

***NOTOCOTYLUS SINDHENSIS* N.SP. (TREMATODA: NOTOCOTYLIDAE) FROM MALLARD (*ANAS PLATYRHYNCHOS*) IN SINDH, PAKISTAN**

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خلاصہ

پاکستان سے چھوٹے لٹرشہ (*Anas platyrhynchos*) کی چھوٹی آنت سے *Notocotylus sindhensis* کو معلوم کیا گیا یہ نئی نوع پرانی نوع *Notocotylus* سے مختلف ہے۔ Papilla کی ترتیب، جسم کے چھوٹے ٹر سائز، اندرونی ساخت شکل۔ Cirrus کے خانے کے چھوٹے ٹر سائز، اندرونی ساخت شکل۔ ایک دھاگے کی موجودگی کی بنیاد پر۔ یہ *Nitoegees* نوع کے سطح پر جو پاکستان کے پرندہ سے معلوم ہوتی درمیان رکھ رہے۔

Abstract

Notocotylus sindhensis n.sp. (Trematoda: Notocotylidae) is described from the small intestine of Mallard (*Anas platyrhynchos*) from Tando Muhammad Khan, Sindh, Pakistan. The new species differs from previously described *Notocotylus* species mainly in the number and arrangements of ventral papilla smaller size of body, the anterior extremity is comparatively narrower; shape and size of cirrus sac and small size eggs, some with only one filament. This is the second description of species level of *Notocotylus* from a bird in Pakistan.

Introduction

Mallard (*Anas platyrhynchos*) belongs to the subfamily Anatinae of waterfowl family Anatidae. It is medium sized often slightly heavier than most dabbling ducks. The bill is yellow in males but black or orange in females they live in wetlands eat tiny animals including water plants, crustaceans and gastropods (Rappole, 2012; Baldassarre, 2014) preferring to congregatge in groups or flocks of different size. The wild mallard is the ancestor of most domestic ducks, and is naturally evolved wild gene pool gets genitically polluted by the domesticated and feral mallard populations. It usually nests on river bank but not always near water.

During recent studies on trematode fauna of birds of Sindh, Pakistan a new species *Notocotylus sindhensis* from the small intestine of mallard was identified and described here. The genus *Notocotylus* is being reported for the second time in bird from Pakistan.

Materials and methods

A total of seven ducks were shot by air gun in December 2015 from a pond located at Tando Muhammad Khan, Sindh, Pakistan (25° 8' 0" N, 68° 32' 0" E) and brought to the laboratory for examination. Their viscera were dissected for presence of trematode parasites and seven specimens were recovered from the small intestine of a single bird. For microscopical examination, the specimens were placed in water for 2-3 h or untill fully extended and pressed slightly between two slides and fixed in AFA (Alcohol – Formalin – Acetic acid) solution for 24 hours followed by dehydration in graded series of 30%, 50% and 70% alcohol. The specimens were stained in Mayer's carmalum and again dehydrated by 70%, 80%, 90% and 100% alcohol. These were cleared in clove oil rinsed in xylene and permanently mounted in Canada balsam. Camera Lucida was used to make diagrams. Measurements are in millimeters. Holotype and Paratypes are in possession of the author (S.W.).

Genus *Notocotylus* Diesing, 1839

Notocotylus sindhensis sp.n.

(Figs. 1-2)

Host:	Mallard (<i>Anas platyrhynchos</i>)
Location:	Small intestine
Locality:	Tando Muhammad Khan, Sindh, Pakistan
No. of specimens recovered:	7 from a single host
No. of hosts examined:	7

Description

Body elongate, anterior region narrower as compared to the posterior end measuring 1.49 – 1.64 by 0.42 – 0.46. Oral sucker terminal, small and muscular 0.088 – 0.092 by 0.090 – 0.094. Maximum body width at the mid of the body, pharynx short, 0.030 – 0.049, esophagus long, bifurcates into caeca which reach up to posterior extremity of the body below the testes. There are three rows of ventral papillae, the median row contains eight papillae. These are comparatively larger in size than the lateral papillae, there is a gap between three anterior and the posterior papillae. The lateral rows contain eleven papillae, slightly smaller than the papillae in the middle row. The testes are slightly lobed, situated in the posterior region of the body, extracaecal and symmetrically placed, the right testis 0.25-0.29 by 0.10-0.13, while the left testis 0.24-0.28 by 0.070-0.14. The distance between testes and vitelline follicles 0.10-0.13. Sperm duct, vas deferens external seminal vesicle indistinct, the cirrus sac is a globular roughly rounded structure measuring 0.10-0.12 by 0.05-0.06, and contains internal seminal vesicle which is followed by a prostatic portion of the male canal and a long ejaculatory duct. The common genital pore is immediately posterior to caecal bifurcation. The cirrus sac distance from anterior end 0.46-0.53. Ovary deeply lobed, situated between the testes near posterior end of the body 0.26-0.32 by 0.13-0.15. Distance between ovary and posterior end 0.15-0.18. Mehlis gland 0.12-0.13, irregular in shape and situated just anterior to ovary. Vitelline follicles situated in extracaecal fields extended from the base of cirrus sac up to a little anterior of testes. Vitelline loops commence from above the ovary and extend up to the base of cirrus sac, leading into a long metraterm. The metraterm coincides with the length of cirrus to open into the common genital pore. The eggs are small filamented thin walled some with one filament measuring 0.010-0.014 by 0.007-0.009.

Discussion

The genus *Notocotylus* was erected by Diesing (1839) with *Notocotylus attenuatus* (Rudolphi, 1809) Kossack, 1911 from wild and domestic ducks as its type species.

The genus *Notocotylus* is worldwide in distribution and contain species from various birds and mammals. Yamaguti (1971) reported 36 species of the genus from different hosts. Later McDonald (1981) listed from waterfowl twenty-four species.

The present species is smaller (1.49-1.64 by 0.42-0.46) in size as compared to *N. attenuatus* (Rudolphi, 1809) Kossack, 1911 (3.1-3.6 by 0.8-1.1); *N. anatis* Ku, 1937 (2.48-4.25 by 0.49-1.19); *N. atlanticus* Stunkard, 1966 (2.2-3.65 by 0.8-1.1); *N. babai* Bhalerao, 1935 (2.2-3.83 by 0.6-0.93); *N. cheonis* Baylis, 1928 (4.0-5.5 by 0.9-1.3); *N. dafilae* Harwood, 1939 (3.0-3.35 by 0.8-0.92); *N. duboisianus* Odening, 1964 (2.05-4.9 by 0.91-1.8); *N. ephemera* (Nitzsch, 1817) Harwood, 1939 (2.5 by 0.9); *N. imbricatus* (Looss, 1839) Szidat, 1935 (2.5-4.2 by 0.5-1.3); *N. indicus* Lal, 1935 (2.18 by 0.63); *N. intestinalis* Tubanguai, 1932 (2.3-3.25 by 0.54-0.75); *N. lopez-neyrai* Dubois et Perez Viguera, 1953 (3.3-3.7 by 1.20-1.4); *N. lucknowensis* (Lal, 1935); Ruiz, 1949 (2.63 by 0.64); *N. magniovatus* Yamaguti, 1934 (2.94-4.3 by 0.81-1.3); *N. marinus* Ginetsinskaia et Naumov, 1939 (1.84 by 0.72); *N. micropalmae* Harwood, 1935 (2.3 by 0.75); *N. nathipandel* Odening, 1964 (4.86 by 1.57); *N. pacifer* (Noble, 1933) Harwood, 1939 (3.0-3.25 by 0.92-1.4); *N. parviovatus* Yamaguti, 1934 (5.17 by 1.19); *N. ralli* Baylis, 1936 (3.0-6.5 by 0.8-1.2); *N. regis* Harwood, 1939 (1.85-2.76 by 1.1-1.25); *N. seineti* Fuhrmann, 1919 (2 by 0.59); *N. skrjabini* Ablasov, 1953 (2.93 by 1.89); *N. solitarius* Singh, 1954 (2.03 by 0.47); *N. stagnicola* Herber, 1942 (2.67-3.5 by 0.72-0.94); *N. tachyerestis* Duthoit, 1931 (5.2-6.4 by 1.1); *N. urbanensis* (Cort, 1914) Harrah, 1922 and *N. zduni* Chiaberashvili et Dzhaveridze, 1968 (2.66-3.83 by ?).

As compared to the recent species *N. loeiensis* Chaisiri *et al.* 2011 (1.678-2.461 by 0.65-0.83) and *N. fosteri* Kinsella and Tkach, 2005 (2.705-3.125 by 0.99-1.09) the present species is smaller in size. The oral sucker in the present species (0.088-0.092 by 0.090-0.094) is smaller as compared to *N. biomphalariae* Flores and Brungi, 2005 (0.12-0.14 by 0.13-0.16); *N. malhamensis* Boyce *et al.*, 2012 (0.17-0.22 by 0.18-0.30); *N. loeiensis* (0.10-0.13 by 0.15-0.16); *N. fosteri* (0.12-0.16 by 0.15-0.17); *N. atlanticus* 0.15-0.18 by 0.12-0.15); *N. johnstoni* (0.12-0.18 by 0.13-0.18) and *N. imbricatus* (0.15-0.23 by 0.17-0.29).

The eggs in the present species (0.010-0.014 by 0.007-0.009) are smaller as compared to *N. attenuatus* (0.015-0.021 by 0.009-0.012); *N. aegyptiacus* (0.02 by ?); *N. anatis* (0.018-0.020 by 0.008-0.010); *N. atlanticus* (0.017-0.019 by 0.011); *N. chionis* (0.020 - ?); *N. dofila* (0.019-0.020 by 0.012); *N. duboisianus* (0.016-0.019 by 0.007-0.011); *N. ephemera* (0.020 by 0.010); *N. gibbus* (0.02 by 0.009); *N. imbricatus* (0.015-0.022 by 0.009-0.013); *N. indicus* (0.018 by 0.011); *N. intestinalis* (0.018-0.020 by 0.013-0.014); *N. linearis* (0.017-0.019 by ?); *N. loeiensis* (0.016-0.019 by 0.010-0.011); *N. lopez-neyrai* (0.018-0.019 by 0.008-0.009); *N. lucknowensis* (0.020 by 0.010); *N. magniovatus* (0.024-0.027 by 0.010-0.012); *N. micropalmae* 0.017-0.020 by 0.010); *N. minutus* (0.020-0.024 by 0.010-0.012); *N. naviformis* (0.017-0.020 by 0.012); *N. orientalis* (0.016-0.009 by 0.10); *N. pacifer* (0.020-0.023 by 0.009-0.010); *N. parviovatus* (0.015 by 0.009); *N. porzanae* (0.020 by 0.010-0.012); *N. ratti* (0.018-0.024 by ?); *N. regis* (0.021-0.026 by 0.010-0.012); *N. seineti* (0.021 by ?); *N. skrjabini* (0.021-0.024 by 0.013); *N. solitarius* (0.016-0.018 by 0.008-0.009); *N. stagnicola* (0.021-0.025

by 0.014 by 0.017); *N. tachyeretis* (0.02 by ?); *N. urbanensis* (0.019 by 0.011); *N. zduri* (0.023 by 0.013) and *N. fosteri* (0.016-0.021 by 0.010-0.013). Bhutta and Khan (1975) reported a single species of the genus *N. panjnadensis* from *Anas crecca* from Pakistan. The present species differs in body shape and size, number and arrangement of ventral glands, shape and size of cirrus sac, position of vitelline follicles, shape and size of papillae and size of eggs. Present specimens can be distinguished in having narrower anterior end and a comparatively broader posterior end; in the number and arrangements of ventral papillae, shape and size of cirrus sac which is globular and smaller in size, while in the rest of species cirrus sac is elongated in shape, the uterine loops are roughly 21-22 in number and the eggs are small in size, some with just one filament. On the basis of these differences the species under study is regarded as distinct from all the species of the genus described hitherto. Hence it is regarded as a new species and named *Notocotylus sindhensis*. The name of species refers to the locality of the host.

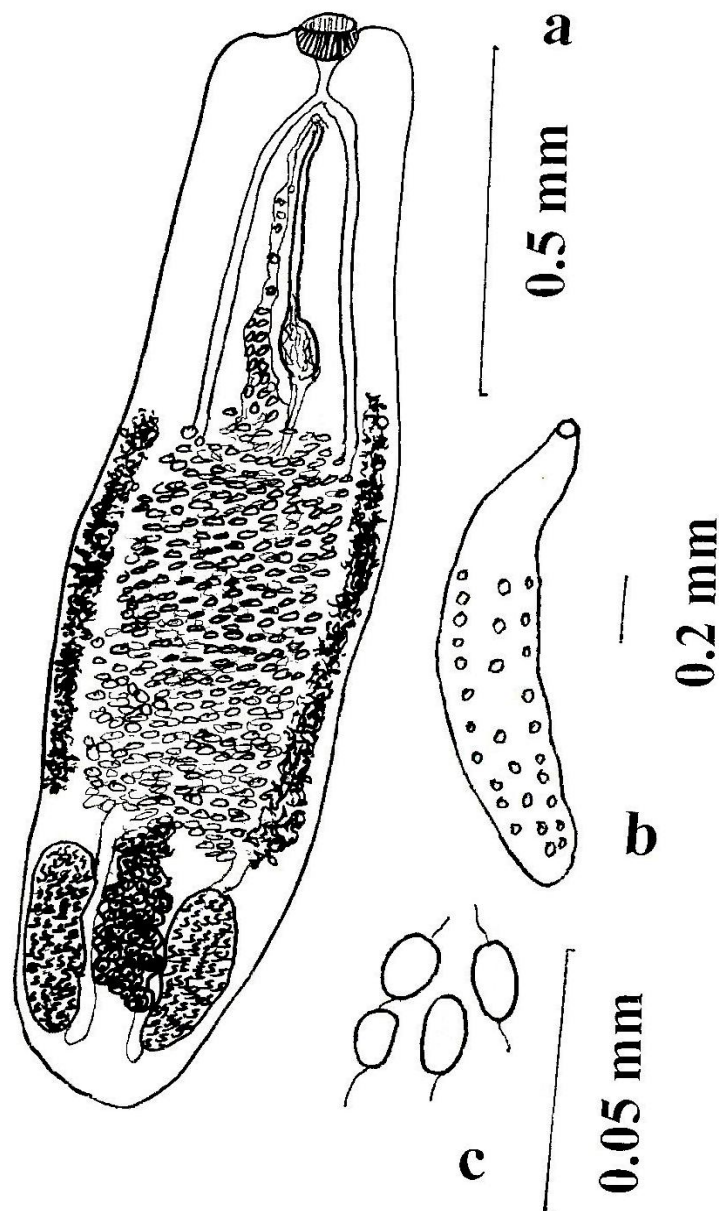


Fig. 1. *Notocotylus sindhensis* n.sp.

- a. Holotype specimen, entire
- b. Ventral view showing papillae



c. Eggs

Fig. 2. Photomicrograph of entire specimen.**References**

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