

The White-Breasted Kingfisher, *Halcyon smyrnensis* (Linnaeus, 1758) as a Host for Nematodes

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Abstract: Examination of gizzard of six white-breasted kingfisher, *Halcyon smyrnensis* (Linnaeus, 1758) collected from Baghdad city for the period from January to November, 2016 revealed that the gizzard of one bird infected with five adult females of *Hadjelia truncata* Creplin, 1825 and two larval spirurid nematode. Some meristic and morphometric characters of the nematode were given. The intermediate and final hosts for the nematode were also mentioned. Recording *H. truncata* from the gizzard of *Halcyon smyrnensis* in this study represents a new host record for this nematode in Iraq.

Keywords: Baghdad, white-breasted kingfisher, *Halcyon smyrnensis*, *Hadjelia truncata*.

1. Introduction

The white-breasted Kingfisher *Halcyon smyrnensis* (Aves: Coraciiformes) is a common species, distributed in Afghanistan, Egypt, Turkey, Northwestern India and Iraq [1]. It was recorded in three marshes in southern Iraq: Huwayzah, Suq Shuyukh and East-Hammar [2].

The spirurid nematode, *Hadjelia truncata* (Creplin, 1825) was found in invertebrate hosts [3],[4], and has a wide range distribution in hosts of different avian orders [5],[6] such as Passeriformes [7], Columbiformes [8],[9],[10] and Coraciiformes [11],[12] in Africa, Asia and Europe [13],[14].

Some Anseriform, Columbiform, Coraciiform and Passeriform birds, were recorded as final hosts of *H. truncata* in Iraq [15],[16],[17],[18],[19],[20].

Infection with this nematode cause lesions in the gizzard lining and severe ventriculitis [21], which may lead the bird to death [13].

The genus *Hadjelia* has been described from numerous birds especially Coraciiforms [22]. *H. truncata* was listed in the check-list of Chaturvedi and Kansal [23] as a gizzard worm of Coraciiform birds. It was reported from *Coracias* sp. [12], *Halcyon smyrnensis* and *Halcyon* sp. from India [23].

A few parasites have been noted in *Halcyon smyrnensis* [24]. Little attention by parasitologists in Iraq, had been given to the parasitic fauna of kingfishers, Isolation of the protozoa *Haemoproteus halcyonis* by Mohammad [25] from *Halcyon smyrnensis*, was the only work that had been done. This paper deals with recording the nematode *H. truncata* from the gizzard of *Halcyon smyrnensis* for the first time in Iraq.

2. Materials and Methods

Six specimens of kingfisher, *Halcyon smyrnensis* were collected in Baghdad during the period from January to November, 2016 from a garden in Bab Al-Muadham District, Baghdad City. Birds were identified according to Salim *et al.* [26]. The oesophagus and gizzard for each bird separated and examined for parasites by the dissecting microscope (Kruss) and the compound microscope (Olympus BH). Five

nematode specimens were isolated underneath the gizzard lining, killed and preserved in 70% ethanol, cleared by lactophenol and identified according to Cram [12], Yorke and Maplestone [27]. Measurements are in millimeters given as means followed by the range in parentheses. Photomicrographs were taken with a digital camera Infinity lite-K100 attached to compound microscope Micros MCX100.

3. Results and Discussion

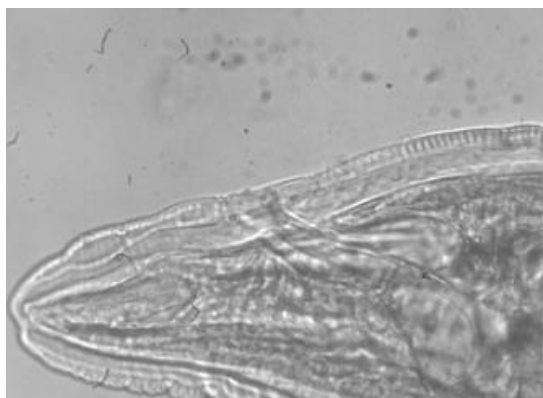
Only one of six bird specimen was found infected with five adult female specimens of *Hadjelia truncata* (Creplin, 1825) and two larvae recovered underneath the gizzard lining.

Hadjelia truncata (Creplin, 1825) (Fig1A ; B & C) Syn. *Spiroptera upupae* Rudolphi, 1819 (nom. nud.); *S. truncata* Creplin, 1825; *Hadjelia inermis* (Geddoelst, 1919) Chabaud and Compana, 1950 [12],[23]. Examining the outer surface of the horny layer in gizzard of *H. smyrnensis* showed no sign of the presence of *H. truncata*, it was found burrowed in the tissue beneath this layer. Five female specimens of *H. truncata* were collected from under the horny layer of the gizzard, Body cylindrical, straight, Head separated from body by slight constriction. Body tapers towards the anterior extremity 24.594 (23.226-26.156) long, 0.2782 (0.231-0.312) maximum wide. The mouth surrounded by two lips. The pharynx 0.047 (0.037- 0.052) long, 0.013 (0.008- 0.016) wide. Muscular oesophagus for 2 specimens only 3.588 (3.510- 3.666). Nerve ring 0.040 (0.031- 0.068) long, 0.048 (0.036- 0.060) wide. Distance anterior end of the body to nerve ring 0.291 (0.260-0.312). Distance anterior end of the body to vulva 3.364 (3.276-3.413). Eggs 0.078 (0.052-0.104) long, 0.026 (0.021-0.0312) wide. The tail is short rounded and conical 0.148 (0.104- 0.234) long. The description of the worm in the present study agrees well with that of Ortlepp [28]. The two larvae isolated in this study were difficult to identify specifically depending on morphological characters by using the light microscopy only. Scanning electron microscope or genetic studies for larval stages could be helpful in this matter. This agrees with Borges *et al.* [29] who mentioned that the difficulty may be due to the lack of differential characters when using light microscopy.

It is known that *H. smyrnensis* fed largely on insects (Burton, 1998) such as crickets, mantises, ants, grasshoppers, winged termites and beetles [30]. Through life cycle of *H. truncata* and in regard to its intermediate hosts, its larvae was found in invertebrate hosts such as the beetles *Asida jurinei*, *A. sericea* and *Phylan abbreviatus* [3],[4]. This may be correlated to the fact that the bird gets its infection with *H. truncata* through its feeding on the infected insects like the beetle *Alphitobius diaperinus*, which was recorded as intermediate host of *H. truncata* by Alborzi and Rahbar [13] and recorded in Iraq by Derwesh [31].



(A)



(B)



(C)

Figure 1: Photomicrographs of female of *Hadjelia truncata*.

- A- Anterior extremity of the body.
- B- Posterior extremity of the body.
- C- Vulva region and eggs.

4. Conclusion

Because of the small number of the bird which examined in this study, so no reliable conclusion on the prevalence and the infection rate could be retrieved.

Since there are limited studies on parasitic fauna of kingfishers in Iraq, so, it is obvious that more works are required to be done on parasitic fauna of kingfishers and all Iraqi birds through using Scanning electron microscope and genetic studies.

References

- [1] A. M. S. Ali and S. Asokan, Observations on nesting ecology of White-breasted Kingfisher *Halcyon smyrnensis* (Aves: Coraciiformes) in Cauvery Delta, Southern India. J. of Ecology and the Natural Environment, 2 (7) , pp. 134-139, 2010.
- [2] J. M. Abed, Status of water birds in restored southern Iraqi marshes. Marsh Bulletin 2(1) , pp. 64-79, 2007.
- [3] S. Yamaguti, Systema Helminthum . Vol.3 The nematodes of vertebrates. Intersci. Pub. Inc., New York , 1961.
- [4] R. C. Anderson, Nematode Parasites of vertebrates: Their Development and Transmission, 2nd ed. CABI Publishing, New York, 2000.
- [5] M. Hromada, V. DudiÁák, R. Yosef, An inside-out perspective of the true shrikes . A review of the helminthofauna. 22(1), 185-204, 2000.
- [6] R. Nabavi, J. Khedri, M. Jahantigh, High clinical disturbance and mortality in pigeon flocks caused by *Hadjelia truncata* infection in Sistan, Iran .Turkish Journal of Veterinary and Animal Sciences , 37, 355-357, 2013.
- [7] J.D. Hair and D.J. Forrester, The helminth parasites of the Starling (*Sturnus vulgaris* L): A CheckList and Analysis. The American Midland Naturalist , 83(2) , pp. 555-564 ,1970 .
- [8] G. Tadros and A. R. Iskander, *Hadjelia truncata* (Crepl., 1825) Gendre,1921 (Spiruridea), a new parasite of pigeons in Egypt and its pathogenicity. J. Egyptian Vet. Med. Assoc., 35 (3) , pp. 283-301, 1975 .
- [9] E.C. Appleby, L.M. Gibbons and K.Georgiou, Distortion of the gizzard in Cyprus pigeons (*Columba livia*) associated with *Hadjelia truncata* infestation. The Veterinary Record, 136 (22) , pp. 561-564 , 1995 .
- [10] G.R. Razmi, G.A. Kalidari and M .Maleki, First report of the *Hadjelia truncata* infestation in pigeons of Iran . Iranian Journal of Veterinary Research, University of Shiraz, 8 (2) , pp.175-177, 2007.
- [11] S.N. Singh, Studies on the helminth parasites of birds in Hyderabad State. Nematoda 2. Journal of Helminthology, 22, 199-218, 1948.
- [12] W. Yorke and P.A. Maplestone, The nematode parasites of vertebrates . Haf. Pub.Com., New York , (1962) .
- [13] A.R. Alborzi and A. Rahbar, Introducing *Alphitobius diaperinus*, (Insecta: Tenebrionidae) as a New Intermediate Host of *Hadjelia truncata* (Nematoda). Iranian Journal of Parasitology, 7(2), 92-98, 2012.

- [14] S. Naem, R.S. Houston, G. Senties-Cué, New insights into morphological features of *Hadjelia truncata* (Spirurida: Habronematidae), as revealed by SEM. Parasitology Research, 112 (1), pp. 327-333, 2013.
- [15] M.A. Al-attar, T.A. Abdul-aziz, *Hadjelia truncata* in pigeons. Vet. Rec. , 117(20) , pp. 535, 1985 .
- [16] A.A. Al-Moussawi, First record in Iraq of two nematode parasites from the blue-checked bee -eater *Merops superciliosus persicus* Pallas, 1773 . Bull. Iraq nat. Hist. Mus.10 (2), pp. 1-7 , 2008.
- [17] A.A. Al-Moussawi, *Hadjelia truncata* Creplin, 1825 (Spirurida : Habronematodae) in the red-backed shrike *Lanius collurio* Linnaeus, 1758 (Passeriformes: Laniidae) collected in Baghdad City, Central Iraq. Journal of Biodiversity and Environmental Sciences (JBES), 6(3), pp.121-126, 2015.
- [18] N.S.J. Al-saffar, Diagnostic study of intestinal helminths of some kinds of columbidae in Baghdad city . thesis. College of Veterinary Medicine / University of Baghdad. ,111, 2009. (in Arabic) .
- [19] H.W.K. Shubber, Distribution of *Hadjelia truncata* Creplin, 1825 (Habronematidae,Spiruridea) among members of the avian family Columbidae in Al-Diwaniya Province,central Iraq .Bulletin of Iraq natural History Museum 11 (1), pp. 69-75, 2010.
- [20] M.K. Mohammad and A.A. Al-Moussawi, Prevalence and infection rate of three gizzard nematodes in the Mallard *Anas Platyrhynchos* L., 1758 collected in Al-Diwaniya and Diyala Provinces , Central Iraq. Ibn Al-Haitham Journal for Pure and Applied Sciences, 24 (3), pp.15-24, 2011.
- [21] C.G. Senties-Cué, B.R. Charlton, L. Anthenill, S. Naem, L. McDougald, M. Bland, Parasitic ventriculitis caused by *Hadjelia truncata* in California rock pigeons (*Columba livia*). Journal of Veterinary Diagnostic Investigation, 23(6), pp. 1243-1246, 2011.
- [22] K. Junker, J. Boomker, Helminths of guineafowls in Limpopo Province, South Africa The Onderstepoort Journal of Veterinary Research, 74 (4), pp. 265-280, 2007.
- [23] Y. Chaturvedi and K.C. Kansal, Check-list of Indian nematodes (animal parasites). The Director, Zoological Survey of India (Edit.) . Records zool. Surv. India Misc. Publs Occ. Pap, 5, pp.1-148, 1977.
- [24] A.P. Nandi, N.C. De, and G. Majumdar, "Records of two new nematodes (Acuariidae) parasitizing kingfishers (Coraciiformes) of West Bengal India". Helminthologia. 22 (3), pp. 161-170, 1985.
- [25] M.K. Mohammad, Blood parasites of some Iraqi wild birds. Iraqi J. Sci., 31(Supplement), pp.31 -39, 1990.
- [26] M.A. Salim , R.F. Porter, S. Christensen, P. Schiermacker-Hansen, S. Aljboor, Field guide to the birds of Iraq. Edited by Nature Iraq and BirdLife international, pp. 1-284 , 2006. [in Arabic].
- [27] E.B. Cram, Bird parasites of the nematode suborders Strongylata, Ascaridata, and Spirurata. Bulletin / Smithsonian Institution, United States National Museum, 1927.
- [28] R.J. Ortlepp, Some helminths recovered from Red- and Yellow billed Hornbills from the Kruger National Park .Onderstepoort J. Vet. Res. 31 (1), pp. 39- 52, 1964.
- [29] J.N. Borges, L.F.G. Cunha, H.L.C. Santos, C. Monteiro-Neto and C.P. Santos, Morphological and Molecular Diagnosis of Anisakid Nematode Larvae from Cutlassfish (*Trichiurus lepturus*) off the Coast of Rio de Janeiro, Brazil. PLoS ONE 7(7) , pp. e40447, 2012.
- [30] M.A. Islam and M. Kamruzzaman, *Halcyon smyrnensis*. In: Siddiqui, K.U., Islam, M.A., Kabir, S.M.H., Ahmad, M., Ahmed, A.T.A, Rahman, A.K.M., Haque, E.U., Ahmed, Z.U., Begum, Z.N.T., Hassan, M.A., Khondker, M. and Rahman, M.M. (eds.). Encyclopedia of Flora and Fauna of Bangladesh. Vol. 26. Birds. Asiatic Society of Bangladesh, Dhaka. Pp, 75 -76, 2008.
- [31] A.I. Derwesh, A preliminary list of identified insects and arachnids of Iraq. Directorate General of Agriculture Research and Projects. The Government Press, Baghdad Iraq., Bulletin, No. 112, pp .123, 1965.

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