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WINTER MIGRATION OF STEPPE EAGLES (*AQUILA NIPALENSIS*) AT JORBEER, BIKANER

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ABSTRACT

Steppe eagle (*Aquila nipalensis*) arrives in flocks during winter migration at Jorbeer. The migration of eagles have supported by availability of predictable food source. There was incredible increase in population of steppe eagles in past years as maximum of 310 eagles recorded in 15 years of research work. They are working as feeding associates of vultures which dominates the raptor population. Relationship during arrival and departure were positive in all years. Jorbeer with consistent supply of good for eagles may be useful for migration behaviour. Nesting has not been recorded as *Aquila* eagles reaches with their juveniles and sub adults. No sign of any drug and disease were observed. The feral dogs are main cause of injuries and death of eagles.

Keywords: *Steppe Eagle, Winter Migration, Population, Feral Dogs*

INTRODUCTION

The Steppe eagle (*Aquila nipalensis*) belongs to the family Accipitridae. Steppe eagle is a bird of prey. It is about 62-81 cm in length and has a wingspan of 1.65 - 2.15 meter and weight 2.3 to 4.9 kg. This is large eagle with brown upperparts and blackish flight feathers and tail. It has a pale throat. The steppe eagle has a global population in range of 100,000 - 1,000,000 individuals. It breeds in extreme South-Eastern Europe, across central Asia, South-West Russia, and Northern Kazakhstan to Transpaikalia, South to the Aral Sea, Northern Tibet and Mongolia. It winters in eastern Africa to South Africa, with fewer also in Middle East and the Indian subcontinent cart to Myanmar (Ferguson-Lees and Christie, 2001). The migration of steppe eagles along the Himalayas was first referred to by (Donald 1923) who observed regular migration of eagles. The migration of 45,000 eagles was counted in Nepal in autumn (Fleming, 1983) where 10,000 - 20,000 steppe eagles noted in Nepal each autumn (Rober, 1989).

The Jorbeer area of Bikaner is center of attraction for winter migrating vultures as seven species have been observed in the area (Khatri, 2013). But other raptors i.e. steppe eagles, Tawny Eagle, Black Kite, White tailed Eagle, Booted eagle, Long legged Bazzard, Laggor falcon, spotted owlet are also showing their regular presence.

Steppe eagle (*Aquila nipalensis*) is regular visitor at Jorbeer in winters. Now a days it becomes most important raptor in area. This study reveals status, migratory pattern and behavior of steppe eagle at Jorbeer area.

MATERIALS AND METHODS

Bikaner district is a Western part of "Thar" desert. Jorbeer has extreme desertic conditions where temperature reaches upto 49.5°C high and minimum -1°C to -2°C. The study area Jorbeer situated South-East to NRCC (National Research Centre on Camel). The geographic location of study area is 28°3' North latitude and 73°5' East longitudes at height of 234.84 MSL. Jorbeer area is carcass dumping place by municipal board. It is situated South-East to Bikaner 12 km. away from city. It is about 4 Square/Kilometer area under conservation of Forest department. The vegetation of the region is thorny and scanty. The flora and fauna inhabiting are well adapted to desert condition viz. water deficiency and extreme of temperature.

Methods

The steppe eagles have been counted from September 2001 the March 2015. Counts were made by using binocular as limited sources available. The timing of observation was 7.00 - 18.00 hrs. in regular

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intervals. The maximum population was recorded in month and year-wise presented in table. Steppe eagles were counted at dumping stand also around four square kilometer on trees, bushes and grounds. Counts were made from a good view of the surrounding landscape and steppe eagles seen perched, feeding flying and basking on ground.

RESULTS AND DISCUSSION

Jorbeer area is a dumping stand for cattle carcasses as approximately 20-35 carcasses dumped per day by municipal board. Alongwith Steppe Eagles seven vulture species were also recorded i.e. King Vulture (*Sarcogyps Calvus*) white backed vulture (*Gyps bengalensis*), Long billed vulture (*Gyps Indicus*), Eurassian griffon vulture (*Gyps fulvus*), Himalayan griffon vulture (*Gyps himalayensis*) and (Egyptian vulture (*Neophron percnopterus*) (Khatr, 2013). Steppe Eagle regularly winters at Jorbeer they arrives in September or October and stays upto March or April months. They reach in small flocks and remains scattered in the area. The maximum population of steppe Egles were recorded (n=310) in year 2015. Population data shows regular increase in number of Aquila eagles. Eagles perched on trees, carcasses and bask on ground (Table 1).

Table 1: Maximum population of Steppe eagles (*Aquila nipalensis*) at Jorbeer year (2000-2015)

Mont hs	Y E A R														
	2000- 2001	2001-2002	2002-2003	2003-2004	2004-2005	2005-2006	2006-2007	2007-2008	2008-2009	2009-2010	2010-2011	2011-2012	2012-2013	2013-2014	2014-2015
SEPT	-	4	8	2	7	-	27	21	32	43	32	23	39	44	38
OCT	19	7	13	7	11	22	38	42	53	49	56	48	53	69	78
NOV	12	15	26	13	21	38	54	67	78	83	93	68	74	87	117
DEC	18	22	30	26	48	49	63	83	92	102	121	105	116	120	199
JAN	17	24	28	32	100	83	107	110	135	164	159	174	181	196	310
FEB	20	18	31	39	66	87	112	121	143	157	170	165	178	189	277
MAR	16	20	27	47	61	56	93	100	98	109	98	108	141	167	205
APR	-	12	22	33	52	23	42	22	48	14	39	52	48	68	112

They were always seen scattered in groups around 4 Sq/Kilometer area of dump site. Mostly steppe eagles are solitary feeders and feed in their own groups, it may be of 10-15 individuals. They not show any type of territorial behavior. Eagles obtain food from carcasses. The feeding and roosting site both were close together at Jorbeer, indicates the high suitability of utilization carcass dumps as good sources (Khatr, 2012). Aquila Eagles were observed healthy, no sick eagle recorded during long term study. Variety of studies suggests that NSAIDs are main cause of vulture and other raptors decline. Effects of any NSAIDs (Diclofenac and Aceclofenac) were not observed at Jorbeer, Bikaner. Feral dogs are main threat for vultures and other raptors (Khatr, 2015)

In India, the species has a widespread winter distribution (Naoroji, 2006). At least thousands of steppe eagles winters in India and their arrival recorded over October-November with birds departing during February-March each year in Nepal (Decandido *et al.*, 2001; Gurung *et al.*, 2004). Large number of steppe Eagles migrated north-west through the area of Dharamsala in autumn 2001 (10,000 - 11,000 individuals estimated) and returning South-East in spring 2002 (5,900 - 6,000 individuals estimated). The totals suggest that at least 10,000 individuals winter somewhere west of India (Jan, 2004). Besides wintering population estimates are not available, but counts of migrating flocks over the Himalayas in Himachal Pradesh observed thousands of eagles winter in India (Donald, 1923; de Rodes, 1989). In Hoang Lein nature reserve, northern Vietnam et total of 1,752 migrating raptors were recorded crossing the Tram Ton.

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Figure 1(a): A group of Steppe Eagles (*Aquila nipalensis*) sitting on Tree top at Jorbeer, Bikaner



Figure 1(b): A adult Steppe Eagles (*Aquila nipalensis*) at Jorbeer, Bikaner



Figure 2(a): A adult Steppe Eagles (*Aquila nipalensis*) in flight Jorbeer, Bikaner



Figure 2(b): A adult Steppe Eagles (*Aquila nipalensis*) feeding on carcass at Jorbeer, Bikaner

The timing of movements through the pass seems to be determined by prevailing weather conditions, particularly the movement of a cold front (Andrew, 2002). Migration routes of 16 steppe eagles were tracked by satellite telemetry between Africa and Eurasia excluding individuals wintering in Arabia (Mayburg *et al.*, 2003). According to advanced theory on ecological grounds that adult and immature steppe Eagles have different wintering grounds (Brooke *et al.*, 1972). This theory was summarized,

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according to which adult birds overwinter in Eastern Africa and young birds in Southern Africa (Brown *et al.*, 1982; Steyn, 1982; Shirihai *et al.*, 2000).

The steppe Eagles have shown consistent winter migration at Jorbeer as sufficient supply of food for the eagles may be useful to migrating behavior. The number of steppe eagles increased in past years and counts at sites are useful to understand the demography of eagles. Steppe eagles appear as feeding associates of vultures. Migrating steppe eagles population at Jorbeer dominated by young birds. Nests availability is a serious matter of concern because eagles are not building their nests.

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