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First report of *Anatoecus dentatus* in domestic duck (*Anas platyrhynchos domesticus*, Linnaeus, 1978) from Southern India

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ABSTRACT

Parasitic infection is one of the prime causes for morbidity and mortality of ducks in India. Ducks have the habit of wading through the water resources especially paddy fields and feeding on snail which favours occurrence of various parasites. Among the parasites, lice infestation affects growth and productivity of ducks by way of irritation. Lice are well adapted as external parasites and usually are more a nuisance than a threat to their hosts. A nomadic farmer from Mannargudi area of Cauvery delta region of Tamil Nadu, India who had a flock of 1600 ducks reported continuous death of 700 ducks within a period of one month and brought a dead duck to Dept. of Veterinary Pathology for postmortem examination. Examination of entire body of duck prior to necropsy revealed the presence of live lice in the hairs around the junction of beak and head. About 7 lice specimens were collected and brought to Dept. of Veterinary Parasitology for identification. The lice specimens were processed and identified as *Anatoecus dentatus* based on the presence of 'tin opener' shaped effracter in the male genitalia. This is the first report of occurrence of these lice in ducks from Southern India.

1. Introduction

Duck is one of the indigenous species of poultry, reared traditionally by the poor farmers for their livelihood in India. The distribution and demographic dynamics of duck population revealed that they are concentrated in Eastern, North-eastern and Southern states of the country. Duck farming in India is characterized as nomadic, extensive, seasonal, and is still held in the hands of small and marginal farmers and nomadic tribes. The extensive coast line (4000 km long) with many inland water bodies in several parts of the India offers excellent natural habitat of ducks. As per the livestock census 2007, duck population in India was reported to be 27.43 million constituting 8.52% of total poultry population. The duck population in Tamil Nadu is mostly concentrated in Vellore, Thiruvallur, Villupuram, Kancheepuram, Tirunelveli, Madurai, Thanjavur and Tiruchirapalli districts as these districts are known for paddy cultivation. There are adequate water resources for wading and feeding on snails and fishes by ducks (Gagendran and Karthikeyan, 2011). However, these resources also favour occurrence of parasites in ducks. Among the parasites, lice infestation affects growth and productivity of ducks due to the intense irritation produced by them. Lice are well adapted as external parasites and usually are more a nuisance than a threat to their hosts. The common duck, *Anas platyrhynchos domesticus* (L.) serve as hosts for seven species of lice throughout the world, viz. *Anaticola crassicornis* (Scopoli), *Anatoecus dentatus* (Scopoli), *Anatoecus icteroides* (Nitzsch), *Holomenopon leucoxanthum* (Burmeister), *Holomenopon maxbeieri* Eichler, *Holomenopon*

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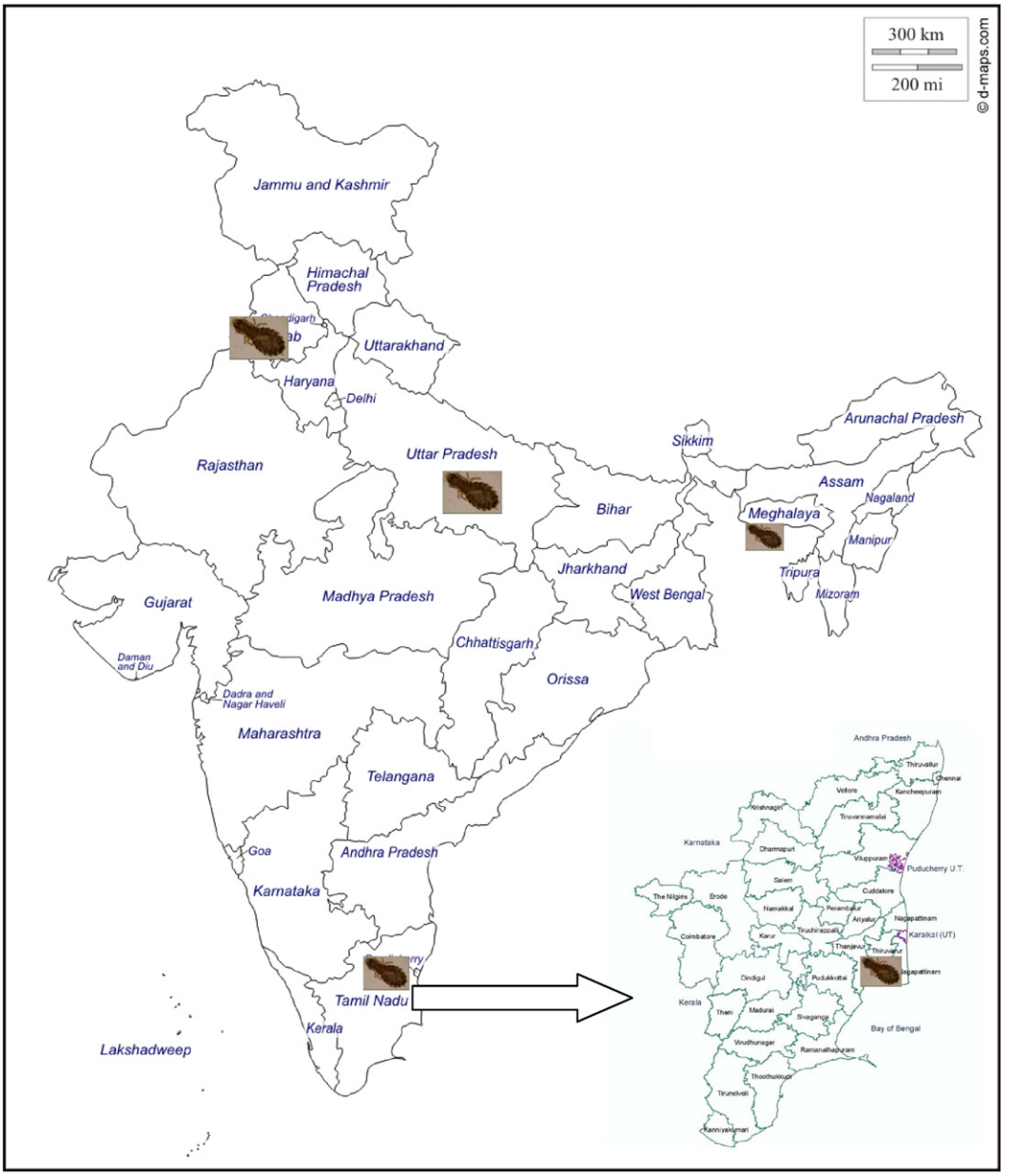

Fig. 1. Geograpical occurrence of Duck lice *Anatochus dentatus* from north Indian states like Utterpradesh, Megalaya, Punjab and currently in south Indian state Tamil Nadu.

transvaalense (Bedford) and *Trinoton querquedulae* (L.) (Aksin, 2011). Ansari (1947) reported only two species, *A. crassicornis* and *A. dentatus* in *A. platyrhynchos* from Punjab. *A. dentatus* has also been reported from ducks of Megalaya, India (Rai, 1977). Ahmad et al. (2013) recovered three phthiraptera species, *A. crassicornis*, *A. dentatus* and *H. leucoxanthum* in Bareilly and Rampur district of northern India during 2011–2012 (Fig. 1). However no chewing louse species of the common duck has yet been reported from Southern India (Tandan and Kumar, 1969; Lakshminarayana, 1979; Laksmanan et al., 2007; Ahmad et al., 2013). Hence the study was envisaged to identify the lice collected from the duck morphologically and know the epidemiological significance in India.

2. Materials and methods

A nomadic duck farmer from Mannargudi area of Cauvery delta region in Tamil Nadu, India had a flock of 1600 ducks. The farmer reported continuous death of 700 ducks within a period of one month after introduction of the ducks in a freshly harvested paddy field for foraging. The farmer brought a one year old dead duck during July, 2013 to Dept. of Veterinary Pathology for postmortem examination to find out the cause of death (Fig. 2a). The duck was placed in a white tray. The entire body of duck

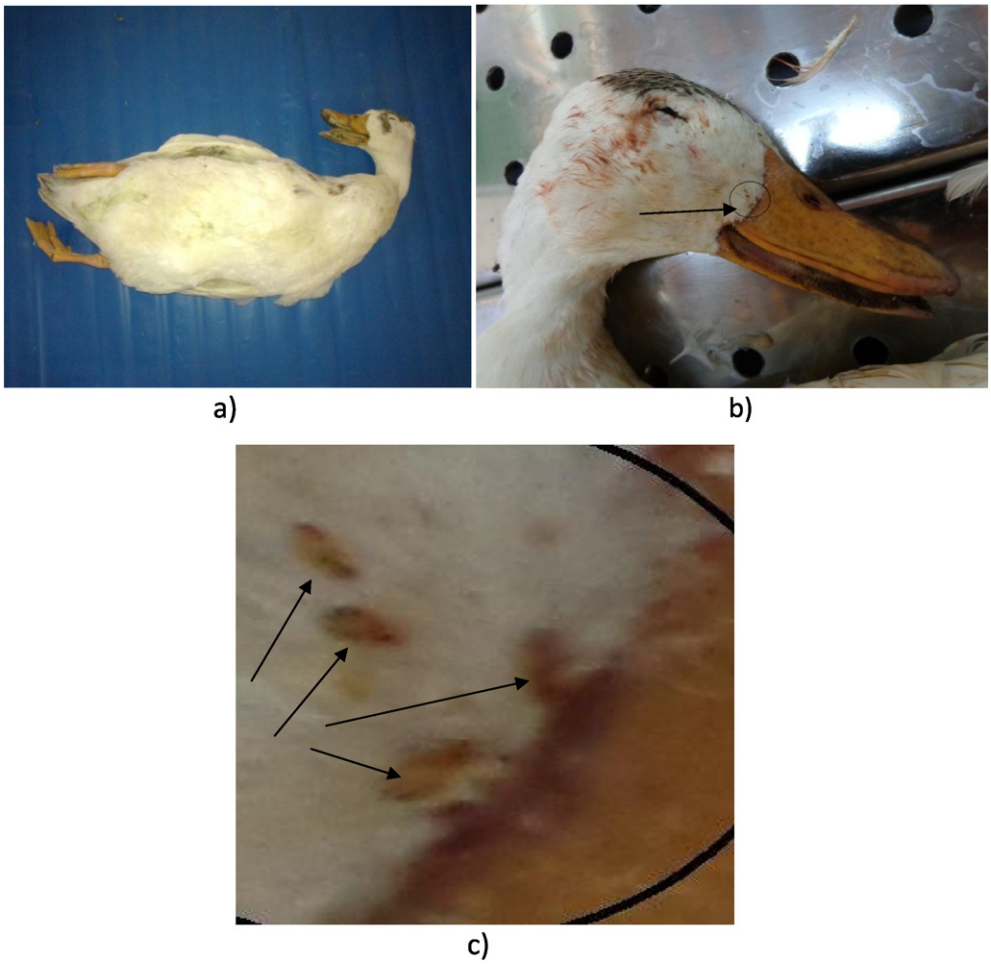

Fig. 2. Lice infestation in the duck original a) Dead duck. b)The hairline area (arrow and encircled) of beak of duck showing the minute lice. c) Enlarged view of hairline area of beak clearly showing lice (arrow).

was examined prior to postmortem and lice were found in the hairs around the junction of beak and head (Fig. 2b and c). Hairs around this area were thoroughly brushed for collection of lice. About 7 lice specimens were collected under stereo-zoom microscope by needle. The lice collected were transferred into Petri dishes containing 70% methanol solution and brought to Dept. of Veterinary Parasitology for identification. The lice were kept in berlese medium for clearing and mounted in a slide by the standard method. Microscopic investigations were undertaken by using the latest literature. Illustrations and dimensions were made by using ocular micrometre in light microscope and photographs were made by using Nikon P7000 digital camera through stereomicroscope, at 100× for whole mount and 400× for terminalia and male genitalia. Holotype and paratypes were deposited in Dept. of Veterinary Parasitology, VCRI, Orathanadu, Tamil Nadu, India.

3. Results and discussion

The death of duck was due to hepatitis as per the postmortem examination. The lice specimens were identified as *A. dentatus* belonging to Mallophaga based on the earlier literature (Ansari, 1947; Clay and Hopkins, 1960; Dik, 2010). This is the first report on the occurrence of these lice in ducks from Southern India. There were 3 female and four male lice in the specimen examined. The female measured about 1.53 mm (Fig. 3a). The head was 0.5 mm length and 0.43 mm width, sub-conical, slightly more broad than long. The preocular region was narrow and temples very wide. The hyaline membrane was concave anteriorly; dorsal anterior plate was glass shaped, wide and shallow, anterior was narrow medially, relatively long, slender and rounded posteriorly. The trabecula was oval proximally; antenna had five segments, the first segment was wider and the second was longer than the others. Temple of the head had one long seta and four spines; occipital bands were parallel; gular plate was sub-pentagonal (Fig. 3b). The length of the thorax was 0.31 mm and 0.4 mm width. Prothorax was quadrangular, slightly broad posteriorly, longer than being wide. Pterothorax was prominent laterally; convex posteriorly, and the posterolateral margin had one spin-like seta

Fig. 3. Morphological features of female *Anatoecus dentatus* original *a*) *Anatoecus dentatus* female in ventral view. b) Head of female *Anatoecus dentatus* showing hyaline membrane (arrow). c) Abdominal segment of female showing well chitinized paratergal plate and setae (arrow).

and 6 long setae on each side. Abdomen was short, broad and rounded, slightly wider than the head. The length and width of the abdomen were 0.72 mm and 0.62 mm respectively. Paratergal plates were highly chitinized (Fig. 3c). Segment I was well developed and notched anteromedially. Segments I–VII had one long seta in the posteroventral margin on each side. Lateral sides of segments VI–VIII had two long setae. Segment IX had two long and one short seta on the posterior margin. There were two clusters composed of two setae each, one short and one long.

The morphological characters of male louse were almost similar to female, but were slightly smaller. The total length of male was 1.28 mm (Fig. 4a). The length and width of head were 0.4 mm and 0.30 mm, respectively (Fig. 4b). The length and width of the thorax were 0.30 mm and 0.35 mm, respectively. Abdominal tergites II–V were divided medially. In genitalia, the basal plate was short and broad, parameters were relatively longer and enclosed proximally, penis was short. There was a well-developed horizontal band, curved posteriorly on each side. There was a vase-shaped pigmented area, oval, well-developed, concave anteriorly, edges extending to the anterior of segment VI (Fig. 4c). There was a 'tin opener shaped effractor' present in the genitalia (Fig. 4d). This structure is present only in *A. dentatus* and absent in other *Anatoecus* species such as *A. icteroides* (Clay and Hopkins, 1960; Dik, 2010) and so the lice were identified as *A. dentatus.* Limited number of studies has been done on the Phthiraptera fauna of the ducks in India. *A. crassicornis* (Scopoli, 1763) (=*Esthiopterum crassicorne*), *A. dentatus* and *Holomenopon obscurum* (Piaget, 1880) (=*Menopon obscurum*) were reported in domestic duck (*Anas platyrhynchos*) from hilly tracts of northern India (Ansari 1947; Rai 1977; Ahmad et al., 2013). However, no chewing louse species of the domestic duck has yet been reported from Southern India (Tandan and Kumar, 1969; Lakshminarayana, 1979; Laksmanan et al., 2007; Ahmad et al., 2013). In this study, seven specimens were obtained from the duck (*A. platyrhynchos domesticus*) and they were identified as *A. dentatus* (Scopoli, 1763). The genus *Anatoecus* is a distinctive genus, characterized by the features of the head, chaetotaxy of the prothorax and other morphological characters. It has been reported on ducks, geese, and flamingos in the Afro-tropical Region (Price et al., 2003). Two lice species; *A. dentatus* and *A. icterodes* were found in the genus *Anatoecus* in Europe (Clay and Hopkins, 1960). Morphological characters of these two species were investigated earlier in detail (Cummings, 1916; Eichler, 1946; Eichler, 1976). *A. dentatus* and *A. icteroides* are the two species of this genus reported from northern India (Ansari, 1947; Rai, 1977; Ahmad et al., 2013). *A. dentatus* has been reported as a cosmopolitan species occurring on various host species in the family Anatidae (Keler, 1960) but had not been previously reported in ducks from Southern India.

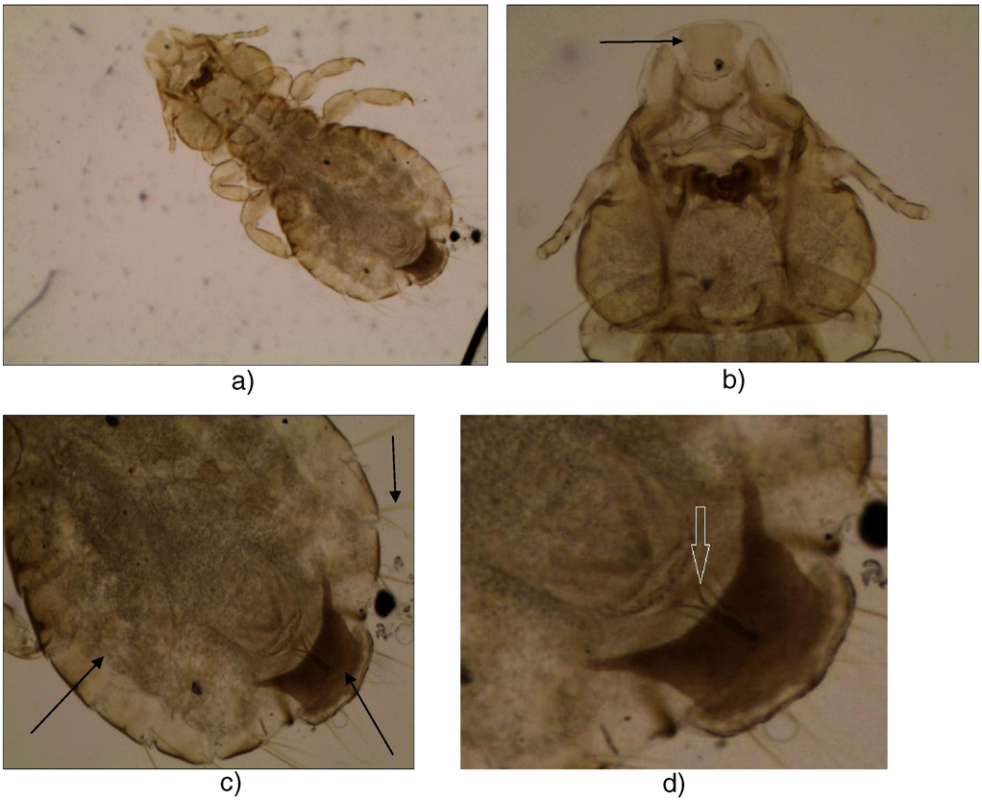

Fig. 4. Morphological features of male *Anatoecus dentatus* original. a) *Anatoecus dentatus* male in ventral view. b) Head of male *Anatoecus dentatus* showing hyaline membrane (arrow). c) Abdominal segment of male showing well chitinized paratergal plate, setae and genetalia (arrow). d) The male genetalia showing the 'tin opener' shaped effractor (arrow).

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