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GIZZARD NEMATODES OF THE HOUSE SPARROW *PASSER DOMESTICUS BIBLICUS* HARTERT COLLECTED IN BAGHDAD CITY, CENTRAL IRAQ

Mohammad K. Mohammad* and Azhar A. Al-Moussawi
Iraq Natural History Research Centre and Museum, University of Baghdad,
Bab Al-Muadham, Baghdad, Iraq
*Email: amarmkm82@yahoo.com

ABSTRACT

Acuaria skrjabini Ozerskaya, 1926 and *Dispharynx nasuta* (Rudolphi, 1819) Stiles and Hassall, 1920, were found embedded in the mucosa of the gizzards of 26.97% of house sparrows, *Passer domesticus biblicus* collected in Baghdad City. Their morphometric and meristic features were expressed and compared with that reported in other studies.

INTRODUCTION

The house sparrow, *Passer domesticus biblicus* Hartert is a synanthropic species with natural distribution throughout Europe, the Mediterranean region and most Asia. It had been introduced intentionally or accidentally into many parts of the world, and these introductions in addition to the expansion of the distribution of species after the break-down of biogeographic barriers by humans (globalization of biodiversity) have altered host and parasite diversity throughout the world (Poulin and Morand, 2004; Taraschewski, 2006). In Iraq, it is a very common resident bird and its distribution includes all kinds of ecosystems (Allouse, 1962; Salim, 2006) except, perhaps, the deep interior of deserts. Surprisingly, only few works had been carried out on house sparrow parasites in Iraq including Shamsuddin and Mohammad (1980) and Mohammad (1990) who investigated for blood parasites only while Abdulabas (2005) examined three passerine birds including house sparrow in Al-Najaf Al-Ashraf Governorate and found two cestode species in the intestine of the house sparrow, but none on gizzard nematodes.

The aim of this work is to provide information on the incidence, identification, intensity and necessary measurements of males and females of gizzard nematodes in house sparrows collected in Baghdad City.

MATERIALS AND METHODS

A total of 56 specimens of house sparrow (36 males and 20 females) were collected in Baghdad city by mist net during the period March to December 2011. Birds were immediately dissected and the recovered gizzards were searched carefully for the nematodes underneath the lining wall. The recovered nematodes were washed thoroughly with normal saline then kept in 70% alcohol and rinsed in lactophenol before examining for clearing. Micrographs were taken with digital camera Infinity lite-K100 attached to compound microscope Micros MCX100. All measurements are in millimeters unless otherwise stated.

RESULTS

Table 1 summarizes the results of examining 56 house sparrows for endoparasites. It would show that 15 (26.97%) were infected with either *Acuaria skrjabini* Ozerskaya, 1926 or *Dispharynx nasuta* (Rudolphi, 1819) Stiles and Hassall, 1920. All cases are single infections except one case of a female harbored both infections. There are no double infection cases with these two nematodes.

Table 1: Examination of bird hosts and findings on *A. skrjabini* and *D. nasuta*.

No. bird examined		No. infected	% infected	No. hosts *Acuaria skrjabini* infected	%	No. hosts *Dispharynx nasuta* infected	%
Male	36	6	16.7	3	8.3	3	8.3
Female	20	9	45	9*	45	-	0
Total	56	15	26.8	12	21.4	3	5.4

*One female of double infection with 13 larval stage of a spirurid nematode.

The results show that female hosts acquire higher rate of infection (45%) than males (16.7%) with both parasites. It shows also that infection rate is higher with *A. skrjabini* (21.4%) compared with only 7.1% in case of *D. nasuta*.

Acuaria skrjabini (figs. 1-3): Anterior end without vesicular swelling, with two small triangular lips, four short straight cordons beginning from mouth angles. Males with asmmytrical caudal alae. Caudal papillae pedunculated, preanals 4 pairs, postanals 7 pairs. Females are longer than males by 5 times (Table 2).

Table (2) : Morphological and Meristic features for males and females of *Acuaria skrjabini* Ozerskaya , 1926 in the present study and other studies . M= male, F= female

Features	In (Ozerskaya,1926 [cited in Sato *et al.*, 2005])		In (Sato *et al.*, 2005)		In the present study (mean)	
Sex of worm	M	F	M	F	M	F
Total body length	8.8-9.2	22.3 28.3	3.6 - 6.7	22.3 28.3	4.23 8.96 (6 796)	26.532-32.707 (29 607)
Maximum body width	0.15-0.19	0.14 0.22	0.11 – 0.13	0.17 0.22	0.093-0.150 (0.113)	0.193-0.345 (0.295)
Pharynx length	0.160 – 0.194	0.18 – 0.23	0.10 0.15	0.13 – 0.20	0.155 0.192 (0.167)	0.176 0.324 (0.237)
Cordon length	0.25 0.28	0.23 -0.38	0.13 0.26		0.190-0.270 (0.230)	0.362-0.550 (0.501)
Muscular esophagus length	0.40 0.46	0.59 0.68	0.26 0.41	0.43 -0.66	0.350-0.433 (0.433)	0.580-1.020 (0.948)
Glandular esophagus length	0.93 – 1.08	1.17 – 1.51	–	0.70 – 1.18	0.862 1.020 (0.944)	1.920 2.241 (2.00)
Nerve ring from the anterior end	–	–	0.132 – 0.170	2 specimens 0.149 and 0.191	0.120 0.196 (0.184)	0.183 0.279 (0.255)
Spicule	inequale		Unequale		inequale	
Right spicule length	0.125 0.148		0.117 0.147		0.093-0.150 (0.110)	
Left spicule length	0.205 – 0.259	–	0.174 – 0.191	–	0.178 0.200 (0.186)	–
Vulva from anterior end		11.11 13.11		6.68 12.19		13.660-18.460 (16.117)
Eggs length		43 48 micron		38 -42 micron		0.301-0.450 (0.373) Mm
Eggs width	–	28 – 29 micron	–	24 26 micron	–	0.205 0.302 (0.204) Mm
Tail length	0.20	0.17 – 0.25	0.184 0.247	0.120 – 0.210	0.176 0.252 (0.192)	0.120 0.243 (0.156)

Dispharynx nasuta (figs.4-6): Only three females were isolated from the gizzards of *P. domesticus*. Body stout, two pseudolabia present, buccal capsule short , four distinct cordons convoluted, beginning at dorsal and ventral sides of oral opening, extending to posterior part of muscular esophagus, recurrent to anterior part of muscular esophagus, transversely striated. Esophagus clearly divided into short anterior muscular part and long posterior glandular part.

Table 3: *D. nasuta* morphometric features of females in comparison with other studies.

morphometric features	In Pinto *et al.* , 2004 From *Phasianuscolchicus* (mm)	In Zhang *et al.* , 2004 From passerine birds	In the present study Um
Total body length	5.134-6.902 (5.705)	3.26-7.84 mm (5.13 mm)	4.160-7.875 (6.094)
maximum body width	0.306-0.578 (0.401)	252-607 (402) mm	0.375-0.441 (0.410)
Buccal capsule length	0.097-0.119 (0.109)	95-152 (125)	0.105-0.109 (0.107)
Buccal capsule Width	0.018-0.216 (0.021)	----------	0.020-0.022 (0.021)
Cordon ascending length	0.115-0.252 (0.191)	441-1051 (765)	0.110- 0.269 (0.194)
Muscular esophagus length × Width	0.476-0.700 (0.588)	444-761 (570) × 52-118 (89)	0.501-0.806 (0.687) × 0.076-0.098 (0.089)
glandular esophagus length	1.302-2.030 (1.646)	1.12-2.00 (1.63) × 111-236 (147)	1.460-1.560(1.510) × 0.201-0.237(0.219)
Nerve ring from the anterior end	0.254-0.349 (0.292)	220-403 (3 13)	0.210-0.286(0.252)
Vulva opening from the posterior extremity	0.966-1.386 (1.170)	0.67-1.41 (1.11)	1.770-2.100 (1.954)
Eggs length	0.028- 0.032 (0.0324)	33-40 (37)	0.322-0.036(0.034)
Eggs width	0.0180- 0.0216 (0.021)	17-26 (21)	0.020-0.023(0.022)
Anus from the posterior extremity	0.0828-0.1260 (0.1044)	114-156 (133)	0.121-0.130(0.124)

Thirteen spirurid (3rd stage) larval specimens were isolated from under lining of the gizzard of *Passer domesticus* (Figs. 7-8). Measurements: 3.410 to 4.412 (4.000) long, body width at nerve ring 0.060 to 0.100 (0.076), body width at the junction of oesophagus and with intestine 0.090 to 0.125 (0.102), nerve ring from anterior end of the body 0.080 to 0.155 (0.109), buccal capsule 0.025 to 0.050 (0.044) long, oesophagus 1.325 to 1.625 (1.471) long, tail 0.050 to 0.087 (0.072) long.

Stomach contents examination reveals presence of rice grains, egg shell fragments, different seeds, insect remains mainly grasshoppers, unidentified grains, plant remains, green algae and different sized small stones.

To the best of our knowledge this work constitutes the first record for these two gizzard nematodes to be reported in Iraq.

DISCUSSION

The high infection rate with *A. skrjabini* (21.4%) of the total hosts examined compared to *D. nasuta* (5.4%) (Table 1) may be explained by being the passerine birds are the principal hosts. Mawson (1972) and Zhang *et al.* (2003) mentioned that *Acuaria* spp. are widely distributed among passerine birds, while *Dispharynx nasuta* had been described in numerous avian hosts, primarily from the Columbiformes, Galliformes, and Passeriformes with isolated records from Anseriformes, Charadriformes, Ciconiformes, Cuculiformes, Falconiformes, Gruiformes, Piciformes and Psittaciformes (Bollette, 1998).

The morphology of the present specimens of *A. skrjabini* is almost related to that of its original description (Ozerskaya,1926 [cited in Sato *et al.*, 2005]) and also of that of Baylis and Daubney (1926) and Sato *et al.* (2005).

House sparrow *Passer domesticus* diet consists mostly of weeds, grass seeds, grains and insects. Where available, it also feeds on cultivated grains, fruits and vegetables. It forages mostly on the ground in open areas In urban areas, garbage constitutes a significant part of the birds diet (Summers-Smith, 1963, ISSG, 2010).

(http://www.issg.org/database/species/ecology). However, stomach contents show no large difference in the main components of diet in both Britain and Iraq, but the presence of insect remains mainly grasshoppers could be directly correlated with presence of helminthes including our two gizzard nematode species.

The recovery of 13 larval stage specimens of a spiruroid nematode in one female host (1.8% infection rate of total number of hosts) did not enabled the authors to withdraw a suitable conclusion in regard to their incidence or their specific identity. Further study is needed to get a clear idea about these nematodes.

The absence of double infection cases in these two studied gizzard nematodes may be related to active antagonism between these species. This is in general agreement with Moore and Simberloff (1990) who found intraspecific relationships between parasitic helminthes of Northern Bobwhite *Collinus virginianus*.

Acuaria skrjabini was recorded in the gizzards of long-tailed finch *Poephila acuticauda*, plum-headed finch *Aidemosyne modesta* and red-faced parrot finch *Erythrura psittacea* in Australia (McOrist *et al.*, 1982); from tree sparrow *Passer montanus* and gray starling *Sturnus cinereaceus* in Japan (Sato *et al.*, 2005).

Dispharynx nasuta was frequently reported from different avian orders around the world. It was reported in USA from pigeon *Columba livia* (Columbiformes) causing severe pathological changes in proventriculus (Hwang *et al.*, 1961); in captive Princess Parrot *Polytelis alexandrae* (Psittaciformes) (Bollette, 1998); in California Quail *Callipepla californica* (Galliformes) (Moore *et al.*, 1988); in African Jacanas *Actophilornis africana*

(Charadriiformes) (Yvonne Schulman, 1992); in Ruffed Grouse *Bonasa umbellus*, Ring-necked Pheasant *Phasianus colchicus*, Peafowl *Pavo cristatus*, Hungarian Partridge *Perdix p. perdix*, Eastern Bobwhite *Collinus v. virginianus*, prairie grouse *Tympanuchus* spp., greater prairie chickens *Tympanuchus cupido pinnatus*, Attwater's prairie chicken *Tympanuchus cupido attwateri*, wild turkeys *Meleagris gallopavo* (Galliformes), Eastern Crow *Corvus b. brachyrhynchos*, Catbird *Dumetella carolinensis*, Eastern Robin *Turdus m. migratorius*, Eastern Bluebird *Sialia s. sialia*, Starling *Sturnus v. vulgaris*, House sparrow *Passer domesticus* and Eeastern Cowbird *Molothrus a. ater* (Passeriformes) (Goble and Kutz, 1945; Maxfield *et al*., 1963; Harper *et al*., 1967; Kellogg and Prestwood, 1968; Moore and Simberloff, 1990; Peterson, 1996, 2004; Williams *et al*., 2000); in Bleeding Heart Pigeon *Gallicolumba luzonica* (Columbiformes) (Lindquist and Strafuss, 1988); in red-bellied woodpeckers *Melanerpes carolinus* (Piciformes) (Foster *et al*., 2002). In Canada it was reported from Hungarian Partridge (Galliformes) (Bendell and Lisk, 1957). It is also reported in Brazil from House Sparrow; in red-crested cardinal.

Paroaria coronata (Passeriformes) (Mascarenhas *et al*., 2009; Calegaro-Marques and Amato, 2010); in Ring-necked Pheasant (Galliformes) (Pinto *et al*., 2004); in Guira Cuckoos *Guira guira* and Smooth-billed Ani *Crotophaga ani* (Cuculiformes) (Bartmann and Amato, 2009); and reported from Costa Rica in *Thrauois episcopus*, *Turdus grayi*, *Caryothrau stespoliogaster*, *Platyrinchus cancrominus*, *Ramphocaenus melanurus*, *Vemivora peregrine* and *Geothlypis poliocephala* (Passeriformes) (Zhang *et al*., 2004). In Morocco it was reported from chickens *Gallus gallus* (Galliformes) (Hassouni and Belghyti, 2006). In Spain it was reported from the common kestrel *Falco tinnunculus* (Falconiformes) (Acosta *et al*., 2010). In Palawan, Philipines it was reported from chiken *Gallus gallus* (Schmiddt and Kuntz, 1970).
The specific identification of the spirurid larvae could not be possible at this stage and needs more advanced examination, probably, with molecular procedures.

To the best of our knowledge, *Acuaria skrjabini* and *Dispharynx nasuta* recovered from *Passer domesticus biblicus* are recorded here for the first time in Iraq.

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Fig. 1: *Acuarioa skrjabini* anterior end.

Fig. 2: *Acuaria skrjabini* male posterior end.

Fig.3: *Acuaria skrjabini* female posterior end.

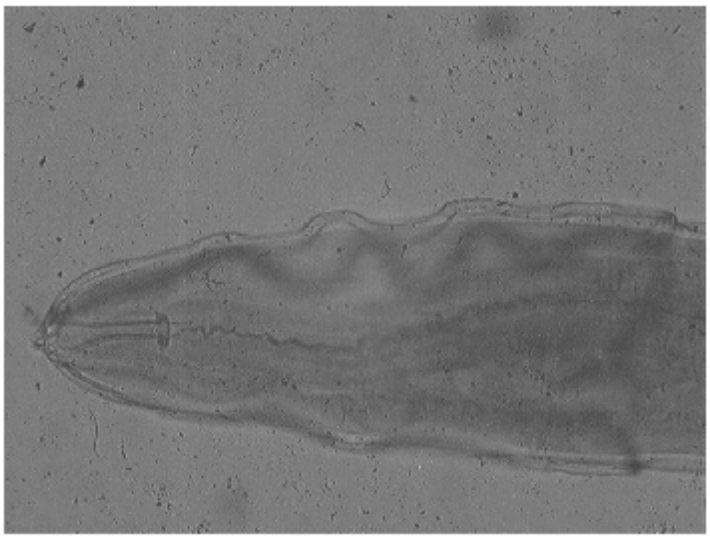

Fig. 4: *Dispharynx nasuta* female head and cordons.

Fig. 5: *Dispharynx nasuta* female posterior region.

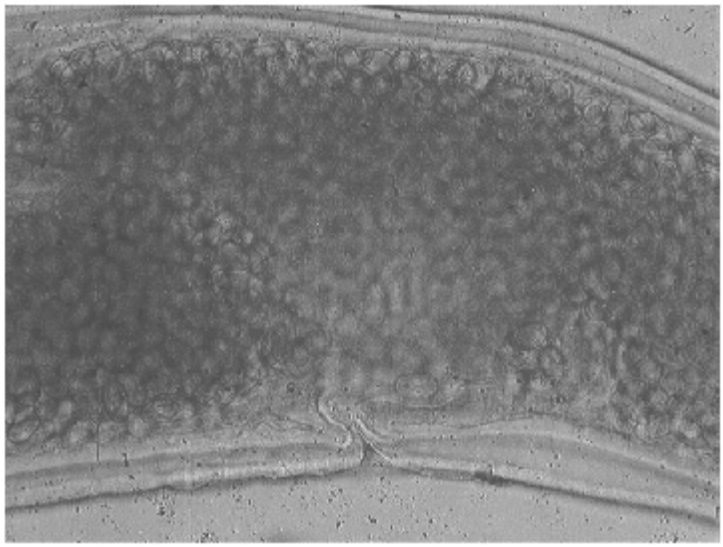

Fig. 6: *Dispharynx nasuta* female vulva.

Fig. 7: larval stage spirurid nematode anterior end. (10).

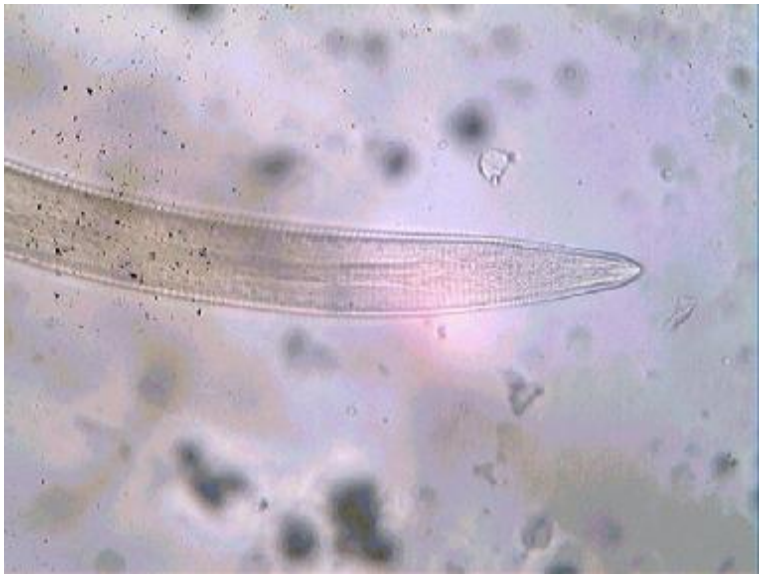

Fig. 8: larval stage spirurid nematode posterior end. (4).

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ديدان القانصة الخيطية في العصفور الدوري في مدينة بغداد وسط العراق

محمد كاظم محمد و أزهار احمد الموسوي
مركز بحوث ومتحف التاريخ الطبيعي، جامعة بغداد،باب المعظم،بغداد،العراق

الخلاصة

وجدت الديدان الخيطية العائدة للنوعين *Acuaria skrjabini* و *Dispharynx nasuta* في الغشاء المبطن للقانصة في ٢٦،٩٧% من افراد العصفور الدوري التي جمعت في مدينة بغداد- وسط العراق. اخذت الصفات المقاسة والمعدودة وقورنت مع المسجلة في الدراسات السابقة.