differ from the earlier descriptions in the female being longer in body size but the tails being smaller.

***Raillietostromylus samoensis* (Lane, 1922) Lane, 1923**

1922. *Crassisoma samoense* Lane, *Ann. Mag. nat. Hist.* (9), 9: 684.

Material.—a ♂ and two ♀♀, Z.S.I. Reg. No. W 7006/1, host—Pig, *Sus scrofa*, location — intestine, locality—Hyderabad (Andhra Pradesh).

Male.—Body 5.9 long and 0.31 wide; mouth dorso-subterminal and protected ventrally by a pair of falcate structures; buccal capsule 0.15 × 0.12 in diameter and armed basally with a pair of large subventral bicuspid teeth; cervical papillae 0.5 away from anterior end; oesophagus 0.67 long; spicules equal, 0.47 long; gubernaculum 0.099 long; bursa same as described for the species.

Female.—Body 6.6 long and 0.41 wide; buccal capsule 0.2 × 0.14 in diameter; oesophagus 0.75 long; tail 0.14 long; vulva not clearly discernible due to the body cavity being crowded with eggs; eggs 0.044-0.055 × 0.044-0.055 in diameter.

Remarks.—Cameron (1924) treated this genus as a synonym of *Globocephalus* Molin, which was supported by Yorke and

Maplestone (1926), Baylis (1936), Neveu-Lemaire (1936), and Teixeira de Freitas and Lent (1936). Yamaguti (1935a) maintained its original generic status but later (1961) synonymised it with *Uncinaria* Froelich. This genus was considered valid by Ozerskafa (1955), Popova (1955), and Skrjabin *et al.* (1961), with whom the present authors are in full agreement.

The present description presents many wider ranges of measurements.

Family ANCYLOSTOMATIDAE Nicoll

Subfamily BUNOSTOMINAE Loos

Bunostomum trigonocephalum (Rud., 1808) Railliet, 1902

1808. *Strongylus trigonocephalus* Rudolphi, *Entozoorum sive vermium intestinalium historit naturalis*, Amstelaedami, 1, 527 pp.

Material.—two ♂♂ and two ♀♀, Z.S.I. Reg No. W 7012-13/1, host—goat, location—intestine, locality—Pashulok (Uttar Pradesh).

Male.—Body 10.8-11.0 long and 0.5-0.55 wide; buccal capsule 0.16-0.18 × 0.13-0.14 in diameter; lancet and dorsal tooth present; oesophagus 0.99-1.0 long; spicules 1.2-1.27 long; bursal rays arranged in typical manner.

Female.—Body 15.6-17.0 long and 0.55-0.6 wide; buccal capsule 0.22-0.24 × 0.18-0.19 in diameter; oesophagus 1.2-1.3 long; tail 0.26-0.27 long; vulva 6.8-7.7 away from anterior end; eggs 0.077 × 0.033 in diameter.

Remarks.—The present specimens differ from the earlier descriptions in the spicules being much longer.

Kalicephalus willeyi Linstow, 1904

1904. *Kalicephalus willeyi* Linstow, *Spolia zeylan.*, 1: 99.

Material.—a ♀, Z.S.I. Reg. No. W 6989/1, host—Russell's Viper, location—intestine, locality—Birati, 24-Parganas (West Bengal), 4.x.1967

Female.—Body 7.0 long and 0.22 wide; head 0.22 wide; capsule 0.18 long; oesophagus excluding buccal capsule 0.44 × 0.15 in diameter; nerve ring 0.3 away from anterior end; tail 0.33 long; vulva 2.6 away from posterior end.

Remarks.—The present specimen shows some minor variations in measurements from the earlier descriptions.

Kalicephalus indicus Ortlepp, 1923

1923. *Kalicephalus indicus* Ortlepp, *J. Helminth*, 1: 180.

Material.—Two ♂♂ and a ♀, Z.S.I. Reg. No. W 6990/1, host—*Ptyas mucosus*, location—intestine, locality—Bhasna, 24-Parganas (West Bengal), 10.xi.1965; two ♂♂, Z.S.I. Reg. No. W 6991/1, host—snake, location—intestine, other particulars not available; a ♂, Z.S.I. Reg. No. W 6995/1, host—*Natrix stolatus*, location—intestine; locality—Bhasna, 24-Parganas (West Bengal), 5.viii.1968.

Male.—Body 4.7-6.4 long and 0.21-0.24 wide, head 0.12-0.6 wide; buccal capsule 0.088-0.11 long; nerve ring 0.18-0.19 away from anterior extremity; oesophagus excluding buccal capsule 0.26-0.28 × 0.099-0.12 in diameter; spicules 0.33-0.39 long; accessory piece 0.12-0.14 long; bursal rays same as described for the species.

Female.—Body 6.2 long and 0.3 wide; head 0.2 wide; buccal capsule 0.14 long; oesophagus 0.29 × 0.15 in diameter; nerve ring 0.22 away from anterior end; vulva 1.29 from posterior end; tail 0.13 long; eggs 0.055 × 0.033 in diameter.

Remarks.—The species is here being recorded for the first time from *Natrix stolatus*.

Kalicephalus minutus (Baylis and Daubney, 1922)
Ortlepp, 1923

1922. *Diaphanocephalus minutus* Baylis and Daubney, *Mem. Indian Mus.*, 7: 332.

Material.—Several ♂♂ and ♀♀, Z.S.I. Reg. No. W 6992/1, host—*Bungarus fasciatus*, location—intestine, locality—Birati, 24 Parganas (West Bengal), 6.iv.1968; Several ♂♂ and ♀♀, Z.S.I. Reg. No. W 6993/1, host and locality same as above, 11.10.1968.

Male.—Body 3.8-6.0 long and 0.16-0.22 wide; head 0.18-0.2 wide; buccal capsule 0.16-0.2 long; oesophagus 0.44-0.52 × 0.11-0.16 in diameter; nerve ring 0.26-0.33 away from anterior end; spicules unequal, longer 0.44-0.5, smaller 0.3-0.33 long; accessory piece 0.11-0.13 long; bursal rays same as described for the species.

Female.—Body 5.9-6.0 long and 0.24-0.3 wide; head 0.2-0.21 wide; buccal capsule 0.2 long; oesophagus 0.5-0.55 × 0.18-0.2 in diameter; nerve ring 0.33 away from anterior end; tail

0.24-0.27 long ; vulva 1.76-1.82 away from posterior end ; eggs 0.044-0.055 \times 0.033-0.044 in diameter.

Kalicephalus fimbriatus (Ortlepp, 1923)

1923. *Occipitodontus fimbriatus* Ortlepp. *J. Helminth.*, 1: 169.

Material.—Two ♀♀, Z.S.I. Reg. No. W 6994/1, host—*Bungarus fasciatus*, location—intestine, locality—Birati, 24-Parganas (West Bengal), 6.iv.1968.

Female.—Body 12.3 long and 0.47 wide ; head 0.33 wide ; buccal capsule 0.23 long ; oesophagus 0.77 \times 0.25 in diameter ; nerve ring 0.47 away from anterior end ; tail 0.33 long ; vulva 4.6 away from posterior end ; eggs 0.055 in diameter.

Family TRICHOSTRONGYLIDAE Leiper, 1912

Subfamily HAEMONOCINAE Yamaguti, 1962 (=Haemonchinae Skrzjabin and Schulz, 1952)

Haemoncus contortus (Rud., 1803) Cobb, 1898

1803. *Strongylus contortus* Rudolphi, *Zool. u. Zoot.*, 3(2): 1.

Material.—Several ♂♂ and ♀♀, Z.S.I. Reg. No. W 7007/1, host—sheep, *Ovis* sp., location—abomasum, locality—Bareilly (Uttar Pradesh), 5.vi.1965 ; several ♂♂ and ♀♀, Z.S.I. Reg. No. W 7008/1, host—sheep, *Ovis* sp., location—abomasum, locality—Calcutta, 26.x.1962 ; Several ♂♂ and ♀♀, Z.S.I. No. W 7009/1, host—sheep, *Ovis* sp., location—small intestine, locality—Bharari (Uttar Pradesh) ; Several ♂♂ and ♀♀, Z.S.I. Reg. No. W 7010-11/1, host—*Ovis* sp., location—abomasum, locality—Pashulok (Uttar Pradesh).

Male.—Body 14.4-17.6 long and 0.31-0.33 wide ; head 0.022-0.33 wide ; oesophagus 1.27-1.32 long ; nerve ring 0.28-0.33 away from anterior end ; cervical papillae situated 0.33-0.38 from anterior end ; spicules equal, 0.38-0.42 long ; bursa as described by Baylis (1936).

Female.—Body 22.3-25.0 long and 0.44-0.5 wide ; head 0.022-0.033 wide ; oesophagus 1.5-1.65 long ; nerve ring 0.33-0.38 away from anterior end ; cervical papillae situated 0.4-0.42 from anterior end ; tail 0.44-0.55 long ; vulva 4.3-4.4 away from posterior end ; eggs 0.44-0.055 \times 0.044-0.055 in diameter.

Subfamily *MECISTOCIRRINAE* Skrjabin and Orloff, 1934

Mecistocirrus digitatus (V Linstow, 1906)

Railliet and Henry, 1912

1906. *Strongylus digitatus* v. Linstow, *Spolia zeylan.*, 3: 168.

Material.—Several ♂♂ and ♀♀, Z.S.I. Reg. No. W 7017/1, host—calf (cow), location—abomasum, locality—Bareilly (Uttar Pradesh), 1.vi.1965.

Male—Body 15.8-23.8 long and 0.4-0.5 wide; oesophagus 1.5-2.0 long; nerve ring 0.24-0.33 away from anterior end; spicules 5.2-7.6 long; bursa as described by Baylis (1936).

Female.—Body 16.8-23.4 long and 0.72-0.73 wide; oesophagus 1.4-1.8 long; nerve ring 0.33 away from anterior end; tail 0.22-0.24 long; vulva 0.44-0.55 away from posterior end.

Remarks.—The present specimens differ from the earlier descriptions in the females being smaller in body size and the spicules being longer.

Subfamily *OSWALDOCRUZIINAE* Skrjabin and Schikhobalova, 1952

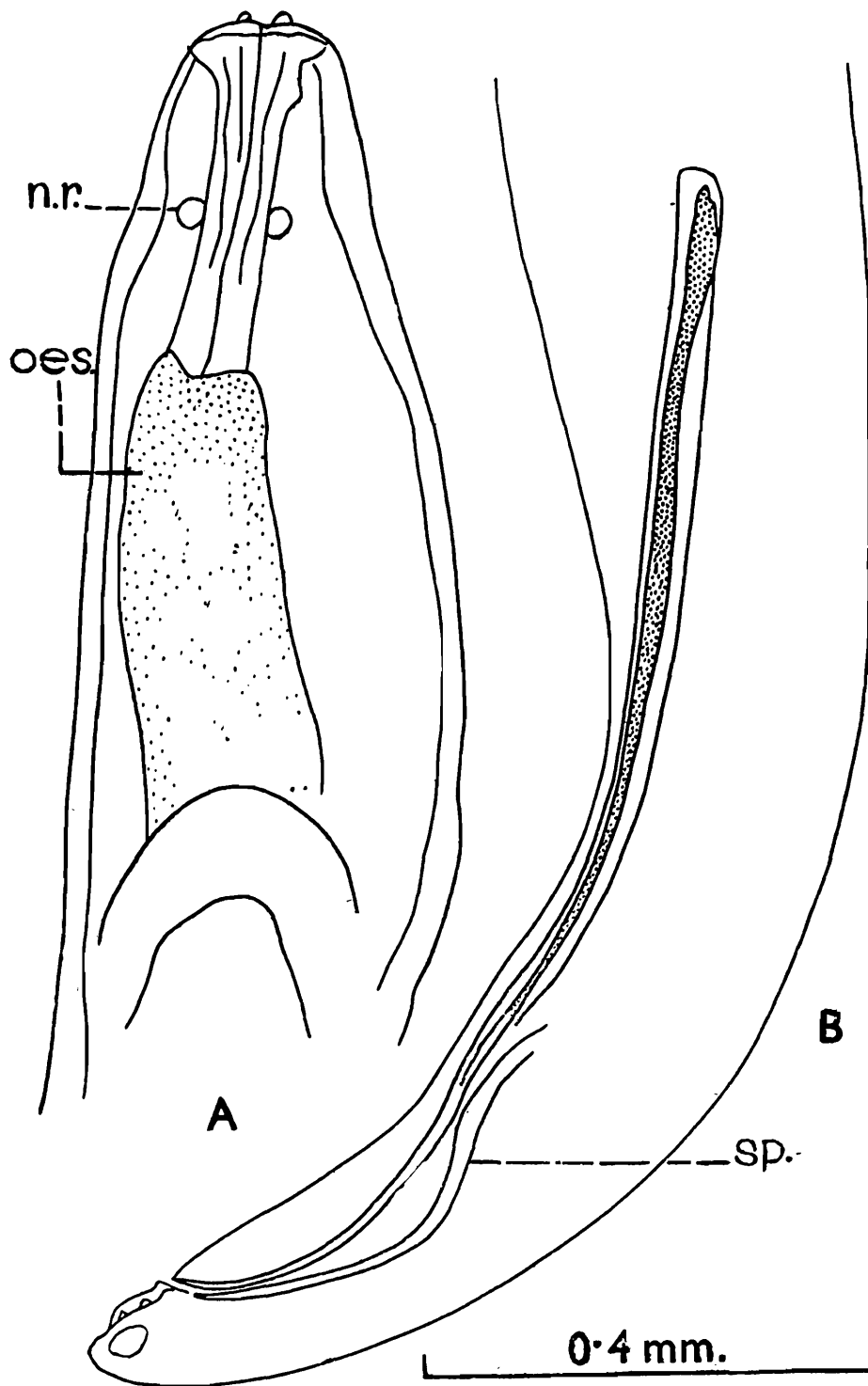
Oswaldocruzia filiformis (Goeze, 1782)

1782. *Ascaris filiformis* Goeze, *Versuch einer Naturgeschichte der Eingeweid ewurmer thierischer Korper Blankenburg*: 471.

Material.—a ♂ and a ♀, Z.S.I. Reg. No. W 6972/1, host—*Rana* sp., location—stomach, locality—Dum Dum, 24-Parganas (West Bengal), 24.iv.1964; several ♂♂ and ♀♀, Z.S.I. Reg. Nos. W 6973-5, 78/1, hosts—*Bufo* sp. and *Rana* sp., locations—liver, stomach and intestine, locality—Birati, 24-Parganas (West Bengal), 27.iv.1965, 7.vi.1965 and 8.vii.1965; two ♂♂ reduce, Z.S.I. Reg. No. W 6976/1, host—*Enhydris* sp., and a ♀, Z.S.I. Reg. No. W 6977/1, host—*Bufo* sp., location—intestine, locality—Bhasna, 24-Parganas (West Bengal), 28.x.1965 and 12.vii.1967; six ♂♂ and ♀♀, Z.S.I. Reg. No. W 6980/1, host—*Bufo* sp., location—rectum, locality—Chitrakunda, Korraput (Orissa), 7.v.1966.

Male.—Body 4.9-9.0 long and 0.13-0.15 wide; head including vesicle 0.033-0.044 wide; oesophagus 0.38-0.5 long; spicules 0.19-0.2 long; bursal rays arranged in typical manner.

Female.—Body 10-17.2 long and 0.13-0.26 wide; head including vesicle 0.044-0.055 wide; oesophagus 0.044-0.5 long; tail 0.22-0.33 long; vulva 3.3-5.5 away from posterior end; eggs 0.055-0.11 × 0.004-0.055 in diameter.



Text-fig. 1. *Hamatospiculum* sp.

a. female anterior end; b. male, posterior end.

Abbreviations : oes. Oesophagus, nr. nerve ring, sp. spicule

Remarks.—Baylis and Daubney (1923) recorded this species from Nankowry Island of the Nicobar group; thus the present record appears to be the first from the Indian mainland.

Since so far the species has been recorded among the reptilian hosts from lizards viz., *Lacerta* sp., its present record from a snake (*Enhydris* sp.) is thus the first of its kind from snakes.

Order FILARIIDEA Yamaguti, 1961

Family FILARIIDAE Claus, 1885

Hamatospiculum sp.

(Text-fig. 1a & b)

Material.—Two ♂♂ and several ♀♀ (damaged), Z.S.I. Reg. No. W 7074/1, host—Sparrow hawk (*Accipiter* sp.), location—abdominal cavity, locality—Bikaner (Rajasthan), collector—Dr. B. Biswas, 15.i.1957

Male.—Body 55.0-67.5 long and 0.66-0.68 wide; oesophagus divided into two portions, anterior 0.33-0.44, posterior 10.2-11.0 long; nerve ring 0.22 from anterior end; tail 0.055 long and with very narrow caudal alae; spicules unequal and dissimilar, left 1.4-2.1, right 0.42-0.44 long; papillae, only two postanal clearly discernible.

Female.—Body 120 long and 0.88 wide; anterior oesophagus 0.55 long; nerve ring 0.27 from anterior end; vulva not distinct; eggs 0.044-0.055 × 0.033-0.044 in diameter.

Diplotrianena bargusinica Skrjabin, 1917

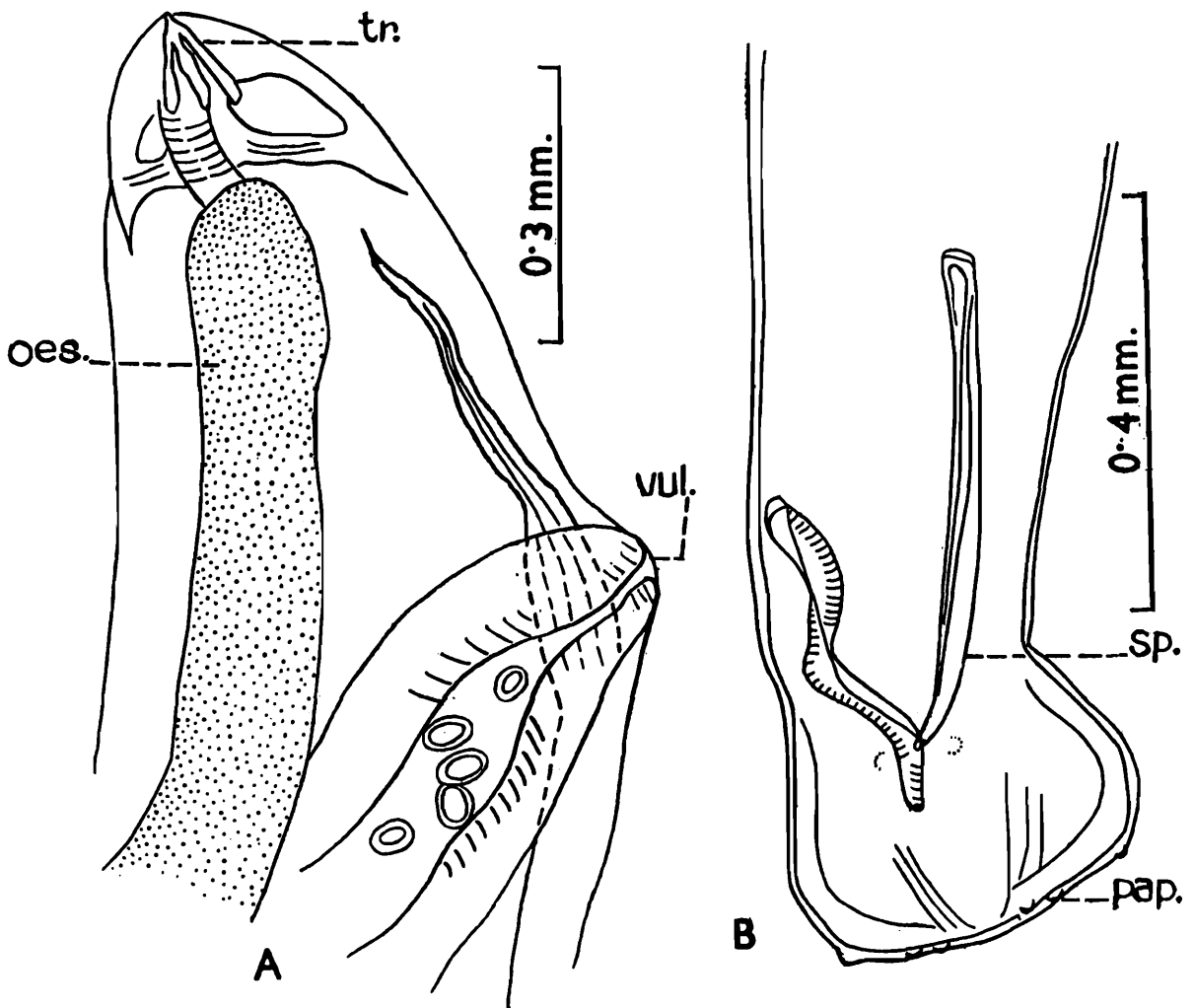
(Text-fig. 2a & b)

1917. *Diplotrianena bargusinica* Skrjabin, *Parasitology*, 9(4): 471.

Material.—Several ♂♂ and ♀♀, Z.S.I. Reg. No. W 7042/1, host—*Turdus ruficollis*, location—body cavity, locality—Sangtey, Paro (Bhutan), collector—Shri E. R. S. Holmes, 15.iii.1970.

Male.—Body 31.0-46.4 long and 0.72-0.77 wide; tridents 0.13-0.14 long; oesophagus divided into two portions, anterior muscular 0.27-0.31, posterior glandular 3.6-4.8 long; cloaca subterminal; spicules unequal and dissimilar, left longer, straight and 0.64-0.66, right shorter, alate, striated, with two spiral curves and 0.38-0.5 long; caudal papillae, preanal, only one pair clearly discernible, postanal, three pairs and situated along the posterior margin.

Female.—Body 85-107 long and 0.99-1.1 wide; tridents 0.11-0.13 long; oesophagus divided into two portions, anterior muscular 0.22-0.27, posterior glandular 3.3-5.0 long; nerve ring 0.16-0.22, and vulva 0.55-0.88, both from anterior end; eggs 0.033×0.055 in diameter.



Text-fig. 2. *Diplotrriaena bargusinica* Skrjabin, 1917.
a. female, anterior end; b. male, posterior end.

Abbreviations: Oes. Oesophagus, pap. papillae, tr. trident, sp. spicule, vul. vulva.

Remarks.—Though the present specimens show some variations from earlier descriptions in respect of body measurements and in the number and arrangement of caudal papillae, in our opinion these variations are intraspecific.

The species has hitherto been recorded from Siberia (Skrjabin, 1917), and Japan (Yamaguti, 1935); and hence its present record from India greatly extends its range of distribution towards the South.

Diplotriaena sp.

The six lots detailed below belonging to the genus *Diplotriaena* from different hosts and localities could not be identified further due to poor preservation.

Material.—Lot 1. Several ♀♀ (fragments), Z.S.I. Reg. No. W 7075/1, host—Roller (*Coracias* sp.), location—body cavity, locality—Kisli, Balaghat (Madhya Pradesh), collector—T. D. Soota, 26.1.1954.

Females.—Tridents 0.19 long; anterior oesophagus, 0.27 long; vulva 0.55 from anterior end; eggs 0.055×0.033 in diameter.

Lot 2. Several ♀♀ (fragments), Z.S.I. Reg. No. W 7076/1, host—An undetermined bird, location—body cavity, locality—Waltair (Andhra Pradesh), 17.ii.1947

Female.—Tridents 0.14 long; anterior oesophagus 0.2 long; nerve ring 0.18 and vulva 0.38, both from anterior end; eggs 0.033×0.077 in diameter.

Lot 3. Several ♀♀ (fragments), Z.S.I. Reg. No. W 7077/1, host—Racket-tailed Drongo (*Dicrurus* sp.), location—coelomic cavity, locality—Garampani, Khasi and Jaintia Hills (Meghalaya), collector—Shri H. Khajuria (Indo-German Expd.), 24.xi.1956.

Female.—Body 42.9 long and 0.95 wide; tridents 0.16 long; anterior oesophagus 0.33 and posterior oesophagus 6.6 long; vulva 0.33 from anterior end; eggs 0.044×0.022 in diameter.

Lot 4. Several ♀♀ (fragments), Z.S.I. Reg. No. W 7078/1, host—Bank Myna (*Acridotheres ginginianus*), location—body cavity, locality—Barasat (West Bengal), collector—Dr. B. Biswas, 19.vi.1952.

Female.—Body 0.66 wide; tridents 0.13 long; anterior oesophagus 0.33 long; nerve ring 0.22 and vulva 0.55, both from anterior end; eggs 0.044×0.033 in diameter.

Lot 5. Several ♀♀ (fragments), Z.S.I. Reg. No. W 7079/1, host—Myna (*Acridotheres* sp.), location—body cavity, locality—

Indian Museum compound, Calcutta, collector—Shri J. K. Sen, 21.vi.1954.

Female.—Tridents 0.13 long; anterior oesophagus 0.22 long; vulva 0.55 from anterior end; eggs 0.044×0.033 in diameter.

Lot 6. Two ♂♂ and several ♀♀ (fragments), Z.S.I. Reg. No. W 7080/1, host—Yellow-cheeked Teat (*Parus ? xanthogenys*), location—body cavity, locality—Jawai, Mount Abu (Rajasthan).

Male.—Tridents 0.088 long; anterior oesophagus 0.33 long; nerve ring 0.22 from anterior end; spicules unequal and dissimilar, left 1.05, right 0.58 long.

Female.—Eggs $0.022-0.044 \times 0.022-0.033$ in diameter; embryos $0.088-0.66 \times 0.0022$ in diameter.

Family DIPETALONEMATIDAE Wehr, 1935

Lemdana sp.

Material.—a ♂ and a ♀, Z.S.I. Reg. No. W 7043/1, host—cuckoo, location—body cavity, locality—Rogulchang, Baratang Island (Andamans), collector—Shri B. S. Lamba, 20.iii.1964.

Male.—Body 18.7 long and 0.55 wide; spicules very unequal, longer 3.2, shorter 0.33 long; tail 0.055 long and without alae; caudal papillae not discernible.

Female.—Body 35.6 long and 0.88 wide; eggs 0.022×0.044 in diameter.

Remarks.—Though the present specimens show some variations from the earlier descriptions, but due to their poorly preserved state specific identification has not been possible.

The genus is being recorded here for the first time from Andaman Islands.

Order SPIRURIDEA Diesing, 1861

Family SPIRURIDAE Orley, 1885

Physocephalus sexlatus (Molin, 1860) Diesing, 1869

Material.—Two ♂♂ and three ♀♀, Z.S.I. Reg. No. W 6941/1, host—Indian Gerbil, *Tatera indica*, location—stomach, locality Kolayat, Bikaner (Rajasthan), collector—Dr. V C. Agrawal, 13.ix.1960.

Male.—Body 8.9-9.5 long and 0.22-0.24 wide ; three lateral alae present and originating at the level of the junction of pharynx and oesophagus ; pharynx 0.12-0.18 × 0.044 in diameter and with 17-20 annular thickenings ; oesophagus 2.2-2.9 long ; tail 0.11-0.12 long, rounded and with a small spike ; caudal alae asymmetrical, 0.82-1.05 long ; longitudinal cuticular ridges present on caudal end ; spicules unequal, left 0.99-1.0 and right 0.25-0.27 long ; papillae clearly discernible only eight pairs, four pedunculate, preanal and sublateral in position (postanals not traceable), four sessile, minute, postanal and subventral.

Female.—Body 11.0-14.7 long and 0.2-0.38 wide ; pharynx 0.13-0.16 × 0.055 in diameter and with 20 annular thickenings ; oesophagus 3.85 long ; tail 0.077-0.11 long ; vulva not discernible due to the body being crowded with eggs ; eggs 0.011-0.022 in size.

Remarks.—The species forms the first host and locality records.

Found in association with members of the genus *Streptopharagus*.

Family GNATHOSTOMATIDAE Lane, 1923

Tanqua tiara (v. Linstow, 1879) Blanchard, 1904

1879. *Ascaris tiara* v. Linstow, *Württemb. Naturw. Jahresh, Jaheg*, 35: 320.

Material.—Four ♂♂ and nine ♀♀, Z.S.I. Reg. No. W 6943/1, host—*Varanus* sp., location—stomach, locality—Bhasna, 24-Parganas (West Bengal), collector—Y Chaturvedi, 22.vii.1968.

Male.—Body 15-22 long and 0.44-0.66 wide ; cuticular striations present on body, more prominent in anterior region and 0.055-0.066 apart from one another ; head 0.16-0.2 long ; head bulb 0.27-0.33 in diameter ; cervical sacs 0.66-0.72 long ; oesophagus 3.0-3.96 long ; tail 0.37-0.38 long ; spicules 0.77-0.83 long ; papillae eight pairs, three preanals and five postanals.

Female.—Body 22-30 long and 0.88-1.2 wide at the maximum ; head 0.2-0.22 long ; head bulb 0.33-0.37 in diameter ; cervical sacs 0.77-0.88 long ; oesophagus 4-4.5 long ; tail 0.33-0.35 long ; vulva 4.5-5.5 away from posterior end ; eggs 0.044-0.066 × 0.033-0.044 in diameter.

Tanqua anomala (v. Linstow, 1904) Baylis, 1916

1904. *Heterakis anomala* v. Linstow, *Spolia zeylan.*, 1(4): 97.

Material.—Several ♂♂ and ♀♀, Z.S.I. Reg. Nos. W 6944-51/1, hosts—*Natrix piscator*, *N. stolatus*, *Enhydris* sp., *Dryophis* sp., location—stomach, locality—Birati and Bhasna, 24-Parganas (West Bengal), collector—Shri S. C. Roy.

Male.—Body 25-30 long and 0.66-1.3 wide; cuticular striations present on body and 0.066-0.11 apart from one another; head 0.22-0.25 long; head bulb 0.31-0.33 in diameter; cervical sacs 0.5-0.66 long; oesophagus 3.8-4.2 long; tail 0.5-0.6 long; spicules 1.4-1.5 long; papillae eight pairs, three preanal and five postanal.

Female.—Body 29-35 long and 1.2-1.3 wide, cuticular striations 0.088-0.11 apart from one another; head 0.22-0.27 long; head bulb 0.27-0.32 in diameter; cervical sacs 0.82-0.88 long; oesophagus 4.4-4.8 long; tail 0.66-0.72 long; vulva 8.8-11.6 away from posterior end; eggs 0.055 × 0.066 in diameter.

Remarks.—The species is here being recorded for the first time from all the above hosts excepting *Natrix piscator*.

Family CAMALLANIDAE Railliet and Henry, 1915

Camalltnides prashadi Baylis and Daubney, 1922

1922. *Camallanides prashadi* Baylis and Daubney, *Mem. Indian. Mus.*, 7(4): 325.

Material.—Several ♂♂ and ♀♀, Z.S.I. Reg. Nos. 6952-61/1, hosts—*Natrix piscator*, *N. stolatus*, *Enhydris* sp., *Ptyas mucosus*, localities—different places in 24-Parganas (West Bengal).

Male.—Body 3.7-6.6 long and 0.088-0.18 wide; cuticular striations on body not prominent excepting in the specimens from *Ptyas mucosus* where they are prominent just behind the head; buccal valves 0.055-0.066 long and 0.066-0.077 wide, "rods" 0.033-0.044 long and attached to buccal valves on either side by chitinoid bodies as described by Baylis (1939), they are of different shapes and different shades of yellow, though sometimes much faded due to which not clearly discernible; posterior ring 0.033-0.044 wide; oesophagus divided into two parts, anterior muscular, 0.21-0.27 long, and posterior glandular, 0.27-0.4 long; nerve ring 0.11-0.12 away from anterior end; tail small, 0.088-0.12 long and with caudal alae,

the terminal portion lacking the alae and is curved ventrally excepting in specimens from *Ptyas mucosus* where it is straight; papillae, pedunculate, preanal five pairs, and postanal five pairs, excepting in the specimens from *Ptyas mucosus* where preanals are eight pairs and postanals nine pairs, the latter divided into four groups of 2:3:3 and 1; spicules unequal and dissimilar, right broad, alate and 0.16-0.24 long, left slender, 0.11-0.16 long; accessory piece triangular, 0.022-0.033 long.

Female.—Body 5-18.3 long and 0.19-0.5 wide; buccal valve 0.066-0.088 × 0.088-0.11 in diameter; rods 0.044-0.12 long; posterior ring 0.033-0.044 wide; anterior portion of oesophagus 0.31-0.36 and posterior 0.38-0.55 long; nerve ring 0.14-0.2 away from anterior end; tail 0.3-0.55 long; vulva 2.3-7 away from anterior end and situated on a tubular appendage; the body cavities of female worms crowded with embryonated eggs excepting in the specimens from *Ptyas mucosus*.

Order TRICHURIDEA Yamaguti, 1961

Family TRICHURIDAE Railliet, 1915

Trichuris globulosa (v. Linstow, 1901) Ransom, 1911

1901. *Trichocephalus globulosus* v. Linstow, *Arch. Mikrask. Anat.*, 58(1): 182.

Material.—Several ♂♂ and ♀♀, Z.S.I. Reg. No. W 6962/1, host—goat, location—rectum, locality—Chitrakunda, Koraputt (Orissa), collector—Shri K. C. Kansal, 12.5.1966; Z.S.I. Reg. No. W 6963-64/1, host—goat, location—caecum, locality—Calcutta, 6.i.1962; Z.S.I. Reg. No. 6966-67/1, host—goat, location—caecum, locality—Etah (Uttar Pradesh), collector—Shri G. Ramakrishna; Several ♂♂ and ♀♀, Z.S.I. Reg. No. W 6983/1, host—*Axis axis*, location—rectum, locality—Jodhpur (Rajasthan), 5.x.1962.

Male.—Body with slender oesophageal, and thicker and shorter posterior portion, the latter 16.5-22.6 long and 0.53-0.77 wide; spicule 4-7.7 long and 0.055-0.088 thick, thickness increasing near the distal end and again narrowing to give a “sabre-like” shape; general characters as also the distal spines on the spicular sheath which are longer than proximal ones are as described by Baylis (1939) but the distal end agrees with

Ortlepp (1937) rather than Baylis as our specimens (excepting those from *Axis axis*) show no swelling or partially or fully everted sheath showing globular structure.

Female.—Thick part of body 14-19.8 long and 0.88-0.99 wide ; vulva 13.8-17.6 away from posterior end and with spines on its lips ; vagina showing few curves and lined anteriorly heavily with spines (as already given by Baylis), excepting in the specimens from chital (*Axis axis*) which show still fewer curves and smaller region with spines.

Remarks.—The species is being recorded here for the first time from *Axis axis*.

***Trichuris ovis* (Abildgaard, 1795) Smith, 1908**

Material.—Several ♀♀, Z.S.I. Reg. No. W 6968/1, host—goat, location—caecum, locality—Bareilly (Uttar Pradesh) 7.vi.1965.

Female.—Thick part of body 17-20 long and 0.8 wide ; vulva 16.5-18.0 away from posterior end and protruded in a tubular form ; eggs 0.055×0.033 in diameter.

***Trichuris* sp.**

(Text fig. 3a and b)

Material.—a ♀, Z.S.I. Reg. No. W 6984/1, host—*Bandicota indica*, location—intestine, locality—Howrah (West Bengal), collector—Y Chaturvedi, 7.xii.1967

Female.—Body 18.7 long and 0.28 wide at the maximum ; thick part of body 7.5 long ; vulva 7.5 away from posterior end and not everted ; vagina 0.73 long, straight, and without convolutions and spines ; eggs 0.066×0.044 in diameter.

Remarks.—Though the present specimen shows some variation in the vagina, in the absence of males specific identification is not possible.

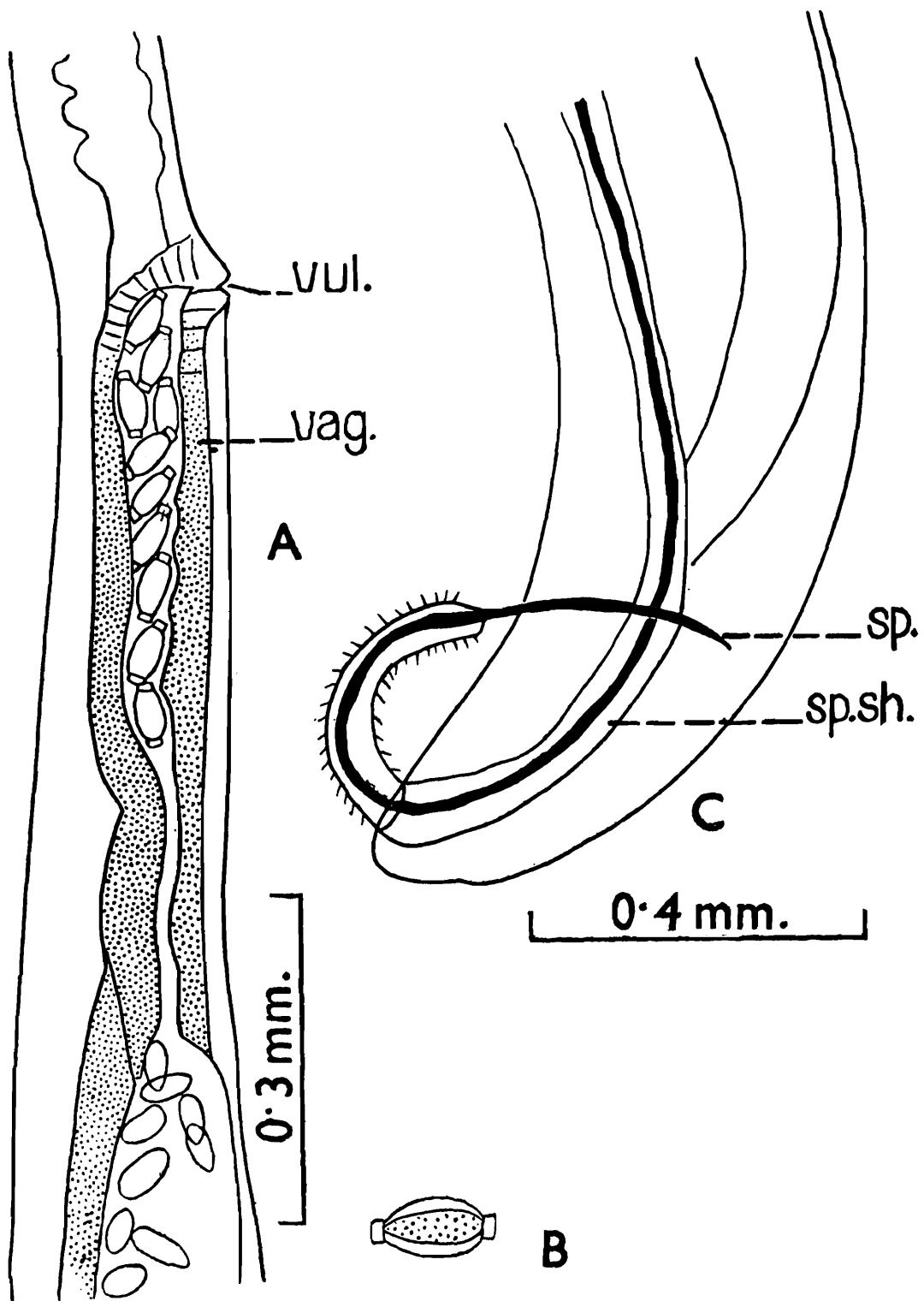
***Trichuris* sp.**

(Text Fig. 3C)

Material.—Two ♂♂ Z.S.I. Reg. No. W 6976/1, host—unknown, locality—Bikaner (Rajasthan), 1.x.1962.

Male.—Thick part of body 6.6 long and 0.35 wide ; spicule 1.2 long ; spicular sheath covered with spines of even length.

Remarks.—Though the present specimen shows some variations in the spines on its spicular sheath; in the absence of females we hesitate to assign it any specific rank.



Text-fig. 3. *Trichuris* sp.

a. female, anterior end; b. egg; c. male, posterior end.

Abbreviations: sp. spicule, sp. sh. spicular sheath, vag. vagina, vul. vulva.

SUMMARY

The paper deals with 18 species of nematodes from the unnamed collection of the Zoological Survey of India. Interesting variations and new host and locality records have been furnished.

REFERENCES

- BAYLIS, H. A. 1936. Fauna of British India, including Ceylon and Burma. *Nematoda*, Vol. I, 408 pp.
- BAYLIS, H. A. 1939. Fauna of British India, including Ceylon and Burma. *Nematoda*, Vol. II, 274 pp.
- BAYLIS, H. A. and DAUBNEY, R. 1923. A further report on parasitic nematodes in the collection of the Zoological Survey of India. *Rec. Indian Mus.*, **25**: 551-575.
- CAMERON, T. W. M. 1924. On the nematode genus *Globocephalus* Molin, 1861. *J. Helminth.*, **2**(2): 65-76.
- NEVEU-LEMAIRE, M. 1936. *Traite de Helminthologie medicale de veterinaire*, Paris.
- ORTLEPP, R. J. 1937. Whipworms from South African ruminants. *Onderst. J. Vet. Sc. and Anim. Ind.*, **9**(1): 91-100.
- OZERSKAJA, V. N. 1953. Parasitic worm fauna of wild boar. *Turdy VIGIS*, **5**: 75-81.
- POPOVA, T. I. 1964 (1955). *Strongylids of animals and man*. 236 pp. (English). Israel Programme for Scientific Translations, Jerusalem.
- SKRJABIN, K. I. 1917. Sur quelques nematodes de oiseaux dela Russie. *Parasitology*, **9**(4): 460-481.
- SKRJABIN, K. I., SHIKHOBALOVA, N. Ф., SCHULZ, R. S., POPOVA, T. I., BOEV, S. N., and DELYAMURE, S. L. 1961 (1952). *Key to parasitic nematodes. Strongylata* (English text) 890 pp. Israel Program for Scientific Translations, Jerusalem.
- TEIZEIRA DE FREITAS, J. F. and LENT, H. 1936. Estudo sobre O genero *Globocephalus* Molin, 1861. *Mem. Inst. Osw. Cr.* **31**(1): 69-80.
- YAMAGUTI, S. 1935. Studies on the helminth fauna of Japan. Pt. 12. Avian nematodes, I. *Jap. J. Zool.*, **6**: 403-431.
- YAMAGUTI, S. 1935(a). Studies on the helminth fauna of Japan, Pt. 13. Mammalian nematodes. *Jap. J. Zool.* **6**(2): 433-457.
- YAMAGUTI, S. 1961. *Systema helminthum*. Vol. 3 pts. 1 & 2, 1261 pp. New York.
- YORKE, W. and MAPLESTONE, P. A. 1926. *The nematode parasites of vertebrates*. 536 pp.