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Research Article

THE INCREASE IN THE POPULATION OF EURASIAN GRIFFON VULTURE (*GYPS FULVUS*) AT JORBEER, BIKANER: CARCASS DUMP AS KEY HABITATS FOR WINTER MIGRATION IN THE GRIFFON VULTURES

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ABSTRACT
Eurasian Griffon vulture (*Gyps fulvus*) is regular winter migratory bird at Jorbeer area, Bikaner (Rajasthan) India. The jorbeer has remained a major source of attraction for vultures in past years as about 20-35 carcasses dumped per day by the municipal board. Eurasian Griffon vultures were observed feeding on carcasses and roosting in trees of *Prosopis cineraria* and *Salvadora Oleodies* adjacent to the dump only in winters. During long term study October 2006 to March 2012 a maximum of 670 Eurasian Griffons were recorded. Vulture's populations gradually build up from October and reach its peak during December to February.
This study has shown that a number of Juvenile and immature Eurasian Griffon vultures from migratory population use carcass dump as feeding ground. Since Griffons feed on dump become highly profitable because large amount of predictable food availability. The feeding and roosting site both were close together at Jorbeer, indicates the high suitability of utilization carcass dumps as food source because it reduces utilization of energy while reaching for food. The increase in Eurasian Griffon vultures was related to livestock availability. This might shows a functional relationship between food abundance and vulture numbers. No sick and diseased Eurasian Griffon vulture was recorded. Nesting has not been observed at Jorbeer.

Keywords: *Eurasian Griffon Vulture, Carcasses, Population, Migratory*

INTRODUCTION
The Griffon vulture (*Gyps fulvus*) is a large old vulture in the bird of prey Acciptridae. It has a white neck ruff and yellow bill. The buff body and wing coverts contracts with the dark flight feathers. Old world vultures are long lived have low reproductive rates, high survival and a low juvenile survival (Wynne-Edwards 1955, Amadon 1964, Piper *et al.*, 1981). They are also highly sensitive to environmental changes (Houston 1984). Eurasian Griffon vulture (*Gyps fulvus*) breeds in Eurasia but migrates of Africa and South Asia. The geographic ranges of these vultures overlap (Pain *et al.* 2003). The *Gyps fulvus* also breeds throughout Balochistan and parts of Sindh. Kohistan and salt range, during winter numbers migrates to indus plains. They migrate down to warmer foothills and plains in winter. They breeds exclusively on mountain cliffs. Spending the spring and summer months in the arid steppic mountains region Balochistan (Roberts 1991). Although the literature suggests that vultures have been common birds in South Asia (Roberts 1991, Gilbert *et al.*, 2002).
Gyps vulture populations across the Indian subcontinent collapsed in the 1990's and continue to decline repeated population surveys showed that the rate of decline was so rapid that elevated mortality of adult birds must be key demographic mechanism. Post mortem examination showed that the majority of dead vultures had visceral gout, due to kidney damage. The realization that diclofenac, a non-steroidal anti-inflammatory group of drug (NSAIDS) potentially nephrotoxic to birds, had become a widely used veterinary medicine led to the identification of diclofenac poisoning as the cause of the decline (Anderson *et al.*, 2005). The population crash has been well documented at Keoladeo National Park, Bhartpur (Rajasthan) over the last decade (Prakash, 1999). A decline of more than 90% is recorded in decade in the nestling population.

Since the outbreak of the disease in India, an increase in the number of Eurasian Griffon vulture (*Gyps fulvus*) spending the winters in India. The Eurasian Griffon vulture breeds in Himalayas but is seen throughout the Indian plains to Deccan plateau during winter, similarly the young Himalayan Griffons wintering in the Himalayan foothills and sometimes as far sour as Kutch in Gujrat (Samant *et al.* 1995). In recent years, unprecedentedly large numbers of migratory Eurasian Griffons (*Gyps fulvus*) have been over wintering in northwest India. This has led to concerns that these birds may act as a conduit for the spread of agent south Asia (Prakash *et al.*, 2003).

Nine species of vultures are recorded in the Indian subcontinent (Ali and Ripley, 1983) of wihch seven species have been observed at Jorbeer area Bikaner (Rajasthan) India. The seven species of vultures are long billed vulture (*Gyps indicus*), white Backed vulture (*Gyps bengalensis*). Eurasian Griffon vulture (*Gyps fulvus*), Himalayan Griffon Vulture (*Gyps himalayensis*), King Vulture (*Sarcogyps calvus*), Cinereous Vulture (*Aegypius monachus*) and Egyptian vultures (*Neophron percnopterus*) come and stay in winter at Jorbeer. But some Egyptian vultures are resident, observed throughout the year.

In certain areas of India, the use of human rubbish dumps close to population areas by Griffon vultures has been significant (Satheesan 2000). This paper reflects growth of Eurasian Griffon vulture during 2006-2011. This increase was related to livestock availability.

MATERIALS AND METHODS

The study area Jorbeer situated South-East to Bikaner at distance of 12 Km from city behind NRCC (National Research Centre of Camel). The geographical location of study area is $20'3^0$ North latitude and $73'5^0$ East longitudes at height of 234.84 MSL. Jorbeer area has remained a major source of attraction for vultures in past year as about 20-35 carcasses dumped per day by municipal board (Figure 1).

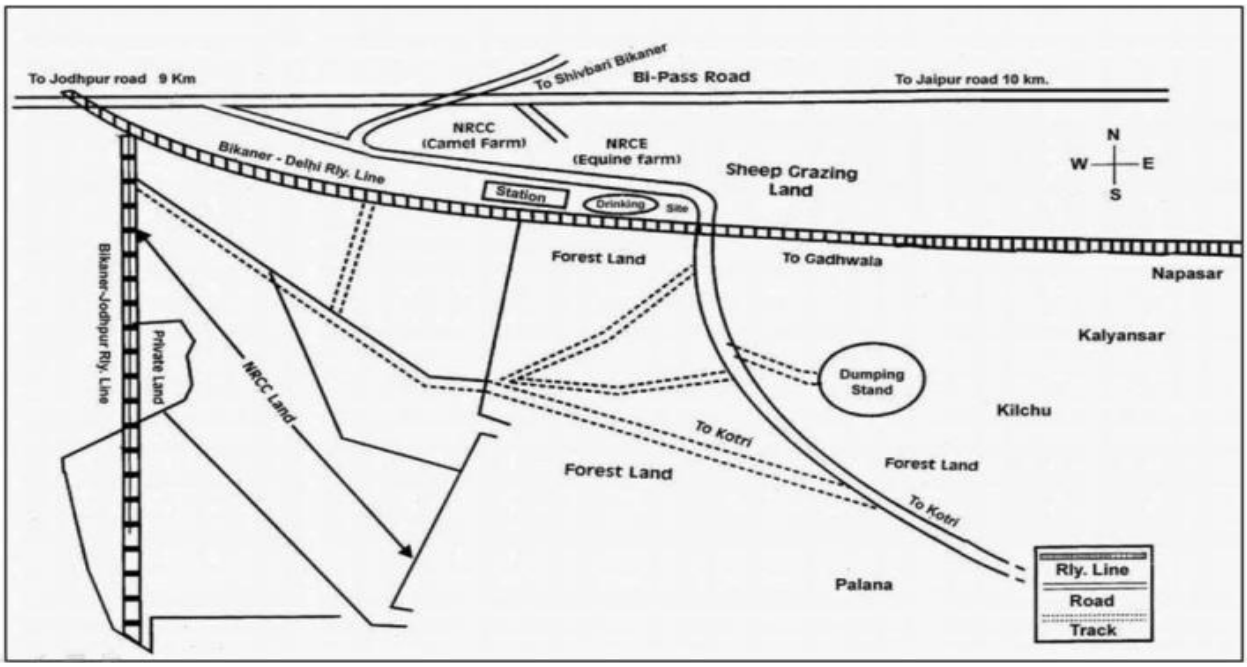

Figure 1: Map of Jorbeer: Showing dumping stand with adjoining areas

The Bikaner district of Rajasthan is situated in the western part of the "Thar" desert. The 'Thar' desert is known for extreme desertic conditions where the temperature reaches upto 49.5^0C high and minimum - 1^0C to -2^0C, high solar incidence 450-500 cal M^{-2} day^{-1}. The vegetation of the region is thorny and scanty. Strong dust storms, shifting dunes, sparse water bodies are the main features of this desert area. In the sandy palins area, tree like *Prosopis cineraria* and *Salvadora Oleoides* and bushes of *Zizypus manutina* were observed at certain places forming the dominant vegetation.

METHODS

I have visited the carcass dump several times every month between October 2006 to March 2011 ensuring coverage of the entire migratory period of this species. Visits were always carried out from morning until dusk in order to determine the importance of nocturnal sites (Garrido and Sarasa 1998). In each visit, all Griffon vultures were counted by binocular, avoiding close approaches that might alter behaviour. In certain instances, when birds were actively feeding, vultures allowed observers to approach <10m. only the highest counts per month were considered (Sunyer 1988).

RESULTS AND DISCUSSION

Eurasian Griffon vulture (*Gyps fulvus*) reaches the Jorbeer area in the month of October. They come as flocks along with Himalayan Griffons and cinereous vultures. Their departure from this area starts in the last week of February and by first week of March they completely leave the area. The maximum population of Eurasian Griffon vultures during study period October, 2006 to March 2011 were recorded i.e. 395 Griffon vultures in year 2005-2006, 410 vultures in 2006-2007, 455 vultures in 2007-2008, 515 vultures in 2008-2009, 580 vultures in 2009-2010 and 670 Eurasian Griffon vultures in year 2010-2011. The Eurasian Griffon vulture is regular winter visitor of Jorbeer. The maximum population of Eurasian Griffon vulture (*Gyps fulvus*) observed in December, January and February months. It was observed that the population of Eurasian Griffon vultures increased regularly in past six years at Jorbeer.(Figure 2)

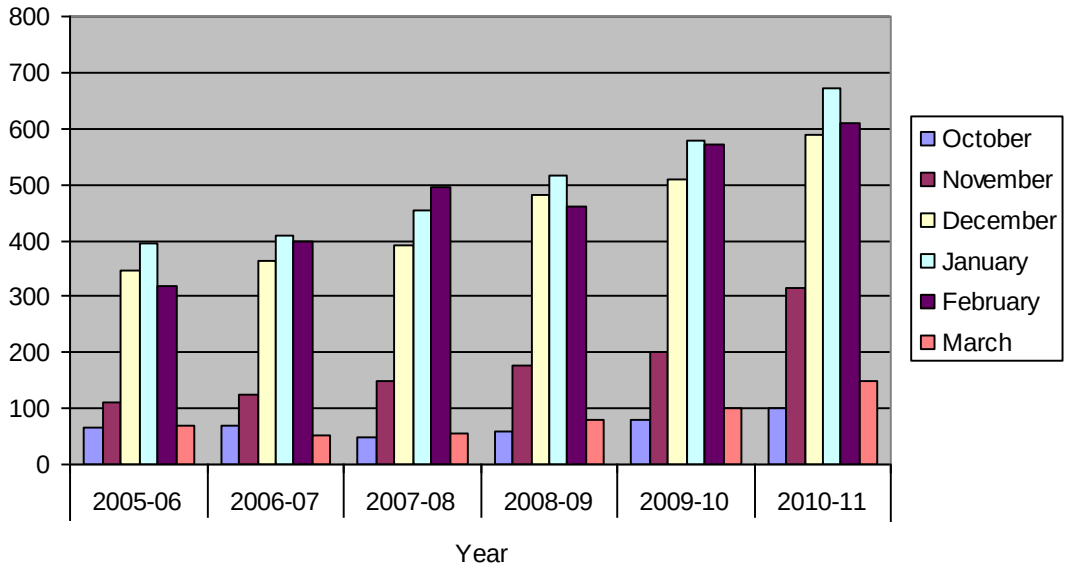

Figure 2: Eurasian Griffon vultures (Gyps fulvus) showing month wise population of year 2006-2011

Cunningham (2000) reported an increase in the number of Eurasian Griffons spending the winters in India. Prakash (1999) has observed wintering 25-30 Eurasian Griffons every year from 1985 to 1996 in Keoladeo National Park Bharatpur Rajasthan.

Spain Holds more than 80% European population of Griffon vulture (*Gyps fulvus*) (Hagemeijer and Blair 1997, Del Moral and Marti, 2001). During the 1980's and 1990's, this population has undergone a sharp increase. The 1979 national count of spain estimated 3,249 breeding pairs (SEO 1981); the 1989 count after improving the census cover, estimated 8,014 pains (Arroyo *et al.*, 1990) and the third count carried out in 1999 with a similar census cover to 1989, estimated 22,455 breeding pairs (Del Moral and Marti 2001). Despite this spectaculars increase, little information is available on the factors affecting their numerical trends (Fernandez *et al.*, 1998 and Olea *et al.*, 1999 for regional approaches).

Jorbeer area has a major source of food availability for vultures as about 20-35 carcasses are dumped per day by the municipal board. The carcass dump of Jorbeer has been covering all the dead animals of the Bikaner city. The Eurasian Griffon was observed to feed with their own groups and Himalayan Griffon also. The maximum feeding occurs between 10.00 hours to 12.00 hours. Moderate feeding occur after 12.00 hours but afterwards it is very rare. One completely feed and with the crop fall they go for rest under shadow of trees *Salvadora Oleodies* to relax.

Food availability has certainly a functional response in Griffon numbers and their distribution (Munday et. al. 1992; Parra and Telleria 2004). Eurasian Griffon vultures were seen feeding on carcass dump at Jorbeer and roosting in tree adjacent to the dump throughout their winter migration. No Griffon vulture was recorded in spring and summer, while higher numbers were observed during wintering season (670 birds). Most birds (between 60 and 100%) were not adults. Carcass dump is adequate feeding sites in addition to exhibiting high food availability to scavengers. While availability of carcasses was high in the study area, some young and inexperienced Eurasian Griffons may have learnt to feed on dump because food taken from this predictable source was earlier to obtain and more profitable than reaching for carcasses and fighting with adults for food. This increase was related to changes in food resources, in particular livestock availability (Griffon vultures feed almost exclusively on livestock carcasses; eg. Donazar 1993). This might indicate a functional relationship between food abundance and vulture numbers although given the low rate of consumption of the available livestock, biomass (Arroyo *et al.*, 1990, Donazar and Fernandez 1990). (Figure 3)

Figure 3: (A) Showing adult Eurasian Griffon vulture (*Gyps fulvus*) with crop fall out after feeding sitting on *Salvadora Oleoides* at Jorbeer **(B)** Showing groups of Eurasian Griffon vulture (*Gyps fulvus*) feeding on Carcasses at Jorbeer

Supplementing populations with carcasses has proven to be particularly crucial for reducing juvenile mortality during critical periods such as post-fledging and migration of the non-adult vulture population (Sunyer 1988, Diaz *et al.,* 1996, Sampietro *et al.,* 1997). Accordingly, Garrido and Sarasa (1998) have suggested the existence of a possible wintering area located in Strait of Gibraltar region (Southern Spain) , strongly associated with a rubbish dump. Indeed this location is frequently used as both a feeding and roosting site during the winter. In certain area of India, the use of human rubbish dumps close to population areas by Griffon vultures has been significant (Satheesan, 2000).

In fact, there have been recorded maximum of 670 Eurasian Griffon vultures feeding at a time along with other individuals belonging to other species such as Himalayan Griffon vultures (*Gyps himalayensis*) Cinereous vultures (*Aegypiues monachus*), Egypian vultures (*Neophron percnopterus*), Steppe Eagle (*Aquila nepalensis*), Black Eagle (*Ictinaetus malayensis*), Cattle Egrets (*Bubulcus ibis*). Intra and inter specific agnostic interactions were sporadic Mostly Griffon vultures feeding in late morning gathered in nearby roosting sites. Both feeding and roosting sites were close together indicates the high suitability of dumps as food source because minimal energy is expended when searching for food (Lack 1954). Additionally, others have affirmed that superabundance of food is one of the causes of the sudden recovery of populations in the country (Olea *et al.,* 1999, Camina 1998).

REFERENCES

Ali S and Ripley SD (1983). Hand book of the Birds of India and Pakistan Compact edition. (Oxford University Press, Bombay).

Amadon D (1964). The evolution of low reproductive rates in birds. *Evolution* **18** 105-110.

Anderson, Mark D, Pipes, Steven E, Swan, Gerry E (2005). Non-steroidal anti-inflammatory drug use in South Africa and possible effects on vulture's news and views. *African Journal of Science* **101**(3-4) 112-114.

Arroyo B, Ferreiro E and Garza V. (1993). II conso Nacional de Buitre Leonado (*Gyps fulvus*): Poblacion, distribution, demografia y conservation, Madrid: ICONA. MAPA.

Camina A (1995). Aprovechamiento de carronas por el buitre Leonado y otros caroneros en La Rioja Institue de Estudior Riajanor. Logrono, Spain.

Cunnigham A (2000). Investigation of vulture mortality in India. Report of a visit to India (February, March, 2000) *Royal Society Protection of Birds and Bombay Natural History Society*.

Del Moral JC and Marti R (ed) (2001). EL Bruitre Leonads on la Peninsula Iberica III Censo National I censo Iberico Coordinater, 1999. Madrid: SEO/Birdlife.

Diaz M, Arensio B, Telleria JL (1996). Avis Ibedricas I No Passeriformes JM Reyero Ediciones, Madrid, Spain.

Donazar JA (1993). Los buitres ibericos. *Biological Conservation* Madrid.

Donazar JA and Fernandez C (1990). Population trends of the Griffon vulture *Gyps fulvus* in northern Spain between 1969 and 1989 in relation to conservation measures. *Biological Conservation* **53**(2) 83-91.

Fernandez C, Azcona P and Donazar JA (1998). Density dependent effect on productivity in the Griffon vulture *Gyps fulvus* then role of interference and habitat heterogeneity. *Ibis* **140**(1) 64-69.

Garrido JR and Sarasa CG (1998). Importancia del vertedero de Los Barrios (Campo de Gibraltor, Cadiz) en la ruto migratoria occidental del Milano Negro (*Milvus migrans*) el Buitre Le onado (*Gyps fulvus*) *Almoraima* **19** 217-224.

Gilbert M, Virani MZ, Watson RT, Qaks L, Benson PC, Khan AA, Ahmed S, Chaudhry J, Arshad M, Mahmood S and Shah QA (2002). Breeding and mortality of Oriental white backed vulture *Gyps bengalensis* in Punjab Province, Pakistan, *Bird conservation International* **12** 311-326.

Hamemeijer WJM and Blair MJ (eds) (1997). The EBCC Altas of European birds: their distribution and abundance.

Lack D (1954). The natural regulation of animal numbers oxford University Press, Oxford, U.K.

Munday PJ, Butchart, Ledger J, Piper S (1992). The vultures of Africa academic press, London.

Olea PP, Garcia J and Falagon J (1999). Expansion del Buitre Leonado *Gyps fulvus* Tamano de las poplacius of parametros reproductores en un area de reciente colonizacion, *Ardeola* **46**(1) 81-88.
Pain DJ Cunningham AA, Donald PF, Duckworth JW, Houston D, Katzner T, Parry Jones J, Poole C, Prakash V, Round P, and Timmins R (2003). Gyps vulture decline in Asia: temperaspatial trends, causes and impacts. *Conservation Biology* **17**(3) 661-671.
Parra J, Telleria JL (2004). The increase in the Spanish population of Griffon vulture *Gyps fulvus* during 1989-1999: effect of food and nest site availability *Bird Conservation international* **14** 33-41.
Piper SE, Mundey PJ and Ledger JA (1981). Estimates of survival in the cape vulture in the cape vulture *Gyps corprotheres*. *Journal of Animal Ecology* **50** 815-825.
Prakash V (1999). Status of vultures in Keoladeo National Park, Bharatpur, Rajasthan, with special reference to population crash in gyps species, *Journal of Bombay Natural History Society Volume* **96**(3) 365-378.
Roberts TJ (1991). The birds of Pakistan volume (1) - Non-passeriformes. Oxford University Press.
Samant JS, Prakash V and Naroji R (1995). Ecology and behaviors of residential raptors with special reference to endangered species. Final report 1990-1993. Bombay National History Society, Mumbai.
Sampietro FJ, Pelayo E and Cabrera M (1997). La importancia de los muladares en Ia consevacion de las rapces carraneras de Arg Argon, *Quercus* **137** 18-22.
Satheesan SM (2000). New dimension to the conservation of scavenging raptors in India Cummunication to III International Carrion Birds Congress, Guadalajara, Spain.
SEO (1981).
Primer conso de Buitreras (1979). *Ardeola* 26-27: 256-259.
Sunyer C (1998). Importancia y manejo de basuresos y muladares para la conservation de las poblaciones de aves rapaces y el control de la rabia selvatica. Ministerio de obrar Publicas, Transportes y Medio Ambient de Espana, Madrid, Spain.
Wynne-Edwards VC (1955). Low reproductive rates in birds, especially sea-birds. Acta XI. *International Ornithological Congress* 1954 540-547.