

*Mallophagan Parasites from Indian Birds. Part I.  
New Species belonging to the Genera Aquanirmus,  
Quadriceps and Rallicola (Ischnocera, Philopteridæ).  
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THE Mallophagan parasites of Indian birds, as well as of mammals, have not received as much attention as other groups of insects. Since the important work of Kellogg and Paine (1914) on Indian material there was no significant contribution until 1948 when Ansari considerably extended our knowledge by describing three new genera and twelve new species, besides recording fifty other known species, from about one hundred birds from the Punjab (India). Even then our knowledge remains grossly incomplete, as Ansari's hundred hosts bring the total number of birds of India examined up-to-date to only about 275, leaving well over two thousand species or subspecies for examination. It was in order to add to our knowledge of these parasites that investigation on the systematics of Indian species of Mallophaga was undertaken.

The material was collected at Lucknow (U.P.) while I was receiving a Research Fellowship of the Indian (Imperial) Council of Agricultural Research (1946-48), for the award of which I wish to express thanks to the I.C.A.R.

My best thanks are due to Professor K. N. Bahl, under whose supervision this work was done ; to Miss Theresa Clay of the British Museum (Natural History) for initiating me into the study of this interesting group, for going through the manuscript and for suggesting the probability of the species described here as new ; and to my friends Kunwar Suresh Singh and Mr. S. P. Mathur for allowing me to examine the birds for their ecto-parasites.

The type slides of the new species have been presented to the British Museum (Natural History) ; the paratypes will be deposited in the Zoological Survey of India (Indian Museum), Calcutta ; and those of *Quadriceps thapari* and *Rallicola clayi* will be added to the extensive collections

of Messrs. Hopkins, Carriker and Thompson and Doctors Eichler and Guimarães.

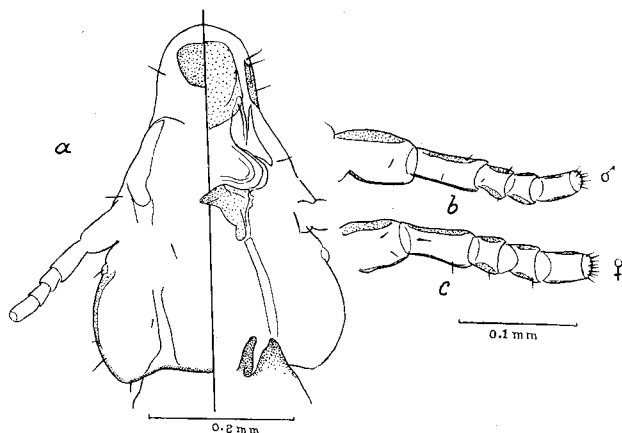
Genus *AQUANIRMUS* Clay and Meinertzhagen, 1939.

*Aquanirmus bahli*, sp. n. (Figs. 1-4.)

*Material Examined*.—Two males and three females from a freshly killed Dabchick or Little Grebe, *Podiceps ruficollis capensis* Salvadori (Podicipidae), on 15.5.49 at Kukrail, Lucknow.

*Type Material*.—Holotype male and allotype female in the British Museum (Nat. Hist.), slide nos. 553 and 554 respectively.

Fig. 1.



*Aquanirmus bahli*, sp. n. a. Male head; Male (b) and female (c) antennæ.

*Description of male*.—Head and antenna as in figs. 1a and 1b respectively. C.I. 0.73-0.75. Prothorax small, pterothorax with an indication of meso-metathoracic junction. Metasternal plate absent.

Abdomen elongated, broadest in segment V. Sternal plates on segments III-VIII. Chætotaxy scarce. Terminal segments and male genitalia as shown in figs. 2 and 3 respectively.

Body measurements as given in Table I,

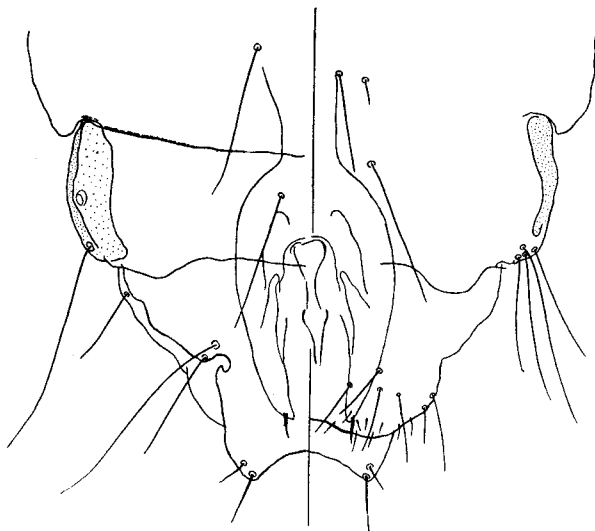
TABLE I.

	Male.		Female.	
	Length.	Breadth.	Length.	Breadth.
Head.....	0.464	0.342-0.350	0.529-0.546	0.407-0.423
Prothorax ..	0.129-0.140	0.275-0.277	0.151-0.166	0.325-0.333
Pterothorax..	0.181-0.185	0.340-0.344	0.207-0.225	0.399-0.407
Abdomen....	0.863	0.391-0.415	1.401-1.418	0.521-0.586
Total.....	1.662		2.306-2.339	
C.I. ....	0.73-0.75		0.77	
Paramere ....	0.147-0.159			
Antenna ....	0.196-0.203		0.181-0.199	

(All measurements are in mm.)

*Description of Female.*—Antenna as in fig. 1c. C.I. 0.77. Metasternal plate present.

Fig. 2.



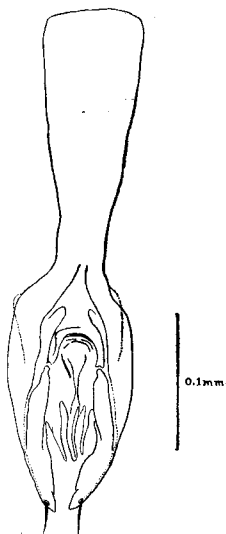
*Aquanirmus bahli*, sp. n. Terminal segments of male abdomen.

Abdomen elongated, broadest in segment V. Segment I small. Tergal plates on segments II-VIII, separated medianly. Lateral sternal plates in segments V-VIII. Pleurites narrow with curved re-entrant heads. Terminal

segment bilobed, each lobe bearing a stout spine. Chaetotaxy scarce. Genital plate distinct on segment VIII, vulva bearing 8-9 spines and 7-8 fine setæ on each side of the middle line, fig. 4. Various measurements as given in Table I.

*Remarks.*—The present species differs from the other species of the genus in the shape of the components of the male genitalia, the shape of the terminal segments of the male abdomen and in the shape of the female head. This is the first species of the genus recorded from India.

Fig. 3.



*Aquanirmus bahli*, sp. n. Male genitalia.

The species has been named after my teacher Professor K. N. Bahl.

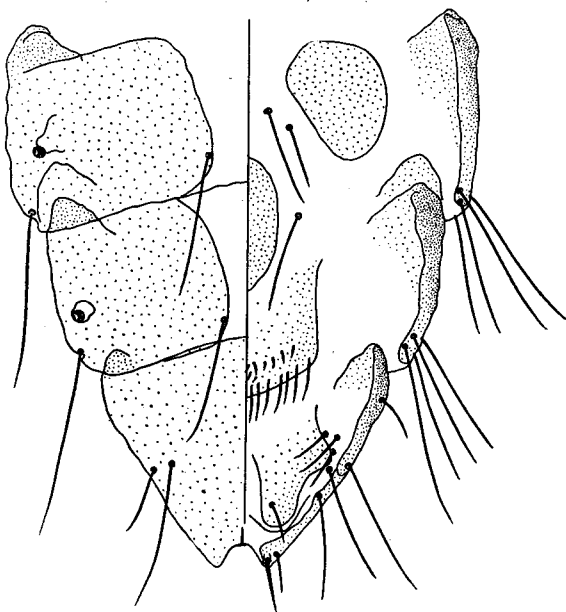
Miss Theresa Clay, British Museum (Natural History) has sent the following note:—

Denny (1842) described *Nirmus podiceps* from British specimens of *Podiceps minor* (= *P. r. ruficollis* (Pall.)) and *Podiceps cristatus* (= *P. c. cristatus* (Linn.)). The forms on these two hosts are subspecifically distinct, and

the four females labelled *Nirmus podiceps* from *Podiceps* sp. in the Denny collection in the British Museum (Natural History) are the form of *Aquanirmus* found on *Podiceps cristatus*; this host should therefore be considered as the type host of *podiceps*.

Nitzsch (in Giebel, 1866) described a *Nirmus runcinatus* from these same two hosts, and a figure in Nitzsch's manuscript shows that *runcinatus* is an *Aquanirmus*.

Fig. 4.



*Aquanirmus bahli*, sp. n. Terminal segments of female abdomen.

As the types are lost a specimen from one of these hosts will have to be selected as neotype, preferably from *Podiceps r. ruficollis* as the form found on this host has no name.

*Aquanirmus bahli*, sp. n., occurring on *Podiceps ruficollis capensis* is quite distinct in the males from the polytypic species found on the European species of *Podiceps*, and can be distinguished by the characters of the genitalia, terminal segments of the abdomen and by the lesser degree of sexual dimorphism of the antennæ.

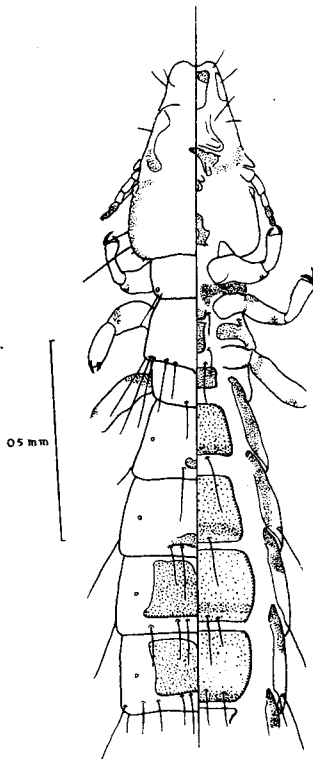
It can be separated in the female from the form occurring on *Podiceps r. ruficollis* by the size and shape of the head. It would seem probable that these two species represent a sympatric pair parasitizing *Podiceps ruficollis*, one of the pair being secondarily absent (or not recorded) on each of the subspecies of the host.

Genus *QUADRACEPS* Clay and Meinertzhagen, 1939.

*Quadriceps thapari*, sp. n. (Figs. 5-9.)

*Material examined*.—Eleven males and ten females from two freshly killed River Terns, *Sterna aurantia* Gray (Sternidæ), at Lucknow on 6.9.47.

Fig. 5.



*Quadriceps thapari*, sp. n. Male.

*Type Material.*—Holotype male and allotype female in the British Museum (Natural History), slide no. 556.

*Description of Male.*—General characters of head and thorax as in fig. 5. C.I. 0.67–0.69. Antennæ nearly equal and alike in the two sexes. Meso- and metasternal plates present.

Abdomen elongated, broadest at segment V. Tergal plates in the form of thickenings; those on segments III and IV small, while those on V and VI broad and prominent and anteriorly divided into two in the middle, that on segment VII smaller and also divided anteriorly (figs. 5 and 6). Sternal plates broad and prominent. Pleurites with elongated heads, those of segments V and VI only partially pigmented in the anterior half. General chaetotaxy scarce. Terminal segments and male genitalia shown in figs. 6 and 7. Various measurements as given in Table II.

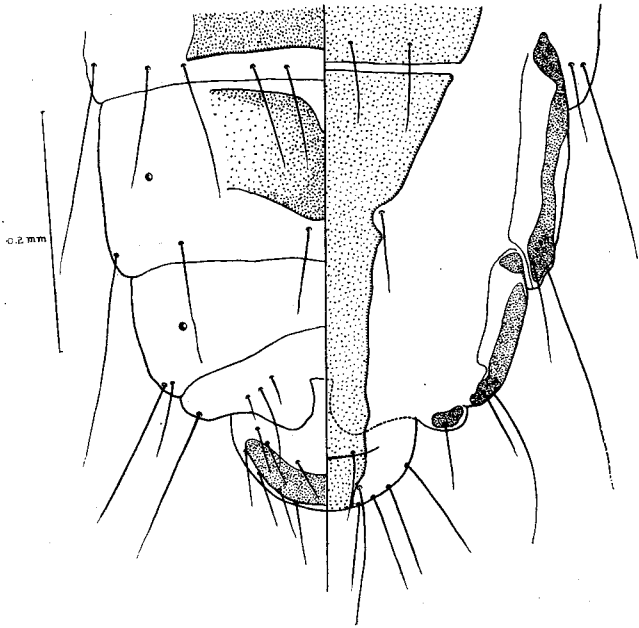
TABLE II.

	Male.		Female.	
	Length.	Breadth.	Length.	Breadth.
Head.....	0.472–0.489	0.326–0.342	0.472–0.505	0.334–0.358
Prothorax ..	0.107–0.111	0.214–0.225	0.105–0.114	0.222–0.240
Pterothorax..	0.181–0.201	0.279–0.299	0.185–0.207	0.296–0.336
Abdomen ....	1.115–1.222	0.383–0.464	1.369–1.514	0.423–0.505
Total.....	1.874–2.021		2.135–2.347	
C.I. ....	0.67–0.69		0.67–0.72	
Paramere ....	0.127–0.140			
Basal plate ..	0.185–0.203			

(All measurements are in mm.)

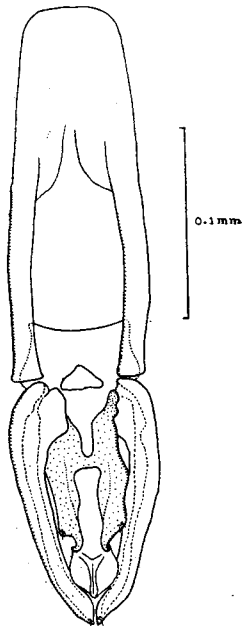
*Description of Female.*—General characters of head and thorax as in male. C.I. 0.67–0.72. Only metasternal plate present. Abdomen elongated, broadest in segment V or VI. Tergal plates on segments III–VIII, that on the fourth segment about 2.5 times as wide as deep. Sternal plates on segments II–VII, that on segment II rectangular, that on V widest, being about ten times as wide as deep. Pleurites narrow with elongated heads and pigmented almost along their whole lengths. Terminal segment bilobed. Vulva bearing 10–12 spines and small setæ on each side of the middle line, fig. 8. Various measurements as given in Table II.

Fig. 6.



*Quadriceps thapari*, sp. n. Terminal segments of male abdomen.

Fig. 7.



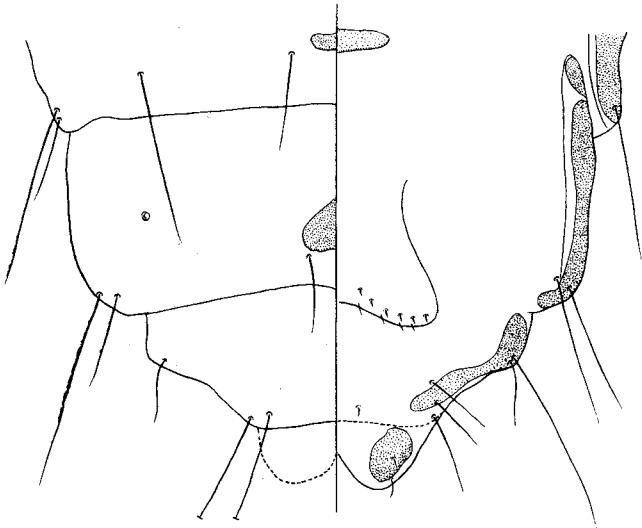
*Quadriceps thapari*, sp. n. Male genitalia.



*Remarks.*—This species is distinguished from other species found on terns in the male genitalia, shape of the male head and pigmentation of the abdomen in both the sexes.

The species has been named after my former teacher Dr. G. S. Thapar.

Fig. 8.



*Quadriceps thapari*, sp. n. Terminal segments of female abdomen.

Genus *RALLICOLA* Johnston and Harrison, 1911.

*Rallicola clayi*, sp. n. (Figs. 9–13.)

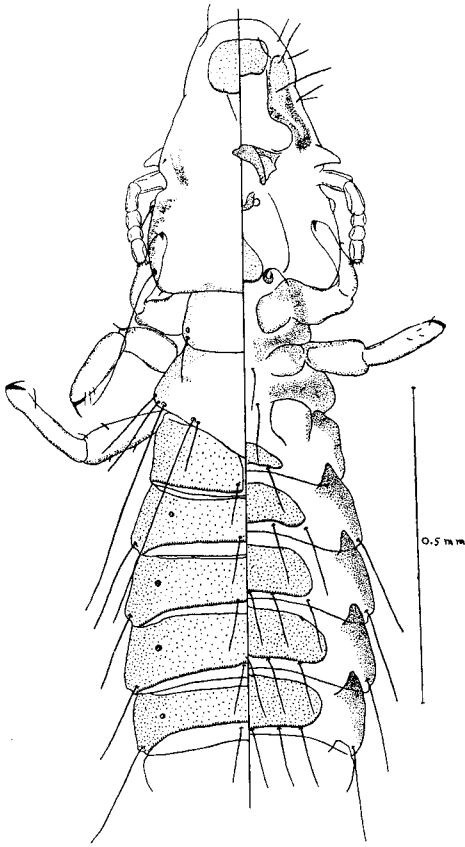
*Material Examined.*—Ten males and nine females from a freshly killed White-Breasted Water-Hen, *Amaurornis phœnicurus chinensis* (Boddaert) (Rallidæ), at Lucknow in March, 1947.

*Type Material.*—Holotype male and allotype female in the British Museum (Nat. Hist.), slide no. 555.

*Description of Male.*—General characters of head and thorax as in fig. 9. C.I. 0.71–0.73. Antennæ slightly dimorphic in the two sexes, fig. 10.

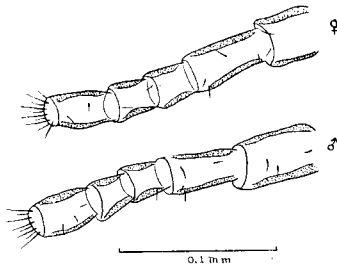
Abdomen elongated, broadest in segment IV or V. General chaetotaxy, tergal and sternal plates as in figs. 9 and 11. Male genitalia as in fig. 12. Various measurements given in Table III.

Fig. 9.



*Rallicola clayi*, sp. n. Male.

Fig. 10.



*Rallicola clayi*, sp. n. Male and female antennæ.

Fig. 11.

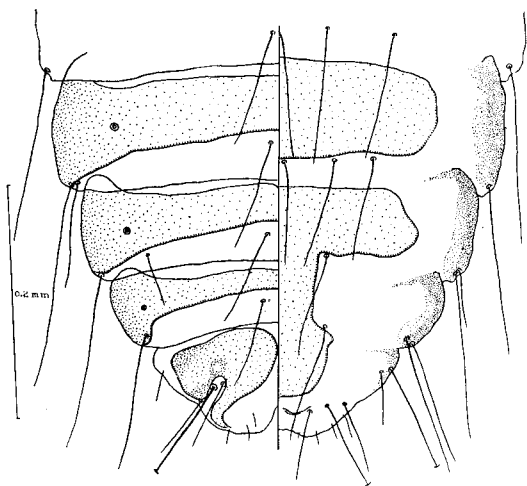


Fig. 12.

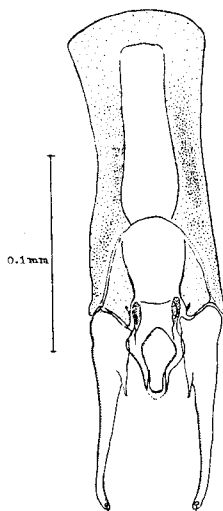
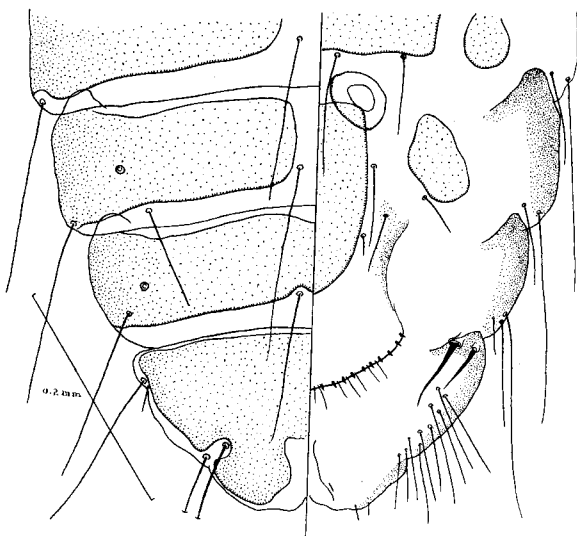


Fig. 13.



- Fig. 11.—*Rallicola clayi*, sp. n. Terminal segments of male abdomen.  
Fig. 12.—*Rallicola clayi*, sp. n. Male genitalia.  
Fig. 13.—*Rallicola clayi*, sp. n. Terminal segments of female abdomen.

TABLE III.

	Male.		Female.	
	Length.	Breadth.	Length.	Breadth.
Head.....	0.438-0.462	0.324-0.349	0.446-0.491	0.341-0.377
Prothorax ..	0.089-0.113	0.203-0.219	0.089-0.105	0.219-0.235
Pterothorax..	0.162-0.178	0.300-0.316	0.194-0.211	0.316-0.332
Abdomen....	0.673-0.710	0.406-0.438	0.718-0.889	0.479-0.530
Total.....	1.380-1.437		1.506-1.680	
C.I. ....		0.71-0.73		0.75-0.77
Paramere....	0.093-0.100			
Basal plate ..	0.146-0.163			

(All measurements are in mm.)

*Description of Female.*—Head and thorax as in male, only the measurements are slightly greater. C.I. 0.75-0.77. Abdomen with tergal plates in segments III-VII, separated medianly, those on VIII and IX continuous. Terminal segments as in fig. 13. Genital plate bears about 10 spines and 7-9 fine setæ on its margin on each side of the middle line.

*Remarks.*—This is the first species of the genus to be recorded and described from India.

The species has been named after Miss Theresa Clay of the British Museum (Natural History).

## REFERENCES.

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