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A Review on Subspecies of Egyptian Vulture

Shivangi Mishra[1], Adesh Kumar[1,2], Amita Kanaujia[1,2]

[1]Biodiversity & Wildlife Conservation Lab, Department of Zoology, University of Lucknow, Lucknow-226007, Uttar Pradesh, India
[2] Institute for Wildlife Sciences, ONGC Center for Advanced Studies, University of Lucknow, Lucknow-226007, Uttar Pradesh, India

***Corresponding author**: kanaujia.amita@gmail.com

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ABSTRACT

The rank of classification that is lower than a species is known as Subspecies. Related *subspecies* are less distinct than species of the same genus. There are three subspecies of Egyptian vulture in the world, of which two subspecies are found in India; *Neophron percnopterus percnopterus* and *Neophron percnopterus ginginianus*.Since not much work has been done at the subspecies level of Egyptian Vulture, this review is a detailed compilation of all the information done at subspecies level across the globe. Such information is valuable to plan effective conservation actions such as adequate supplementary feeding areas and other conservational measures where both subspecies share their niche. Further studies must be taken up to study the interaction level and niche sharing between both the subspecies of Egyptian Vulture in India and hence to plan for conservation strategies.

Key words: Egyptian Vulture, Subspecies, Conservation.

The Egyptian Vulture *(Neophron percnopterus*, Linnaeus 1758) is a medium sized scavenger and has a broad range distribution throughout Southern Palearctic region and North Africa (Cramp & Simmons 1980, Del Hoyo et al. 1994, Baumgart 2001). Egyptian Vulture is the only member of the genus *Neophron* and is distributed throughout southern Europe, northern and central Africa, the Middle East, Central Asia and the Indian subcontinent (Ferguson-Lees & Christie 2001). The population is declining throughout its range. Due to this consistent declines the status of the Egyptian vulture got changed from Least Concern to Endangered on the IUCN Red List in 2007 (Bird Life International 2008) with a global population estimated at 20,000 – 61,000 individuals (Birdlife International 2014). The species is very much smaller and lighter in comparison to other vultures (Cramp, Simmons1980). Its European population is estimated at some 3300-5050 pairs (Birdlife International 2012).

There are 3 subspecies of *Neophron percnopterus* in the world:

- *N. p. ginginianus* in India and Nepal.
- *N. p. majorensis* on the Canary Islands.
- *N. p. percnopterus* in the rest of the species' distribution.

Neophronp. percnopterus and Neophron p. ginginianus are found in India.

Baxter et al. (1968) reported a nineteenth century reference to the use of tools by the Egyptian vulture *Neophron percnopterus* and observed that instead of raising the egg into the air and dropping it upon a stone, it carries a stone into

the air and drops it upon the egg. Keymer et al. (1972) observed Diseases of birds of prey and concluded that birds of prey are susceptible to most avian bacterial infections. Bratislava et al. (1989) studied about the Egyptian Vulture *Neophron percnopterus* in Macedonia and suggested that about 60 nesting pairs still exist in Macedonia. Donazar and Ceballos (1989) studied growth rates of nestling Egyptian vultures *Neophronpercnopterus*in relation to brood size, hatching order and environmental factors. Donazar et al. (1994) studied about Copulation Behaviour in the Egyptian Vulture (*Neophron percnopterus*).The copulation behavior of Egyptian Vulture seems to be exceptional when compared to the other raptors, mate attendance was intensive. Yosef & Alon (1997) inferred, "Do immature palaearctic Egyptian Vultures *Neophron percnopterus* remain in Africa during the Northern summer?". Pablo et al. (1998) studied the effects of age and captivity on plasma chemistry values of the Egyptian Vulture and concluded that future studies should consider age as a major source of variability in avian plasma chemistry. Prakash et al. (1999) studied about the status of Vultures in Keoladeo National Park, Bharatpur, Rajasthan with special reference to Population Crash in *Gyps* Species. Liberatori and Penteriani, (2001) studied about the declining population of the Egyptian vulture in the Italian peninsula along with its distribution, habitat preference, productivity and conservation implications. Chhangani and Mohnot, (2004) suggested that it is premature to conclude that Diclofenac is the main factor for the decline of vulture population. Agudo et al. (2007) studied about isolation and characterization of 18 microsatellite loci in the Egyptian vulture (*Neophron percnopterus*).Dell'omo and Cavallina, (1996) studied about Blood chemistry and hematological values of captive Egyptian vultures (*Neophron percnopterus*).Aminotransferase, lactate dehydrogenase, and alkaline phosphatase, were higher during spring than during winter. In addition, cholesterol values decreased with age whereas creatinine values increased. Guido Ceccolini et al. (2009) observed Migration and wintering of released Italian Egyptian Vultures *Neophron percnopterus*. Hernandez and Margalida, (2009) observed and recorded the poison-related mortality effects in the population of Egyptian vulture in Spain. Gangoso et al. (2008) studied long-term effects of lead poisoning on bone mineralization in Egyptian vulture *Neophron percnopterus* and studied about the existence of long-term effects of lead poisoning. Thakur et al. (2010*)* studied about Avifauna of Arki Hills, Solan (Himachal Pradesh), India and showed that Arki Hills sustain three such species of birds, which have been facing threat to their existence throughout their natural distributional range. These are Indian White-backed Vulture and Red-headed Vulture has been placed under Critical category and Egyptian Vulture has been categorized as Endangered. Sethi and Chauhan (2010) observed nesting of rare vultures in Katerniaghat Wildlife Sanctuary, Uttar Pradesh, India. Ainara Cortés-Avizanda et al. (2010) observed first case of Albinism in Egyptian Vultures.Sua´ rez-Pe´ rez et al. (2012) isolated *Mycoplasma neophronissp*. nov., from the upper respiratory tract of Canarian Egyptian vultures (*Neophron percnopterus majorensis).* Clements et al. (2012) studied about Vultures in Cambodia and their population, threats and conservation and also observed that Cambodian vultures are severely food limited and are primarily dependent on domestic ungulate carcasses, as wild ungulate populations have been severely depleted over the past 20 years.

Angelov et al. (2013) studied large increase of the Egyptian Vulture *Neophron percnopterus* population on Masirah Island, Oman. The absence of wild mammalian carnivores on the island (which can lead to poisoning events), the lack of human disturbance at the nests, and the existence of the rubbish dump and the way in which waste is handled may be the main factors contributing to the large resident Egyptian Vulture population on Masirah. Stoynov et al. (2013) studied about the distribution and conservation of the Egyptian vulture (*Neophron percnopterus* linnaeus, 1758) in southwest Bulgaria. Galligan et al. (2014) examined counts of Egyptian and Red-headed Vultures obtained on road transects in and near protected areas between 1992 and 2011 and found indications that the declines in both species appear to have slowed and possibly increased after the ban was introduced. These results suggest that both species may have been adversely impacted by diclofenac. Arkumarev et al. (2014) studied congregations of wintering Egyptian Vultures *Neophron percnopterus* in Afar: Ethiopia and proposed that the Endangered Egyptian Vulture *Neophron percnopterus* congregates and communal roosts in the wintering areas and where food availability is maximum and where even a single threat might lead to large population declines. Ansari (2015) studied about Status and distribution of Vultures in Gautam Budh Nagar District, Uttar Pradesh, India.

The scenario of three subspecies of Egyptian Vulture across the globe

Neophron p. percnopterus is having occurrence in most of the range of the species: Europe, Africa, Middle East,Central Asia and North West India and *Neophron p. ginginianus* in most of the Indian Subcontinent (Brown & Amadon 1968, Del Hoyo et al. 1994). According to Brown and Amadon (1968) latter is slightly smaller in size, having yellow as opposed to the dark brown bill colour and the claws and feet are comparatively weaker.

The third subspecies *Neophron p majorensis* (Donzar et al. 2002), distinguished by its larger size from the *N. percnopterus* subspecies as there is no difference in the plumage color pattern, is endemic to the Canary Islands (Table.1). The Canary Islands are an archipelago located in the Atlantic Ocean, 100 kilometres west of Morocco. Historically, the Canary Islands has been considered a bridge between three continents; Africa, America and Europe. The seven avian species are endemic to the Archipelago (Blanco & Gonzalez 1992). It includes the three subspecies of birds of prey: Common Buzzard (*Buteo buteo insularum*, Foericke1903), Eurasian Sparrow hawk (*Accipiter nisus granti*, Sharpe 1890) and Eurasian Kestrel (*Falco tinnunculus canariensis* Koenig 1890) in the west islands. According to Del Hoyo et al. 1994, there are three raptor species without known distinct subspecies status: Egyptian Vulture (*Neophron percnopterus*), Osprey (*Pandion haliaetus*) and Barbary Falcon (*Falco pelegrinoides*). In Macaronesia (Palearctic subregion including the Atlantic Islands, the Egyptian Vultures inhabit the Canary and the Cape Verde Archipelagos (Bannerman 1963; 1965, Bannerman & Bannerman 1968). This was very common historically at Islands of La Gomera, Tenerefe, Gran Canaria, Fuerteventura and Lanzarote (Martin 1987).

The results from the study of Jose Antonio Donazar et al. 2002 suggested that there are striking morphological differences between the population of Egyptian Vultures on this Islands and other region (Western Europe and North Africa). The analyses of mitochondrial DNA suggested that the haplotypes exist are exclusive to the Canary Islands. Therefore, the description of a new subspecies of Egyptian Vulture has been done. It was observed that the Canarian Egyptian vultures are comparatively larger in body mass and 18% heavier than Iberian Egyptian vultures. Tail feathers and wing chord were 4-8%longer in Canarian vultures. There was smaller but significant difference in the length of tarsus, primary feather, bill and bill with cere. The Gigantism was also known to occur very well on the Islands (Petren & Case 1997, Grant 1998) as there is absence of dominant species (Thaler1973).
The subspecies is a recognizable population of the species by morphological features and it is geographically separated by other populations of the species (Campbell & Lack, 1985). Generally, the bird species are distinguished on the basis of appearances and morphometrics (Watson 2005). Mundy (2014) studied about the Egyptian Vultures and the principle of subspecies in vultures.

Table.1: Differences between three subspecies of Egyptian Vulture.

Name of species	IUCN Status	Characteristics feature	Population Trend	Habit and Habitat
N. p. ginginianus	Endangered	• Smaller in size. • Yellow beak with slightly pinkish tip. • Found in India and Nepal.	Decreasing	An opportunistic scavenger and found mainly semi-arid zones, Desert, Deccan Peninsula and Gangetic plain. Ecologically found in variety of habitats such as desert and agricultural areas.
N. p. percnopterus	Endangered	• Larger than *N.p.ginginianus*. • Yellow beak which terminates with a black tip at the base. • Found in India and rest of the species' distribution.	Decreasing	A scavenger with a beak suitable for picking up food items rather than tearing flesh. Found mainly around rubbish dumps and slaughter houses near towns, villages, and outskirts of cities.
N. p. majorensis	Endangered	• Resembles the subspecies *Neophron percnopterus percnopterus* • The plumage is white with rufous coloration in the crown, nape, median wing coverts, breast and tail region. • Endemic to Canary Islands.	Decreasing	Found in Europe, Western and Central Asia winter predominantly in the Sahel zone. The species dwells arid woodlands and semi-arid bush country, especially canyons and rocky areas. They primarily feed on small and medium-sized (vertebrate) carcasses.

Two subspecies found in India

The *Neophron percnopterus percnopterus* (Linnaeus 1758) and *Neophron percnopterus ginginianus* (Latham 1790) subspecies of the Egyptian Vulture found in India differ by only two characteristics: size (by "5%", Ferguson-Lees & Christie 2001) and bill colour strictly rhamphotheca (Proctor & Lynch1993). They meet, and overlap to some extent, in north-west India (Rajasthan 73°E) at least, and Naoroji (2006) has the photographic proof of that. Hence, not only the *ginginianus* individuals have yellow bill, it also appears smaller/shorter in size to *percnopterus* individuals. The adults of both the subspecies are white with recognizable black primaries and secondaries. Secondaries of *ginginianus* are paler than primaries. The face is bare yellow with elongated nostril slit. Adult birds are very often seen near human habitation and along garbage dump sites. Eyes are dark brown and legs are pale yellow or grayish. Both the subspecies are considered to be "local migrants" (Naoroji 2006). At their zone of overlap in Rajasthan they probably could interbreed with the nominate types. Therefore, more careful observations should be done. Juvenile of both the subspecies are similar entirely dark brownish or black and paler wing coverts and rump (Naoroji 2006).

Detailed account of the three subspecies of Egyptian Vulture

1. *Neophron percnopterus percnopterus*

Fig.1: *Neophron percnopterus percnopterus*

Measurements

Wing- Male 470-536mm; Female- 460-545mm (Naoroji, R. 2006)

Tail: Male 220-251mm; Female- 240-267mm (Naoroji, R. 2006)

Weight- 1,600-2,400g

Weight (male and female): 1.6-2.4 kg (Brown &Amadon, 1968**)**

Description

Neophron p percnopterus: resident and partial migrant, confined to the northwest of Indian subcontinent from Pakistan to Kashmir, Himachal Pradesh and Punjab. Also found in Uttar Pradesh, west Rajasthan. Some individuals have also been observed at Ladakh. Also, the nominate subspecies extends from southern Euro east to Central Asia upto eastern Kazakhstan, West Asia and North Africa.

2. *Neophron percnopterus ginginianus*

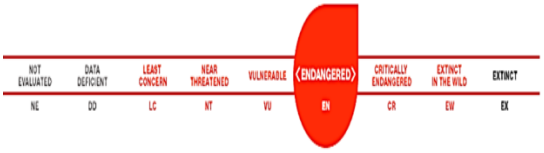

Fig.2: *Neophron percnopterus ginginianus*

Measurements

Wing- Male 393-490mm, Female- 455-505mm (Naoroji, R. 2006)

Tail- Male 228-251mm, Female- 240-267mm (Naoroji, R. 2006)

Description

Neophron p ginginianus: widespread and resident throughout the subcontinent and almost all geographical zones excluding the Trans-Himalaya, Northeast and Islands, and areas in North West has been occupied by nominate race. Sometimes seen in drier areas of peninsula hills. But overall rare throughout the forested Western Ghats, though it was once abundant in the Nilgiri and common in Wynaad (Davison 1883)

Levy (1990) stated that there is facial sexual dimorphism in which males have dark facial stripe near the eye; but this statement had some dispute and it has been observed that both male and female may randomly show this.

Though almost similar, the nominate subspecies, *Neophron percnopterus percnopterus* is little larger with the dark brown tip of curved beak as against the yellow in the other race, *Neophron percnopterus ginginianus.*
Females are larger, 10-15 % heavier than the male and the male is approximately 98%of the female in size (Ferguson-Lees and Christie 2001).

3. *Neophron percnopterus majorensis*

(Source: Google Image)

Fig.3: *Neophron percnopterus majorensis*

Measurements
Wing- Male 485-554mm (Naoroji, R. 2006)
Tail- 240-285mm,
Weight- 1,900-2,850g (Donazar *et al*,2002a)

Description
***Neophron p majorensis*/ The Canarian Egyptian Vultures:** are currently endemic to the eastern Canary Islands. This species was once common on most of the Canary Islands, but today is in danger of extinction. As opposed to other subspecies of Egyptian Vulture, this race (*majorensis*) is non-migratory.

Locally it is also known as 'Guirres' the plumage patterns of *Neophron p majorensis* resembles the nominate subspecies *Neophron p. percnopterus* (Brown & Amadon 1968, Cramp & Simmons 1980). It is significantly larger than the nominal subspecies (*N. p. percnopterus*, i.e., about ± 0.5 kg heavier and wings are ± 20 cm longer, Donazar et. al 2002).

The adults of Canarian subspecies are white in plumage, impregnated by rufous color especially in the crown, nape, breast, tail and median wing coverts. The *Neophron p majornesis* is sedentary and show difference from the western European populations which are very long distance migrants (Cramp & Simmons 1980). The name of this subspecies has been derived from the word "majorata", an ancient name of Fuerteventura Island. It was so called by the Spanish conquerors, as the major native guanche tribe of the Island was famous as the "Majos". The inhabitants of the Island at present are still called as "majoreros" and according to the geographical distribution of this subspecies it is named as the Canarian Egyptian Vulture.

They forage solitary, or sometimes in couples. They mainly feed on small and medium-sized (vertebrate) carcasses, but also feed insects and young vertebrates and may scavenge on various organic matters. They are frequent visitors of rubbish dumps. A detailed study has been done on the diet of Egyptian vultures on Fuerteventura, based upon 523 pellets which revealed 19 different species of prey: 42.3% dead domestic mammals (96.9% goats) and 39.7% domestic birds (pigeons and chickens). The Wild preys were consumed in much lower frequency (16.2%) and included small mammals, birds, insects (beetles, ants and Hemiptera) and even terrestrial molluscs (Medina 1999).

Canarian Egyptian vultures show remarkable flexible mating strategies, including both polygenous and polyandrous trios (one male with two females and one female with two males, respectively (Donázar et al. 1994).

CONCLUSIONS

A lot of work has been done on Egyptian vultures *Neophron percnopterus* in the world but very less work has been done at the subspecies level. As the two subspecies are present in India (*Neophron p. percnopterus* and *Neophron p. ginginianus*), there is a likelihood of interbreeding between the two subspecies as they share the similar niche. Both the subspecies have been observed in Uttar Pradesh and Rajasthan. Therefore, further work must be done on them at their interaction level to know more about their habits, ecology and their biology.

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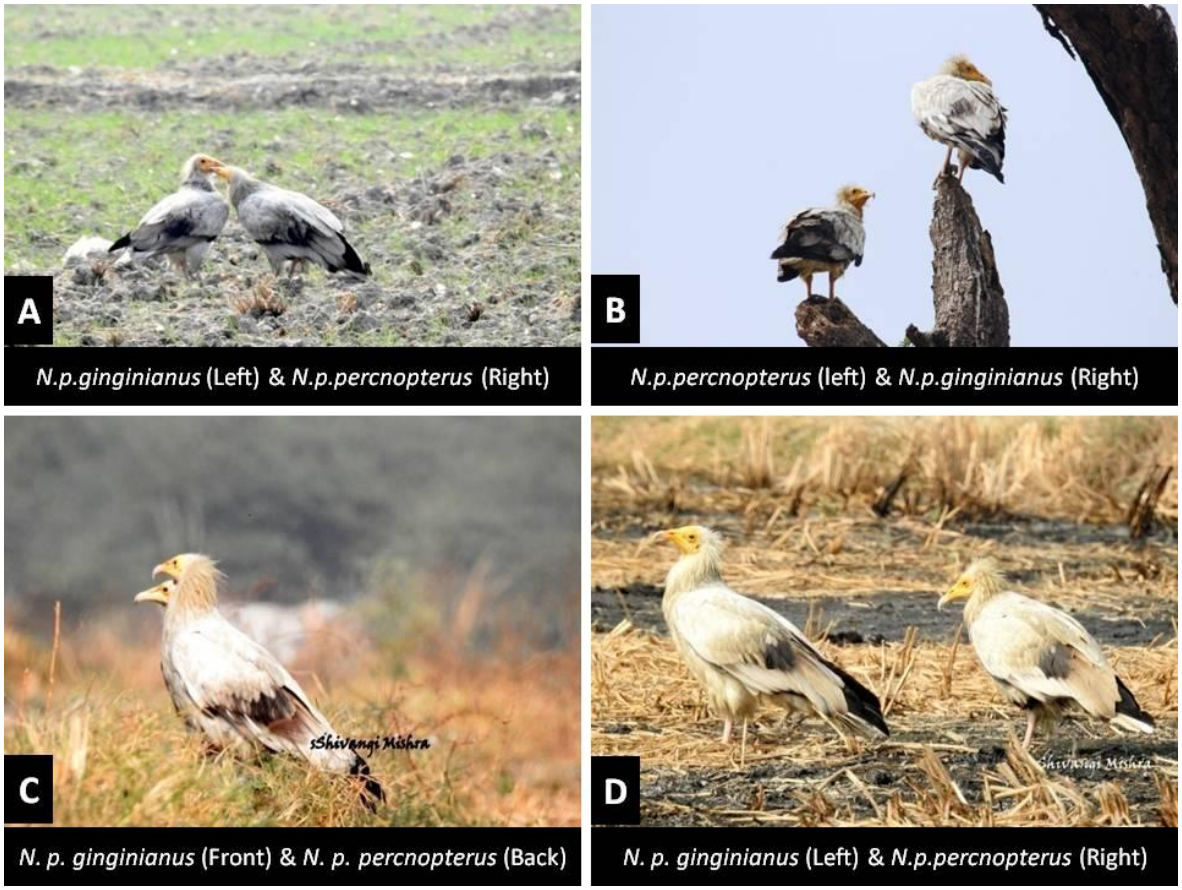

Fig. 4 (A-D): *Neophron p. percnopterus* and *Neophron p. ginginianus* in Uttar Pradesh, India

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