

Prevalence and morphotaxonomic characteristics of nematode, *Contracaecum travassosi* (Gutierrez, 1943) from bird jungle babbler, *Turdoides striata*

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ABSTRACT:

The research study was conducted on the helminth parasite of bird Jungle babbler, *Turdoides striata* from district Naushahro Feroze, Sindh during, 2015-16. The total (n= 110) specimens were collected from (n= 48) birds that belonged to the genus; *Contracaecum* Railliet and Henry, (1912), were recovered from the anterior, median and posterior part of large intestine but mostly most of the helminth were found in terminal part of the large intestine of the host. Present specimens were observed in diverse form its congress, but having morphologically closely resemblance with *Contracaecum travassosi*, Gutierrez, 1943 which consists medium sized body. Prominent buccal capsule is along with developed inter labia but oesophagus was observed cylindrical and simple without bulb. Spicules were un-equals and they do not contain gubernaculum. Longitudinal sucker with a chitinous rim and vulva located at the little distance from the anterior region. Surrounding the tail region ten pairs of caudal papillae of which six pairs were postlocal, three pairs were Prelocal and one pair was paraclonal with tail pointed posteriorly. Female eggs had elliptical position and nearly rounded. The infections rate of parasites were found high during the hot summer season in the month of July when compared with contrast season (winter, cold season) specially with December and January. Such type of research study for the purpose to find out the helminth burden in the host Jungle babbler (*Turdoides striata*) was carried out first time. Therefore; it is suggested that, the lot of passeriformes birds contain variety of helminth parasites in their internal tract and organs, so it is strict need to carry out the systematic study of the parasite that logged the burden to their host birds.

Keyword: *C. travassosi*, *Interlabia*, *Vulva*, *Caudal papillae* and *Turdoides striata*.

INTRODUCTION

Birds are distributed in all the continents, Arctic and Antarctic regions, they are found all altitudes in various habitats, like open oceans, marshy places, grassy fields, Savanna and trees. Certain birds have migratory habits and travel thousand kilometres for breeding and nesting that avoid harsh weather or climate [1]. Birds are poikilotherm along with endoskeleton and having feathers for flight but most of them are flying birds (craniate) while as some running birds (ratitae) are in their flying nature and most of them play positive role in maintenance the balance in ecosystem [2]. Negative role as well as positive role of birds in agriculture was described [3, 4]. Similarly agriculture is the richest source of food for birds and food comprises fruits, green vegetation of the crop plants, seeds, rodents, insect, grain, arthropods etc. [5]. Fluctuation of bird population can migrate in different seasons, it indicates that wether the area is not fruitful or healthy and if there is total nonappearance of the birds from an area such area is considered as polluted indicator, extreme hunting, human disturbance or human pressure [6]. Birds are sensitive to their envirmetal changes and the earth's biodiversity and health status in the ecosystem [7, 8]. Disturbance occurs in their community structure when changes occur in vegetation by the activities of human being or naturally. So individualistic appearance of bird species shows the environmental changes [9, 10, 11]. Wild fire can play critical role in the disturbance and this response relay the badly impact on the variety of bird species but documentary shows that most bird species have been found post fire compared with burn free areas [12]. The insufficient amount of water and food relay the negative impact on the quality and quantity of birds [13]. Understanding the envirmetal impact on bird community, their relative value, investigating diversity is the important. Different research scholars have already documented the different

diversity in birds [14]. And it was also suggested that diversity can be increased with the enhanced level of vegetation [10].

Jungle babbler, *Turdoides striata* Dumont deSainte Croix, 1823 belongs to (Leiothrichidae) family predominantly found in Indian sub-continent, well known as *Saath bhai* or *seven sisters* in Hindi. Their body colouration is dusky, found in tropical areas mostly in variety Southeast Asia. They comprise strong legs and generalised bill. They are weak in their flight and not strongly migratory live in wooded region or scrubland environment, habit from swamp to near desert. Mainly insectivores but some species may eat smaller lizards and other vertebrates and they are common residing breeding birds, often found in gardens, cities and forests [15]. Their habitat is cultivation and forest, separate in sexes, commonly found in flocks of seven to ten and can produce noise. Continual chattering, harsh mewling calls, speaking and tweeting is a common characteristic and generally known as social. On the nature of food largely eat grains, berries, nectar and insects. They may live 16.5 and attain sexual maturity only within three years and bread throughout the year. Female leave their natal group after the passing of two years and play chases and mock flights [16].

The helminth cause great infection to the variety of bird species and reported many infections in birds [17], because there is huge marshlands along the sides of Indus River. It is an estimated that 1855 bird species at (19%) of extant species are migratory bird species [18]. The migratory birds are reservoir for *Compylobacter* (Curved bacteria) reported at high amount in some species [19]. Due to the presence of trematode many infections occur like; infection in the bi laterally tract [20, 21]; nasal cavities [22, 23]; mesenteric veins [22] air sacs and corneal surface [24]; chicken also harbour parasites in their blood [25]. *Heterakis gslinarium* has been associated with *Histomonas meleagridis* and turkey and chickens with hyper infection. *Columba livia* harbor different helminthes but nematodes are

frequently occurring and affect health of birds [26, 27]. *Perdix erdix* since from past fifty years declined in Europe [28] and decline of both types of birds was associated with certain agricultural practices [29, 30]. Similarly, in current, gray partridge has been declining in UK dramatically [7], gray partridge and pheasants can share gastrointestinal parasites to each other through feeding behaviour [31, 32]. Studies regarding feeding of Jungle Babblers have been undertaken by various workers [15] but few studies relating to the helminth parasites of the jungle babbler and around district Naushahro Feroze, Sindh, Pakistan. Therefore, the present work was undertaken to investigate the internal frame work of the host bird to find out the burden of the helminthes parasites of *Turdoides striata* from perspective region.

MATERIALS AND METHODS

The undomesticated bird Jungle babbler, *Turdoides striata* were captured for the purpose to check out the helminth burden to the host birds during, 2015-16. A total of (n= 48) host birds were examined, which were collected from different intervals of district Naushahro Feroze, Sindh, Pakistan. Most of the birds were purchased five local Taluka markets of the respective district and brought them to Parasitology laboratory, Department of Zoology, Shah Abdul Latif University, Khairpur. The experimental process was initiated under laboratory conditions. First of all, the glass slides were poured with the 100% ethanol and left them for 15-25 minutes in the coplin jar for the sterilized purpose. Then slides were cleaned with spongy cloth piece and cotton swab. By the wearing hand gloves and with the help of four to five drops of chloroform host on cotton swab bird was anaesthetised. Therefore feathers was removed from the sternum till to near the cloacal opening, by the help of forceps a longitudinal cut was given and whole internal visceral organs were tacked out from the internal frame work of the body but before the pouring of internal organs in petty dishes a little amount of normal saline solution were added in each dish and kept internal organs separately in separate pattery dishes individually. By the applying the source of stereo dissecting microscope each organ were slough and gradually examined. Then parasites were laid on glass slide and added one drop of glycerol and two drop of lacto phenol and cover slip were given above the specimen for the further microscopic examination by this procedure slides of nematode helminthes were mount for short time. By the help of Camera Lucida diagram of nematode were formulated. Photography of the specimens was taken by the source of Meiji infinity 1DK3000 camera. Whole body organelles measurement of the parasite was taken in millimetres but eggs measurement was taken in micro meters. Finally, Holotype of the specimen s placed in the Parasitology Laboratory, Department of Zoology, Shah Abdul Latif University Khairpur, Sindh, Pakistan reference motivation for research purpose.

Statistical analysis

Finally, the data was inserted in MS, excel spread sheet and latter on imported for analysis of variance for examination the significant results with the help of SXW software, 8.1, version (USA).

RESULTS

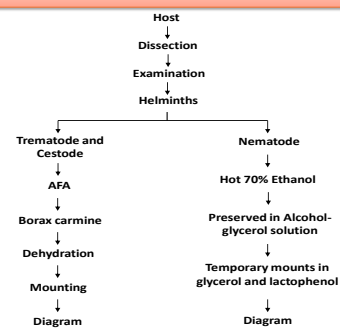
Systematic position

Family: *Anisakidae* Skrjabin and Karokhin, 1945; Subfamily: *Filocapsulariinae* Yamagutii, 1961; Super-Family: *Ascaridoidea* Railliet and Henry, 1915; Genus: *Contraecum* Railliet and Henry, 1912; *Contraecum travassosi* Gutierrez, 1943; Location: Large intestine; Host: Jungle babbler;

Turdoides striata, Locality: Naushahro Feroze, Sindh, Pakistan; Number of specimen: 110 from 48 host birds. Finally, the bird was dissected and mounts were made according under given procedure.

Dissection process

Dissecting and permanent mount procedure



Description of male

Body of the worm measured 16.855 X 0.663. Buccal capsule measured 0.039 X 0.041. Interlabia present, usually well developed. Esophagus without bulb, simple, cylindrical, winded at posterior measured 0.126 X 0.978 with 0.876 muscular parts. Spicules un-equal measured 0.663 X 0.686 and the Gubernaculum was absent. Longitudinal sucker with a chitinous rim measured 0.039 X 0.142. Ten pairs of caudal papillae of which six pairs are postlocal, three pairs are Prelocal and one pair is paraclocal with tail pointed posteriorly.

Description of female

Body of the female is larger than the males measured 28.026 X 0.947. Buccal capsule measured 0.041 X 0.044 in size. Esophagus measured 0.157 X 0.986 with 0.884 muscular parts. Vulva located at the distance of 8.905 at the distance from anterior region. Tail measured 0.592. Eggs elliptical nearly rounded measured 5-33 X 5-79 (Diagram-1 and Photograph-2).

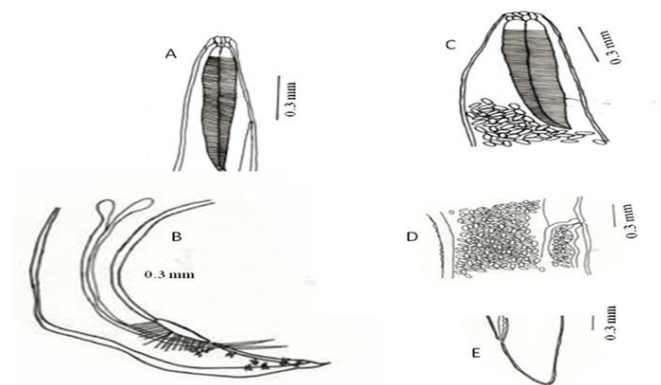
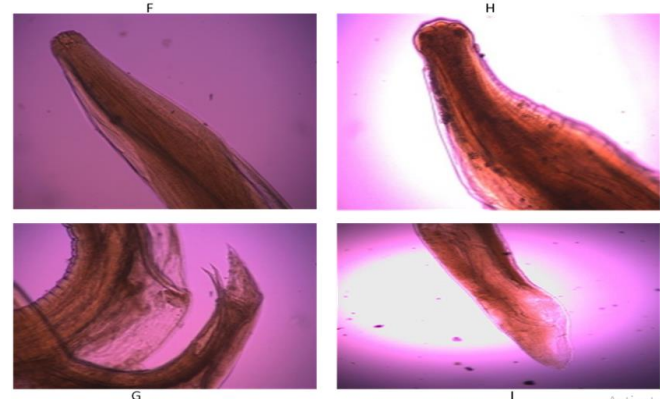


Diagram-1 *Contraecum travassosi*: Gutierrez, 1943; **A**: Anterior portion of male worm; **B**: Posterior end of male showing spicules; **C**: Female anterior portion; **D**: Vulva and eggs; **E**: Posterior portion of female worm.



Photograph 2: Photograph of F: Anterior portion of male; G: Posterior portion of male worm; H: Anterior portion of female; I: Posterior portion of female worm.

Remarks

The genus; *Contraecum* Railliet and Henry, 1912 was proposed to accommodate the nematodes collected from the intestine and internal viscera of different host birds. Type species of this genus is *C. Spiculigerum*, Rud., 1809 syn., *Ascaris spiculigera* Rud., 1809 in the *Podiceps*, *Pelecanus onocrotalus*, *Stercorarius*, *Mergus*, *Colymbus*, *Phalacrocorax*, *Cygnus*, *Larus*, *Uria* and *Alca*; from Africa and Europe, *Phalacrocorax carbo* and *Mergus merganser* from Turkestan; *Phalacrocorax carbo hanedae* also from Japan; *Plotus* spp., *Phalacrocorax* India; *Ardea* sp., and *Phalacrocorax* from China and India; *P. auritus*, *Larus argentatus* from Cuba and *P. vigua mexicanus* from Mexico, respectively.

Other species of this genus reported from the various bird species; *C. nasutum* (Schneider, 1866) from *Pelecanus onocrotalus*; *C. granulosum* (Schneider, 1866) from *Trachypetes aquilus* at Brazil; *C. multipapillatum* (Drasche, 1882) from *Tantalus loculator*, *Ardea Herodias* at Brazil; *C. diomedae* (Linstow, 1888; Johnston, 1938) from *Diomedae brachyurao*, *Phoebetria palpebrata*, *D. exulans* and *D. nigripes* at Antarctic; *C. magnipallatum* (Stoss, 1890) from *Pelecanus* sp., *Glaucionetta clangula* at Africa and Europe; *C. ovale* (Linst, 1907) host *Podiceps cristatus* at Europe; *C. rosarium* (Connal, 1912) bird *Nycticorax* sp., from India and West Africa; *C. Scotti* (Leiper and Atkinson, 1914) from *Diomedae melanophrys* at Antractic; *C. tricuspis* (Gedoelst, 1916) host *Anhinga*, *Ardea* etc. at Calcutta; *C. rodhaini* (Gedoelst, 1916) recovered from *Plotus rufus* from Congo and Mexico; *C. punctatum* (Gedoelst, 1916) bird *Pseudotantalus ibis* in Congo; *C. engonium* (Baylis and Daubney, 1922), *Cinconia nigra* from India; *C. haliaeti* (Baylis and Daubney, 1923) reported in *Haliaeetus leucogaster*, *H. Indus*, *Ichthyophaga ichthyaeetus* and *H. leucocephalus* at India; *C. turkestanicum* (Skrjabin, 1923), *Mergus merganser* at Russia; *C. quadricuspe* (Walton, 1923), host *Butorides virescens* at Illinois; *C. magnipapillatum* (Chapin, 1925) bird *Megalopterus hawaiiensis* from Hawaii; *C. matwejewi* (Layman and Mudrezowa, 1926) recovered from *Sterna macrura* at Russia; *C. bodenheimeri* (Witenberg, 1929) from *Puffinus khuli* at Suez; *C. hagedashiae* (Sandground, 1933) host *Hagedashia hagedash nilotica* from Tanganyika territory; *C. andersoni* (Vevers, 1933) recovered from *Florida caerulae* at British Guiana; *C. milvi* (Yamaguti, 1935) host *Milvus migrans formosanus* and *M. lineatus* at Japan also from *M. govinda*, *Butastur teesa* in India; *C. torquatum* (Yamaguti, 1935) from *Larus canus* major at Japan; *C. crenulatum* (Stekhoven, 1937) host *Cancroma cochlearia* in Brazil; *C. milviensis* (Karokhin, 1937) bird *Milvus lineatus* from Siberia; *C. pseudodontum* (Kreis, 1937) recovered from *Phalacrocorax* in Europe; *C. fuhrmanni* (Kreis, 1937) collected from *Plotus levaillandi* locality not given; *C. antracticum* (Johnston, 1938) from *pygoscelis adeliae* at common wealth bay; *C. carlislei* (Ortlepp, 1938) recovered from *Anhinga anhinga* at Chapultepec Zoo, Mexico also from *Phalacrocorax vigua* at Montevideo; *C. pandioni* (Sobolev and Sudarikov, 1939) host *Pandion haliaetus* at Russia; *C. clelandi* (Johnston and Mawson, 1941) bird *Pelecanus conspicillatus* from Australia; *C. bancrofti* (Johnston and Mawson, 1941) from *Pelecanus erythrorhynchus* in Mexico; *C. umiu* (Yamaguti, 1941) recovered from *Phalacrocorax Capillatus* at Japan; *C. nycticoracis* (Johnston and Mawson, 1941) bird *Nycticorax caledonicus* in N. S. Wales; *C. sinulabiatum* (Johnston and Mawson, 1941) reported from *Plotus novae-hollandiae* and *Phalacrocorax* spp., at Australia; *C. himeu* (Yamaguti, 1941)

syn. of *C. spiculigerum* (Skrjabin *et al.*, 1951) from *Phalacrocorax pelagicus* at Japan; *C. magnicollare* (Johnston and Mawson, 1941) recovered from *Sula* sp., *Diomedea* and *Anous stilodus* at New Zealand and Australia; *C. quincuspis* (Lucker, 1941) observed from *Anhinga anhinga* at USA; *C. eudyptulae* (Johnston and Mawson, 1942) collected from *Eudyptula minor* at Tasmania and Australia; *C. travassosi* (Gutierrez, 1943) from *Pandion haliaetus carolnensis* at North America and also from *Phalacrocorax albiventer*, *P. vigua* and *Argentina* at Montevideo; *C. plagiaticium* (Lent and Freitas, 1948), bird *Nycticorax nycticorax* at Uruguay; *C. nehli* (Karokhin, 1949) recovered from *Colymbus nigricollis* at Russia; *C. spasskii* (Mozgovoy, 1950) host *C. ruficollis*, *C. nigricollis*, *C. griseigena* and *Colymbus auritus* at Russia; *C. oshmarini* (Mosgovoy, 1950) reported from *U. aalge inorta* and *Uria lomvia* at Kamtchatka Sakhalin; *C. macronectidis* (Schuurmans,- Stekhoven, 1950) from *Macronectes giganteus* at Argentina; *C. lari* (Kreis, 1951) reported from *Larus marinus* at Faroer; *C. circi* (Oschmarin, 1963) host *B. lagopus*, *Buteo buteo* and *Circus cyaneus* at Russia; *C. eudyptes* (Johnston and Mawson, 1953), collected from *Megadyptes antipoda* and *Eudyptes cristatus* from Auckland Islands; *C. heardi* (Mawson, 1953) recovered from *Aptenodytes pentagonica* and *Eudyptes cristatus* at Antractic; *C. ruficolle* (Vuylsteke, 1953) observed from *Poliocephalus ruficollis capensis* at Congo; *C. accipitres* (Inglis, 1954) host *Sarcogyps calvus* at India; *C. septentrionale* (Kreis, 1955) observed from *Phalacrocorax aristotelis* at Iceland; *C. yamaguti* (Mawson, 1955) host *Merganser merganser americanus* at Canada; *C. anasi* (Mawson, 1956) from *Anas rubripes* at Canada; *C. maxicanum* (Flores Barroeta, 1957) observed from *Pelicanus occidentalis californicus* from Mexico; *C. pingi* (Hsu, 1957) host *Astur gentilis schvedowi* from Canton; *C. cantonense* (Hsu, 1957) observed from *Buteo buteo burminacus* and *Astur gentilis schvedowi* at Canton; *C. bubakii* (Akram, 1996), host *Phalacorcorax niger* from Manchar Lake at Sindh; *C. philomultipapillatum* (Labriola and Suriano, 1996) collected from *Bubulcus ibis ibis* in Argentina; *C. himeu* (Yamaguti, 1941) and (Nagasawa *et al.*, 1999) reported from *Phalacorcorax Capillatus* at Japan; *C. magnicollare* (Hugot *et al.*, 1991) and (Jhoston and waston, 1941) host *anouminutes*; *C. bioccai* (Mattiucci *et al.*, 2008) recovered from *pelicanus ccidental* at Columbia; *C. Pyripapillatum* (Shamsi *et al.*, 2008) from *Pelicanus conspicillatus* at Australia and *C. gibsoni* (Mattiucci *et al.*, 2010) reported from *Pelicanus crispus* in Greek waters. On accord of the diagnostic features, present specimens have close resemblance with *Contraecum travassosi* Gutierrez, 1943 in all essential features collected from the host *Turdoides Striata*. Hence, it is identified as such, and jungle babbler is the new host record for the genus; *Contraecum* Railliet and Henry, 1912 in Pakistan. (Tabel-1)

DISCUSSION:

The research based study was conducted on the helminth parasite in *T. striata* of district Naushahro Feroze, Sindh on total (110) specimens were collected from (48) birds which were recovered mostly in terminal part of the large intestine of the host bird. Since from the few decades; adequate management had been applied to understanding the habitats and relationship among the bird species. For example, if study is conducted only particular host birds, regarding its ecology, threats, habitats and distribution to its status, then appropriate answer will be given with an understanding of its habitat requirements. Because the our environment globally getting destroyed at an alarming, so for the maintaining sufficient and appropriate number of biodiversity of the birds in agro-ecosystem, it is strictly need to

apply certain measure for ecological sustainability which show the beneficial results for the organism [33]. But due to the rapid growth rate and urbanization had resulted reduction in agriculture, and wet lands, i. e. lakes, streams, tank bodies, rivers and reservoirs are going continuously towards alarming and activities of human being also created pollution of various types. So these activities are making wetlands lose because certain bird species are dependant chiefly to the aquatic organisms and farming lands attract majority of the migratory bird species, on that basis birds are incorporated with farmers every day to their activities and they are effective in controlling agricultural pests. But extensively application of chemical pesticides has extremely reduced the birds population because of unavailability of pray [34]. Birds are chief ingredients as well as significant link in regulating the food chain to their ecosystem, they are important in biological consideration, ecologically resourceful [35]. By the using of undercooked fish may leads to the food-borne zoonoses and mostly infection is caused by the larvae of *Pseudoterranova* and *Contracaecum* [36, 37].

The morphologically resemblance with *C. Travassosi* these specimens were found in different form its congress, which consists medium sized body with the prominent buccal capsule and spicules were un-equals that not contained the gubernaculum. The nematodes such as; *Ascaridia*, *Capillaria* and *Heterakis*, cestodes; *Hymenolepis* and *Raillietina* were the main genera of parasites those found in the poultry birds [38]. *Ascaridia gali* was worldwide distributed nematode of wild and domestic birds. Ducks, guinea fowl and geese were mostly affected by nematode; *Capillaria* [39]. Crop type, agricultural practices, improper arrangement, shift in cultivation, these factors affects the activities of the birds and resulting in the reduction in the farmland birds. Rainfall creates the possibility for activity of breeding in birds, food availability, and habitat formation, but atmospheric condition and human rapid growth rate deteriorate the bird's habitat [40, 41]. The infection rate of parasites was found high in summer season during, July compared with winter season in December and January with the helminth burden in the host. The results of this research study are in agreement who found the prevalence and parasitic infection of nematodes, cestodes and coccidian's serve harmful impacts as; retarded growth, low egg production, malnutrition and some time death to their hosts. The birds like; Quails, chickens, pheasants and turkeys were also worldwide parasitized by; *R. echinobothrida* and *R. Tetragona* [42].

This kind of research study is taken first time over the helminth parasite, *T. striata* at district Naushahro Feroze, Sindh - Pakistan. Therefore; the present study suggests that, more research work should be carried out on the other passeriformes for the presence of helminth parasites with systematic study. The prevalence of helminth parasites were observed during this research study and results are in agreement with the [43] who also initiated research work on the impact of cestode, *Hymenolepis* spp., in the bird Jungle babbler in same locations. Besides, the research study was also supported to this research study conducted by [15] who observed the prevalence of trematode, *Lyperosomum longicauda* (Rudolphi, 1809) in bird jungle babbler bird. During their research studies, the results were found the significantly different during the month wise infestation in these birds. Keeping in mind above valuable ideas for the research work, it is suggested that the laboratory based scientific study should be supported out on the bio-diversity of cestode, nematode and trematode parasites of the *Turdoides striata*.

CONCLUSION

It is further concluded that the bird jungle babbler especially an Indian given name *Sath Bhai* is well known of Indo - Pak sub-continent bearing voracious feeder of insect pests complex in agro-ecosystem. This bird is attached by many living parasites which cause to death and day by day decrease its population. Therefore, the reason of mortality was highlighted through its internal parasites identification and occurrence.

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