subcutaneously. The tigress defecated large amount of faecoliths the next day. The fluid, antibiotic and supportive therapy were continued daily for five days since she cooperated well in the squeeze cage with enema given at three-day interval. The tigress improved and relapsed intermittently. Finally, she died on 16.v.2006. The carcass weighed 110.5kg. On postmortem examination the muscles were atrophied with little congestion. Lungs were congested and compressed. Cardiac muscles were firm. Subcutaneous and pericardial fat was deep yellow. Liver was mildly firm. Gastric and intestinal contents were scanty with mucous. The histopathological examination of liver, kidney, heart, lungs, stomach and intestine did not reveal any significant changes. Hence, the death of the tigress was attributed to off-feed condition associated with senility.

In the present case the tigress was off-feed and might have suffered from adynamic ileus. The wound in the lumbar region healed due to dressing and specific antibiotic therapy. The exact cause of the ileus may be associated with senility. Administration of fluid, electrolyte, and antibiotic along with supported therapy resulted in temporary improvement until the condition relapsed. The colon which is a very distensible organ that stores faeces before elimination makes the course of the disease frequently long. The affected animals lose their appetite and die of starvation as happened in this case. Similar findings were observed in dogs and cats by Pass (1985).

**Reference**

**Pass, M.A. (1985).** Small Intestine, pp.738-752. In: Douglas H. Slatter (ed.). *Text Book of Small Animal Surgery. 1st Edition.* W.B. Saunders Company. Philadelphia, 743pp.

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## Prospective studies on prevalence of gastrointestinal parasites in zoo birds

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In spite of the better management in zoos, birds sometimes are under stress either due to the climatic changes, housing conditions or nutrition. In most zoos regular deworming programme is mandated by the Central Zoo Authority. This study was undertaken to know the prevalence of the parasitic infection to plan out effective preventive programme for specific parasites. It was conducted for a period of six months at Shri Sayaji Baugh Zoo, Vadodara. The zoo was visited every month and faecal droplets were collected in sample collection bottle from each cage of different bird groups. A total of 282 faecal samples were collected from 437 birds and examined.

Housing: Birds of each group were kept in separate cage under deep litter system. Each cage having water trough and feed trough. Deep litter material was changed every month and cages were daily cleaned early in the morning.

Feeding and watering schedule: Feeding was done through feed trough from 0830 to 0900hr and from 1430 to 1500hr daily. Feeds were separate for each group of birds.

Collection of faecal sample from zoo: About 5-20g of faeces of were collected from each cage of the aviary for screening for parasitic infection.

Storage and preservation of faecal sample: Faecal materials were kept separately in plastic collection bottles and stored in the laboratory refrigerator until examination.

Examination of faecal samples: Faecal samples were examined grossly for presence of gravid segments of cestodes immature and mature parasites, and later were processed for qualitative examination.

Qualitative examination: Fresh group droppings were processed by sedimentation technique in laboratory using the methods as described by Thienpont (1979) and Georgi (1985).

**Results and Discussion:** Several species of trematodes, cestodes and nematodes were found in free-living birds. Enumeration of all of them would be an arduous task of little practical value because most helminthes cause insignificant damage to the host. However, under certain conditions like stress, parasites may effect either the survival or reproduction of host populations especially in captivity.

In the present study, the overall prevalence of parasitic infection in various groups of birds is illustrated in Table 1.

Out of 282 faecal samples 101 samples were positive for parasitic load (35.86 %). Among them *Ascaridia* spp. 30 (27.3%), *Eimeria* spp. 33 (30.03%), *Capillaria* spp. 9 (8.19%), *Strongyloides* spp. 4 (3.64%) and mixed infection in 15 (13.65%) infection was observed in most of the birds. The above observations substantiate the findings of Patel *et al.* (2000) of prevalence of *Ascaris* and *Capillaria* spp. as 20.75 % and 13.2 % along with 17.92 % prevalence of *Eimeria* spp. from faecal samples of pigeon group. They also recorded *Ascaridia galli* and *Cotugnia digonopora* from hariyal pigeon and *Ascaridia galli* from postmortem of parakeet, peacock and cockatiel.

Little research has been conducted on diseases and ailments affecting wild birds, and most of the investigational and diagnostic work has been carried out on an ad-hoc basis in response to a sudden large-scale mortality in a particular area (Abrey, 1993).

It has been observed from the present study that the over all prevalence of parasitic load was found to be 35.81% in the zoo. The higher prevalence of parasites was found about 83.33% in group one of peafowl (*Pavo cristatus*), where as mixed infection of parasites was observed in the pigeon group; the Pheasant (*Chrysolophus* spp.) group did not revealed any parasitic load. Most of the birds revealed prevalence of A*scaridia* spp., *Eimeria* spp., *Strongyloides* spp. and *Capillaria* spp. alone or mixed.

### References

**Abrey, A.N.S. (1993).** Diseases of free-ranging birds, pp.163-174. In: Fowler, M.E. (ed.). *Zoo and Wild Animal Medicine. Current Therapy-3.* W.B. Saunders Company. The Curtis Centre, Pennsylvania 19106.

**Georgi, J.R. (1985).** *Parasitology for Veterinarians* 4th Ed. W.B. Saunders, London, pp.344-348.

**Patel, P.V., A.I. Patel, R.K. Sahu & R. Vyas (2000).** Prevalence of Gastro-intestinal parasites in captive birds of Gujarat Zoos. *Zoos' Print Journal* 15 (7) : 295-296.

**Thienpont, D. (1979).** *Diagnosing Helminthiasis through coprological examination.* Beerse Jansen Research Foundation.1st edition, pp.44-67.

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***Table 1. Prevalence of parasitic infection in zoo birds***

| Groups of Birds | Scientific name | No. of Group Sample Examined | No.of Birds | No.of Positive | Percent Positive | Identificationof egg/oocyst |
|---|---|---|---|---|---|---|
| 1. Peafowl | *Pavo cristatus* | 6 | 4 | 5 | 83.33 | *Ascaridia* spp. (2), Mixed infection of *Ascaridia* spp. and *Capillaria* spp. (3) |
| 2. Parakeets | *Psittacus* spp. | 42 | 80 | 13 | 30.95 | *Eimeria* spp. (8), *Ascaridia* (3), *Strongyloides* spp. (1), Mixed *Strongyloides* spp. and *Eimeria* spp. (1) |
| 3. Pigeon | *Columbia* spp. | 42 | 129 | 22 | 52.38 | *Ascaridia* spp. (8), *Eimeria* spp. (6),Mixed - *Ascaridia* spp. And Strongyloides spp. (1), *Ascaridia* and *Eimeria* spp. (4), *Capillaria* and *Eimeria* spp. (1), *Capillaria, Eimeria* and *Ascaridia* spp. (1), *Capillaria* and *Ascaridia* spp. (1) |
| 4. Pheasant | *Chrysolophus* spp. | 24 | 13 | 0 | 0 | — |
| 5. Lorry | *Pisttaciformes* spp. | 36 | 65 | 16 | 44.44 | *Ascaridia* spp. (4), *Eimeria* spp. (9),*Capillaria* spp. (1), *Strongyloides* spp. (1), Mixed - *Eimeria* spp. And *Ascaridia* spp. (1) |
| 6. Love birds | *Agoporins* spp. | 6 | 19 | 3 | 50.00 | *Capillaria* spp. (1), *Ascaridia* spp. (1), *Strongyloides* spp. (1) |
| 7. Duck | *Todona* spp. | 12 | 7 | 3 | 25.00 | *Ascaridia* spp. (2), *Eimeria* spp. (1) |
| 8. Cockatoo | *Cacatoe* spp. | 18 | 5 | 3 | 16.66 | *Eimeria* spp. (1), *Capillaria* spp. (2) |
| 9. Rossella | *Platycerus* spp. | 12 | 2 | 4 | 33.33 | *Ascaridia* spp. (3), *Strongyloides* spp. (1) |
| 10. Macaw | *Ara* spp. | 18 | 3 | 7 | 38.88 | *Ascaridia* spp. (4), *Eimeria* spp. (3) |
| 11. Dove | *Oeopelia* spp. | 12 | 18- | 3 | 25.00 | *Capillaria* spp. (2), *Eimeria* spp. (1) |
| 12. Emu | *Dromiceins* spp. | 6 | 5 | 0 | 0 | — |
| 13. Conur | *Arotinga* spp. | 12 | 4 | 5 | 41.66 | *Capilaria* spp. (2), *Eimeria* spp. (1),Mixed *Capilaria* spp. and *Eimeria* Spp. (1), *Ascaridia* spp. And *Eimeria* spp. (1) |
| 14. Koel | *Endynoms* spp. | 6 | 2 | 0 | 0 | — |
| 15. Indian Pied Hornbill | | 1 2 | 4 | 4 | 33.33 | *Eimeria* spp. (3), *Ascaridia* spp. (1) |
| 16. Flamingo | *Phoehicopterus* spp. | 6 | 3 | 2 | 33.33 | *Capilaria* spp. (1) and*Ascaridia* spp. (1) |
| 17. Cockatiel | *Mymphirus* spp. | 12 | 17 | 1 | 8.33 | *Ascaridia* spp. (1) |
| | **Total** | **282** | **437** | **101** | **35.81** | |

Note: Number in parentheses indicates the number of positive samples



## Endoparasitic infection of Spotted Deer *Axis axis* in Puducherry

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***plus web supplement of 1 page***

The Axis or Spotted Deer *Axis axis* is the most widely distributed and abundant cervid species in the Indian protected areas (Arora, 1982). Endoparasites play an important role in the health status of the wild animals. The effects of parasites on domestic animals are well studied and it is largely assumed that the same holds true for wild animals. This study records the endoparasitic infection of captive Spotted Deer reared at Department of Forests and Wildlife, Puducherry.

Eighteen stags (>1 yr) reared were used in this study. Fresh faecal droppings from them were collected during the month of October 2006 for the first time. Standard parasitologic techniques - direct smear, sedimentation and centrifugal floatation techniques were performed as per the method of Moredun Research Institute (2000). However, larval culture technique was not attempted using the faecal pellets.

Adult deer, wherever observations could be made, apparently looked healthy and active without any visible clinical signs of infection. Of 18 stags screened for endoparasitic infection, eight of them harboured either single or mixed parasitic eggs. Direct smear and centrifugal floatation technique revealed the presence of *Trichostrongylus axei*, *Cooperia punctata* and *Capillaria bovis* eggs (Image 1[w]). Faecal pellets from five stags were positive for *Cooperia* spp and *Capillaria* spp eggs, two stags were positive for *Trichostrongylus* spp egg and one stag was positive for *Trichostrongylus* spp and *Capillaria* spp eggs. The parasitic eggs were identified based on its morphology described by Soulsby (1982). Perusal of literature revealed that helminths of captive Spotted Deer in India are scanty.

Ramasamy & Arora (1991) recorded prevalence of *Mullerius capillaris* in free ranging Spotted Deer in India. Mckenzle & Davidson (1989) reported *Trichostrongylus axei*, *Cooperia punctata*, *Haemonchus contortus* and *Capillaria bovis* infected Axis Deer in island of Molokai, Hawaii. Our results are in agreement with the findings of Mckenzle & Davidson (1989). Identification of ova of these potentially dangerous parasites suggested that moderate infection of Spotted Deer had occurred.

[w] See Image 1[w] in the websupplement at www.zoosprint.org

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**References**

**Arora, B.M. (1982).** *Bibliography on Microbiological, Pathological, Parasitological and Clinical Studies in Indian Wild fauna - Mammals, Aves and Reptiles.* Division of Epidemiology, Indian Veterinary Research Institute, Izatnagar, India. 236pp.

**Mckenzle, M.E. & W.R. Davidson (1989).** Helminth parasites of intermingling Axis Deer, wild swine and domestic cattle from the island of Molokai, Hawaii. *Journal of Wildlife.Diseases* 25(2): 252-257.

**Moredun Research Institute (2000).** Laboratory Techniques for the Diagnosis, Culture and Identification of Nematodes Infecting small ruminants. U.K, 15pp.

**Ramasamy, K. & B.M. Arora (1991).** Prevalence of *Muellerius capillaries* in free-ranging Spotted Deer *Cervus axis* in India and its experimental cross-transmission to goats. *Journal of Wildlife. Diseases* 27(1): 102-106.

**Soulsby, E.J.L. (1982).** *Helminths, Arthropods and Protozoa of Domesticated Animals.* 7th edition. The Williams and Wilkins Company. Baltimore, 603pp.

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