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Endoparasites in captive pheasants in P.K.R farms, Cavin Estate, Chennai India

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Abstract
A study was conducted to find out the common endoparasites that affect the Captive Pheasants. This study was carried out in captive pheasants reared at P.K.R Farms, Cavin Estate, Injambakam, Chennai. A total of 16 droppings (fecal samples) were collected in small containers filled with 10% formalin. The samples were thoroughly examined for the presence of various endoparasites by qualitative methods and quantitative method. The result revealed the presence of endoparasites such as *Ascaridia* sp. (12.50%), *Strongyle* (18.75%), *Eimeria* sp. (06.25%) and *Ascarid* sp. and *Strongyle* of mixed infections (06.25%). Based on this study, the major causes for endoparasitism were identified and discussed. To prevent endoparasites, important management measures were suggested in order to promote the health of birds from parasitic infections.

Keywords: Captive pheasants endoparasites Chennai

Introduction
Pheasants belong to the family '*Phasianidae*' and Order '*Galliformes*'. Pheasants are brightly coloured, large bodied and ground dwelling birds. These birds exhibit greater sexual dimorphism in both size and plumage. *Galliformes* comprises of 70 genera and 284 species, while 45 species are known from India. The natural range of the pheasants spreads throughout South-east Asia.

In captivity, peafowl can live for about 23 years but it is estimated that they live only for about 15 years in the wild Flower, (1938) [7]. Domesticated peacocks and other fancy birds develop a variety of infections due to unnatural habitat and suboptimal management conditions Athar *et al.*, (2001) [1]. Regrettably, like other captive birds, they are also suffering from potential stress and frequent cases of parasitic infections, which are among the most prevailing diseases that affect them El-shahawy, (2010) [6]. The major stress factor that can lead to lowered performance and malnutrition is intestinal parasitism Badran and Lukesova, (2006) [2]. Parasitic infections are among the most common sanitary problems affecting wild birds and become either a sub clinical condition or even a cause of death, they have attention only when they have threatened agriculture or human health Pheasants, also being insectivorous, tend to scavenge on worms of decaying animals and often introduced to endoparasitic infections. Pheasants were susceptible to a wide range of diseases, in which parasitism is one of the major health problem, which might be transmitted from one group of birds to other. This study helps in identification of this parasitic prevalence in captive conditions.

Materials and Methods
A total of 16 droppings (fecal samples) were collected from Silver Pheasant Enclosure (N=7) Golden pheasant Enclosure (N=3) and Lady Amherst Enclosure (N=6) at P.K.R Farms, Cavin Estate, Injambakam, Chennai. Collected samples were stored in small containers filled with 10% formalin. The samples were thoroughly examined for the presence of various endoparasites by qualitative methods like centrifugal sedimentation, floatation techniques and quantitative method like the number of eggs per gram of feces (EPG) / Oocyst Per Gram (OPG) as suggested by Soulsby (1982) [13].

Results and Discussion
In Sedimentation Technique, Silver Pheasant Enclosure (N=7), 14.28% (n=1) of the samples revealed evidence of *Ascarid* sp. then 14.28% (N=1) of the samples showed evidence of *Strongyle*. In Golden Pheasant Enclosure (n=3), 33.33% (n=1) of the samples showed evidence of *Strongyle.* In Lady Amherst Enclosure (N=6), 16.66% (n=1) of the samples revealed

evidence of *Ascarid* sp. then 16.66% (N=1) of the samples showed evidence of *Strongyle* and Further one sample (16.66%) revealed mixed infection which comprised eggs of *Ascarid* sp and *Strongyle*..(Table 1).

In Flotation Technique, Silver Pheasant Enclosure (N=7), 14.28% (N=1) of the samples revealed evidence of *Capillaria* sp. then 14.28% (N=1) of the samples revealed evidence of *Strongyle*. Further one sample (14.28%) revealed mixed infection which comprised eggs of above mentioned species. In Golden Pheasant Enclosure (N=3), 33.33% (n=1) of the samples revealed evidence of *Capillaria* sp. then 33.33% (n=1) of the samples revealed evidence of *Strongyle*. In Lady Amherst Enclosure (N=6), 16.66% (N=1) of the samples revealed evidence of *Strongyle*, 16.66% (N=1) of the samples showed evidence of *Eimeria* sp.

Among the 16 dropping samples, *Capillaria* sp. eggs were identified in 12.50% (N=2) of the samples. Further, *Strongyle* eggs were identified in 18.75% (N=3) of the samples and *Eimeria* sp. eggs were found in 06.25% (N=1) of the samples. Similarly, 06.25% (N=1) of the samples contained mixed infection of above mentioned species. (Table 2).

Eggs Per Gram (EPG) values in Silver Pheasant Enclosure (N=7) revealed 250±35.06, 1100±59.08 and, 500±71.22 mean EPG±S.E of *Ascarid* sp., *Strongyle* and *Capillaria* sp. Respectively.

In Golden pheasant Enclosure (N=3) revealed 1058±99.66 mean EPG±S.E of *Strongyle*. In Lady Amherst Enclosure (N=6) revealed 442±58.55 and 800±66.33 mean EPG±S.E of *Strongyle* and *Capillaria* sp. (Table 3).

Oocyst Per Gram (OPG) values in Silver Pheasant Enclosure (N=7) and Golden pheasant Enclosure (N=3) no evidence found for oocyst in the studied sample. In Lady Amherst Enclosure (N=6), 2184±561.12 mean OPG±S.E of the samples showed evidence of *Eimeria* sp. (Table 4).

Birds in zoo are often subjected to an additional stress of caged captivity, overcrowding and the environmental conditions which are rejuvenating the development of parasites. As a result, the birds in captivity generally harbour more parasitic infections as compared to their counterparts living freely. The incidence of helminthic parasites in all birds was observed higher than the zoo animals by Dhoot *et al.* (2002) [5]. As such, despite a regular deworming regime, parasitic infections had been reported in zoo birds at various locations of India (Parsani *et al.*, 2007) [11]. Most of the studies carried out in past in India were mainly conducted on the pooled dropping samples screening of the captive birds.

Prevalence of gastrointestinal parasites in captive birds was reported coprologically by Reddy *et al.* (1992) [9] at Bannerghatta National Park, Bangalore wherein the examination revealed the presence of nematodes, comprising of *Ascaridia* sp., *Strongyle* and *Capillaria* sp. in almost equal proportion. These findings are in coherent with the results obtained from the collected samples. Faecal screening for endoparasites among free-ranging peafowl at Tirunelveli and Kanyakumari in Tamil Nadu (Subramanian *et al.*, 2003) [14] revealed the infection with a range of nematodes (*Heterakis, Ascaridia, Capillaria, Syngamus and Strongyloides* species).

A study in Maharajbagh Zoo, Nagpur (Dhoot *et al.*, 2002) [5] exhibited the presence of *Ascaridia* and *Capillaria* sp. predominantly in birds. These findings are coherent with the result obtained from our study. Encountering of *Ascaridia* sp. in this study was in agreement with the report furnished by Rosskopf and Woerpel (1996) [12] who stated that *Galliformes* harboured *Ascaridia* sp. in addition to *Psittacines* and pigeons. Young birds were more susceptible to ascardiasis than the mature birds but even mature birds might have sub-clinical infections with one or two ascarids. Similarly, in our study also, *Ascaridia* sp. was encountered in adult peafowls.

The encountering of *Eimeria* sp. in this study by flotation technique was in agreement with the reports furnished by Burr (1987) [3] who had used flotation technique, opined that numerous species of *coccidiae* occurred in birds and these protozoans infected the small intestine of birds and produced the oocysts that were passed in the dropping. These findings are in coherent with the results obtained from our studied. Oocysts of *Eimeria* sp. were identified in the dropping samples based on the keys provided by Soulsby (1982) [13]. The sporulated oocysts containing four sporocysts each with two sporozoites were identified in the positive faecal samples, in this regard. Papini *et al.* (2012) [10] stated that intestinal *coccidia* occurring in birds included species of the genera *Eimeria* sp., *Isosopra* sp., *Tyzzeria* sp., and *Wenyonella* sp., and they could be differentiated by the characteristic morphology of their sporulated oocysts which differed mainly in number of sporocysts and sporozoites. These findings are in accordance with our studied.

Encountering the mixed infection comprising of different endoparasitic fauna in peafowl was in agreement with the findings of Titilincu *et al.* (2009) [15] who reported mixed infections with nematode parasites like *Ascaridia* sp., *Heterakis* sp., *Syngamus trachea*, *Capillaria* sp. and *Strongyloides pavonis* in peafowls.

Urquhart *et al.* (1996) [16] stated that among the different *strongyles* noticed in animals, it was the *Syngamus trachea* which was commonly referred as gape worm, parasitizing the upper respiratory tract was noticed in non-aquatic birds and most common transport host for this was the common earth worm, including the variety of other invertebrates like slugs, snails and beetles. However, eggs of *Syngamus trachea* were not revealed in any of the studied samples obtained from Pheasants.

Further, an in depth study on parasites and microbial organisms affecting peafowls is required, incorporating the protozoan infections, especially the ones caused by coccidian parasites, which are of great importance for species conservation and also, to prevent spread of diseases of zoonotic importance. The most prevalent protozoan infections in zoo birds have been incriminated to *coccidia* in the past. Chauhan *et al.* (1973) [4] carried out a study on birds of Delhi and Lucknow zoos and identified *E. pictus* from Golden Pheasant (*Chrysolophus pictus*) and Silver Pheasant (*Lophura nyathemera nippone*); *E. meleagridis* or *E. adenoeides* Lady Amherst‟s Pheasant (*Chrysolophus amherstiae*). These findings are in coherent with the results obtained from our studied. Encountering of *Capillaria* sp. in the dropping samples of captive pheasants encountered in this study was in agreement with the findings of Hurst *et al.* (1979) [8] who reported about the occurrence of capillariasis in duck, pheasant, partridge, quail and turkey.

Table 1: Enclosure wise dropping examination by sedimentation method in captive pheasants - P.K.R Farms (N=no of dropping samples)

Enclosure No.	Details of sample collection	*Ascarid* Sp	*Strongyle*	Mixed Infection
1	N=7	1(14.28)	1(14.28)	-
2	N=3	-	1(33.33)	-
3	N=6	1(16.66)	1(16.66)	1(16.66)
Total	16	2(12.50)	3(18.75)	1(06.25)

Table 2: Enclosure wise dropping examination by flotation method in captive pheasants - P.K.R Farms (N=no of dropping samples)

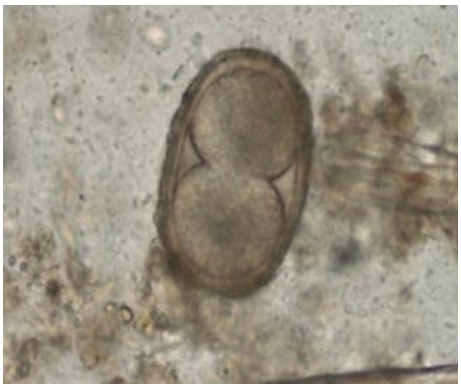
Enclosure No.	Details of sample collection	*Capillaria* Sp	*Strongyle*	*Eimeria* Sp	Mixed Infection
1	N=7	1(14.28)	1(14.28)	-	1(14.28)
2	N=3	1(33.33)	1(33.33)	-	-
3	N=6	-	1(16.66)	1(16.66)	-
Total	N=16	2(12.50)	3(18.75)	1(06.25)	1(06.25)

Table 3: EGG Per Gram (EPG) values in captive pheasants enclosure wise in P.K.R Farms (N=no of dropping samples)

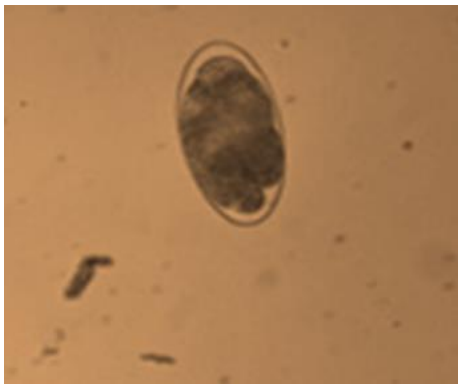
Enclosure No	Details of sample collection	*Ascarid* Sp mean EPG ± S.E	*Strongyle* mean EPG ± S.E	*Capillaria* Sp mean EPG ± S.E
1	N=7	250±35.06	1100±59.08	500±71.22
2	N=3	-	1058±99.66	-
3	N=6	-	442±58.55	800±66.33

Table 4: Oocyst per gram (OPG) values in captive pheasants enclosure wise in P.K.R Farms (N=no of dropping samples)

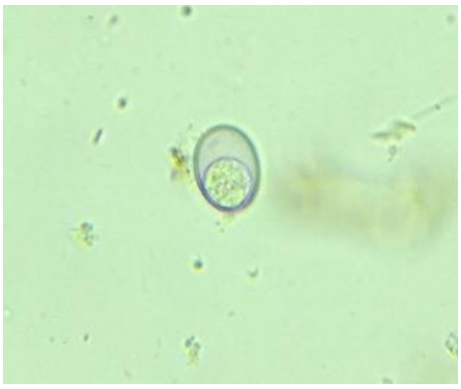
Enclosure No	Details of sample collection	Oocyst Per Gram(OPG)
1	N=7	-.
2	N=3	-
3	N=6	2184±561.12



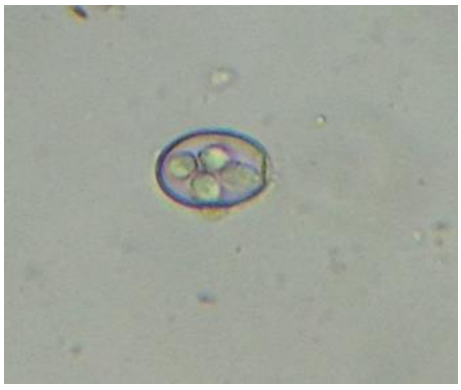
Egg of *Ascarid* sp. (40X)



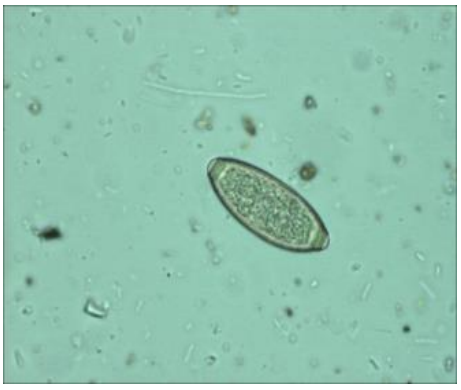
Egg of *Strongyle* (40X)



Unsporulated oocyst of *Eimeria* sp. (40X)



Sporulated oocyst of *Eimeria* sp. (40X)



Egg of *Capillaria* sp. (40X)

Plate 1

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