RESEARCH ARTICLE

Absence of Endoparasites in Long-Billed Vultures (*Gyps indicus*) in Bundelkhand Region, India

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ABSTRACT

Long-billed Vultures (*Gyps indicus*) are found in many protected and unprotected areas of Bundelkhand Region, but relatively diminutive studies do not illustrate the factors that may pessimistically impact their populations. This species was therefore surveyed for various factors that may influence the health of wild raptors and study of endoparasites was one of these factors. During 2007–2012, carcasses of 16 vultures were found. Out of these 9 dead vultures and 1 live juvenile were examined for endoparasites. Rest of the carcasses were decomposed hence could not be examined. At necropsy, the samples were methodologically observed for the endoparasites in viscera, liver, trachea, heart and other body organs. The faecal matter of the live juvenile was examined microscopically but no protozoan or helminthes infection (trematodes, nematodes and cestodes) was reported. Helminthes were absent in all the carcasses. Death due to helminthiasis can only be in the case of heavy infestation. Moreover the absence of helminthes reflects the feeding habits of vultures i.e. they are scavengers rather than predators and scavenge on dead cattle. The intermediate hosts required for trematodes do not form a part of the vulture food chain, the only doubt being the presence of cestodes and nematodes. No vulture sample represented any clinical signs that could be associated with the presence of parasites, fighting behavior being the main cause of deaths.

Keywords: *Vultures, endoparasites, carcasses, helminthes*

INTRODUCTION

The study of wildlife represents one of the cardinal part of current environmental protection policies, because they are considered as bio-indicators whose presence, abundance and health status is indicative of a particular set of environmental conditions. Birds are an integral part of virtually every ecosystem and it is not surprising that they are commonly found in households and zoos all over the world.

The usefulness of birds as indicators of ecosystem's integrity has been widely discussed (Greenwood, 1977; Bowerman *et al.*, 2000). Given the role that raptors play in the food chain, changes in their health status can have significant effects on the ecosystem integrity.

Birds can harbour a wide variety of endoparasites varying from nematodes, trematodes, cestodes, acanthocephalans, and protozoans (Altman *et al*., 1997; Rupley., 1997; Olsen and Orosz, 2000) Parasites usually cause little or no distress to healthy individuals in the wild, but for birds in captivity parasitic infections are among the most common sanitary problems (Barnes., 1986). Due to an increased risk of exposure, parasites can lead to serious problems or even to death in birds recently brought into captivity, kept for prolonged periods in confined housings, and stressed by injuries, illnesses, or adaptation to new environments (Kronea and Cooper 2002; Lacina and Bird 2000; Smith 1993). Many a times no pathological changes are seen in the avian host when the parasites coexist with them. This study was initiated to gain knowledge of endoparasites in vultures in wild and to determine if vultures sampled from the Bundelkhand Region were infested with endoparasites or not which could further reveal the host parasite relationship.

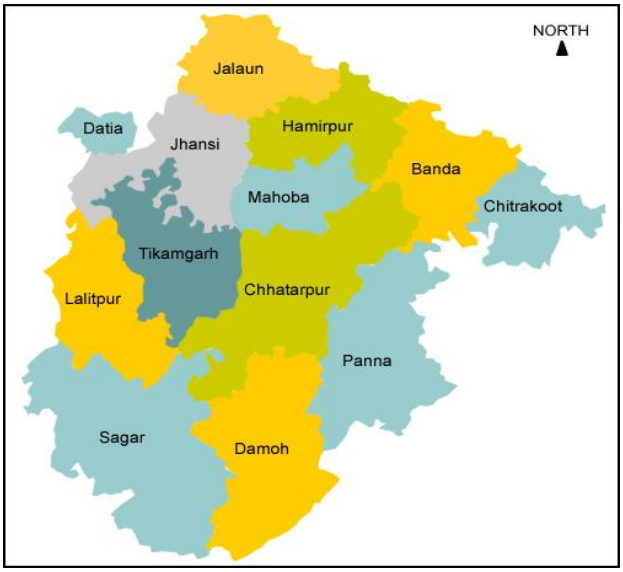

Fig 1: Map of Bundelkhand Region

Source: Land Use Plan for Development of Bundelkhand Region Based on Land and Soil Resources Survey, National Bureau of Soil Survey and Land Use Planning (Indian Council of Agricultural Research), Nagpur: November 1981.

The study was carried out in an area of two States of India, Uttar Pradesh and Madhya Pradesh known as Bundelkhand (Fig.1). The Bundelkhand region within these boundaries has an area of around 70,000 sq. km. The region stretches over districts of Southern Uttar Pradesh and Northern Madhya Pradesh (Bundelkhand Vikas Nidhi, 1990-1991; Bundelkhand Development Authority, 2007). The principal rivers are the Sindh, Betwa, Ken, Bagahin, Tons, Pahuj, Dhasan, and Chambal. Bundelkhand is a hot and semi-humid region. The temperature during summer goes upto 48^0C.

MATERIALS AND METHODS

Since vultures are Schedule I birds as well as Critically Endangered, it was difficult to get samples. A total number of 16 dead vultures were reported during the study period (2007-2012). The post mortal examination of samples for endoparasites was dependent on the condition of carcasses, which was further dependent on the lapse of time until the carcass was post mortem. The carcasses of 9 dead vultures and 1 sick juvenile were examined for endoparasites and further sample were collected for microscopic study. The blood was collected from wing veins of live bird that was about to die, by using 2 ml syringe and needle, feathers in the axillary region were plucked to isolate wing vein and the site was disinfected by 70% methylated ethanol. The blood smears were prepared, air dried, fixed with Methanol, stained with Giemsa and examined for blood parasites (Bennett, 1970). Faecal or intestinal sample were examined for confirmation of parasite infestation on direct smears. Faecal samples were collected in 10% formalin. Small portion of faeces mixed with 1-2 drop of Lugol's iodine was placed on glass slide and microscopically examined. Formalin fixed faeces were also mixed with a supersaturated solution of sugar or salt, filtered and centrifuged then surface supernatant was transferred to a slide and examined for parasite eggs. Endoparasites were also examined by necropsy examination of the dead vultures. These included exposure of the internal organs, removal and separation of the organs such as lungs, liver etc. Viscera were opened and examined properly in normal saline (0.5%).

RESULTS AND DISCUSSION

The faecal matter of the juvenile was examined but no protozoan or helminthes infection was reported. There was no parasitic infestation in trachea, intestines. Helminthes i.e. trematodes, nematodes and cestodes were absent in all the carcasses. Death due to helminthiasis can only be in the case of heavy infestation. The carcasses examined had no tissue damage that may be caused by the parasites as a result of burrowing into the mucosal lining of the mouth, oropharynx, oesophagus, and crop. The samples examined had no diphtheritic membranes extending from the oral cavity to the proventriculus, emaciation, necrosis, oedema, and no inflammation was observed.

Keymer (1972) studied the diseases of birds of prey. Although birds of prey are hosts for a wide range of parasites, there is little evidence of pathogenicity. Blood parasites are known to cause morbidity and mortality in various avifauna (Atkinson, 1991; Forrester, 1991). Hematozoan parasites were not found on blood smears from any of 82 Griffon vultures (*Gyps fulvus*) examined from Spain. Old World vultures have been sampled mostly for haematozoa in Africa. In India no specific research work has been done with haematozoans of vultures. However, Saxena (1967) obtained cestodes from *Neophron percnopterus ginginianus* (Lath.), the smaller scavenger vulture. The tapeworm was described as *Neophronia melanotus* sp. Noy. The genus *Neophronia axena.* 1967, includes three species, viz., *N. Lucknowensis saxena,* 1967, *N. luteus saxena,* 1968 and *N. irregularis Saxena*, 1968. Jairajpuri and Siddiqi (1970a) reported *Porrocaecum inconstrantia* from the intestine of Indian White-backed vulture (*Gyps bengalensis*) located in Laharpur, Sitapur (UP), India. Greiner and Mundy (1979) argued that use of rocky crags as nesting and roosting sites may isolate cape vultures from potential arthropod vectors. Conversely, tree-nesting vulture species showed haematozoa prevalences that varied between 31% in the White-headed vulture and 63% in the Lappet-faced vulture. The samples studied in Bundelkhand Region were of those Long-billed vultures that were breeding in the monuments or cliffs. Thus support the concept of absence of probable arthropod vectors. Alternatively, a well-developed immune system (Ricklefs, 1992) and/or presence of highly host-specific blood parasites in the avian community could explain absence of infections in griffon vultures.

CONCLUSION

In conclusion, the findings suggest that blood parasites were uncommon in *Gyps* vultures occurring in the Bundelkhand region, and they were not demonstrating active infections in the peripheral blood when examined. No vulture sample represented clinical signs that could be associated with the presence of parasites, fighting behavior being the main cause of deaths. Moreover the absence of helminthes reflects the feeding habits of vultures i.e. they are scavengers rather than predators and scavenge on dead cattle. The intermediate hosts required for trematodes do not form a part of the vulture food chain. The vulture colonies were in monuments and cliffs and thus isolated them from the potential arthropod vectors responsible for transmission of protozoan infections. More research is required to ascertain the prevalence of hematozoa in vultures, especially comparative studies on cliff and tree-nesting species that sample nestlings and assess ecological conditions regulating host vector-parasite relationships.

REFERENCES

Altman RB, Clubb SL, Dorrestein GM, and Quesenberry K (1997) Avian Medicine and Surgery, W.B. Saunders, Philadelphia, Pa, USA.

Atkinson CT (1991) Vectors, Epizootiology and Pathogenicity of Avian Species of Haemoproteus (Haemosporina: Haemoproteidae). *Bull. Soc. Vector Ecol*.16:109-126.

Barnes HJ (1986) Parasites in Clinical Avian Medicine and Surgery,G.J.HarrisonandL. R.Harrison, Eds., W.B. Saunders, Philadelphia, Pa, USA, pp.472–485. Bennett GA (1970) Simple techniques for making avian blood smears. *Canadian Journal of Zoology*, 48: 585-586.

Bowerman WW, Best DA, Grubb TG, Sikarskie JG, and Giesy JP (2000) Assessment of environmental endocrine disruptors in bald eag1es of the Great Lakes. *Chemosphere,* 41:1569-7.

Bundelkhand Vikas Nidhi 1990-91.

Forrester DJ (1991) The ecology and epizootiology of avian pox and malaria in wild turkeys. *Bull. Soc. Vector Ecol*., 16:127-148.

Greenwood A (1977) The role of diseases in the ecology of British raptors. *Bird Study*, 24: 259-265

Greiner EC and Mundy PJ (1979) Hematozoa from southern African vultures, with a description of *Haemoproteus janovyi* sp.n. *The Journal of Parasitology,* 65:147-153.

Indian Council of Agricultural Research Nagpur (1981) Land Use Plan for Development of Bundelkhand Region Based on Land and Soil Resources Survey, National Bureau of Soil Survey and Land Use Planning.

Keymer IF (1972) Diseases of birds of Prey. Zoological Society of London, Regent‟s Park, London, *N.W.1 Vet. Rec*. 90: 579-594

Kroneand O and Cooper JE (2002) Parasitic diseases in Birds of Prey: Health and Diseases, J. E. Cooper, Ed., Blackwell Science, Oxford, UK, 3rd edition, pp. 105-120.

Lacina D and Bird D (2000) Endoparasites of raptors: a review and an update, in Raptor Biomedicine III, J. T. Lumeij, D.Remple, P.T.Redig, M.Lierz, and J.E.Cooper,Eds., Zoological Education Network, Lake Worth, Fla, USA, pp: 65-99.Bundelkhand MP and Development Authority, April 2007

Olsenand GH and Orosz SE (2000) Manual of Avian Medicine,Mosby, Inc., St. Louis, Miss, USA.

Ricklefs RE (1992) Embryonic development period and the prevalence of avian blood parasites. *Proceedings of the National Academy of Sciences,* 89:4722-4725.

Rupley E (1997) Manual of Avian Practice, W.B. Saunders, Philadelphia, Pa, USA.

Smith SA (1993) Diagnosis and treatment of Helrninths in birds of prey. In: Raptor Biomedicine. (Redig, P.T., Cooper, LE., Remp1e, J.D., Hunter, D.B. Eds.). University of Minnesota Press, Minneapolis, pp 21-27.

Saxena SK (1967) Studies on Cestodes of the common Indian vulture, *Neophron percnopterus* (Linn.) IV. On *Neophronia melanotus* sp. Nov. *Sonderdruck aus Zoologischer Anzeiger* 181;146-152.

Jairajpuri DS and Siddiqi AH (1970a) *Porrocaecum inconstantia* n. sp. (Nematoda: Toxocaridae) from the vulture, *Gyps bengalensis*. *Indian Journal of Helminthology*, 22; 93-96.