Journal of Veterinary and Animal Sciences. 29 (1998) 64-67

OBSERVATION ON THE BIOLOGY OF *ORNITHOSTRONGYLUS QUADRIRADIATUS* (STEVENSON, 1904) IN PIGEONS II. PARASITIC STAGES

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Much data have been amassed on the incidence of pigeon ornithostrongylosis in different parts of world. However, very little work has been reported on the developmental stages of this parasite in pigeons. Since it is known to be the most pathogenic strongyle worm causing morbidity and mortality in pigeon farming, it is mandatory to understand the biology of parasite for effective control measures. Considering the above, the present work was undertaken to investigate more details on this aspect.

Materials and methods

Twelve, one and half months old, infection free pigeons constituted the experimental birds for this study. The infective larvae were collected from water culture seeded with eggs of *O. quadriradiatus* after 72 hours. After experimental oral infection of ten birds (200 l/ bird), they were sacrificed at the rate of one per day from day 1 to 10 post-infection. The remaining two birds served as control and were autopsied on day 10 PI. The entire digestive tract was thoroughly scraped and examined under binocular dissection microscope. Worms both immature and mature, if present, were collected and morphology was studied in detail. Camera lucida drawings were made for measurement in both fresh and fixed specimens.

Results and discussion

The exsheated third stage larvae were recovered from proventriculus and duodenum after 24 hrs PI but only very few moulting stages could be collected at this time indicating that third moulting was initiated.

Parasitic stages

The measurements of parasitic stages of *O. quadriradiatus* are furnished in Table 1.

Fourth stage larvae (Figs. 1, 2 and 3)

On day two PI, all the larvae developed to fourth stage and on day three PI many of these larvae started fourth moulting. The head

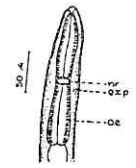
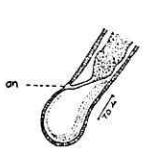


Fig:1



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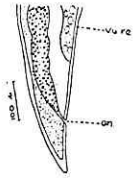

Fig:3

Fig:1 - Fourth stage larva - Head end
Fig:2 - Male tail end
Fig:3 - Female tail end

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Table 1 Measurements of parasitic stages of *O. quadriradiatus* (in microns)*

Larval stage	Total length	Breadth at oesophageal region	length of oesophagus	Distance from anterior end			Vulva from tail tip	Spicule	Tail (from anus to posterior end)
				Nerve	Excretory	Anus			
Fourth									
Male	986-1320(1160)	36-47 (41)	224-244 (235)	108-131 (120)	124-149 (138)	937-1230 (1080)	-	-	49-86 (68)
Female (1516)	1340-1620 (49)	41-56 (258)	244-269 (134)	122-146 (151)	139-164 (1423)	1308-1480	-	-	48-129 (78)
Fifth									
Male (2254)	2087-2384 (62)	53-69 (268)	254-281 (140)	128-151 (154)	146-168 (2170)	2017-2282	-	51-78 (69)	69-102 (84)
Female	2854-3480 (3246)	62-76 (69)	268-292 (280)	134-163 (146)	152-178 (165)	2790-3376 (3156)	264-306 (282)	-	68-101 (88)

* Represents measurements of 50 larvae at each stage

end with slight cuticular inflation could be appreciated on both sides. Developing males and females could be differentiated based on the tail end. The males showed a truncated short tail. Bursal rays were not prominent. The females had long tapering tail and developing genitalia was clearly seen.

Fifth stage larvae (Figs. 4, 5 and 6)

The larvae or juveniles were collected from lumen of duodenum from days four, five and six PI. The cuticle was thick and the anterior end showed cephalic cuticular inflation. The oesophagus was

Fig 4 Fig 5 Fig 6

Fig 4 : Fifth stage larva - Head end
Fig 5 : Male bursa
Fig 6 : Female tail end

well developed and clubshaped. In males, bursal rays and spicules could be seen clearly. The spicules were equal, ended distally into three processes. Prebursal papillae and telamon could be clearly seen on dorsal side. In females the tail end tapered to narrow blunt end with a short spine at the tip. A few immature eggs were seen in the uteri of female worms collected on day six PI.

Adult worms

A very few mature worms on day six and many on day 7-10 PI were collected from duodenum. The morphology of adult worms resembled the description made by Deo (1962) and Tongson *et al.* (1975).

The faecal samples of infected birds became positive for the egg of *O. quadriradiatus* after seven days PI. During the course of infection the droppings of infected birds were greenish in colour from day five PI onwards and the birds showed a gradual reduction in weight. The control birds were negative for any infection and were in good condition. The details on developmental stages of worms collected at different intervals in digestive tract are presented in Table 2.

It was observed by experimental infection that the third and final moults occurred within 24 and 72 hours PI respectively and the worms reached maturity on day six and started to lay eggs from day seven PI in infected birds. Cram and Cuvillier (1931) and Cuvillier (1937) also observed the similar moulting periods but the prepatent period reported by them was one to two days earlier than present findings. In addition they found that some of the fourth stage larvae were deeply penetrated into the glands of proventriculus, but in the present study the larvae were seen closely adherent to the mucosal surface with their anterior extremity buried in between the glands of proventriculus. Due to lack of earlier information, the present morphological details could not be compared.

Table 2 Developmental stages of *O. quadriradiatus* collected at different intervals

Day (PI)	Stages of larvae/worms obtained	Location
1	Third stage and few moulting forms	Proventriculus and duodenum
2	Fourth stage	-do-
3	Fourth stage and moulting forms	-do-
4	Fifth stage (Juveniles)	Duodenum
5	Fifth stage (Juveniles)	Duodenum
6	Juveniles and a few mature worms	Duodenum
7-10	Mature worms	Duodenum

Summary

The morphology and development of fourth and fifth stages of larva of *O. quadriradiatus* were described in detail. The prepatent period was found to be seven days.

Acknowledgement

The authors are grateful to the Professor and Head, Department of Parasitology and to the Kerala Agricultural University for providing necessary facilities for the completion of this work.

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