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SHORT COMMUNICATION

NEW BREEDING AND ROOSTING LOCALITIES OF THE CRITICALLY ENDANGERED WHITE-RUMPED VULTURE *GYPS BENGALENSIS* (GMELIN, 1788) IN RAISEN DISTRICT, MADHYA PRADESH, INDIA

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ABSTRACT

The present study aimed to report and provids an account of the population status, nesting behavior, and conservation threats faced by the Critically Endangered white-rumped Vultures-*Gyps bengalensis* (Gmelin, 1788) (Aves, Accipitriformes, Accipitridae) in Baairukhhar village, Raisen District, Madhya Pradesh, India in the month of April 2023. In the current study, the nesting and roosting sites were systematically surveyed, and a total population of 98 to 102 white-rumped vultures were recorded. For roosting purposes, the white-rumped vultures preferred high-canopy trees, including sacred fig *Ficus religiosa* L., 1753 and Teak-*Tectona grandis* L. f., 1782 in the area. A total of 12 nests of white-rumped vultures were observed, all of which were located on high canopy *F. religiosa* trees with an 800 meter radius within and around the Baairukhhar Village outskirts. The presence of this critically endangered species in an anthropocentric area could have adverse effects on their breeding success and lead to a decline in the population within the landscape.

Keywords: Conservation, Old World vultures, Raisen, Range extension, White-rumped.

INTRODUCTION

Vultures are social birds that exhibit various behaviors such as roosting, soaring, and feeding together in flocks (Yadav and Kanaujia, 2023). Vultures generally roost on mature trees, cliffs, monuments, and ground during the morning and evening hours. Vultures roost in open landscapes that are exposed to sunlight to warm up, and maintain their plumage. For breeding and nesting purposes, vultures also choose mature trees, cliffs, and monuments (Jha *et al*., 2020; Yadav and Kanauja, 2023). The white-rumped Vulture *Gyps bengalensis* (Gmelin, 1788) build its nest on tall trees. Several factors influence their choice of roosting

and nesting sites, including the duration of sunlight, the vultures' orientation towards the sun while sitting, the availability of food sources, tree height, tree condition, branching pattern, and the presence of nearby water bodies (Beauchamp, 1999; Ahmad *et al*., 2020; Yadav and Kanaujia, 2023).

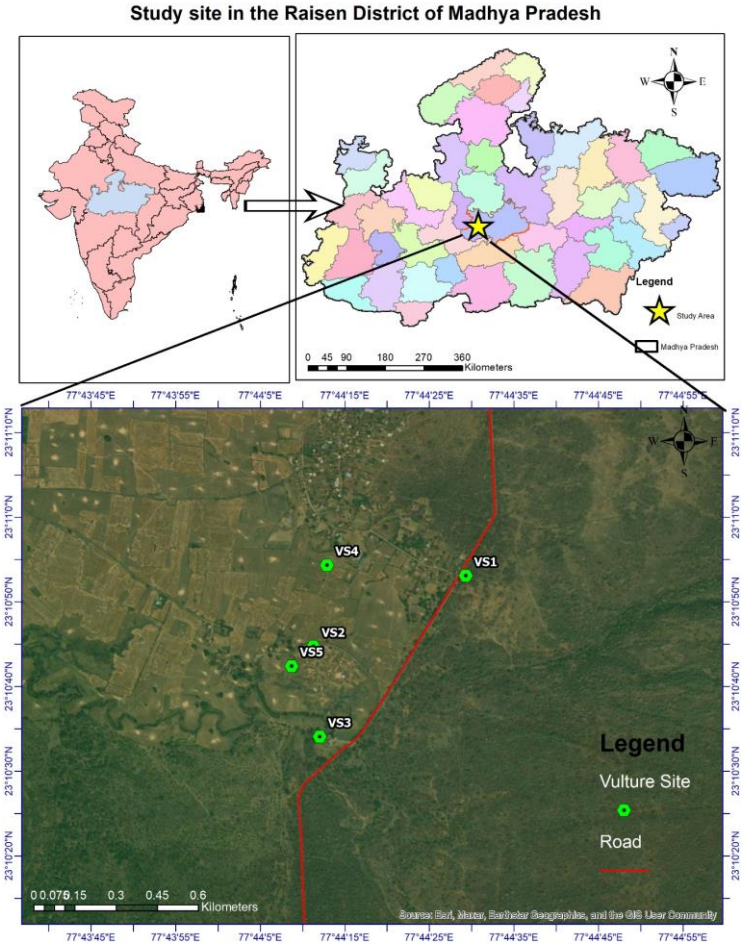
Globally, there are 23 vulture species, and the Indian sub-continent is a home to nine of them (Prakash 1999; Navaneethan *et al*., 2015), they are viz.: Bearded Vulture *Gypaetus barbatus* (Linnaeus, 1758) (NT); Cinereous Vulture *Aegypius monachus* (Linnaeus, 1766) (NT); Egyptian Vulture *Neophron percnopterus* (Linnaeus, 1758) (EN); Himalayan Griffon-*Gyps himalayensis* Hume, 1869 (NT); Indian Griffon Vulture *Gyps fulvus* (Hablitz, 1783) (LC); Long-billed Vulture *Gyps indicus* (Scopoil, 1786) (CR); Red-headed Vulture *Sarcogyps calvus* (Scopoil, 1786) (CR); Slender-billed Vulture *Gyps tenuirostris* Grey, 1844 (CR); White-rumped Vulture *Gyps bengalensis* (Gmelin, JF, 1788) (CR) (Jha, 2015; Vaidyanathan, 2021; Gill *et al*., 2023). [Note: IUCN Red List Categories: LC-Least Concern; NT-Near Threatened; EN-Endangered; CR-Critically Endangered].

Various regions in India support vulture populations, with the state of Madhya Pradesh being supportive of a high number of vulture locations, species, and individuals in India (Jha, 2018; Jha and Jha, 2020). Out of nine vulture species found in India, Madhya Pradesh houses six resident species and two migratory species. The species reported from Madhya Pradesh are Egyptian Vulture, Cinereous Vulture, Red-headed Vulture, Indian Vulture, White-rumped vulture, Slender-billed Vulture, Griffon Vulture and Himalayan Griffon (Gurjar *et al*., 2011; Navaneethan *et al*., 2015; Yadav *et al*., 2018; Yadav and Kanaujia, 2023).The populations of *Gyps* vultures in the Indian subcontinent have experienced a severe decline over the past decade, with current numbers estimated to be less than 5% of their original number for various vulture species (Prakash *et al*., 2003; Navaneethan *et al*., 2015). The main reason for the population decline is the nonsteroidal anti-inflammatory veterinary drug diclofenac. Some secondary threats, like collisions with power lines and habitat destruction, are also the cause of the decline of vulture populations. Previously, the white-rumped Vulture was abundant in southern and south-eastern Asia have declined rapidly since 1990 across the Indian subcontinent. The species is now classified as critically endangered by the IUCN Red List (Samson and Ramkrishanan, 2020; BirdLife International, 2023).

Vultures hold a significant ecological role as they contribute to the ecosystem by scavenging deceased and decaying animals, thereby aiding in environmental cleanliness. The drastic reduction in vulture populations within India has had repercussions on the management of livestock carcasses and has led to a rise in human-linked diseases such as rabies (Samson and Ramkrishanan, 2020).

Study area: The Central Indian state of Madhya Pradesh (MP) is covering an area of 3, 08,252 Km^2, lies within the tropical and subtropical climate zone between $22^0$6'- $26^0$30' N and $74^0$00'- 82^0 51' E. The average annual rainfall is about 1370 mm, which gradually decreases from east to west MP. The forests mostly belong to tropical dry deciduous and moist deciduous types. Raisen District lies in the central MP. The district is situated between

latitudes 22^0 47′ and 23^0 33′ N and $77^0$21′ and 78^0 49′ E (Map 1). The present study focuses on Barrukhaar Village (23°11'02"N 77°44'16"E) situated within the Chicklod forest range of the Obedullahganj Forest Division in the Raisen District. Barrukhar village is encircled by forests on three sides, while one side borders agricultural fields, which are mainly paddy fields with trees.



Map (1): Map of the study area pinned with white-rumped vulture roosting and nesting sites New Vulture location report.

Process of data collection: A rapid ornithological survey was conducted to assess the roosting and breeding populations of vultures in the study area. At first, opportunistic sightings of vultures were recorded during the field survey. Later, a systematic data collection was done from 7 April to 15 April 2023. The population size of white-rumped vultures was estimated by direct counting of the individuals observed in the roosting and nesting locations

during the early morning (06.00–09.00 a.m.) and late evening (05.00 –07.00 p.m.). The observations were recorded on alternate days morning, and evening for 8 days by two researchers. A total of 40 man-hours have been used for observation and data collection. The morning observations start with the counting of vultures on the rousing site, followed by nest observation and other relevant data collection. All observations were done using binoculars (Olympus 10x50S) from a distance ranging between 100–300 m. The data were documented through photographs captured using a Nikon D5600 camera with 70-300mm lens, and the coordinates of roost sites were logged using GPS devices. The roost and nesting site map was created by utilizing Google Earth Pro and Q-gis 3.16.

Notes and field information

The village of Barrukhaar is surrounded by a reserve forest on three sides. The area from Barrukhaar to Chiklod Kalah, the landscape is plain with moderately dense forest (Map 1). The forest area is dominated by Teak *Tectona grandis*, and there are also some other significant tree species, such as Saaj *Terminalia elliptica*, and Tendu *Diospyros melanoxylon*. On the other hand, the area between Barrukhaar and Raisen has hilly topography and is open to moderately dense forest in the area. Doodhi (*Wrightia tinctoria*) and Bhirra (*Chloroxylon swietenia*) are the predominant trees. Other important tree species found in the area are Dhavda (*Terminalia elliptica*), Mahua (*Madhuca indica*), Saaj (*Terminalia elliptica*), Tendu (*Diospyros melanoxylon*), etc. The village is present in a transitional zone between two types of forest (Map 1). The village has three species of tall trees, i.e. Sacred fig *Ficus religiosa*, Teak *Tectona grandis*, and Mango *Mangifera indica*.

The present study documented an estimated overall population of white-rumped vultures ranging between 98 and 102 individuals within the study area. All the night roosting and nesting activity was observed in the high canopy trees of Sacred fig *Ficus religiosa* and Teak-*Tectona grandis* (Pl. 1). A total of 12 nests were observed in the study area. All the nests are documented on the Sacred Fig tree (Pl. 2). All 12 nests are active, with 5 nests feeding and nesting with the young one, and the rest 7 nests show regular movement of the vulture. In the current study, the Sacred fig tree has been documented as the tree of choice for white-rumped vultures in the study area when it comes to building their nests. This occurrence could possibly be attributed to the fact that these two tree species were predominantly observed as the tallest ones (more than 23 m) with a wide canopy and were situated in open spaces, likely receiving direct morning sunlight. Similarly, many tree species were preferred by white-rumped vultures for building nest across India and Bangladesh. According to Jha *et al.* (2020), there are 43 tree species used by vultures for roosting, and 29 tree species with a comparatively shorter height were not used for nesting, indicating a preference for taller trees. *Ficus religiosa* (Sacred fig) and *Boswellia serrata* (Indian frankincense) are the most preferred tree species for nesting and roosting of white-rumped vultures.

Plate (1): Nesting and roosting site of white-rumped vulture on Sacred fig *Ficus religiosa*.

Plate (2): Nests of whie rumped vulture on sacred fig *F. religiosa*.

Plate (3): Morning basking behavior *F. religiosa*.

Plate (4): Night roosting on *F.s religiosa*.

The present study recorded nests of white-rumped vulture on trees between 15-24 m above the ground level in the study area. All the vulture nests were restricted to the high canopy trees only. Out of the total nests of the white-rumped vulture were recorded with an 800 m radius of the village, of which six nests are inside the village, and three nests are inside the agricultural field nearby, and three nests are in the road side area near the village. One of the nests inside the village is disturbed due to earthen brickwork. One sacred fig inside the earthen brickwork area is pruned, due to which there is only night roosting observed (Pl. 4). In India, the sacred fig is one of the religious trees that is unharmed due to religious belief

(Wani *et al*., 2020). Based on our field observations, the white-rumped vulture species exhibits a preference for such areas for both roosting and breeding activities. However, in cases where there is a scarcity of high canopy trees, the population might either disperse or experience a decline in breeding success. The conservation efforts for the white-rumped vulture in India involve strict protection under the Indian Wildlife Protection Act of 1972, with the species listed in Schedule I. The ban on the veterinary use of diclofenac has been a crucial step, alongside the initiation of a conservation breeding program led by the Bombay Natural History Society (BNHS).

The present study reports a new site of breeding of the white-rumped vulture, which could be helpful for future conservation and management. The presence of critically endangered species in the village area of the village may lead to many types of conflict that may lead to a decrease in breeding success and population decline in the landscape. A proper management approach combined with the preservation of large trees close to the village can aid in the preservation and growth of the species. Any suitable habitat that is still present must be protected as part of vulture conservation. Governmental initiatives and local cooperation can accomplish the conservation of the vulture habitat.

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CONFLICT OF INTEREST STATEMENT

The authors declare no conflict of interest related to the work in the manuscript. We "the authors" have followed and signed the scientific research ethics announced by the journal.

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مواقع جديدة للتكاثر و تجمع للنسر أبيض الظهر *Gyps bengalensis* (Gmelin,1788) المهدد بالانقراض في منطقة رايسين، ماديا براديش، الهند

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الخلاصة

هدفت الدراسة الحالية إلى بيان حالة السكان وسلوك التعشيش والتهديدات التي تواجهها النسور (بيضاء الظهر) المهددة بالانقراض (Aves, Accipitriformes, Gmelin, 1788) (Accipitridae في قرية بايروكخار، منطقة رايسين، ماديا براديش، الهند في شهر أبريل 2023.

في هذه الدراسة ، تم مسح مواقع التعشيش والتواجد بشكل مدروس وممنهج، وتم تسجيل إجمالي عدد يتراوح بين 98 إلى 102 من النسور بيضاء الظهر. فضلت النسور البيضاء الظهر الأشجار ذات القمة العالية؛ لأغراض التجمع والتكاثر ولا سيما أشجار التين *Ficus religiosa* L., 1753 وأشجار الساج *Tectona* grandis L. f., 1782 في المنطقة، و تمت ملاحظة اعشاش النسور (بيضاء الظهر) التي بلغت ١٢عشاً، والتي تقع جميعها على أشجار عالية من نوع *F. religiosa* ضمن مساحة دائرية بلغ نصف قطرها 800 متر داخل وحول ضواحي قرية بايروكخار. ولوحظ إن وجود هذه الأنواع المهددة بالانقراض بكثرة في منطقة ذات كثافة سكانية عالية، مما يجعل له آثار سلبية على نجاح تكاثرها ويؤدي إلى انخفاض عددها داخل المناظر الطبيعية.