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## A New Acuariid Nematode *Synhimantus* (*Dispharynx*) *jamshorensis* n. sp. (Nematoda: Acuariidae) in *Passer domesticus* (Passeriformes: Passeridae) in Sindh, Pakistan

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### Abstract

During ongoing helminthological studies, out of 56 House Sparrows *Passer domesticus* examined only one host was found to harbor three nematodes (1♂ and 2♀) in intestine. The collected nematodes were relaxed and killed in hot 70% ethanol and stored in a mixture of glycerin and 70% ethanol (1:1 by volume). The nematodes were identified as *Synhimantus* (*Dispharynx*) *jamshorensis* new species. *Synhimantus* (*Dispharynx*) *jamshorensis* can be distinguished from its congeners in body length, cordon (descending branch) length, number of post-anal papillae, egg size and spicule size. The House Sparrow *Passer domesticus* is a new host record for *Synhimantus* (*Dispharynx*) *jamshorensis* n. sp. in Pakistan.

**Keywords:** Avian nematode, *Synhimantus* (*Dispharynx*) *jamshorensis* n. sp., House sparrow *Passer domesticus*, Sindh, Pakistan

### 1. Introduction

The House Sparrow *Passer domesticus* (Linnaeus, 1758) is having a worldwide distribution.<sup>[1]</sup> It is well known that House Sparrows harbor a huge number of helminth parasites.<sup>[2,3,4,5,6,7,8]</sup> Diet of House Sparrow comprises weeds, grass seeds, grains, and insects. It rummages for the most part on the ground in open areas. In urban areas, garbage constitutes a critical part of the bird's diet<sup>[9]</sup>. House Sparrow commonly lives in agricultural areas and several human settlements are primary habitats (Roberts, 1992; Clement, *et al.*, 2013)<sup>[10, 11]</sup>. House Sparrows are considered agricultural pests<sup>[12]</sup> and in most areas of Pakistan it is considered as Hilal or edible.

Acuariidae is a large family which contains 25 genera. However Zhang *et al.* (2004)<sup>[13]</sup> considered *Dispharynx* a subgenus of *Synhimantus*. Type species of *Dispharynx* is *D. nasuta* (Rudolphi, 1819)<sup>[14]</sup>. Skrzjabin *et al.* (1965) recorded 23 species in this genus. The genus *Dispharynx* Railliet, Henry & Sisoff, 1912 has been reported from different birds worldwide.<sup>[7, 13, 14, 15, 16, 17]</sup> From Pakistan, *Synhimantus* (*Dispharynx*) was recorded from the bird *Fulica atra*.<sup>[18]</sup>

The aim of present work is to provide information on the identification, intensity and necessary measurements of specimen of intestinal nematodes in *Passer domesticus* collected in Jamshoro City. The present specimens are new to science.

### Material and Methods

During present investigation (August-December, 2014), 56 House Sparrows *Passer domesticus* (Linnaeus, 1758) were collected at random from different parts of Jamshoro, a city and capital of Jamshoro District, Sindh, Pakistan, located on the right bank of Indus River, approximately 18 km Northwest of Hyderabad and 150 km Northeast from Karachi (25.43° North latitude, 68.28° East longitude).<sup>[19]</sup> and brought to the Parasitology Laboratory of Department of Zoology, University of Sindh, Jamshoro. After anesthetizing, birds were dissected and examined for the presence of endoparasites. Three live nematodes collected from intestine of the host, were relaxed and killed in hot 70% ethanol and preserved in a mixture of glycerin and 70% ethanol (1:1 by volume) for prolonged storage. Nematodes were cleared in lactophenol and temporarily mounted for detailed study. Morphological characteristics were

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studied using a light microscope. Drawings were made with the aid of camera Lucida (Fig.1. A-E). Photographs were taken with Olympus DP-12 camera (fig.2.A-D). All measurements are given in millimeters (mm) unless otherwise stated. Identification of the material was done by referring literature [19, 18, 7, 13, 17] and nematodes key book [14]. The specimens were deposited in APL-DZUSJ (Advanced Parasitology Laboratory, Department of Zoology, University of Sindh, Jamshoro), Pakistan.

## Results and Description

Family Acuariidae Seurat, 1913

Subfamily Acuariinae Railliet, Henry & Sisoff, 1912

Genus *Dispharynx* Railliet, Henry & Sisoff, 1912

*Dispharynx jamshorensis* n. sp.

## Description

Body of male is smaller than female. Body of the male worm is transparent, ventrally coiled (Fig.2-A). Body of female is stout and ventrally curved (Fig.2-B). Anterior region of both nematodes presents similar morphological characteristics (Fig1.A & C). Obliquely striated cuticle present. Four undulating cordons present, beginning at dorsal and ventral sides of oral opening, extending to posteriorly to posterior part of muscular esophagus, Buccal capsule short, transversely striated. Mouth with small lateral lips and conical. Esophagus consisting of two parts. Nerve ring situated at level of anterior part of muscular esophagus. Excretory pore situated anterior to posterior limit of cordons. Cervical papillae between recurrent cordon, simple bicuspid.

**Male:** (Table.1.Fig.2.A.) Body is 4.1 mm in length and 0.6 mm maximum in width. Buccal capsule 0.0056 mm in length. Cephalic cordons, descending branch 0.048 mm long, recurrent branch 0.05 in length. Esophagus is divided into muscular 0.021 mm and glandular 1.8 mm portions. Nerve ring is 0.064 mm from the anterior side and excretory pore 0.02 mm from anterior end. Caudal papillae are four in number; four pre-anal and four post-anal pairs of pedunculated papillae are present. Spicules (Fig.1.B & 2.C) are unequal and dissimilar. Left spicule is thin, slender, 0.0197 mm long and right spicule is banana shaped, 0.0164mm long. Cloacal aperture is 0.024 mm from the posterior extremity. Tail is bluntly round.

**Female:** (Table.1. Fig.2.B) Body is 6.428 mm in length and maximum 0.571 in width. Cordons descending branch 0.136mm in length and recurrent branch 0.107 mm in length, four cuticular cordons are wavy and extending for a distance about 0.030 mm from the anterior extremity. Buccal capsule is 0.013 mm long. The esophagus is divided into two anterior muscular portions 0.136 mm and posterior glandular portion 3.857 mm. The nerve ring is situated at about 0.013 mm from the anterior end. Excretory pore is 0.053 mm from anterior end. Conical tail is 0.011 mm in length. Eggs (Fig.1.E) are smooth, oval and thick shelled 2.5-3.0 in length and 1.5-2.0 mm in width. Vulva in posterior 4<sup>th</sup>quarter of body measuring 0.01 mm.

**Table 1:** List of Comparative Morpho-taxonomic characters with measurements of different species of *Synhimantus* (*Dispharynx*) from different hosts.

	<i>Synhimantus</i> ( <i>Dispharynx</i> ) <i>jamshorensis</i> n. sp. (Chandio, Dharejo, Khan and Naz, 2016)	<i>Synhimantus</i> ( <i>Dispharynx</i> ) <i>nasuta</i> (Birmani.N.A.,2011)	<i>Synhimantus</i> ( <i>Dispharynx</i> ) <i>na</i> <i>suta</i> (M.K.Mohamm ad & A.A.Al- Moussawi., 2012)	<i>Synhimantus</i> ( <i>Dispharynx</i> ) <i>na</i> <i>suta</i> A.A. Al- Moussawi & H.S.Al- Hamdany.,2015 )	<i>Synhimantus</i> ( <i>Dispharynx</i> ) <i>nasuta</i> (Zhang, et al, 2004)	<i>Synhimantus</i> ( <i>Dispharynx</i> ) <i>nasuta</i> (Zhang, et al, 2004)
Male						
Length	4.1	5.55	----	----	3.61-6.36	6.77
Width	0.6	0.18	----	----	0.141-0.311	0.303
Cordons (ascending branch)	0.05	-----	----	----	-----	----
Cordons (descending branch)	0.048	-----	----	----	0.209-0.439	0.413
Buccal Capsule	0.0056	0.85	----	----	0.073-0.125	0.127
Muscular Esophagus	0.021	0.16	----	----	0.422-0.740	0.645
Glandular Esophagus	1.8	0.21	----	----	1.18-2.00	1.94
Nerve ring	0.064	----	----	----	0.159-0.289	0.297
Excretory pore	0.02	----	----	----	0.203-0.429	0.333
Caudal papillae	4 pre & 4 postanal	4 pre & 5	----	----	4 pre & 5 postanal	4 pre & 5 postanal
Left spicule	0.0197	0.21	----	----	0.380-0.589	0.460
Right spicule	0.0164	0.13X0.03	----	----	0.133-0.193	0.244
Cloacal aperture	0.024		----	----	-----	-----
Female						
Length	6.428	5.27	5.510 (3.81-7.34)	4.160-7.875	3.26-7.84	----
Width	0.571	-----	0.403 (0.306-0.533)	0.375-0.441	0.252-0.607	----
Cordon (ascending Branch)	0.107	-----	0.203 (0.222-0.247)	0.110-0.269	0.125-0.458	----
Cordon (descending branch)	0.136	-----	-----	-----	0.312-0.619	----
Buccal Capsule	0.013	0.09	0.108 (0.102-	0.105-0.109	0.095-0.152	----

			0.121)			
Muscular esophagus	0.136	0.17	0.516 (0.431-0.732)	0.501-0.806	0.444-0.761	----
Glandular esophagus	3.857	0.24	1.602 (1.294-1.74)	1.460-1.560	1.12-2.00	----
Nerve ring	0.013	----	0.310 (0.228-0.346)	0.210-0.286	0.22-0.403	----
Excretory pore	0.053	----	----	----	0.266-0.568	----
Vulva	0.01	1.0	----	1.770-2.100	0.67-1.41	----
Eggs	2.5-3X1.5-2	0.013-0.016X0.009X0.014	0.030 (0.230-0.32)X0.021 (0.022-0.0216)	0.22-0.036X0.020-0.023	33-40 X 17-26 um	----
Site of infection	Intestine	Under lining of the gizzard	Under lining of the gizzard	Mucosa of the gizzard	Under lining of the gizzard	Under lining of the gizzard
Host	<i>Passer domesticus</i> (Pakistan)	<i>Fulica atra</i> (Pakistan)	<i>Sturnus vulgaris</i> (Iraq)	<i>Passer domesticus biblicus</i> (Iraq)	<i>Thraupis episcopus</i> (Costa Rica)	<i>Turdus grayi</i> (Costa Rica)

The new species is similar to *Synhimantus (Dispharynx) nasuta* reported by Birmani (2011) [18] from the bird *Fulica atra* in having 4 pairs of pre-anal papillae. *Synhimantus (Dispharynx) jamshorensis* n. sp., can be readily distinguished from *Synhimantus (Dispharynx) nasuta* recorded by Zhang *et al.* (2004) [13] from the passerine birds of Costa Rica by the combination of the following characters: smaller body size, cordon length, number of post anal papillae, egg size, habitat and different host species (Table.1). The females of *Dispharynx nasuta*, recovered from the *Passer domesticus biblicus* (Mohammad and Al-Moussawi, 2012) [7] differ in most of the morphometric features from females of *Synhimantus (Dispharynx) jamshorensis* n. sp. (Table-I) Stable characters (cordon length, body size, number of post-anal papillae, spicule size and shape, egg size, host species) that differentiate it from the related species, *Dispharynx nasuta* documented by Birmani (2011) [18], from different

avian host and morphometric characters are given in (Table.1).

Therefore, on the basis of above mentioned characteristics the present specimens of nematode are identified as *Synhimantus (Dispharynx) jamshorensis* n. sp., and *Passer domesticus* is a new host record for *Synhimantus (Dispharynx) jamshorensis* n. sp., in Pakistan. The species name is given after the locality of host bird.

#### Taxonomic summary

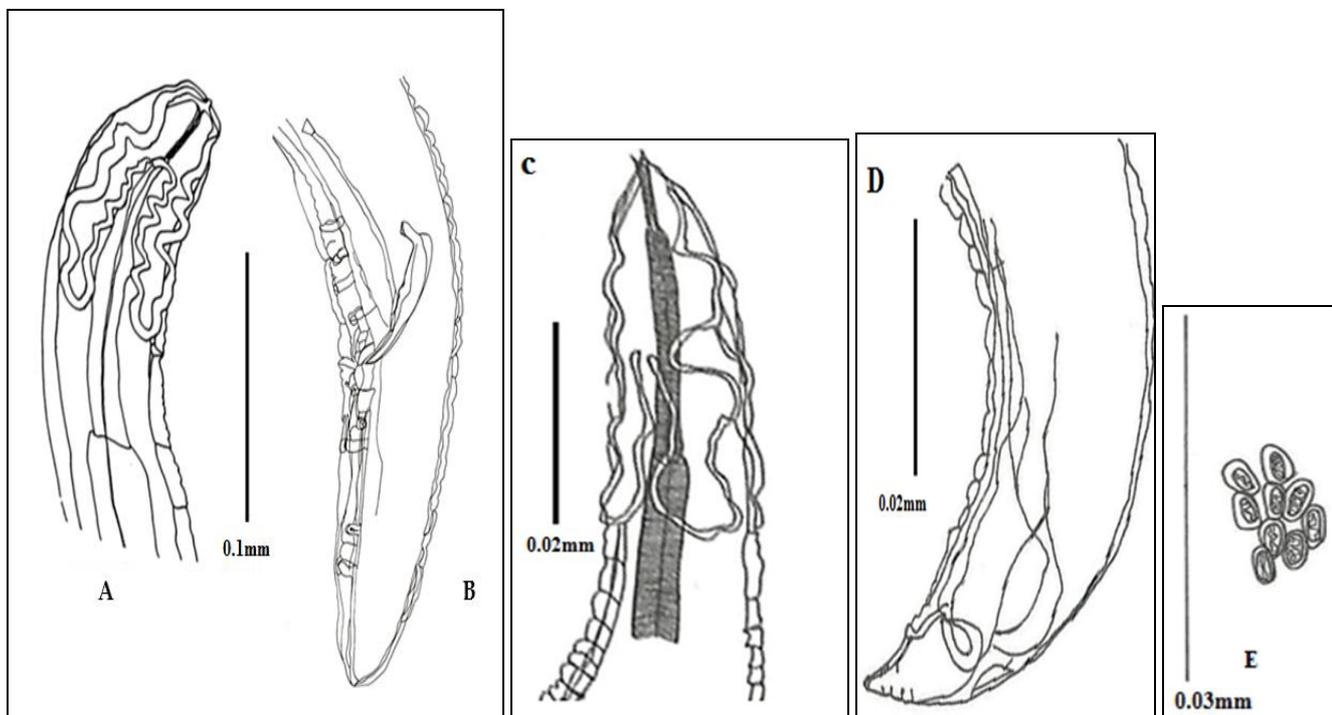
Types Host: House Sparrows *Passer domesticus* (Passeriformes: Passeridae)

Type locality: Jamshoro, Sindh, Pakistan.

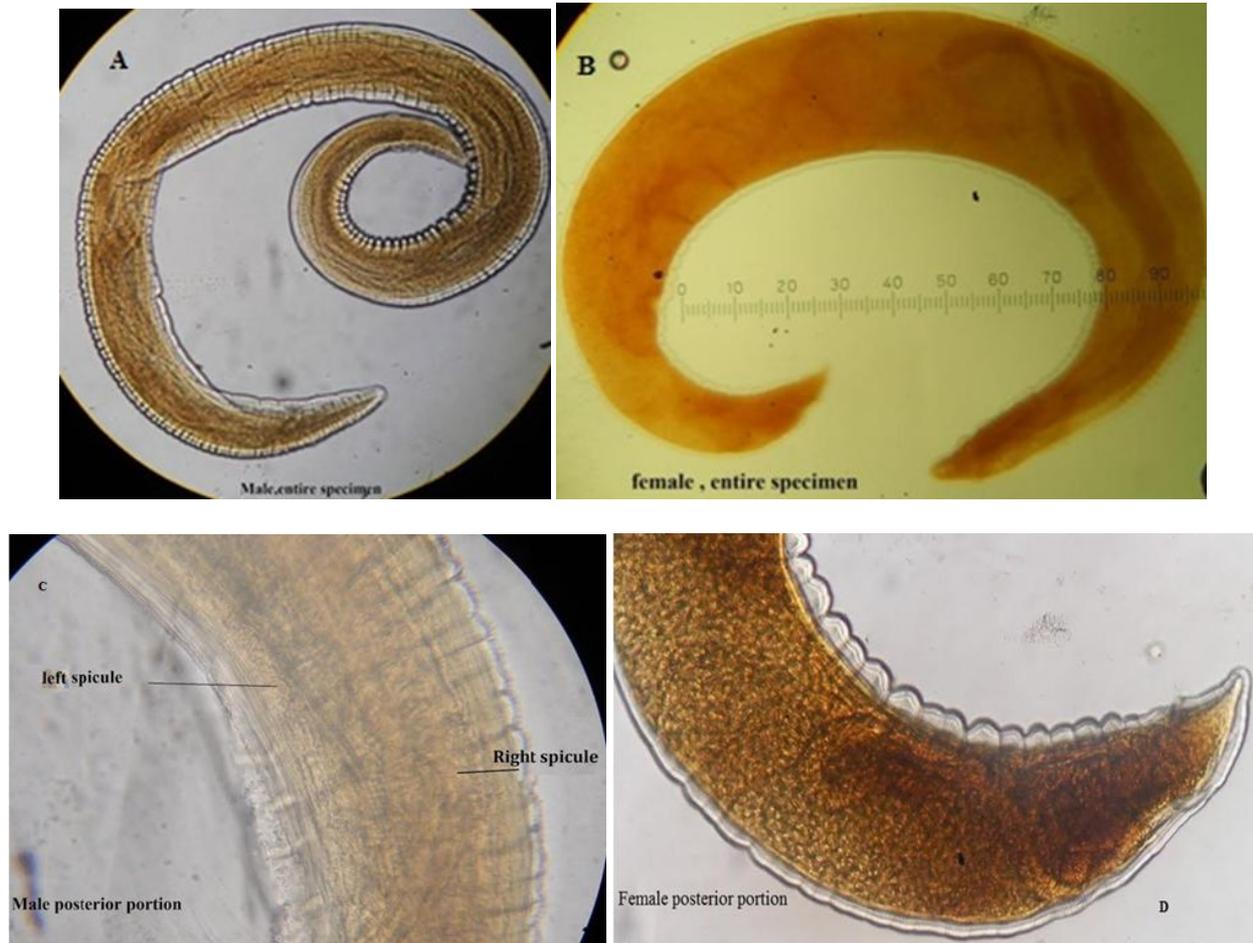
Number of specimens recovered: 03(1♂ and 2♀).

Site of infection: Intestine.

Etymology: The species name refers to the Jamshoro city from where the host was collected.



**Fig 1:** *Dispharynx jamshorensis* n. sp. A & B. Anterior and posterior portions of male; C & D. Anterior and posterior portions of female; E. Eggs.



**Fig 2:** *Dispharynx jamshorensis* n. sp. A & B. Photographs of male and female entire worm. C & D Photographs of Male and Female Posterior Portion.

## Discussion

In the present study *Dispharynx* is considered as a subgenus of *Synhimantus* Railliet, Henry and Sisoff, 1912. Hence the nematodes recorded from the intestine of *Passer domesticus* are named as *Syhimantus (Dispharynx) jamshorensis* n.sp. Species name refers to the locality of the host. During present investigation, 56 house sparrows (*Passer domesticus*) were examined only one bird was found to harbor the nematode, *Synhimantus (Dispharynx) jamshorensis* n. sp. (1 ♂ and 2 ♀) in the intestine. In present study recovery of a small number of nematodes may be due to seed-eating habits of the House Sparrows (Cooper and Crites, 1974) [6].

Nematodes belonging to *Synhimantus (Dispharynx)* Railliet, Henry and Sisoff, 1912 have been reported from different birds orders around the world. [13, 20, 21, 22, 23]

The Specimens of *Synhimantus (Dispharynx) nasuta* were also collected from underlining of the gizzard of different passerine birds including *Caryothraustes polioaster*, *Geothlypis poliocephala*, *Platyrinchus cancrominus*, *Ramphocaenus melanurus*, *Thraupis episcopus*, *Turdus grayi* and *Vermivora peregrine* of Costa Rica (Zhang *et al.*, 2004) [13].

Al-Moussawi and AL-Hamdany (2015) [17] collected three females of *Dispharynx nasuta* (Rudolphi, 1819) from the elementary canal of *Sturnus vulgaris* from Iraq and Mohammad and AL-Moussawi (2012) [7] three females of *Dispharynx nasuta* (Rudolphi, 1819) from the gizzard of *Passer domesticus biblicus* Hartert.

Morphometric comparison of *Synhimantus (Dispharynx) nasuta* recovered from 07 passerine hosts *Geothlypis*

*poliocephala* (Zhang *et al.* 2004) [13], indicated as a distinct species. However, Zhang *et al.* (2004) [13] felt that further studies, based on additional specimens are necessary to designate these specimens as a new species.

However, Zhang *et al.* (2004) [13] felt that further studies, based on additional specimens are necessary to designate these specimens as a new species. The described nematode, *Synhimantus (Dispharynx)* sp., was also reported from the underlining of the gizzard of passerine bird, *Turdus grayi* of Costa Rica (Zhang *et al.*, 2004) [13]. Although it was found distinguishable from all other species of *Synhimantus (Dispharynx)* but due to paucity of the material Zhang *et al.* (2004,2005) [13,16] did not propose it as a new species. In Pakistan, Birmani (2011) [18] reported *Dispharynx* sp., from the underlining of the gizzard of *Fulica atra*. However, until now no specimens of *Synhimantus (Dispharynx)* are reported from *Passer domesticus* in Pakistan. In the present study *Synhimantus (Dispharynx) jamshorensis* n. sp., is recorded for the first time from *Passer domesticus* from the Pakistan.

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