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ORIGINAL ARTICLE

Vultures of Pilibhit Tiger Reserve (PTR), Uttar Pradesh

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ABSTRACT
India had millions of vultures in mid-1980s but sweeping population drops between 1996 and 2007 saw 99% of these vulture populations vanish. Because of such extensive and speedy population declines, all three vulture species were listed as Critically Endangered by the IUCN in 2000. The study on the status of vultures in Pilibhit Tiger Reserve (BRT), was carried out from December 2015 to May 2016 in winter and summer seasons using opportunistic sightings. During study a total 150 individuals belonging to six species were recorded. Long-billed Vultures Gyps indicus (LBV) were more frequently sighted (n=69) followed by Egyptian Vulture Neophron percnopterus), Griffon vulture Gyps fulvus, Cinereous vulture Aegypius monachus, White-backed vulture Gyps bengalensis and Himalayan Griffon Vulture Gyps himalayensis.The study reveals that vulture population in PTR was primarilyreliant on large carnivore carcasses. Consistent monitoring of vulture roosting and feeding, nest sites in the study area is suggested to assess their status and breeding success. As vultures feeding on dumped livestock carcasses nearby villages, use of Diclofenac in the villages in and around the PTR park should be checked as it has caused a large-scale mortality in vultures in various parts of the country.
Keywords: *Pilibhit Tiger Reserve, Population, Carcasses, Status of vultures.*

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INTRODUCTION

India had millions of vultures in mid-1980s but sweeping population drops between 1996 and 2007 saw 99% of these vulture populations vanish. Because of such extensive and speedy population declines, all three vulture species were listed as Critically Endangered by the IUCN in 2000. Above the next decade, confirmed very large declines (>96%) of three *Gyps* vulture species in India. Similar rapid declines were documented in Pakistan and Nepal [9]. Added current declines in Egyptian Vulture (*Neophron percnopterus*) and Red-headed Vulture (*Sarcogyps calvus*) have also been documented throughout India [3, 7].

Several workers state that reason for the decline appears to be the use of the veterinary drug Diclofenac for giving cattle [20] and remaining to food shortages and loss of habitat. The studies have been carried out on vulture species across various parts of India [10, 20, 17, 24, 25, 23, 11, 12, 16, 2]. This paper defines the study of vultures in Pilibhit Tiger Reserve, Uttar Pradesh from December 2015 to May 2016.

STUDY AREA

The study on the status of vultures in Pilibhit Tiger Reserve (BRT), was carried out from December 2015 to May 2016. Pilibhit Forest Division covers an area of 712.88 km2 and is situated between 28º52'-28º46' N Latitude and 79º55'-82º15' E Longitude in the foothills of Himalaya adjoining Shukla Phanta Wildlife Reserve, Nepal (Fig.1). Pilibhit forest division is managed under five forest ranges namely Barahi, Haripur, Deoria, Mala and Mahof, which comprises of 52 Forest Beats. This division is very important for long term conservation of wildlife in the Terai Arc Landscape (TAL) owing to its contiguity with the terai-bhabar forests of Surai range of Terai East Forest Division in the north-west and with the Kishanpur

Wildlife Sanctuary in the south-east.This division also provides connectivity to the Shukla Phanta Wildlife Reserve with Kishanpur Wildlife Sanctuary in India through Lagga-Bagga forest block, Tatarganj area of North Kheri Forest Division and across Sharda river, Haripur range of Pilibhit Forest Division. Lower water table and swampy areas are peculiar features of terai.

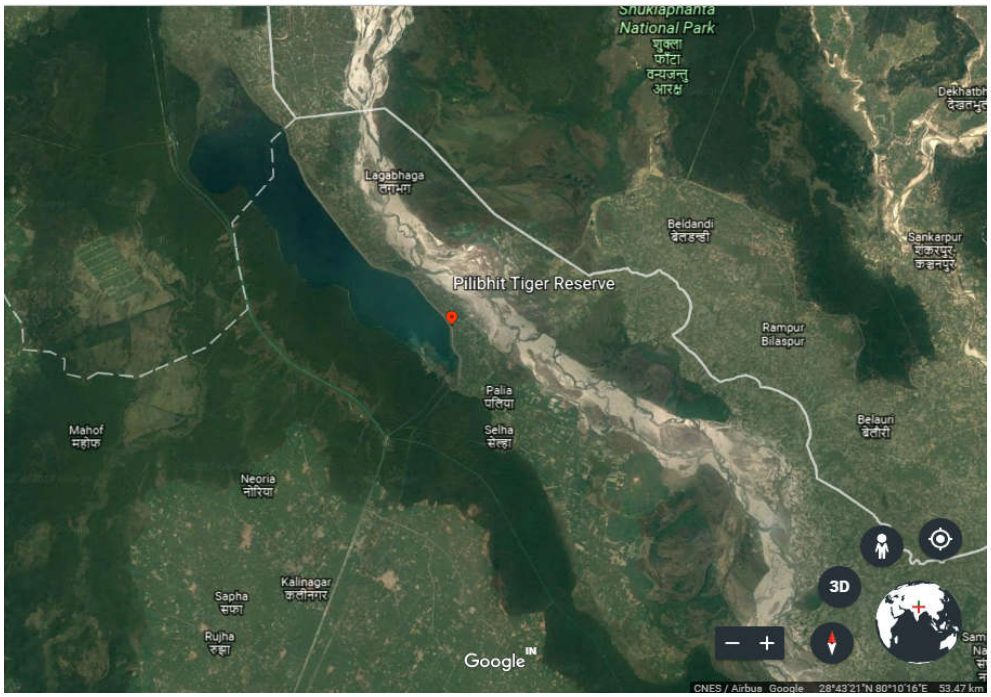

Fig.1: Map of Study Area (PTR)

MATERIALS AND METHODS

Opportunistic sightings of vultures were recorded in the Pilibhit Tiger Reserve (PTR) from December 2015 to May 2016, On each sighting of vulture(s), species composition, activities and major habitat type were recorded. The observations were made with the help of a pair of Bushnell binoculars (8x42) and 70 D SLR camera and the identifications were made with the aid of the standard field guide and book [15, 19].

RESULT AND DISCUSSION

The study reveals the vulture's diversity in thePilibhit Tiger Reserve (PTR) and recorded area 6 vultures' species in study area (Table 1). 3 species *Gyps indicus, Gyps bengalensis, Neophron percnopterus*are residential and 3 species *Gyps fulvus, Gyps himalayensis, Aegypius monachus*(Fig.2,3,4,5,6 & 7) are migratory and have a range of Critically Endangered to Least Concernaccording to IUCN Status.

Table. 1: Vultures of Pilibhit Tiger Reserve (PTR)

SN	Common Name	Scientific Name	Local Name	Family	R/M	IUCN Status
1	Long-billed vulture	*Gyps indicus*	Gidh	Accipitridae	R	CE
2	White-backed vulture	*Gyps bengalensis*	ChamarGidh	Accipitridae	R	CE
3	Egyptian vulture	*Neophron percnopterus*	GobarGidh, KolGidh	Accipitridae	R	E
4	Griffon vulture	*Gyps fulvus*	ChotaGidh	Accipitridae	M	LC
5	Himalayan Griffon vulture	*Gyps himalayensis*	PahadiGidh	Accipitridae	M	NT
6	Cinereous vulture	*Aegypius monachus*	Kala Gidh	Accipitridae	M	NT

(R-Residential; M-Migratory; CE- Critically Endangered; E-Endangered; NT-Near Threatened; LC-Least Concern. Source: The IUCN Red List of Threatened Species. Version 2016-3.)

1. Long-billed vulture (*Gyps indicus*), Scopoli 1786

Fig.2: *Gyps indicus* in flight

Characteristics: It is referred to as the Indian Long-billed vulture. Medium sized, smaller than Eurasian Griffon, larger than Oriental White backed vulture. Naked blackish to grey -brown head and neck sparsely covered with white down. A Buff ruff is present at the base of neck. Body below and underwing –coverts are pale sandy-brown, underwing-coverts edged buff, auxiliaries darker brown.
Sex: Separate sexes
Voice: Cackling, grunting and hissing sounds.
Habitat: Nest and roost solely on crags and forts within its range. These inhabit open savanna and also open country near villages, towns and cities.
Habit: Food: Feeds exclusively on carrion, mainly dead livestock
Status: Resident approximately south of the Gangetic plain (especially common in Rajasthan and Gujarat), and throughout peninsular India. Absent in North east and extreme south.
Distribution: These species are distributed in India and Pakistan. It was also recorded in Nepal.

2. White-backed vulture (*Gyps bengalensis*), Gmelin 1788

Fig.3: *Gyps bengalensis* in flight

Characteristics:

Referred most commonly as The Indian White-backed vulture. Naked dark grey head and neck scantily covered with buff down,mainly on nape, crown and hind neck. Prominent white patch on lower back and upper tail-coverts the main identification feature. Eyes are dark brown, bill pale bluish, silvery grey tipped black on upper mandible.

Sex: Sexes alike.

Voice: Not very vocal, except when feeding and during nesting. Calls consist of a variety of croaks, hisses and screeches.

Habitat: They occur in temperate areas, mostly in plains and occasionally in hilly regions. Gyps bengalensis is generally found in open areas and fields enclosing scattered trees.

Habit: White-rumped vultures feed mostly on the ground, but roost and nest in trees and cliffs, and spend much of their time soaring on wind currents searching for carrion.

Food: Solely carrion,small and large,from a dead Jungle cat to an elephant-either decayed or fresh. They also scavenge on fish from dried up lakes and marshes.

Status: Residential.

Distribution:Most common in deserts (mainly fringes and near habitation) and Semi -arid zones, followed by the Gangetic Plain, Deccan Peninsula, and the Western Ghats where now scarce. Commonly breeds along desert fringes.

3. Egyptian vulture (*Neophron percnopterus), Linnaeus 1758*

Fig. 4: *Neophron percnopterus* Adult, Juvenile and Sub-adult

Characteristics: Small vultures, with long, narrow and pointed wings. The bill is long and slender, hooked at the tip. The head is completely naked. The legs are long with long toes and claws.
Sex: There is no sexual dimorphism in Egyptian Vultures.
Voice: Usually silent. At nest adults greets each other with mewing grunts and harsh prolonged hisses, hoarse variation of which is used to warn off mobbing crows.
Habitat: They prefer dry and pen environment such as deserts and agricultural areas. It's found near human settlements where it can easily feed on available refuse.
Habit: It is commensal with man. It roosts on different substrates as buildings, trees, cliffs, electric pylons etc. and sometimes even on the ground if cliffs and trees are unavailable.
Food: Opportunist scavenger,less dependent on larger carcasses than other vultures.
Residential/ Migratory Status: Residential
Distribution:*N.p. percnopterus* is resident and partial altitudinal migrant mainly restricted to the northwest of the Indian subcontinent from Pakistan to Kashmir, Punjab and Himachal Pradesh, from the plains to into Uttar Pradesh, Kutch and west Rajasthan.

4. Griffon vulture (*Gyps fulvus),* Hablizl 1783

Fig. 5: *Gyps fulvus* with *Gyps himalayensis*

Characteristics: Adults have head and neck covered with dense white down. Hair like plumes forms a prominent cream-buff to yellow-white fluffy ruff. Flight feathers are dark brown, outer blackish and secondaries browner. Eyes are golden brown to brown. Yellowish or greenish horny to dusky brown bill. Legs are dirty yellow to greenish grey. Juveniles are similar to adult but overall darker. It has mainly whitish, rather fully feathered head and neck.
Sex: Separate sexes.

Voice: Mostly unrecorded. Similar to Indian White-backed Vulture; a threatening hoarse hiss.
Habitat: They breed up to 2500 to 3000 m mainly in the barren lower foothills and mountains, desert tracts, open grasslands and semi-arid areas.
Habit: Gregarious. Habit's not unlike others. Attracted to carcass by sight from the air while soaring and searching for food over long distances.
Food: Exclusively carrion but
Residential Status: Migratory
Distribution: Distributed in northwest Africa, Europe, and Mediterranean region, Turkey, Middle East, Arabia, Iran, Kazakhstan, Afghanistan, Pakistan and North Eastern India.

5. **Himalayan Griffon vulture *(Gyps himalayensis),* Hume 1869**

Fig.6: *Gyps himalayensis* roosting on*Semal* tree *(Bombaxceiba)*

Characteristics: Adult is characterized by very pale plumage. Head and neck covered with thick, down-like, short yellowish-white feathers, naked pinkish fore neck often visible. Ruff in adults is whitish and wooly. A bare violet-pink patch present at base of neck on either side of crop. Juvenile is characterized by overall dark plumage (except for white head). Unlike adult, ruff is long and pointed, buffy-brown with pale shaft streaks.
Sex: Separate sexes.
Voice: Hisses, grunts and cackles.
Habitat: Terrestrial
Habit: Gregarious.
Food: Exclusively carrion
Residential Status: Migratory
Distribution: It is distributed in Himalayan Pakistan, India, Tibet, Nepal and Bhutan. Also occurs in Central and western China, Kazakhstan, Uzbekistan, Kyrgyzstan, Tajikistan, Afghanistan and Mongolia. It is also a rare winter visitor to Thailand, Cambodia and Bangladesh.

6. Cinereous vulture (*Aegypius monachus*), Linnaeus 1766

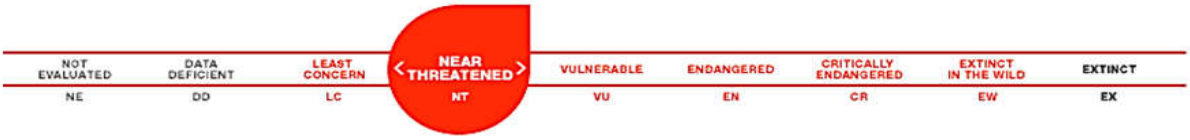

Fig.7:*Aegypius monachus*in flight

Characteristics: Adult is Massive, dark, sooty-brown with blackish outer primaries. Head pattern varies with age. Naked skin on neck and head bluish grey with faint red hue on sides, framed by brownish black ruff. Juveniles are predominantly blackish. Bare skin is pinkish.
Sex: Separate sexes.
Voice: Hisses, croaks and harsh grunting.
Habitat:Scrub, arid and semi-arid and open grassland, as well as forest.
Habit: The cinereous vulture is a carrion-feeder and is usually dominant over other species when gathered at a carcass. Although it may eat some insects, tortoises, snakes and lizards.
Food: Mostly carrion and also dead or stranded fish.
Residential/ Migratory Status: Migratory
Distribution: The cinereous vulture has a large range across Europe and Asia, stretching from Spain to China in the breeding season and from the Middle East, across India and east to North and South Korea during the winter.
A total 150 individuals belonging to six species were recorded. Among these Long-billed Vultures *Gyps indicus* (LBV) were more frequently sighted (n=69) followed by Egyptian Vulture *Neophron percnopterus* (EV) (n=30),Griffon vulture *Gyps fulvus* (GV) (n=21), Cinereous vulture *Aegypius monachus*(CV) (n=17), White-backed vulture *Gyps bengalensis* (WBV) (n=8) and Himalayan Griffon Vulture *Gyps himalayensis* (HGV) (n=5). The overall scenario of different vultures' species was recorded in PTR (Table 2& fig. 8,9,10).
The existence of vultures in wooded area, mature trees and a foraging range [8, 5, 2]. Vultures follow in protected forests [4, 5, 1, 22] and their density was higher in the interface of protected and unprotected area [1].

Fig.8: Vultures are roosting in PTR

Fig.9: Vultures are flying in PTR Fig.10: Vultures in preening position

The data for vultures in PTR was recorded seasonally (winter and summer). The population of these vultures varies according to season. The total population of vultures' species for study period (December to May) was 150 with a mean population of 75.The Variance (Population Standard), σ2 was 2592 with a standard deviation 50.91.The most sighted population of vulture for two season was 69(Long-billed vulture) with a mean of 34.5. The Variance (Population Standard), σ2 was 264.5 with a standard deviation 16.26. While on other hand least sighted population of vulture for two season was 5 (Himalayan Griffon vulture) with a mean of 2.5. The Variance (Population Standard), σ2 was 12.5 with a standard deviation 3.53.

No efforts were made to observe the nest and nesting site characteristics and the breeding status of vulture in PTR. Multiple vulture species associations were observed feeding on large carnivore kills. Comparable explanations were also stated from other workers in India by Majumder *et al.* [17], Ramesh *et al.* [21]and in Africa by Hunter *et al.* [13] and Houston [14]. On a few occasions vultures were seen roosting on the semal tree and hovering in sky in Mahof range of PTR. The observations recommend that vultures in PTR feed mostly on large carnivore kills. Fig.1 shows, the population of all six vultures' species in the Pilibhit Tiger Reserve (PTR) for study period (December 2015- May 2016).

Table. 2: Total Population of Vultures Species in of Pilibhit Tiger Reserve (PTR)

SN	Vultures Species	Winter	Summer	Sum	Mean	Variance σ^2	SD σ
1	Long-billed vulture	46	23	69	34.5	264.5	16.26
2	White-backed vulture	6	2	8	5	18	4.24
3	Egyptian vulture	19	11	30	15	32	5.65
4	Griffon vulture	21	0	21	10.5	220.5	14.84
5	Himalayan Griffon vulture	5	0	5	2.5	12.5	3.53
6	Cinereous vulture	14	3	17	10	98	9.89
	Total	111	39	150	75	2592	50.91

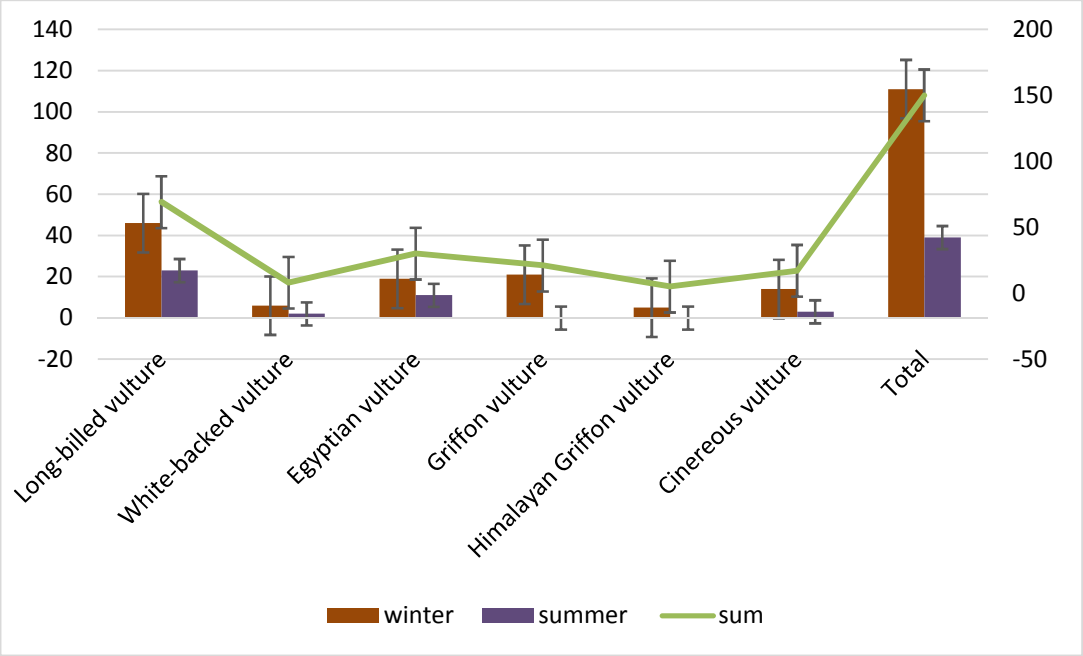

Fig. 1: Vultures population in Pilibhit Tiger Reserve (PTR)

CONCLUSION

The present study reveals the vulture species in PTR for first record and that vultures in PTR were mainly dependent on large carnivore kills. Continued monitoring will be helpful in conserving and managing vulture diversity as well as feeding and breeding sites of vultures. Consistent studies helped in finding out the present status and occurrence. There is also a prerequisite for enhanced awareness of dumping practices and avoiding disturbance to vultures while they are feeding on domestic and wild ungulates. Resident administrative bodies like Panchayats can be tangled and made responsible for the safe disposal of carcasses for vultures. Media personalities can be also involved to highlight the importance of vultures and their ecological role.

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