Notes on breeding of Egyptian Vulture *Neophron percnopterus* near Viramgam

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Introduction

The Egyptian Vulture (*Neophron percnopterus*) is a small vulture, with three recognised subspecies; the nominate *percnopterus* is a resident and winter migrant to India while *ginginianus* is resident in the Indian Peninsula and the third subspecies is extralimital (Orta *et al*. 2019). The two subspecies are identical in plumage except that the curved bill tip is dark brown in nominate and yellow in *ginginianus*. The nominate subspecies is mainly restricted to the NW of the Indian Subcontinent from Pakistan into Kashmir, Punjab and Himachal Pradesh (Naoroji 2006). The subspecies *ginginianus* is widespread and resident throughout the Indian Subcontinent, excluding the Trans-Himalaya, Northeast India and the Islands. The Egyptian Vulture is widely distributed in Gujarat; the nominate being a winter migrant to our state while *ginginianus* is a resident (Ganpule 2016). The Egyptian Vulture is still fairly common in north Gujarat region, with scattered sightings from other parts of the state. It is now considered to be an 'Endangered' species due to rapid population decline in India, with long term declines in other parts of its range (BirdLife International 2019). Except northern Gujarat, it is now uncommon in many parts of Gujarat, with scattered sightings from Saurashtra and southern Gujarat.

I studied the breeding biology of the Egyptian Vulture in Gujarat and the details of my study are presented here.

Study area

The study was conducted near Kumarkhan Village (22° 54' N, 72° 01' E), in Ta: Viramgam, Dist: Ahmedabad. The area is mainly agriculture lands (farms), surrounded by some scrub. There are a few large trees in the farms. The main crops in this area are castor (*Ricinus*) and cotton (*Gossypium*). The village lies to the north of Nal Sarovar Bird Sanctuary, and is about 10-12 kms from the sanctuary. There are two carcass dumping sites near the area; one site is around 300 mts from the nesting tree while the other dumping site was around 600 mts away in a straight line distance.

Methodology

The study was carried out from February 2018 till the end of July 2018. The study was initiated as soon as a nest of Egyptian Vulture was found. The nest seemed to be active and both the adult birds were seen displaying around the nesting area in February. The nest was visually monitored using a Nikon Monarch 10x50 binoculars, and photographs were taken with a DSLR camera (Nikon D7100) and telephoto lens (Sigma 150-600 mm). The nest was also monitored using the automatic motion/time lapse cameras (Cuddeback Silver Series - Model 1224 and Bushnell Trophy Cam - Model 119436), for the duration of the study. My reason for using cameras after incubation, especially during hatching, was to minimise disturbance to the birds. The cameras were fixed on a nearby branch, above nest level, at a distance of two-three meters, ensuring that the breeding pair was minimally disturbed. During my study, I have taken extreme precautions so as not to disturb the birds and established protocols related to studies of breeding birds were followed strictly. The welfare of the breeding pair and the nestling(s) was always kept in mind while observing them.

Observations and results

Nest site and nesting material: The nest was in a neem tree (*Azadirachta indica*), in an area surrounded by agriculture farms. The area surrounding the nest had many other small trees on the periphery of the farms. The height of the nesting tree was approximately 35 feet. The nest was located in a forked branch of the tree trunk and was at a height of approximately 20 feet. The nest was quite large and untidy looking. The nesting materials used were quite varied and I recorded the following: rubber, cattle hair, pieces of leather, cotton, sticks {of neem, *khijado* (*Prosopis cineraria*) & most probably 'babool' (*Acacia nilotica)*}, wool, dog dung, pig dung, leaves of neem tree, roots of plants, plastic strainer and straps, types of ropes, pieces of sponge, different types of threads, cattle dung, pieces of hosiery and woollen clothes, soil and other particles, etc. After the nesting was completed, the nest was measured and had a diameter of around 38 inches.

Egg laying and incubation: The first egg was laid on 1 March 2018. A second egg was laid on 5 March 2018. The eggs were

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off-white and heavily marked brownish. The shape was more round than ovoid. Both the parent birds were observed to incubate the eggs round the clock and rarely left the eggs unattended. The eggs were never left unattended for more than 3-5 minutes and one of the adult birds always used to be present nearby. During the change of duties, each parent rotated the eggs slightly, changing the position with either its beak, or feet. On 18 March 2018, it was observed that one adult brought a dried stick, put it on one side and repaired the nest. The repairing of the nest was observed a few more times during the incubation period and continued even when the chick was growing. The incubation period for the first egg was 42 days (egg hatching on 11 April 2018) and for the second egg was 43 days (hatching on 17 April 2018). During the incubation period, it was observed that many other birds visited the nesting tree. Some interesting observations were as follows: on 14 March 2018, a Red-necked Falcon (*Falco chicquera*) perched on the nesting tree for a few minutes. On 22 March 2018, a Greater Coucal (*Centropus sinensis*) visited the nest when no parent bird was in the nest. The coucal did not try to pirate the eggs. The adult bird came back within 1-2 minutes and the coucal flew away.

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Fledgling growth: The eggs hatched 6 days apart. The first egg hatched at around 10:00 hrs in the morning on 11 April and by 13:30 hrs, the chick was seen raising its head. The one day old hatchling was covered with white down. It was fed and cared for by both the adults. The chick was seen begging for food in the first week. The second egg started hatching at around 11:30 hrs on 17 April 2018 and the chick came out of the egg by 15:30 hrs. Size difference between the two chicks was apparent; the elder chick was much larger than the recently hatched chick. It was observed that both the adult birds did not feed the younger chick and kept feeding only the elder chick. Feeding of the younger chick was neither directly observed by me nor seen in the time lapse cameras. As a result, the second chick died on 21 April 2018. While I am not sure of the exact cause of death, it seems that since it was not fed by the parents, it had starved.

By the end of April, the surviving chick had grown quite large in size but still showed mainly white down feathers. By the first week of May (fourth week), its size had increased but down was still mostly white, with a few black-brown specks of emerging pin-feathers visible on the wings. The chick continued growing and left the nest in the last week of July. The growth of the fledgling is given in detail in the table below.

Growth of the Egyptian Vulture from Day 1 till the end of week 11

Age	Growth and plumage
Day 1	Absolutely white in colour; looked like a small lump of cotton.
Week 1	Body covered with white down, pinkish bare parts.
Week 2	Body covered with white down, greyish head, bill with pale tip and grey legs.
Week 3	Body colour still mostly white with a few black-brown specks of emerging pin-feathers; a number of pins on the wings, nape, and dorsal regions.
Week 4	Good number of black-brown feathers developed on wings, back, and head.
Week 5	The head still covered with white down, large number of black and pale brown feathers on wings, body and underparts.
Week 6	White down on head reduced and replaced with blackish feathers. Rest of the body covered with feathers. Grown almost 70–80% of the size in comparison to the parents.

Week 7	Head almost fully covered with blackish feathers, underparts blackish with pale brownish spots, black feathers with pale brownish tips on wings, very similar to fresh juvenile plumage, size similar to adult.
Week 8	Like fresh juvenile plumage, size similar to adult, stretching / flapping wings.
Week 9 -10	Juvenile plumage, seen perching outside the nest and taking short flights.
Week 11	Juvenile plumage, seen flying and soaring, left nest – fledged.

Food and feeding: Both the parent birds were seen feeding the chick. The chick was fed with small pieces of flesh in the initial days and as it grew older, the adults brought a variety of food to the nest. The food noted was a five striped palm squirrel (*Funambulus pennantii*), House Rat (*R. rattus*), Gerbil (*Gerbillus* sp.), Indian hare (*L. nigricollis*), unidentified fish, common garden lizard (*C. versicolor*), Grey Francolin (*Francolinus pondicerianus*), a probable Greater Coucal, unidentified birds, etc. On observing the nearby carcass dumps, the Egyptian Vulture was noted to be present on a fresh buffalo carcass on 15 March 2018, on a fresh carcass of a young cow on 6 April 2018, and on an almost finished buffalo carcass on 25 April 2018. The carcass dump was observed for 15 days in total but the presence of the Egyptian Vultures was noted only on 3 days.

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Threat from bird fauna and other threats in the nesting area: I observed many other raptor species around the nest tree during the study. A Booted Eagle (*Hieraaetus pennatus*), Common Kestrel (*Falco tinnunculus*), Black-winged Kite (*Elanus caeruleus*), Shikra (*Accipiter badius*), Black Kite (*Milvus migrans*), Red-necked Falcon, Indian Spotted Eagle (*Aquila hastata*) and Eurasian Marsh Harrier (*Circus aeruginosus*) were seen in the area surrounding the nesting tree. On 11 March 2018, a Booted Eagle approached near the nesting tree in flight. Both the Egyptian Vultures were seen flying near the eagle and trying to drive it away. However, none of the birds of prey approached near the nest, tried to steal the eggs or attack the nestling. A Common Indian Monitor (*V. bengalensis*) was also observed near the nest once.

Discussion

The breeding of the Egyptian Vulture has been studied in detail in India earlier (Dharmakumarsinhji 1955, Ali & Ripley 1978, Naoroji 2006, Orta *et al*. 2019). Naoroji (2006) gives the breeding season for the species from end February/March to June, but mainly from February to May. Here, the first egg was laid on 1 March, which agrees with the breeding period given in the reference texts. The species is said to be adaptable, and nests on crags and cliffs, as well as on large trees and on buildings. The nest here was in a large neem tree. The variety of nesting materials observed here is not unusual. In a study carried out in Uttar Pradesh, a similar variety of nesting materials was seen (Mishra *et al*. 2017). The use of different nesting materials here is probably dependent on their availability from nearby areas and has different uses in the nest as explained by Mishra *et al*. (2017).

The incubation period observed here was 42 days for one egg and 43 days for the other. Naoroji (2006) gives the incubation period as 43 days and states that two eggs are laid but usually only one hatches. However, Orta *et al*. (2019) give the clutch for this species as 1-3 eggs, stating that both adults feed the chicks. In a recent study in Noida, Uttar Pradesh, two eggs were laid but only one was incubated as the other egg rolled off the nest on to the window ledge (Goyal & Sood 2018). Here, it was observed that both the eggs hatched but second chick hatched 6 days after the first one. Orta *et al*. (2019) state that the eggs usually hatch at 3-5 days interval. In this context, it has been found that the younger chick can die if the age-size difference between the chicks is large, which was seen in this case. The second chick was most probably not fed by the parents, resulting in its death. This might be due to its relative inferiority in begging for food compared with the elder chick (Mendelssohn & Leshem 1983). In a study on Egyptian Vulture in Spain, it was noted that if the second hatched chick survived beyond 7-14 days, then it could be expected to survive until it fledged (Donázar & Ceballos 1989). Unfortunately, in this study, the second-hatched chick died after just 4 days. However, in a study on breeding of Egyptian Vulture conducted in Patiala District, Punjab, India, over three years from 2015-2017, it was observed that six young hatched and fledged from three broods of two eggs each, with the

hatching interval between the two eggs being six days; all chicks survived to fledging and no mortality or siblicide of the younger chick due to aggression by the elder chick/starvation occurred (Kumar *et al*. 2018). So, more than one young do fledge in this species.

Hatching is said to occur from early to mid-May (Naoroji 2006) while in the present study, hatching was in the second week of April. The nestling/fledging period is estimated to be 70-90 days (Orta *et al*. 2019) or around 75-80 days (Naoroji 2006). In the present study, the fledging period was around 80 days, which agrees with what has been reported earlier. The whole nesting cycle takes around 4.5 - 5 months to complete, which was seen here too. The fledged juvenile is said to be dependent on its parents for almost one month after it has fledged (Orta *et al*. 2019). In this study, I could not carry out further observations to see whether the juvenile had remained with its parents or not.

The spectrum of food seen here agrees with what is known for the species. The Egyptian Vulture is an opportunistic scavenger, and feeds on a variety of bird, mammal, amphibian and reptile remains, offal and any organic rubbish (Naoroji 2006). In the present study, the presence of the Egyptian Vulture in the nearby carcass dump was noted only thrice in 15 days of observation and suggests that it does not heavily depend on cattle carcasses in this area for food and has a varied diet. But, the feeding habits of the Egyptian Vulture in Gujarat require further study as the data gathered here is insufficient to draw any conclusions. On one occasion, a freshly killed/scavenged five striped palm squirrel was brought to the nest and given to the grown chick, which ate it. When the chick was smaller, it was fed by both the parents – feeding it small pieces of flesh from prey brought to the nest.

Conclusion

The breeding of the Egyptian Vulture was partially successful in this study as the adults fledged one chick while the second chick died. Both parents actively looked after and fed the nestling. The incubation period was 42 and 43 days, while the fledging period for one nestling was around 80 days. The adults fed a variety of prey to the nestling. The nesting materials observed here were quite varied, and included many man-made items like pieces of clothes and other plastic items, which are known to be used by the species.

Since the Egyptian Vulture is now an 'Endangered' species, more attention should be given to its food and habitat preferences, breeding biology, etc. here in Gujarat. Active conservation measures should be adopted so that this species continues to thrive here. Gujarat has a good population of Egyptian Vultures, especially in some districts of northern Gujarat, and it is hoped that its population will increase if proper attention is given towards its conservation.

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