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Research Note

Oxyspiruriasis in zoo birds

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Abstract. Oxyspiruriasis caused by the bird eyeworm, *Oxyspirura mansoni*, a thelaziid nematode, in three species of pheasants, 3 *Chrysolophus pictus* (golden pheasant), 7 *Lophura nycthemera* (silver pheasant) and 9 *Phasianus colchicus* (common pheasant) in Zoo Negara Malaysia are reported. Birds with the disease were treated with a solution of 0.5% iodine or 0.5% lysol. Antistress powder for 4 days in water and non-strep vitamin powder in water was also provided. Control measures included removal of the cockroach intermediate host, *Pycnoscelus surinamensis* (Surinam cockroach) from the vicinity of the birds. The golden pheasant is a new host for *O. mansoni* in peninsular Malaysia.

Oxyspiruriasis was first described in peninsular Malaysia in 1939 and later in 1948, but details of disease manifestation or the causative agent was not mentioned (Mustaffa-Babjee. 1968). However, Mustaffa-Babjee (1968) described an outbreak of oxyspiruriasis in domestic fowls in Kuala Terengganu, Terengganu. He provided data based on experimental and natural observations pertaining to disease, causative agent, and intermediate host. Subsequently, this condition was reported by Zahedi *et al.* (1982) and Vattanodorn *et al.* (1984) in domestic fowls; Zahedi *et al.* (1982) in zoo birds and Amin-Babjee *et al.* (1985) in jungle fowls. This worm has been reported in Bangladesh (Islam *et al.*, 1995); Florida, USA (Foster *et al.*, 2002); Kansas, USA (Robel *et al.*, 2003); Brazil (Pinto *et al.*, 2006); New Zealand (Lee *et al.*, 2006) and Mexico (Rodriguez – Tovar *et al.*, 2008).

The causative organism of oxyspiruriasis belongs to several species of thelaziid nematodes belonging to the genus *Oxyspirura* (Skrjabin *et al.*, 1967). Members of *Oxyspirura* occur under the nictitating membrane of the eye of its host and hence aptly referred as eyeworms. To date, in peninsular Malaysia only one species, *Oxyspirura mansoni* (Cobbold, 1879) Ransom, 1904 has been implicated as the causative agent of oxyspiruriasis (Krishnasamy *et al.*, 1986/87).

This paper report cases of oxyspiruriasis in captive wild birds examined at Zoo Negara Malaysia during 1981-1984. Information on several cases was gathered from records (autopsy reports and medical cards)

maintained at the Zoo Clinic. Also measures adopted to interrupt transmission cycle in the zoo are briefly outlined.

Birds that were off-feed, exhibited signs of uneasiness or irritation, such as scratching at the eyes, were taken wrapped in a damp cloth (to avoid stress) to the clinic for examination for eyeworms. Birds found dead were examined for the presence of eyeworms at autopsy.

Prior to clinical examination, a local anesthetic, 5% xylocaine® was instilled to both eyes of the birds. After a few minutes (2-5 minutes), the nictitating membrane was separated with the aid of a pair of blunt-pointed forceps to reveal the conjunctival sac and look for the presence of worms. A diagnosis of oxyspiruriasis was made based on the presence of the parasite in the eye or in its absence on clinical sings. The worms were processed and indentified using the descriptions and measurements in Zahedi *et al.* (1982) and Krishnasamy *et al.* (1986/87).

The eyes of all birds examined were treated with a solution of 0.5% iodine or 0.5% lysol, administered with a syringe. This initial treatment was made after a lapse of 1 or 2 minutes following the application of the local anesthetic. The treatment was repeated before holding the birds for observation. Antistress powder in water was provided for a period of 4 days. Non-strep vitamin powder in water was also provided. Medication via parental injection was avoided as this procedure could cause stress in birds thus resulting in their death.

Mitterpak *et al*. (1972) successfully treated *O. mansoni* infection by applying 2 – 3 drops of 10% tetramisole to the infected eyes or by administering it orally at a dose of 40 mg/kg body weight. Local application of 2 – 3% boric acid, 0.05% mercuric chloride, 0.05% lysol or 0.5% diethylcarbamazine have been shown to be effective (Soulsby, 1968).

With a view to check the incidence of oxyspiruriasis in captive zoo birds the following measures were initiated. Cockroach harbourages, such as rotten tree trunks and large stones were removed or their numbers reduced from the bird enclosures. Periodic examinations for cockroaches to assess population density were conducted and any cockroaches encountered were removed with a pair of forceps. All susceptible captive birds were provided with a propalytic dose of 0.5% dietylcarbamizine. The drug was diluted in drinking water.

The causative agent, *O. mansoni* is a whitish or yellowish worm; the males measuring 10-16 mm and females 12-19 mm long. The male spicules located at the posterior end are unequal; body attenuated at both ends; tail coiled ventrally and lack alae; mouth circular and muscular; V-shaped gubernaculums located ventrally, and cuticle smooth. The female with vagina muscular and long; tail long and tapering to a blunt-point; distance of vulva from anus about twice the length of tail. Based on these features the worms were identified as *O. mansoni*. The developmental cycle of this nematode involves a cockroach intermediate host. In peninsular Malaysia, Mustaffa-Babjee identified a species of *Pycnoscelus* as the intermediate host in his study. Subsequently, Zahedi *et al*. (1982) in criminated *Pycnoscelus surinamensis* (Surinam cockroach) as the intermediate host of this parasite in zoo birds and domestic chicken from Kapar, Klang in Selangor state. Birds acquire infection through the ingestion of *P. surinamensis* containing the infective stages of the parasite.

Nineteen birds comprising of 3 species were examined for eyeworms (Table 1). These included 3 *Chrysolophus pictus* (golden pheasant), 7 *Lophura nycthemera* (silver pheasant) and 9 *Phasianus colchicus* (common pheasant). Of this 1 *L. nychemera* and 2 *P. colchicus* were found dead with some degree of post-mortem changes. All these 3 dead birds had worms. Of those examined 10 birds succumbed to the condition; 8 harboured the parasite.

Oxyspirura mansoni is a parasite of considerable veterinary importance. In this study and those of Zahedi *et al.* (1982) and Vattanodorn *et al.* (1984) it was commonly encountered. Mustafa-Babjee (1968) found marked conjunctivitis and petechial haemorrhages in the nictitating membrane, also blindness and total destruction of the eye- ball. However, Amin-Babjee *et al.* (1985)

Table 1. Captive zoo birds examined for oxyspiruriasis

Species	Date examined	Lesions/Signs	Worms	Treatment	Remarks
Phasianus colchicus	1/8/81	No distinct lesions	present	lysol	died
Phasianus colchicus	23/12/81	Mucopurulent discharge through nasal passage	absent	iodine	died
Phasianus colchicus	9/4/82	Eyes partially closed	absent	iodine	survived
Phasianus colchicus	12/4/82	Bilateral lacrimation	present	iodine	died
Phasianus colchicus	17/4/82	Head drooping, both eyes closed	present	lysol	died
Phasianus colchicus	22/5/82	Eyes bright and alert, no characteristic lesions	present	lysol	survived
Phasianus colchicus	17/6/82	Eyes bright and alert, no characteristic lesions	present	iodine	survived
Phasianus colchicus	4/3/83	Eyes inflamed, conjunctivitis	present	No treatment	examined as carcass
Phasianus colchicus	14/3/83	No distinct lesions	present	No treatment	examined as carcass
Lophura nycthemera	24/12/81	No distinct lesions	present	lysol	died
Lophura nycthemera	5/3/82	Eyes closed, lacrimation	present	lysol	died
Lophura nycthemera	8/3/82	Eyes closed, lacrimation	present	lysol	died
Lophura nycthemera	26/2/83	Eyes inflamed, conjunctivitis	present	No treatment	examined as carcass
Lophura nycthemera	11/3/84	No distinct lesions	absent	lysol	survived
Lophura nycthemera	22/8/84	Bilateral cataract	absent	lysol	died
Lophura nycthemera	13/9/84	Bilateral cataract, partial blindness	present	lysol	died
Chrysolophus pictus	22/5/84	No distinct lesions, eyes seen closed	absent	lysol	survived
Chrysolophus pictus	13/6/84	Left eye inflamed	present	lysol	died
Chrysolophus pictus	19/7/84	No distinct lesions	absent	lysol	survived

found no obvious clinical signs in 7 out of 14 jungle fowls with the parasite. In our study the clinical signs seen were conjunctivitis, bilateral cataract and partial blindness, inflammation of the eye, mucopurulent discharge through nasal passage, and marked cloudy cornea.

Since implementation and strict adherence of measures against occurrence of oxyspiruriasis were initiated in the pheasants no further cases of eyeworms were seen. It is stressed here that to check this serious condition in rare and important ground birds, consistent surveillance is imperative. The golden pheasant, *Chrysolophus pictus* is a new host record for *O. mansoni* in peninsular Malaysia.

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