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SOME ASPECTS OF BREEDING BIOLOGY OF THE WHITE-BACKED VULTURE *GYPS BENGALENSIS* NILAGIRI NORTH FOREST DIVISION IN WESTERN GHATS, TAMIL NADU

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ABSTRACT
Vultures are an important component of the forest ecosystem performing the role of scavengers which consume dead and decaying animal carcasses, thereby keeping the environment clean and healthy. Nine species of vulture are recorded in India. Of the total of four species of vultures recorded during our study period of 2010-2012. There are two breeding colonies of the White-backed vulture recorded in Nilagiri Reserve Biosphere, Western Ghats. Vultures utilized *Terminalia arjuna* tree for nesting and roosting. The occurrence of the vultures in the study area is due to the prey predator availability and Savannah type of forest helping vultures for easily locating their prey.

KEY WORDS: Status, Indian White-backed vulture, Nest preference, Breeding biology, Savannah type Forest, Western Ghats.

INTRODUCTION

Vultures are avian scavengers that play an important role in keeping clean the environment from dead animals. Nine species of vultures have been recorded in the Indian sub-continent, of which five belong to the genus *Gyps* (Prakash *et al*., 2003). In mid-nineties the population crash of the Gyps species was noticed in Keoladeo National Park (Prakash, 1999). Three species of vultures endemic to South Asia are in grave danger of extinction and are now listed as critically endangered (IUCN, 2004). Mass mortality was observed in Punjab province Pakistan; results indicated uric acid deposition in their kidneys due to anti-inflammatory drug called "Diclofenac" (Oaks *et al.,* 2004). During postmortem examination, the similar symptoms were noticed in Indian Gyps vultures also (Green *et al.*, 2004). The nation-wide repeated survey (1992 -2007) was conducted by Bombay Natural History Society throughout the India. The survey result showed that population decline of the species were white-backed vulture 99.9 %, Long-billed vulture, *Gyps indicus* and Slender-billed vulture, *Gyps tenuirostric* 96.8 % (Prakash *et al.*, 2007).

In Segur plateau of the Western Ghats four species of vultures have been recorded, They are two Gyps species recorded namely White-backed vulture (*Gyps bengalensis),* Long-billed (*Gyps indicus*) and two non gyps species Red-headed vulture (*Sarcogyps calvus*) and Egyptian vulture *(Neophron percnopterus)*. *Gyps* vultures breed colonial or semi colonial, and nests on trees, fort walls and rocky cliffs (Ali & Ripley, 1983). Most of the studies on the breeding biology of raptors in India are based on the data collected by egg collectors (Baker 1928). In India there are abundant, but in some ways inadequate data, on the nest and eggs since 1945, there have been few details published about the breeding biology of the Indian raptors (Brown, 1976 and Prakash, 1988). Basic information on the breeding biology of the raptors is available in Indian Subcontinent (Ali and Ripley, 1983).

Recently some aspects of breeding biology of *Milvus migrans govinda* (Dasal and Malhotra 1985), *Pernis ptilorhyncus*, *Spizaetus cirrhatus* and *Spilornis cheela* (Naoroji and Monga 1983, Naoroji, 1985) have been worked out. In India detailed breeding biology of the raptors, namely *Aquila pomarina* and *Haliaeetus leucoryphus* and some aspect of breeding biology of *Elanus caeruleus*, *Pernis ptilorhyncus* and *Aquila clanga* studied in Keoladeo National Park, Bharatpur (Prakash1988). Similarly, the white-backed vulture, *Gyps africanus*, and Ruppells griffon, *Gyps ruppellii* some breeding aspects studied in Serengeti National Park (Houston, 1976).

The role of captive breeding in raptor conservation has only recently been realised, and since 1970's main hope in some regions of saving the Peregrine. So, far 30 species of diurnal raptors, from small falcons to large vultures, have produced young in captivity (Ian Newton, 1979). However, the detailed breeding biology of the White-backed vulture in Western Ghats is lacking. Hence, the present breeding information (2010-2012) collected at Segur plateau in Western Ghats, Tamil Nadu to understand their some aspects of breeding behaviour.

MATERIALS & METHODS

Study area

Segur plateau is located in Nilagiri District the total area 448.3km^2 (11°31'3'' N76°47'16''E) and the elevation 900m located adjoining the Bandipur National Park to the Northwest, Wayanad Wildlife Sanctuary to the west and Sathyamangalam Wildlife Sanctuary and the Nilgiri East ranges to the East the north side of the plateau is defined by the Moyar river and the 260 meters deep moyar Gorge. South of the Segur plateau is the higher Nilgiri plateau.

The average rainfall receiving less than 500 mm annually, while the east part receives more than 1000mm of the rainfall. The five major streams, the Moyar river, the Segur river, the Avarahalla river, the Kedarhalla river and the Gundattihalla river flow through the Segur plateau which originates from the Nilgiri Plateau.

METHODOLOGY

Incubation Period

The incubation period is strictly defined as the time which, with regular uninterrupted incubation, elapses from the laying of the last egg in a clutch to the hatching of that egg (Capbell and Lack 1985). The incubation period was usually as described above, during the present study. If the exact laying date or hatching date could not be obtained then the incubation period was estimated by extrapolating with the help of the incubation period recorded elsewhere.

Nestling period:

The period between the hatching and the leaving of the nest by the young is termed the nestling period. The nestling period was also estimated in case when the hatching date or nest leaving the young was unknown, by extrapolating with the help of recorded nestling period elsewhere and also by the fact that incubation and nestling periods are correlated (Newton, 1979).

Fledgling Period

The period between the time the nestlings leave the nest to the time they became independent. The fledgling period is given only when it was recorded.

Breeding Season

The start of the breeding season is described by taking the mean date of laying of the first egg as has been described by Campbell and Lack (1985). The termination of the breeding season was taken when the young leave the nest. The breeding season was estimated, if the laying dates were not known, by extrapolating from incubation dates, or from the age of nestlings as has been done elsewhere (Campbell and Lack 1985).

Breeding Success

a) Hatching Success

It denotes the percentage of eggs successfully hatched

b) Nestling Success

It denotes the percentage of nestling successfully fledges.

c) Nesting Success

It denotes the percentage of eggs which produces successful fledglings.

Body maintenance Activities

Body maintenance activity which includes preening, wing display, sunning, head scratching, feather stretching and wingover leg exercise.

RESULT & DISCUSSION

The White- backed vulture normally breeds in large trees like *Ficus bengalensis, Ficus religiosa, Mangifera indica, Dalbergia sissoo and Terminalia arjuna etc.* (Ali and Ripley, 1983). However, the white-backed vultures preferred strongest and tallest *Terminalia arjuna* tree species in the study area because the strongest hold of Asiatic Elephant population. The average height of the tree is 35.7m, GBH 555.8 m and distance of tree nest 3m were recorded. According to Ali and Ripley 1983 dependence of vulture species on water body is recorded. This may be maintaining humidity is an important role for hatching of the egg (Jemima parry Jones, 2003). The vulture nest distributed of segur platea in Moyar riparian habitat (Fig.1.).

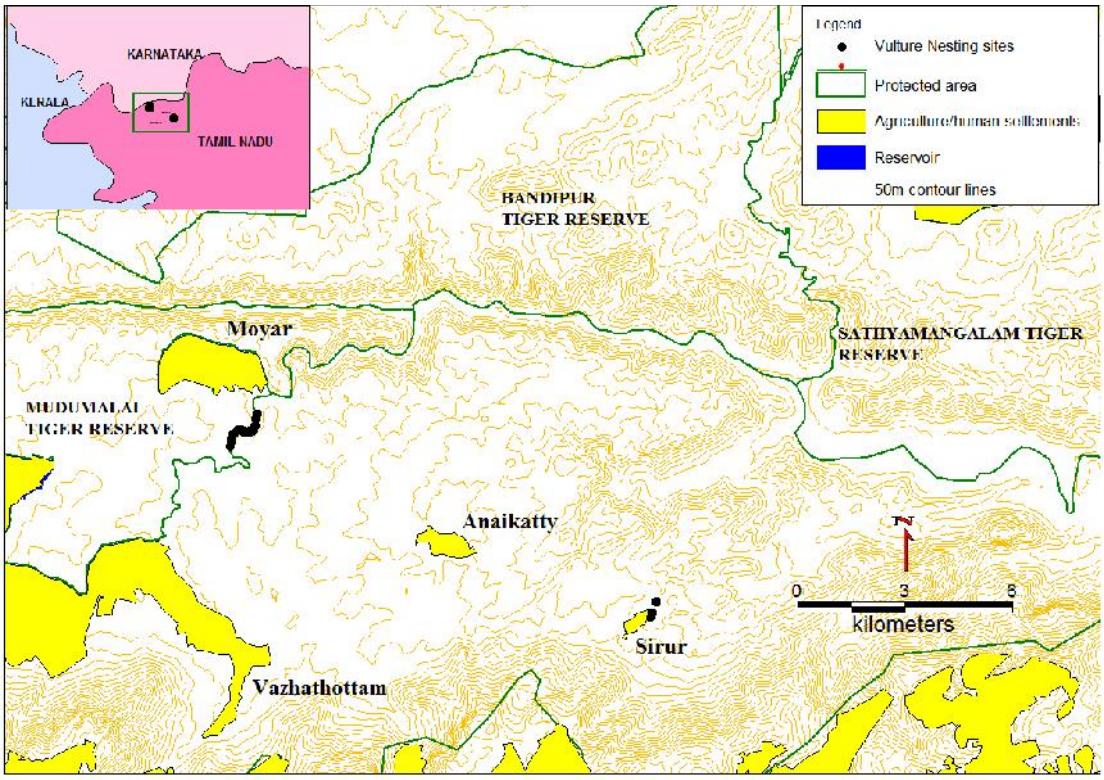

FIGURE 1. White-backed vulture nest distribution in Segur, Western Ghats

All the nest were found on *Terminalia arjuna* (N=51) and *Mangifera indica* trees (N=1). A total maximum of 6 nests of white-backed vulture recorded on a *Terminalia arjuna* tree. Pair formation is main behaviour of the initiation of the breeding. During pair formation both sexes flew together, while flying giving shadow for each others, always sat together and roosts at night. The coitus was completed minimum 28 seconds (N=4) and maximum 38 seconds (N=16) respectively.

The male vultures used to pick nest material place on a nest and shown to the partner nest digging display noticed. Vultures are sexually monogamous. During nesting period both the parents shared nest building and incubation. The female white backed vulture is more involved incubation than male. Two types of incubation were noticed, while standing on the nest and gave shading to nest during high temperature. At the time of incubation both the partners are helped for preening each other this could be to strengthen the pair bond in *Aquila* species (Prakash, 1988) the similar behaviour observed in *Gyps bengalensis*.

Shading of eggs perhaps help in controlling the egg temperature by shielding them against sun and at the same time allowing any draft of air to cool them as much as possible as its reported in other birds also (Elkin,1983). A clutch of one egg has been previously recorded in India for White-backed vulture (Ali and Ripley, 1983) and a clutch of two eggs (Prakash, 1988). If the first egg breaks the second egg was laid within the shortest time period. During winter season morning and evening hours tightly incubated. Average incubation period of white-backed vulture was 57days. After hatching for brooding female most of the time spent for raising the nestling than the male. However, feeding male regurgitated more food than the female (Fig.2). It was done in all the three postures namely, lie, sit and stand. Similar behaviour also observed in *Aquila* raptor species (Prakash, 1988). Breeding season extends from October to June. The spread in laying dates was considerable. During 2010-2012, most of the birds laid between the first weeks of the November. The nestling success is 70% was recorded. The main threats to study area are Para- veterinarians using available 30 ml human diclofenac to their free ranging cattle. In Sriyur vulture breeding colonies found in nearby human settlements and yearly once Sriyur Amman temple festival celebrated during peak breeding season this may be main threats to the breeding colony. Similarly, Common langur and roost in the same breeding trees even though we didn't came across any harm for vultures as well as their nestlings. The Segur Plateau holding last strongest population of the White-backed vultures due to the prey and predator availability.

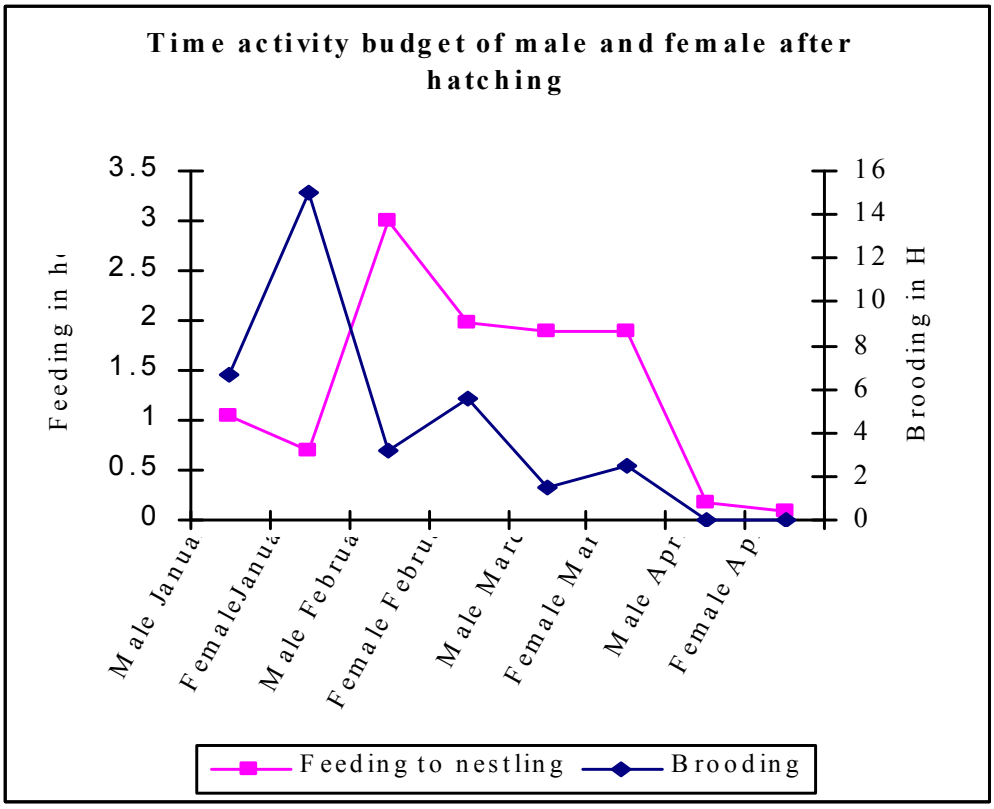

FIGURE 2. Monthly average time spent for male and female white-backed vulture raising the nestling

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