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Status of Red-headed Vulture (*Sarcogyps calvus*) in Bundelkhand Region, India

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Abstract: Vultures are excellent indicators of environmental health and as carrion feeders play an important ecological role. They are the only known vertebrate obligate scavengers. Nine different species of old world vultures are found in India. Red-headed Vulture (RHV) is one of the resident vulture species and is found throughout the country up to 2000 m elevation. This study was carried out in two states of India, Uttar Pradesh and Madhya Pradesh known as Bundelkhand. The grids of 15x15 sq km and random points were laid over the study area. Transects of 10 km were conducted in all the selected grids. As a result, 46, 54 and 74 vultures were recorded from 2017 to 2019, respectively. There was a continuous rise in the RHV population during the study period, which is a good sign for the species. Along with other vulture species, RHV is also facing serious threats. Biotic and abiotic threats such as habitat loss, predation, hunting and disturbance, scarcity of food and water, change in land use and agricultural practices, poisoning and, mortality in road accidents while feeding. The population trend is showing positive signs but only regular monitoring and conservation activities will help in saving the species.

Keywords: Environmental, Obligate, Scavengers, Biotic, Abiotic, Vulture

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Introduction

Vultures play an important role in the environment as a scavenger. They seem unfriendly but facilitate our ecosystems frequently by cleaning up dead bodies of animals and birds. They protect our environment from several diseases which may spread from the microbes growing on those dead bodies. They are the only known vertebrate obligate scavengers. Obligate scavengers are those who solely depend on carrion for food. Vultures had evolved physiological mechanism that allows them to cut back their high metabolic rate by resting at their roost. Nine different species of old world vultures are found in India (Ali and Ripley, 1987) i.e. Red-headed Vulture (*Sarcogyps calvus*), Cinereous Vulture (*Aegypius monachus*), Griffon Vulture or Eurasian Griffon (*Gyps fulvus*), Himalayan Griffon (*Gyps himalayensis*), Long-billed Vulture (*Gyps*

indicus), Slender-billed Vulture (*Gyps tenurostris*), White-rumped Vulture (*Gyps bengalensis*), Bearded vulture (*Gypaetus barbatus*) and Egyptian vulture (*Neophron percnopterus*) (Ali and Ripley, 1995; Gadhvi and Dodia, 2006; Birdlife International, 2007).

The Red-headed Vulture (RHV) is a resident species found throughout the Indian subcontinent and can be spotted up to an altitude of 2000 m in the Himalayas. As per the literature, it was never abundant and was always sparsely distributed throughout the country. Its habitat mainly comprises open country, cultivated and semi-desert areas, deciduous forests, foothills and river valleys. Morphologically RHV are very distinct (Fig. 1) with redhead and legs and two broad red skin folds on the neck called lappets. They are medium-sized vultures but possess an impressive wingspan of over 2 m and juveniles having dark eyes and more mottled dark brown plumage (Ali, 1993).There is no morphological difference between males and females (Naoroji, 2006) except that males have white iris while females have dark brown (Ali, 1993).

The aim of this study was to unearth the status of one of the least known species of Asian vultures. RHV's are in dire need of conservation. Baseline information collected through this study will help in conserving and monitoring the species.

Fig. 1: Red-headed Vulture in flight

Materials and Methods

Study Area:

The study was carried out in two states of India, Uttar Pradesh (U.P.) and Madhya Pradesh (M.P.) known as Bundelkhand (Fig. 2). Bundelkhand anciently known as Chedi Kingdom (Bundeli) got its name from Bundela Rajputs until the 16th century, during the rule of Chandel Rajputs later on by Bundela Rajputs, is a geographic region of central India. It lies between 23°35′-26′ N and 78°-82′ E. It has an area of around 70,000 sq km. It traverses across the administrative boundaries of 13 districts. Seven districts like Jhansi, Jalaun, Lalitpur, Hamirpur, Mahoba, Banda, and Chitrakoot are of U.P, while six districts such as Datia, Tikamgarh, Chhatarpur, Damoh, Panna and Sagar are from M.P. Major rivers that run through the area are Yamuna, Ken, Betwa and Dhasan.

The grids of 15x15 sq km were laid over the study area and random points were generated through ArcGIS software (Fig. 3). The grids with random points were selected for the survey. If the presence of species was found in the grid then the adjacent grids were also surveyed for species presence. All the sites with species presence were surveyed and several factors like GPS location, timing, temperature etc. were recorded. Other than this, help was taken from local people and forest staff to get first-hand information about any sighting of the species.

Based on local information and the existing knowledge of the study team, careful observations of potential vulture nesting habitat were made. Nesting vultures were thoroughly searched for by scanning potential cliffs and nesting trees in open areas. If a nest was observed, the careful examination of it was done using binoculars for the correct identification of species, the number of individuals and status (nesting/roosting/ perching). Also, we kept a sufficient distance from the nesting spot. Transects of 10 km were done in all the selected grids for locating nesting, roosting and feeding sites. Transects were done mostly by vehicle wherever possible based on terrain and availability.

Results

Vultures are found in almost all the habitat s like the desert, semi-desert, open areas, plains, forest,

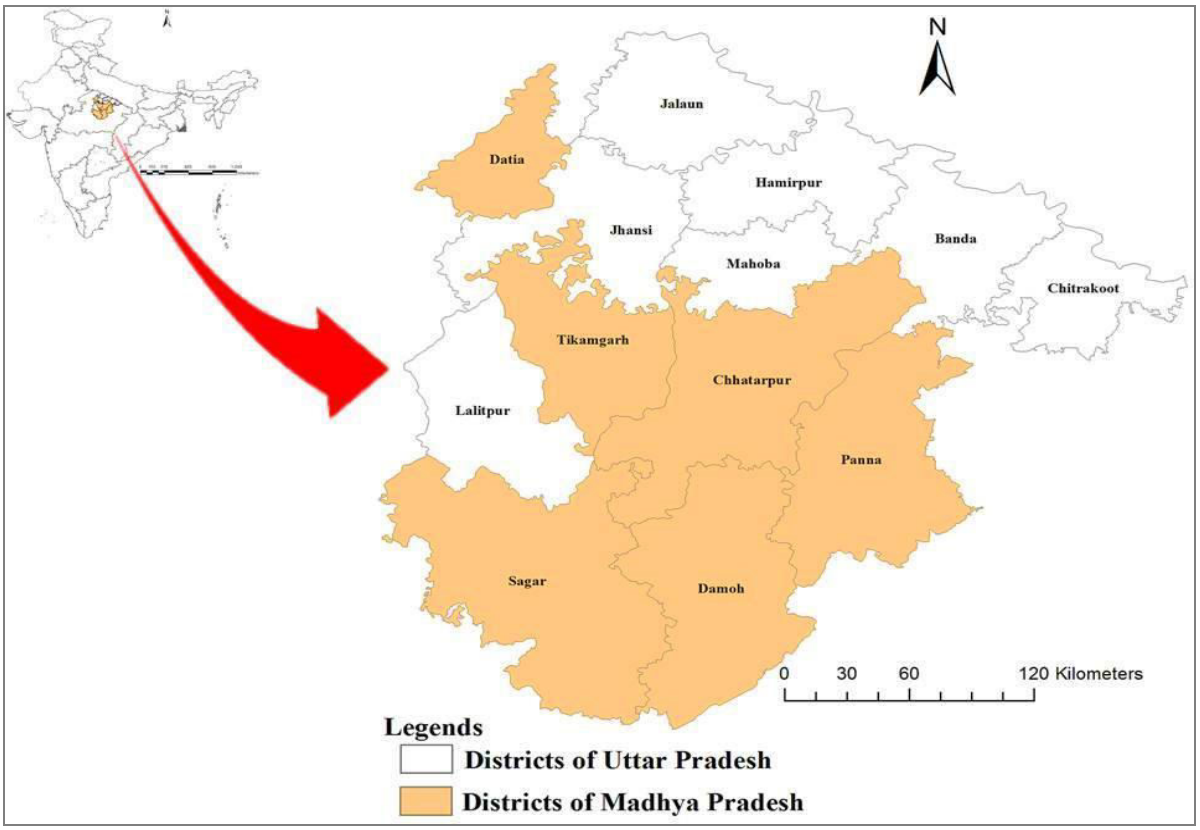

Fig. 2: Map of Study Area: Bundelkhand

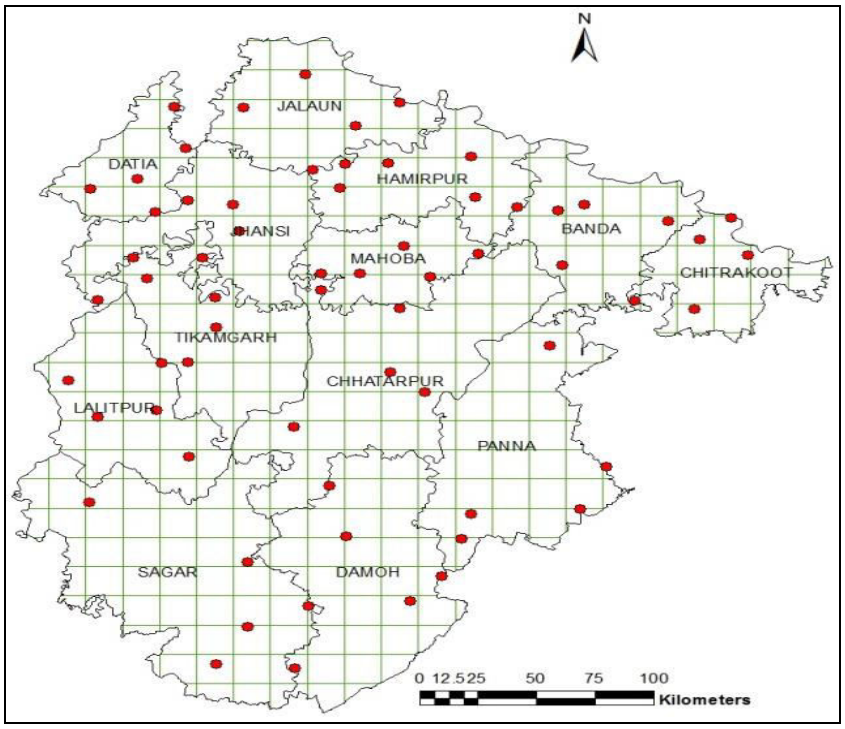

Fig. 3: Map showing random points generated with grids (15*15 sq km) throughout the study area

mountains, hills and human settlements (old monuments mostly). The results are based on the surveys conducted from 2017 to 2019. The total RHV counts in these three years were 46, 54 and 74, respectively (average 58). Out of these, juveniles were 19.57%, 24.07% and 27.03% in respective years. Out of 13, only 8 (3 of U.P and 5 of M.P.) districts reported the RHV throughout the study period. In 2017, Damoh had the maximum RHV sighting i.e. 20 (17 adults and 3 juveniles) and Tikamgarh had 4 (3 adults and 1 juvenile) (Table 1; Fig. 4).

Table 1: Status of RHV in 2017

Division	Adult	Juvenile
Chhatarpur	6	1
Damoh	17	3
Sagar	11	4
Tikamgarh	3	1
Total	**37**	**9**

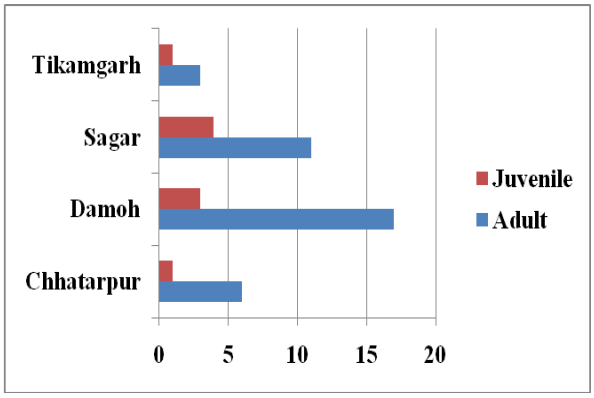

Fig. 4: Bar Chart showing Status of RHV in 2017.

In 2018, Panna (12 adults and 5 juveniles) and Sagar (13 adults and 4 juveniles) have a maximum RHV number with 17 in each. While the Chhatarpur (3 adults and 0 juveniles) and Tikamgarh (1 adult and 2 juveniles) have a minimum sighting of 3 RHV in each district (Table 2; Fig. 5).

Table 2: Status of RHV in 2018

Division	Adult	Juvenile
Chhatarpur	3	0
Damoh	12	2
Panna	12	5
Sagar	13	4
Tikamgarh	1	2
Total	**41**	**13**

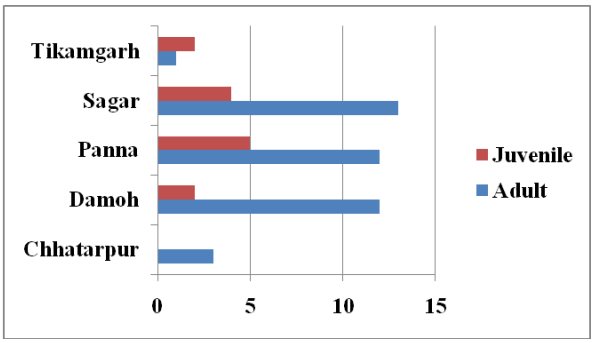

Fig. 5: Bar Chart showing Status of RHV in 2018.

In 2019, the maximum sighting was from Panna (including Panna National Park) i.e. 28 RHV (21 adults and 7 juveniles) and minimum in Jhansi i.e. 1 adult (Table 3; Fig. 6). There is a continuous rise in the RHV population during the study period, which is a good sign for the species and the conservationists.

Table 3: Status of RHV in 2019

Division	Adult	Juvenile
Chhatarpur	4	3
Chitrakoot	5	0
Damoh	12	2
Jhansi	1	0
Lalitpur	1	2
Panna	21	7
Sagar	10	6
Total	**54**	**20**

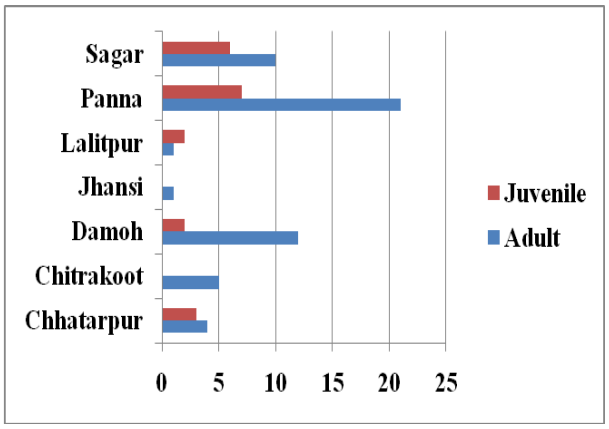

Fig. 6: Bar Chart showing Status of RHV in 2019.

Discussion

The vulture population, especially the Gyps species across the Indian subcontinent has declined drastically since the 1990s (Prakash *et al.*, 2003; Gilbert *et al.*, 2002, 2006).When compared to other vulture species in the study area, RHV is a relatively timid and solitary bird and often found in breeding pairs (Chhangani, 2007; Sinha *et al.*, 2017). The study is fresh and first of its kind on the RHV in Bundelkhand. When compared to other studies on RHV in different parts of the country, the result of status seems promising as the population was stable. Only 8 districts (Chitrakoot, Chhatarpur, Jhansi, Lalitpur, Damoh, Sagar, Tikamgarh, and Panna) reported the RHV population from 2017 to 2019. RHV were never abundant and were always rare to sight. They show territorial behaviour and avoid colonizing with the same species or even other vulture species. The population of RHV has decreased less so far than those of the three south Asian Gyps vultures (Cuthbert *et al.*, 2006).

RHV population in India was declining at a rate of 41% per year in 1999 and 44% per year between 2000 and 2003 (Cuthbert *et al.*, 2006). This resulted in their consideration as a critically endangered species (Birdlife International, 2007).The population result in the current study shows the growing trend and defies the claim of decreasing population trend in previous reports by Prakash *et al.* (2003) and Gilbert *et al.* (2006). The positive trends showing in the current study is the result of efforts and studies made by researchers and conservationists.

Nests were also searched during the survey. According to Postupalsky (1974), an active nest is one in which eggs have been laid, and an occupied nest is one in which eggs have not been laid but some nest-building activity has taken place. In our study most of the RHV populations and nests were observed in and around protected areas. The major protected areas in Bundelkhand are Panna National Park, Orchha Wildlife Sanctuary, and Ken Gharial Wildlife Sanctuary. Vultures mostly prefer lofty and sparsely branched trees for nesting and roosting. Such trees provide safety from predators and a better view of surroundings and an easy take-off (Yamac, 2007; Jha, 2015). This also facilitated nocturnal perches with favourable microclimate by causing temperature inversion (Thompson *et al.*, 1990). It was suggested that some vulture species tended to choose dead trees for roosting (Ceballos and Donazar, 1990) but it was not confirmed in the present study.

Along with other vulture species, RHV is also facing serious threats. A drug named Diclofenac commonly used for cattle in different areas of the country is the major threat to the RHV population. It was the major cause of the high mortality rate in vultures. Diclofenac has the persistent ability to remain inside the dead bodies of cattle if remain untreated. When these are fed upon by vultures then the drug is biomagnified. This biomagnification leads to death due to kidney dysfunction which ultimately leads to kidney failure (Ghalib *et al.*, 2019).The production of veterinary Diclofenac is already banned in Nepal, Pakistan and India since 2006, but still, some illegal production and supply is being maintained in the market (Subedi and DeCandido, 2014).

Conclusion

RHV is facing many biotic and abiotic threats such as habitat loss, predation, hunting and disturbance, scarcity of food and water, change in land use and agricultural practices, poisoning and,

mortality in road accidents while feeding. Therefore rigorous efforts for in situ conservation are needed. A shortage of food and increasing urbanization in the typical habitats of RHV may force the birds to explore new areas. The population trend is showing positive signs but only regular monitoring and conservation activities will help in saving the species.

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