

On Some species of the Genus *Acuaria* Bremser, 1811 from Avian Hosts from Lucknow

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Family—Acuaridae Seurat,
Acuaria anthuris (Rudolphi, 1819)
Railliet, Henry & Sisoff, 1912
(Plate. 1. Figs. 1-4)
(Plate. 2. Figs. 1-3)

Numerous specimens of both sexes were collected from the wall of the gizzard of the common house crow, *Corvus splendens* Vieillot and starling, *Sturnus vulgaris* Linnaeus which died in the Prince of Wales Zoological

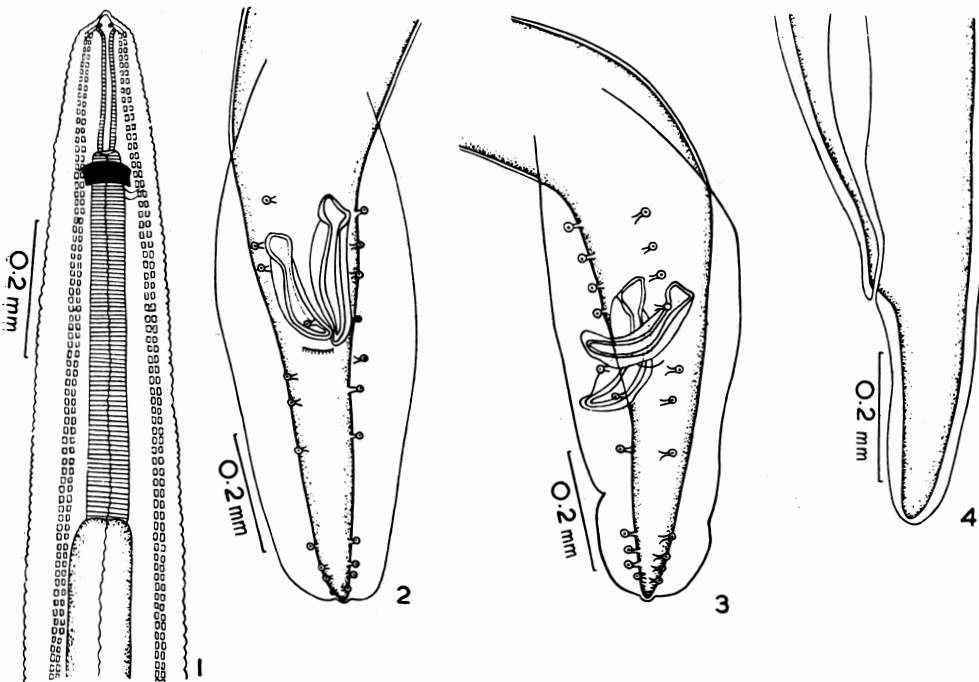


Plate. 1-2 *Acuaria anthuris* (Rudolphi, 1819) Railliet, Henry & Sisoff, 1912

- Plate. 1 Fig. 1 Anterior end of male. Lateral view.
Fig. 2 Posterior end of male. Ventral view.
Fig. 3 Posterior end of male. Ventral view.
Fig. 4 Female tail. Lateral view.

The paratype and holotype specimens of the forms described in this paper will be deposited in Dr. G. S. Shapar's Helminthological Collection, Lucknow.

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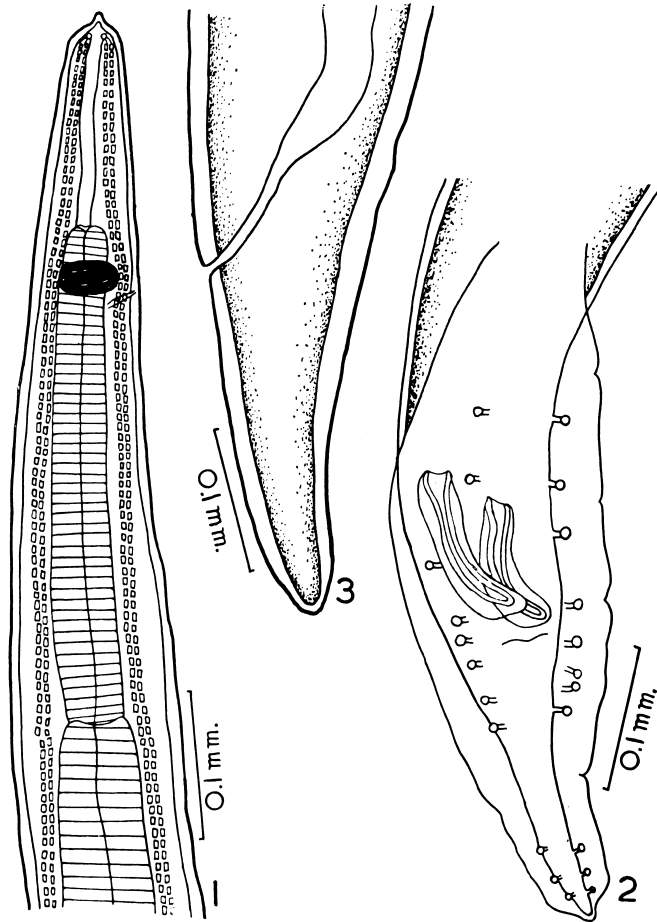


Plate. 2 Fig. 1 Anterior end of male. Lateral view.
 Fig. 2 Posterior end of male. Ventral view.
 Fig. 3 Female tail. Lateral view.

Gardens, Lucknow.

Description: Body medium sized, almost of uniform diameter, attenuated only for a short distance near head and tail ends. Head with two small triangular lips and a pair of sessile papillae. Four long cordons present in form of grooves directed posteriorly upto middle of glandular oesophagus. Vestibule long, cylindrical, thick walled, transversely striated. Oesophagus bipartite with anterior muscular and posterior glandular portions. Excretory pore close to nerve ring. Cuticle thick transversely striated, striations 0.01 to 0.0 mm. apart in male and 0.01 to 0.025 mm. apart in female specimens. Eggs

elliptical and thick shelled.

Male: Body 4.0 to 10.1 mm. long, 0.12 to 0.30 mm. wide. Head 0.04 to 0.07 mm. in diameter with four long cordons in form of grooves extending upto posterior oesophagus. Vestibule 0.12 to 0.19 mm. long, 0.01 to 0.05 mm. wide. Anterior oesophagus 0.33 to 0.60 mm. long, 0.04 to 0.07 mm. wide. Posterior oesophagus 0.80 to 1.70 mm. long, 0.06 to 0.08 mm. wide. Entire oesophagus 1.13 to 2.30 mm. long. Nerve ring at 0.16 to 0.20 mm. and excretory pore 0.18 to 0.34 mm. from anterior extremity. Tail bluntly conical, 0.15 to 0.50 mm. Eleven pairs of pedunculated caudal papillae of which four pairs are pre-

Table 1 Comparative account of *Acuaria anthuris* (Rudolphi, 1819)
Railliet, Henry and Sisoff, 1912 from two different avian
hosts. (Measurements in mm.)

Male :	<i>Corvus splendens</i>	<i>Sturnus vulgaris</i>	Range
Size	8.4 -10.1 ×0.20-0.30	4-5.68 ×0.12-0.22	4-10.1×0.12-0.3
Diameter of head	0.05-0.07	0.037-0.05	0.037-0.07
Extension of cordons	0.80-0.85	0.80 -1.30	0.80 -1.30
Vestibule	0.16- 0.19×0.02-0.04	0.12-0.135×0.01-0.015	0.12-0.19×0.01-0.04
Anterior oesophagus	0.52- 0.80×0.05-0.07	0.33-0.40 ×0.04-0.045	0.33-0.60×0.05-0.07
Posterior oesophagus	1.20- 1.70×0.07-0.08	0.80-1.30 ×0.06-0.07	0.80-1.70×0.06-0.08
Entire oesophagus	1.75-2.20	1.13-1.70	1.13-2.20
Tail	0.35-0.50	0.15-0.21	0.15-0.50
Caudal papillae	11 pairs	11 pairs	11 pairs
Preanal papillae	4 pairs	4 pairs	7 pairs
Postanal payillae	7 pairs	7 pairs	4 pairs
Spicules	0.13-0.20	0.09-0.105	0.09-0.20
	0.22-0.20	0.12-0.14	0.12-0.25
Female :			
Size	14.50 -19.90 ×0.04-0.05	9.60 -10.30×0.28 -0.30	9.60 -19.90 ×0.28 -0.40
Diameter of head	0.06-0.08	0.05-0.07	0.05-0.08
Extension of cordons	0.75-0.90	1.30-1.35	0.75-1.35
Vestibule	0.17 - 0.22 ×0.02-0.025	0.16 - 0.17×0.015-0.02	0.16 - 0.22 ×0.015-0.025
Anterior oesophagus	0.79 - 0.86 ×0.08-0.11	0.45 - 0.55×0.075-0.08	0.45 - 0.86 ×0.075-0.11
Posterior oesophagus	1.50 - 1.80 ×0.10-0.12	1.30 - 1.35×0.14 -0.15	1.30 - 1.80 ×0.10 -0.15
Entire oesophagus	2.30-2.72	1.80-1.85	1.80-2.72
Tail	0.25-0.34	0.25-0.28	0.25-0.34
Vulva from anterior end	7.0 -8.90	2.50-3.20	2.50-8.90
Eggs	0.038- 0.045×0.02-0.028	0.035- 0.04×0.02 -0.022	0.035- 0.045×0.02 -0.025

anal and seven pairs postanal. Of postanal papillae four pairs lie at tip of the tail and three pairs between anus and tail end. Spicules subequal, alate 0.09 to 0.02 mm, and 0.12 to 0.25 mm. long. Gubernaculum absent.

Female: Body 8.90 to 19.90 mm. long, 0.30 to 0.50 mm. wide. Head 0.05 to 0.08 mm. in diameter. Vestibule 0.16 to 0.22 mm. long, 0.015 to 0.025 mm. wide. Anterior oesophagus 0.45 to 0.86 mm. long, 0.075 to 0.11 mm. wide. Posterior oesophagus 1.30 to 1.86 mm. long, 0.10 to 0.15 mm. wide. Entire oesophagus 1.75 to 2.66 mm. long. Nerve ring at 0.21 to 0.27 mm. and excretory pore 0.26 to 0.38 mm. from anterior end. Tail bluntly conical 0.25 to 0.34 mm. long. Vulval opening at 0.80 to 8.9 mm. from

anterior end. Uterine branches divergent. Eggs elliptical, thick shelled, 0.035 to 0.045 mm. long, 0.02 to 0.028 mm. wide.

Hosts: Common house crow, *Corvus splendens* Vieillot and starling *Sturnus vulgaris* Linnaeus

Location: Wall of the gizzard

Locality: Lucknow.

Discussion: The present form is referred to *Acuaria anthuris* (Rudolphi, 1919) Railliet, Henry & Sisoff, 1912 but differs from it in having specimens of both the sexes of smaller size and in the measurement of various organs. These differences are considered as individual variations. This form is recorded for the first time from a new host Starling, *Sturnus vulgaris*.

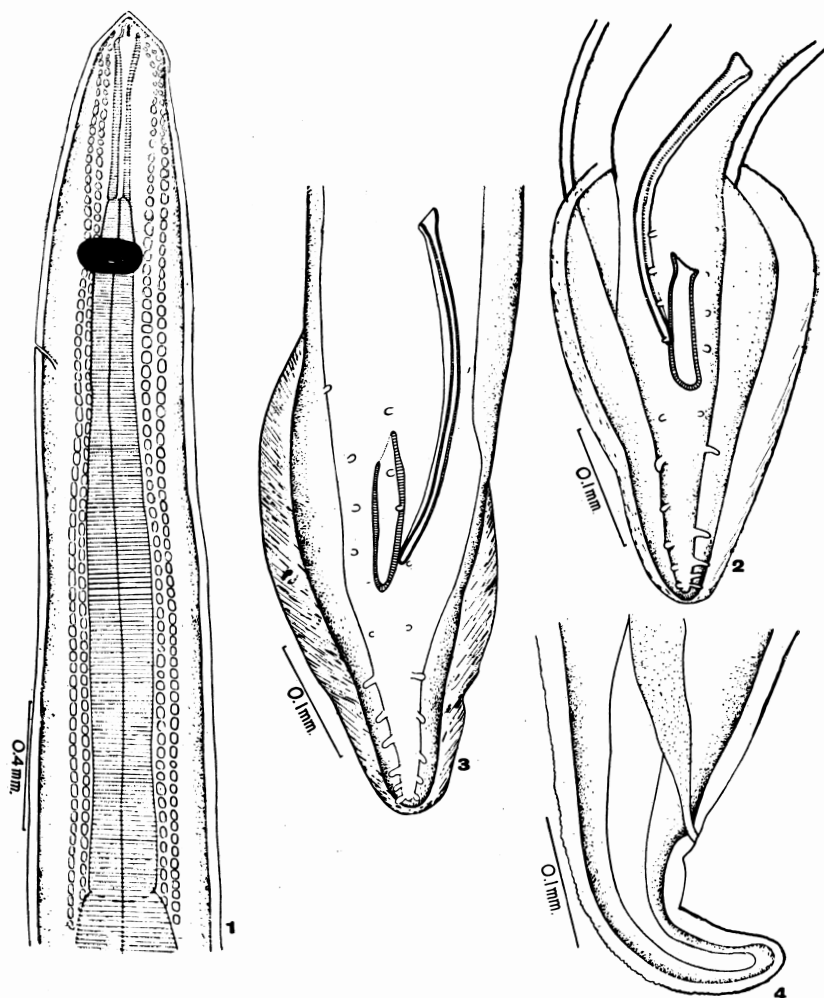


Plate. 3 Figs. 1-4 *Auaria lucknowensis* n.sp.

Fig. 1 Anterior end of male. Lateral view.

Fig. 2 Posterior end of male. Ventral view.

Fig. 3 Posterior end of male. Ventral view.

Fig. 4 Female tail. Lateral view.

Acuaria lucknowensis n.sp.

(Plate. 3. Figs. 1-4)

Numerous specimens of both sexes were collected from the wall of the gizzard of Green Magpie, *Cissa chinensis* which died in the Prince of Wales Zoological Gardens, Lucknow.

Description: Body small, thin spirally coiled. Cords straight, non recurrent and not anastomosing. Tail conical. Vulva

postequatorial. Mouth with two large lips, simple and triangular. Buccal cavity thick walled and cylindrical. Oesophagus cylindrical divided into two parts, anterior small, narrow muscular and posterior broad and glandular. Cuticle striated, striations 0.006 to 0.01 mm. apart in male and 0.09 to 11 mm. apart in female.

Male: Body 5.40 to 7.78 mm. long, 0.20 to 0.23 mm. wide. Head 0.04 to 0.08 mm. in diameter. Cords consist of double rows of

irregular cuticular plaques somewhat wavy anteriorly and extending upto anterior oesophagus. Buccal cavity 0.12 to 0.16 mm. long, 0.01 to 0.016 mm. wide. Anterior muscular oesophagus 0.39 to 0.48 mm. long, 0.04 to 0.06 mm. wide. Posterior glandular oesophagus 1.42 to 2.0 mm. long, 0.12 to 0.14 mm. wide. Entire oesophagus 1.81 to 2.48 mm. long. Nerve ring at 0.16 to 0.22 mm. and excretory pore 0.18 to 0.25 mm. from anterior end. Caudal alae broad, well developed extending upto 0.36 to 0.43 mm. from hind end. Tail bluntly rounded, 0.17 to 0.19 mm. long. Ten to eleven pairs of pedunculated caudal papillae of which four pairs preanal and six to seven pairs postanal. Spicules unequal, dissimilar-with funnel shaped tips. Right spicule slender, alate on its inner side, 0.235 to 0.275 mm. long. Left spicule short, broad, slightly stouter than right, 0.095 to 0.13 mm. long. Gubernaculum absent.

Female: Body 12.60 to 18.20 mm. long, 0.25 to 0.33 mm. wide. Head 0.07 to 0.09 mm. in diameter. Buccal cavity 0.16 to 0.19 mm. long, 0.015 to 0.02 mm. wide. Anterior oesophagus 0.48 to 0.85 mm. long, 0.07 to 0.10 mm. wide. Posterior oesophagus 1.10 to 2.40 mm. long, 0.12 to 0.18 mm. wide. Entire oesophagus 1.58 to 3.25 mm. long. Nerve ring at 0.18 to 0.27 mm. and excretory pore 0.24 to 0.28 mm. from anterior end. Vulva post-equatorial, 8.25 to 14.55 mm. from anterior end. Tail 0.075 to 0.11 mm. long, rounded at tip. Eggs thin shelled, 0.032 to 0.026 mm. wide.

Host: Green Magpie, *Cissa chinensis*

Location: Wall of gizzard

Locality: Lucknow.

Discussion: Skrjabin, Sobolev & Ivashkin (1965) regarded the genus *Cheilospirura* as a synonym of *Acuaria* in Acuaridae and consequently the species *C. centrocerci* Simon, 1939, *C. cyanocitta* Boyd, 1966, *C. falconis* Clapham, 1947, *C. gallinae* Sultana, 1961, *C. hyderabadensis* Singh, 1948, *C. multispinosa* Viguieras, 1957, *C. pavonis* (Ortlepp, 1925), *C. phalacrocoracis* Smogorjevskaya and *C. serptocephala* Gilbert, 1930 are transferred to *Acuaria* as new combinations. The

present form belongs to the genus *Acuaria* Bremser, 1811 of which the following species viz. *A. anthuris* (Rud, 1819) Railliet, Henry & Sisoff, 1912, *A. hamulosa* (Dies, 1851), *A. pavonis* (Ortlepp, 1925), *A. conica* Maplestone, 1931, *A. lata* Maplestone 1931, *A. brevispicula* Maplestone, 1932, *A. indica* Maplestone, 1932, *A. hyderabadensis* Singh, 1948, *A. kungi* Singh, 1948, *A. alii* Rasheed, 1950, *A. upupa* Rasheed, 1960 are known from Indian birds. The new form differs from *A. kungi*, *A. alii* and *A. upupa* in having spicules unequal instead of equal. Further the new form can be distinguished from *A. anthuris*, *A. conica*, *A. brevispicula* and *A. dicrura* in having spicules unequal instead of subequal. The new form has a close resemblance to *A. hamulosa*, *A. hyderabadensis*, *A. singhi* and *A. pavonis* in having unequal spicules but differs from *A. hamulosa* and *A. hyderabadensis* and *A. pavonis* in having spicule ratio 1:2.5 instead of 1:6 or more. In the new form the vulva lies far behind the middle of the body while in *A. hamulosa* it lies slightly behind the middle of the body. The new form also differs from *A. singhi* in having spicule ratio 1:2.5 instead of 1:2 and in having four pairs of preanal papillae instead of two pairs. The males of *A. lata* and *A. indica* are unknown. The females of *A. crami* is not known. In view of the differences it is regarded as a new species with the specific name *Acuaria lucknowensis* n.sp.

Acuaria copysychusi n.sp.

(Plate. 4. Figs. 1-3)

One male and one female specimens were collected from the gizzard of a bird, The Magpie Robin, *Copsychus saularis* (Linnaeus) which died in the Prince of Wales Zoological Gardens, Lucknow.

Description: Body medium sized, and spirally coiled. Head with two small conical lips, four cuticular cordons in the form of ridges extending upto posterior oesophagus. Oesophagus bipartite. Vulva equatorial. Cuticle striated, striations 0.01 to 0.013 mm. apart in male and 0.007 to 0.009 mm. apart in female spmale specimens.

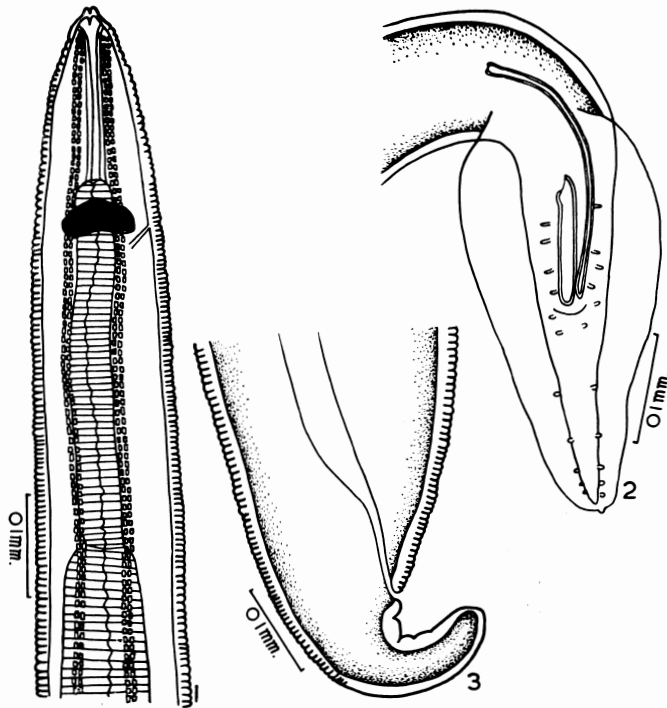


Plate. 4 Figs. 1-3 *Acuarria coppsychusi* n. sp.

- Fig. 1 Anterior end of male. Lateral view.
 Fig. 2 Posterior end of male. Ventral view.
 Fig. 3 Female tail. Lateral view.

Male: Body 6.70 mm. long, 0.15 mm. wide. Head 0.045 mm. in diameter. Vestibule cylindrical, thick walled, 0.145 mm. long, 0.015 mm. wide. Anterior oesophagus 0.36 mm. long, 0.045 mm. wide. Posterior oesophagus 1.45 mm. long, 0.085 mm. wide. Entire oesophagus 1.81 mm. long. Nerve ring at 0.18 mm. and excretory pore 0.21 mm. from anterior end. Caudal alae broad, symmetrical, 0.40 mm. long. Tail bluntly conical, 0.195 mm. long. Eleven pairs of pedunculated caudal papillae, of which four pairs are preanal, one pair adanal and six pairs postanal. Spicules unequal, dissimilar. Right spicule, short, broad with funnel shaped tip, 0.12 mm. long, 0.018 mm. wide. Left spicule long, tubular, 0.275 mm. long.

Female: Body 18.70 mm. long, 0.30 mm. wide. Head 0.07 mm. in diameter. Vestibule 0.19 mm. long, 0.02 mm. wide. Anterior oesophagus 0.30 mm. long, 0.08 mm. wide. Posterior oesophagus 1.70 mm. long, 0.10 mm.

wide. Entire oesophagus 2.0 mm. long. Nerve ring at 0.24 mm. and excretory pore 0.30 mm. from anterior end. Tail ventrally curved, bluntly conical, 0.145 mm. long. Vulva equatorial, 9.30 mm. from anterior end. Eggs 0.038 to 0.04 mm. long, 0.022 to 0.023 mm. wide.

Host: The magpie robin, *Copsychus saularis* (Linnaeus)

Location: Gizzard

Locality: Lucknow.

Discussion: The present form differs from *A. conica* Maplestone, 1931 and *A. brevispicula* Maplestone, 1932 from the same host in having unequal spicules. In the new form the spicules measure 0.12 mm. and 0.275 mm. in length while in *A. conica* 0.168 and 0.112 mm. and in *A. brevispicula* 0.09 and 0.075 mm. in length. It further differs from *A. brevispicula* in having eleven pairs of caudal papillae instead of ten pairs. The new form has a close resemblance to *A. hamulosa*, *A.*

hyderabadensis, *A. singhi* and *A. lucknowensis* n.sp. in having spicules of unequal size. The new form differs from *A. singhi* in having four pairs of preanal papillae instead of two. The new form can also be distinguished from *A. hamulosa* and *A. hyderabadensis* in having spicule ratio 1:2.3 instead of 1:1.6 or slightly more. The new form has a close resemblance to *A. lucknowensis* n.sp. in the number and arrangement of anal papillae and in the ratio of spicules but however differs from it in having vulva preequatorial

instead of postequatorial. Accordingly it is regarded as a new species with the specific name *A. copsyhusi* n.sp.

Acuarria magpii n.sp.

(Plate. 5. Figs. 1-3)

One male and one female specimens were collected from the horny lining of gizzard of a bird, red-billed blue magpie, *Urocissa erythrorhyncha occipitalis* which died in the Prince of Wales Zoological Gardens, Lucknow.

Description: Body small, spirally coiled.

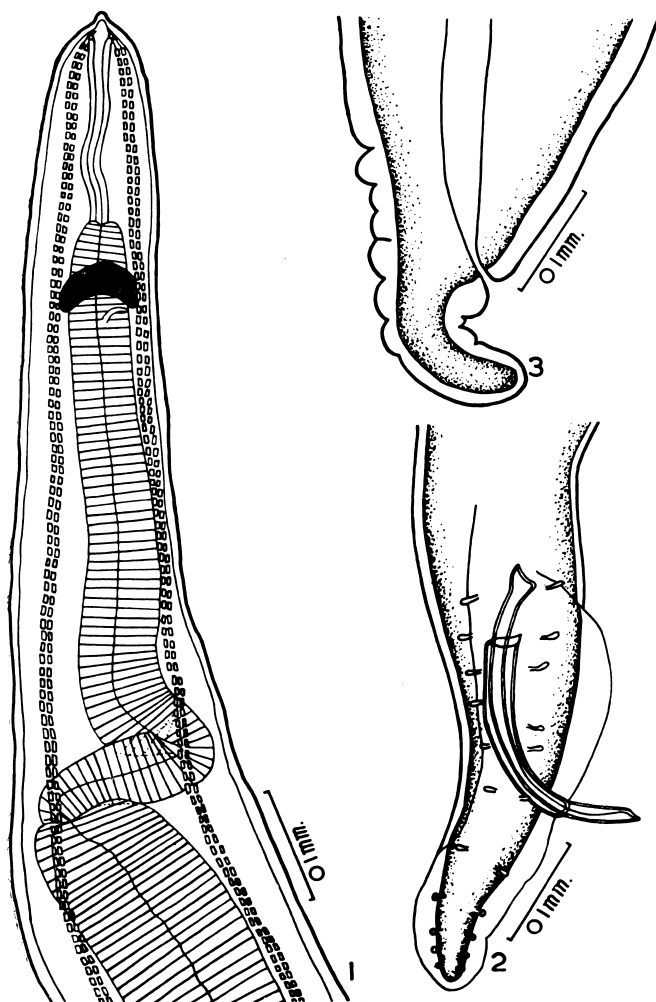


Plate. 5 Figs. 1-3. *Acuarria magpii* n. sp.

Fig. 1 Anterior end of female-Lateral view

Fig. 2 Posterior end of male-Ventro lateral view

Fig. 3 Female tail-Lateral view

Cordons are in the form of ridges extending upto the posterior oesophagus. Head with two triangular lips bearing two minute cervical papillae. Vestibule cylindrical and thick walled. Oesophagus bipartite, an anterior muscular and a posterior glandular oesophagus. Vulva postequatorial. Cuticle transversely striated, striations 0.01 to 0.015 mm. apart in male and 0.012 to 0.015 mm. apart in female specimens.

Male : Body 5.65 mm. long, 0.20 mm. wide. Head 0.05 mm. in diameter. Vestibule 0.15 mm. long, 0.02 mm. wide. Anterior oesophagus 0.44 mm. long, 0.05 mm. wide. Posterior oesophagus 1.90 mm. long, 0.08 mm. wide. Nerve ring at 0.19 mm. and excretory pore at 0.23 mm. from anterior end. Tail conical, 0.19 mm. long. Caudal alae well developed, 0.40 mm. long. Eleven pairs of pedunculated caudal papillae of which seven pairs are paeanal and six pairs postanal. Spicules unequal, dissimilar. Right spicule slender, 0.27 mm. long while left short and broad, 0.17 mm. long, 0.03 mm. wide. Gubernaculum absent.

Female : Body 13.85 mm. long, 0.35 mm. wide. Head 0.06 mm. in diameter. Vestibule 0.15 mm. long, 0.02 mm. wide. Anterior oesophagus 0.60 mm. long, 0.075 mm. wide. Posterior oesophagus 2.30 mm. long. Nerve ring at 0.215 mm. and excretory pore at 0.255 mm. from anterior end. Tail conical, 0.12 mm. long. Vulva postequatorial, 7.35 mm. from anterior end. Eggs thick shelled, 0.025 to 0.03 mm. long, 0.013 to 0.015 mm. wide.

Host : Red billed Blue Magpie, *Urocissa erythrorhyncha occipitalis*

Location : Lining of gizzard

Locality : Lucknow.

Discussion : The present form resembles closely to *A. anthuris* (Rud., Railliet, Henry & Sisoff, 1912 from the same host in having eleven pairs of caudal papillae but differs in having unequal, in having male specimens of longer size, in having vulva behind the middle region of the body instead of at about middle of body and in the relative size of various organs. Accordingly it is regarded as a new species with the specific name *A.*

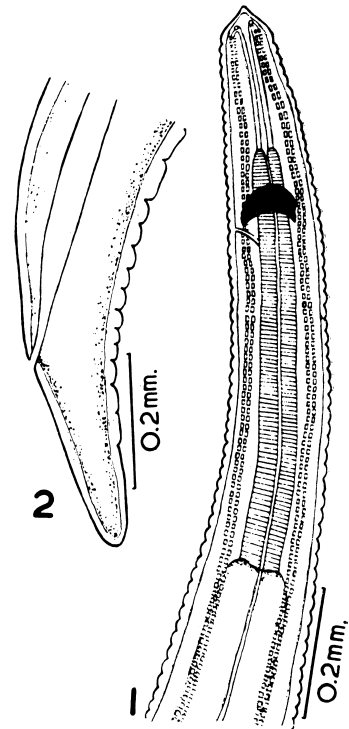


Plate. 6 Figs. 1-2. *Acuaria* sp.

Fig. 1 Anterior end of female-Lateral view

Fig. 2 Female tail-Lateral view

magpii n.sp.

Acuaria sp.

(Plate. 6. Figs. 1-2)

Only one female specimen was collected from the mucosa of the gizzard of a bird, *Common mynah, Acridotheres tristis* (Linnaeus) which died in the Prince of Wales Zoological Gardens, Lucknow.

Description : Body 11.40 mm. long, 0.30 mm. wide. Anterior extremity with four long cordons in the form of grooves extending upto glandular oesophagus Head 0.07 mm. in diameter. Vestibule cylindrical, thick walled, 0.21 mm. long, 0.02 mm. wide. Oesophagus consisting of two parts, an anterior muscular oesophagus, 0.65 mm. long, 0.06 mm. wide ; posterior glandular oesophagus 1.80 mm. long, 0.10 mm. wide. Entire oesophagus 2.45 mm. long. Nerve ring at 0.29 mm. and excretory pore 0.33 mm. from anterior end. Tail conical, 0.30 mm. long. Vulva postequatorial,

6.6 mm. from anterior end. Cuticle transversely striated, striations, 0.019 to 0.021 mm. apart. Eggs 0.03 to 0.045 mm. long, 0.018 to 0.021 mm. wide.

Host: common mynah, *Acridotheres tristis* (Linnaeus)

Location: mucosa of gizzard

Locality: Lucknow, India.

Discussion: Due to lack of sufficient material the species could not be determined.

Summary

Five species of the genus *Acuaria* Bremser, 1811 three of them are new to science, are described and discussed; the species were collected from the Prince of Wales, Zoological Gardens, Lucknow; from a variety of avian hosts. Of these *Acuaria lucknowensis* sp. nov. from the green magpie, *Cissa chinensis*, *A. copsychni* sp. nov. from the magpie robin, *Copsychus saularis* and *A. magpii* sp. nov. from the red billed magpie, *Urocissa erythrorhyncha occipitalis* are described as new species. *Acuaria anthuris* the type species of the genus from *Corvus splendens* and Hazaragul, starling, *Sturnus vulgaris* is being redescribed. In addition *Acuaria* sp is recorded from a Mynah, *Acridotheres tristis*.

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インド Lucknow の動物園の魚類より見出された *Acuaria* 属線虫の数種について

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インドの Lucknow の Prince of Wales 動物園の鳥類から得た5種の *Acuaria* 属線虫について記載した。このうち3種は未記載のもので、ミドリカササギ *Cissa chinensis* からの *Acuaria lucknowensis* sp. nov., カササギコマドリ *Copsychus saularis* からの *A. copsychni* sp. nov. とアカクチバシアオカササギ *Urocissa*

erythrorhyncha occipitalis からの *A. magpii* sp. nov. を新種として記載した。カラスの1種 *Corvus splendens* とムクドリ *Sturnus vulgaris* から得た *Acuaria anthuris* (本属の type species) と *Acuaria* sp. についても述べた。