

*Status Survey of Endangered Species*

# **Status of Kiang**

***Equus kiang* Moorcroft, 1841**

**(Perissodactyla : Equidae)  
in Eastern Ladakh, India**

**J.R.B. ALFRED, J.M. JULKA, H.S. MEHTA,  
R.M. SHARMA, P.C. TAK,  
D.K. SHARMA AND R. PALIWAL**



**ZOOLOGICAL SURVEY OF INDIA**

*Status Survey of Endangered Species*



**Status of Kiang, *Equus kiang* Moorcroft, 1841  
(Perissodactyla: Equidae)  
in Eastern Ladakh, India**

**J.R.B. Alfred, J.M. Julka\*, H.S. Mehta\*\*, R.M. Sharma\*, P.C. Tak\*\*,  
D.K. Sharma\* and R. Paliwal\***

*Zoological survey of India, M-Block New Alipore, Kolkata-700 053*

*\*High Altitude Zoology Field Station, Zoological Survey of India, Solan-173211*

*\*\*Zoological Survey of India, Northern Regional Station, Dehra Dun*



**Zoological Survey of India  
Kolkata**

## CITATION

Alfred, J.R.B.; Julka, J.M.; Mehta, H.S.; Sharma, R.M.; Tak, P.C.; Sharma, D.K. and Paliwal, R. 2006. *Status Survey of Endangered species*. Status of Kiang, *Equus kiang* Moorcroft, 1841 (Perissodactyla : Equidae) in Eastern Ladakh, India : 1-23. (Published by the Director, *Zool. Surv. India*, Kolkata)

Published : February, 2006

ISBN 81-8171-093-2

© Government of India, 2006

### ALL RIGHTS RESERVED

- No part of this publication may be reproduced, stored in a retrieval system or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording or otherwise without the prior permission of the publisher.
- This book is sold subject to the condition that it shall not, by way of trade, be lent, resold hired out or otherwise disposed of without the publisher's consent, in any form of binding or cover other than that in which it is published.
- The correct price of this publication is the price printed on this page. Any revised price indicated by a rubber stamp or by a sticker or by any other means is incorrect and should be unacceptable.

### PRICE

**India : Rs. 150.00**

**Foreign : \$ (U.S.) 10, £ 7**

Published at the Publication Division by the Director, Zoological Survey of India, 234/4, A.J.C. Bose Road, 2nd MSO Building (13th Floor), Nizam Palace, Kolkata-700020 and printed at Power Printers, New Delhi 110 002.

# CONTENTS

1. INTRODUCTION .....	1
2. PREVIOUS STUDIES .....	2
3. STUDY AREA .....	3
4. METHODOLOGY .....	5
5. TAXONOMY .....	6
5.1 Subspecies .....	6
5.2 Synonymies .....	7
5.3 Type locality .....	7
5.4 Citation .....	7
5.5 Local names .....	7
5.6 Physical description .....	7
5.7 Osteology .....	8
5.8 Call .....	8
5.9 Moulting .....	9
5.10 Geographic range .....	9
6. ECOLOGY AND BEHAVIOUR .....	10
6.1 Habits .....	10
6.2 Habitat .....	10
6.3 Food and feeding .....	11
6.4 Herd .....	11
6.5 Herd size .....	12
6.6 Predation .....	12
6.7 Mortality .....	13
6.8 Breeding .....	13
6.9 Uses .....	14
7. POPULATION STATUS .....	14

8. THREATS .....	18
9. CONSERVATION .....	18
9.1 Status .....	18
9.2 Suggested Conservation Measures .....	19
10. ACKNOWLEDGEMENTS .....	19
11. REFERENCES .....	20

## 1. INTRODUCTION

The Kiang or Tibetan Wild Ass is an IUCN Data Deficient species (Globally), Vulnerable (Nationally), listed in Appendix II of CITES and Schedule I of the Indian Wildlife (Protection) Act, 1972 (amended up to 2003) (Sanjay Molur *et al.*, 1998). As no comprehensive account of this species is available, therefore, an attempt is made to compile the existing information and the data collected during field surveys by the Zoological Survey of India to provide an update on the status of Kiang in eastern Ladakh.

The Assess, Horses and Zebras belong to the family Equidae. The living members of this family are native to Central and Eastern Asia and Africa except Sahara. The family is monogeneric containing a single genus *Equus* (Walker, 1968), which is represented by nine valid species in the world, viz., *Equus asinus*, *E. burchellii*, *E. caballus*, *E. greveyi*, *E. hemionus*, *E. kiang*, *E. onager*, *E. quagga* and *E. zebra*, (Wilson & Reeder, 1993).

In Indian limits, two species occur, viz., *E. khur* Lesson, 1827 (Indian Wild Ass or Khur) and *E. kiang* Moorcroft, 1841 (Tibetan Wild Ass or Kiang). The former survives as an isolated population in Little Rann of Kutch in Gujarat, whereas the latter occupies the cold deserts of Ladakh (Groves, 2003). They are easily distinguished from each other by the characteristics as given in Table 1.

**Table 1.** Distinguishing Features of Indian Wild Ass (Khur) and Tibetan Wild Ass (Kiang). (Groves and Mazak, 1967; Prater, 1971; Alfred *et al.*, 1994; Groves, 2003).

Feature	Indian Wild Ass or Khur or Ghorkar ( <i>Equus khur</i> )	Tibetan Wild Ass or Kiang ( <i>Equus kiang</i> )
Coat colour	Reddish yellow grey in summer; grey in winter	Reddish in summer; brown in winter
Height at shoulder	110-120 cm	120-135 cm
Width of dorsal stripe	60-80 mm (summer) 70-90 mm (winter)	35-65 mm (summer) 40-75 mm (winter)
Extent of dorsal stripe	Mane to tail-root	Mane to tail-tuft
Black ring above hoof	Absent	Present
Size of hoof	Small, ass-like	Larger, horse-like
Size of ears	Long, ass-like	Short, horse-like
Tail	Tufted at tip	Long hair on lateral surface almost to tail-root

## 2. PREVIOUS STUDIES

*India* : Moorcroft (1819-1825) during his travels through the Himalayas, recognised the distinctiveness of kiang from 'wild variety of horse' in eastern parts of Ladakh, and designated it as a new species, *Equus kiang*, resembling more to an ass than to a horse.

Ronaldshay (1902) gave a brief account on the behaviour of kiang in eastern Ladakh. Detailed osteological studies on kiang from Ladakh and other areas are of Groves and Mazak (1967). They also gave an up-to-date world distribution of its three subspecies. Rasool (1989, 1992) provided useful information on its westernmost distribution, habits, uses and population status (20-25 individuals) in the Shimshal Valley (Pakistan-occupied Kashmir). Mallon (1991), Bhatnagar and Wanchuk (2000), Pfister (2004), Tak and Sharma (2004) studied habitat, distribution, status and conservation of Kiang in eastern Ladakh.

Fox *et al.* (1991) estimated a population of about 1500 (0.25/km<sup>2</sup>) kiang in eastern Ladakh. High populations of kiang exist in Changthang Wilderness Area of eastern Ladakh with high density in Hanley, Chushul and Kuyul areas (Kitchloo, 1994). A population of about 1880 individuals is estimated to exist in the Changthang Wildlife Sanctuary with a density of 0.47 kiangs/km<sup>2</sup> for an area of about 4,000 km<sup>2</sup> (Julka *et al.*, 1999). Studies of Bhatnagar and Wanchuk (2000) and Pfister (2004) estimated that more than 2000 kiang survive in the area.

Low populations of kiang (subspecies *polyodon*) are occasionally found in northern Sikkim (Ali 1981, Lachungpa 1994, Shah 1994) and they possibly migrate to these areas from adjoining Tibet.

Based on osteological studies on the material of southern kiang from Sikkim in Zoological Museum in Berlin, Denzau and Denzau (2003) have drawn a new map for its distribution to include Sikkim, Nepal and south Tibet.

*China (including Tibetan Plateau)* : Based on height, Hodgson (1847) described *polyodon*, a distinct subspecies of kiang, from southern Tibet. Earlier distributional records of kiang in China are those of Prjewalsky (1875) and Hedin (1898). The 'aggressiveness' of Kiang towards travellers reported by Landor (1899). Hedin (1903, 1909 and 1922) reported high populations of kiang in some parts of Tibet. Hedin (1903) and Rawling (1905) presented observations on breeding of Kiangs. (Schäfer 1937) counted over 1000 kiangs with an average body mass of 250-300 kg and for some stallions 350-400 kg in Yalong Valley of Qinghai, China. Mazak (1963), Crandall (1964), Groves and Mazak (1967), Groves (1974), Feng *et al.* (1986) and Pohle (1991) have conducted morphological studies of Kiang.

There are some reports on the hunting of kiangs for meat in Qinghai, especially during the Great Leap Forward between years 1958 and 1961 (Zhang, 1984). Nevertheless, it had no appreciable impact on their density in the area as indicated by their subsequent high population counts (Butler *et al.*, 1986; Gao and Gu, 1989; Feng, 1991a; Schaller *et al.* 1991; Kaji *et al.*, 1993; Harris, 1993). In Xinjiang, their densities vary between 0.03-0.08 km<sup>2</sup> (Achuff and Petocz, 1988) and 0.75 km<sup>2</sup> (Feng, 1991b).

Recently, Harris and Miller (1995) have brought out a comprehensive account on its general habitat affinities and patterns of dietary overlap in relation to other Tibetan wild ungulates in Qinghai Province of China.

*Nepal* : Trumler (1959) described a new subspecies of kiang from Nepal. But Groves and Mazak (1967) have established that Trumler's material of kiang came from Sikkim. However, Schaller (1998) is of the opinion that kiang occasionally cross from Tibet into the Dolpo and Mustang areas of Nepal.

### 3. STUDY AREA

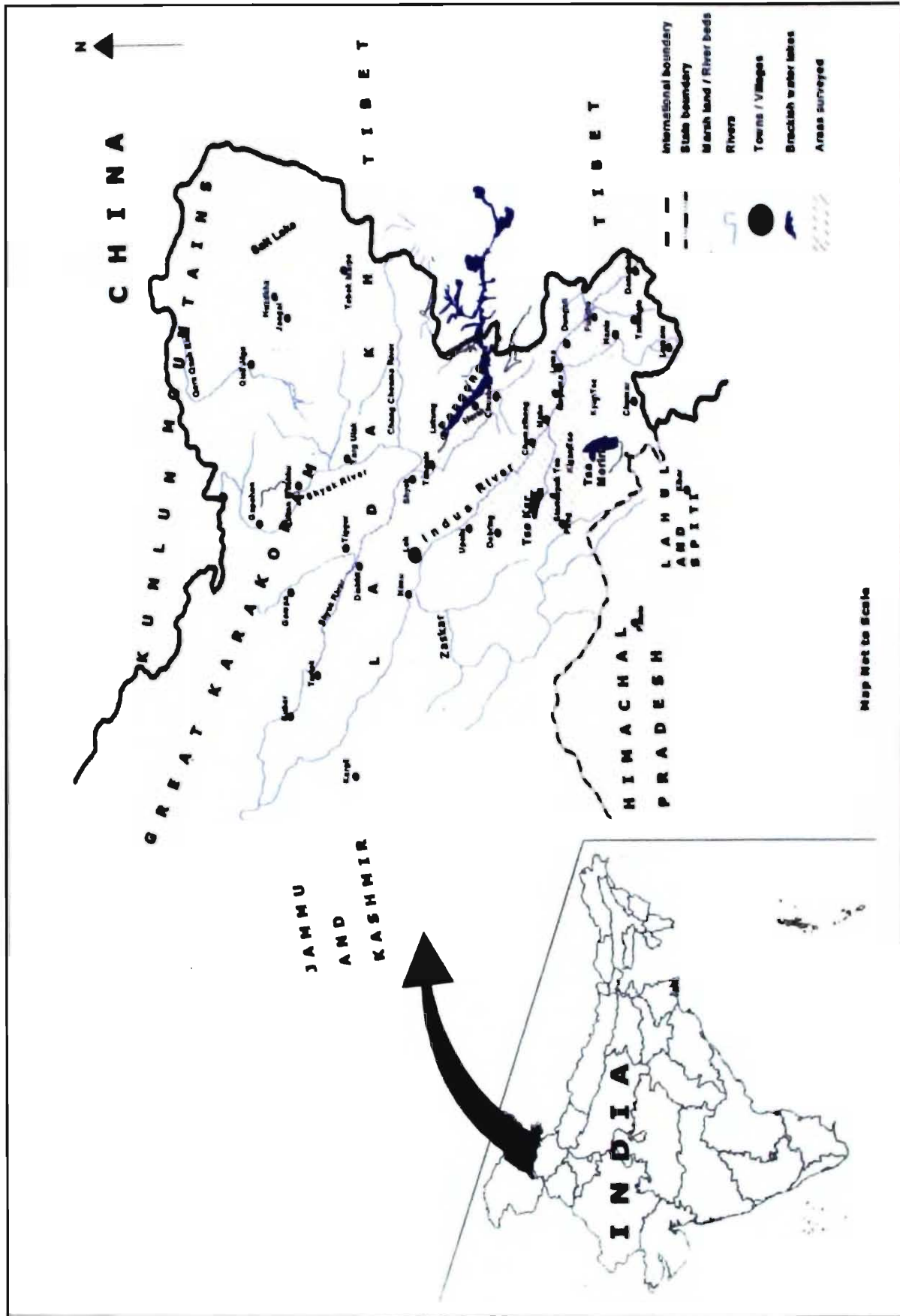
Pfister (2004) defines the Eastern Ladakh : from Upshi up the tributary valley to Taglang-La (Manali road); along the 'upper Indus' through Chumatang (3950 m) and Mahe (4050 m) to Loma (4200 m) and the Tibetan border; the Rupchu from Tanglang-La (5400 m) along Manali road (the More plains) to Pang, Tso-Kar (4600 m), Puga/Sumdo (4300 m) and Tsomoriri (4600 m) plains with adjoining areas; and the Changtang from Chumur (4450 m) eastwards via Hanle (4350 m) to the Tibetan border and north to Chushul (4450 m) with Pangong-Tso and Tangse (3800 m) to the west (Map-1).

The Changthang Wilderness Area (CWA) was notified in 1987 to provide sanctuary to its unique fauna and flora. It is located in northeast Ladakh and covers an area of about 4,000 km<sup>2</sup> between latitudes 34° 79' and 33° 79' N and longitudes 78° and 79° E. Physiographically, the Changthang is a southwest extension of the Tibetan plateau. General topography is rugged and comprises of vast marshy and sandy plains, more or less flat tablelands surrounded by barren mountains. Elevation varies from 4,000 m to 7,000 m above mean sea level. The area is drained by tributaries of the Indus river and bestowed with some very large brackish water lakes, namely Pangong Tso, Tso Moriri, Tso Kar, etc. Tso Kar with an area of about 15.6 km<sup>2</sup> is situated at an altitude of about 4500 m. Tso Moriri is the second largest lake in Ladakh (area, 138 km<sup>2</sup>) (Ramsar Site No. 1213) is located at an elevation of approximately 4500 m. Pangong Tso is the largest brackish water lake in the area, having an area of about 700 km<sup>2</sup>. Its maximum estimated length is about 135 km and average width as 5 km (approx 1/3 of the lake lies in India). The CWA also harbours some vast freshwater marshes in the river valleys.

Four distinct ecosystems can be recognised in the CWA (Kitchloo, 1994) :

- i) Riparian habitat with marshy lands along Indus River and its catchments (18%).
- ii) Aquatic habitat in Pangong Tso, Tso Moriri and other lakes (6%).
- iii) High altitude pastures (20%).
- iv) High altitude cold desert (55%) including agricultural land (1%).

The climate is extremely dry and cold, approaching arctic conditions. Average annual rainfall varies from 6 to 8 cm. Snowfall is not uniform as large tracts even remain snow-



Map 1. Areas Surveyed for Kiang populations in Ladakh

free during the winter. Daytime temperature in summer rises to 35°C but in winter, it remains below the freezing point. Minimum temperature during winter may be as low as -40°C. The vegetation comprises alpine arid pastures, dominated by low thorny scrub (*Loricera spinoides*, *Hippophae rhamnoides*), Tibetan furze (*Caragana* sp.) and a variety of grasses (*Festuca* sp., *Carex* sp., *Artemisia* spp., *Draba* sp., etc.).

#### 4. METHODOLOGY

While conducting general faunistic surveys in eastern Ladakh during August 2002 and August-September 2005 by four wheel drive vehicle, the Kiang population counts were made. The vehicle was driven at a slow speed (15-20 km/hr) to record Kiangs. On an average 30-40 km distance (one side) was traversed per day for the counts. Sightings were made during bright day light hours and the observation timings were kept constant throughout study period. On an average after every 2-3 km, the vehicle was stopped and the slopes and valleys were scanned. While driving in open straight valleys the scanning area was divided into small blocks and number of kiangs in each block was counted. Two to three observers repeated each count in each block for the accuracy. Observations were made with the aid of 10x50 power prismatic field binoculars. Due to the similar appearance of coat, long sighting distances and intensive heat waves, it was difficult to identify sex of the individual(s). The photographs were taken using 500 mm zoom lens, Sigma make fitted to an EOS ultrasonic Canon camera.

To assess the population status of Kiang, the following sectors/segments of eastern Ladakh were surveyed :

- 1) Pang Tanglang La (Moore Plains)
- 2) Nyoma Loma
- 3) Mahe Nyoma
- 4) Loma Chushul
- 5) Chushul Thakum Lukung (Pangong Tso)
- 6) Chushul Tangtse (Parma Valley)
- 7) Chushul Lol Yogma
- 8) Loma Dungti Tigermala (Dumchok) (Upper Indus)
- 9) Loma Hanle (Neelamkhul Plains)
- 10) Kalang Tar Tar Valley
- 11) Mahe Tso Moriri
- 12) Sumdo -Tsokar

## 5. TAXONOMY

Kingdom	ANIMALIA
Phylum	CHORDATA
Class	MAMMALIA
Order	PERISSODACTYLA
Family	EQUIDAE
Subfamily	EQUINAE
Genus	<i>Equus</i> Linnaeus, 1758
	<i>Equus kiang</i> Moorcroft, 1841

Some taxonomists recognise three subspecies of Kiang based on characters as given in table 2.

### 5.1 Subspecies

Three subspecies of *Equus kiang* have been recognised by some taxonomists as detailed in table 2.

**Table 2.** Distinguishing features and distribution of three subspecies of Kiang (*Equus kiang*) (Source : Julka *et al.*, 1999).

Feature	<i>E. kiang polyodon</i> Southern kiang	<i>E. kiang kiang</i> Western kiang	<i>E. kiang holdereri</i> Eastern kiang
<i>Colour</i>	Light brown in winter and light brown in summer with a greater extent of white underside	Dark auburn in winter and shining brick-red in summer	Similar to <i>polyodon</i>
<i>Height at Shoulder</i>	104-113 cm	120-135 cm	139-141 cm
<i>Skull</i>			
<b>Male</b>			
<i>Av. Greatest Length</i>	473.0 mm	518.4 mm	527.7 mm
<i>Av. Basal Length</i>	426.0 mm	461.2 mm	463.1 mm
<b>Female</b>			
<i>Av. Greatest Length</i>	481.0 mm	514.2 mm	519.3 mm
<i>Av. Basal Length</i>	436.5 mm	456.4 mm	458.1 mm
<i>Distribution</i>	East Tibet, Szechwan	East Ladakh (India; Jammu & Kashmir) & adjoining West Tibet	South Tibet, North Sikkim (India)

**5.2. Synonymies** : *equioides*, *nepalensis*, *tafeli* Groves and Mazak (1967) and Groves (2003) have separated *kiang* from *hemionus*.

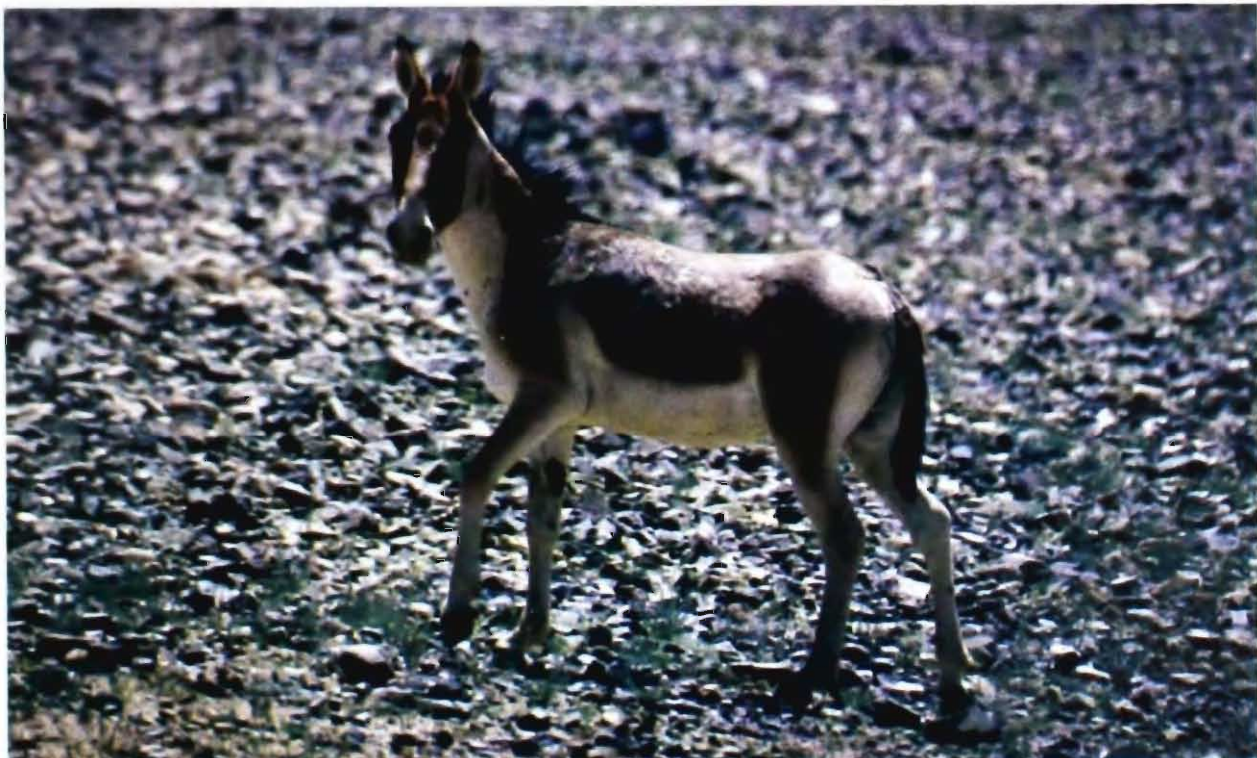
**5.3. Type locality** : Ladakh, Kashmir (India), Tibet, Tsinghai and Szechwan (China), adjacent Nepal and Sikkim (India).

**5.4. Citation** : Travels in the Himalayan Provinces, 1 : 312.

**5.5. Local names** : Skiang, Kiang.

**5.6. Physical description** : *E. kiang* is the largest of all African and Asiatic wild asses in the world. It is considered to be closer to horses than to asses. Morphological similarities with horses are short ears (165-178 mm), large tail tuft and broad hooves with dark round ring. Like all wild asses, it has a short upright mane and a dark and thin stripe along the back (not bordered with white) extending from nape to tail tuft. Its body length is about 210-230 cm, shoulder height about 130-140 cm, tail length 90-100 cm, and body weight 250-380 kg.

The upper parts of kiang are reddish brown and are sharply contrasted with the pure white under parts including the rump. The white area stretches up the ventral half (stomach-side) of the neck to the jowls. A thin stripe of brown extends down the front of the legs, which are otherwise white. Where legs meet the body, large wedges of white reach up the sides. The thick grey muzzle has a thin border of white. The summer coat is short and



**Photo 1** : An adult Kiang

sparse compared to the very long, thick, browner winter coat. There is a short, dark brown mane, which stands vertically and follows the top of the neck from the ears to the shoulders. The tail has a dark brown tuft, with long hairs growing up the side. The life span of kiang is estimated to be of about 20 years (*summarised from* Prater, 1971, Brent, 2001, Groves 2003 and Pfister, 2004) (Photo 1, 2 & 3).



**Photo 2 :** Horse-like hoof of Kiang

Kiangs are very similar to *E. hemionus* (The Onager or Asian wild ass) genetically and physically. The

mitochondrial DNA divergence between two species is only 1%, which probably occurred about 5,00,000 years ago (Ryder and Chemnick, 1990).

**5.7. Osteology :** Size large, skull length 492-537 mm (n=15). Skull resembles *E. hemionus*, except that incisors tend to sit more vertically in the jaws and highest point on cranial profile is often directly above the posterior rim of the orbit, instead of behind it (Groves, 2003).

**5.8. Call :** Cry is more like braying than neighing (Moorcroft and Trebeck, 1819-1825 and Rasool, 1992). Rather silent, it utters a snort puff when alarmed; stallions, when excited, frequently utter a repeated two-syllabic, nasal, shrill braying-neighing 'whiii-huu' mostly when full gallop (Pfister, 2004).



**Photo 3 .** Adult Kiangs



**5.9. Moulting :** In fact, there is no information available on moulting process on the wild population of Kiang. However, the observations made on the topographical succession of spring moult of a four year old male Kiang in Prague Zoo (USSR) (Mazak 1962), suggests that the complete process of moulting takes about eighty days (5<sup>th</sup> May to 25<sup>th</sup> July). First, the changes of hair begin on the head around eyes and cheeks; followed at the distal parts of limbs, ventral part of the neck, cranial region and terminating on the belly, flanks and the thighs of the hind legs.

During our surveys, a few individuals were observed in various stages of moulting in the month of August (Photos 4, 5, & 6). This indicates that the wild population of Kiang in eastern Ladakh exhibit almost a similar pattern of topographical succession of moulting as reported in captivity. It means that the moulting process is completed in most of the individuals by July end.

**5.10. Geographic range :** *India* : Ladakh-Rupshu, Changthang and Chang-Chenmo in Jammu and Kashmir and north Sikkim; *China* : Tibet, Tsinghai and Szechwan regions; *Pakistan* : Pakistan-China border along bank of rivers Oprang and Muztagh (eastern most part of Khunjerab National Park beyond Shimshal); and *Nepal*.

**Photo 4, 5 & 6 :** Kiang (s) in various stages of moulting

## 6. ECOLOGY AND BEHAVIOUR

**6.1. Habits :** Kiangs are one of the most inquisitive animals and may frequently approach within 50 yards or so of any strange object. If approached, they trot off, turn, look and leave. They live in cohesive herds, which do not disintegrate for a longer time.



Photo 7 : Kiangs in a typical habitat

**6.2. Habitat :** Kiangs are inhabitants of open flat, rolling plains, including deserts, semi-deserts, or steppe with drinking water sources between 3590 and 4850 m altitudes (Photo 7 & 8). They occur all along eastern Ladakh from valley bottoms to ridgelines mainly covered by sedge-grass meadows interspersed with bushes of *Caragana* species and sparse to dense sturdy grasses of *Festuca* species (Tak and Sharma 2004). They prefer direct sources of water when available.

however, they satisfy their water needs in winter by eating snow (Grzimek's 1975).

In contrast to the mountain ungulates, Kiangs use broad valleys, areas of dissected terrain with large xeric basins as “*escape terrain*” (Photo 9). They have been reported travelling long distances in search of food and water (Harris and Miller, 1995).



Photo 8 : Habitat of Kiang with *Caragana* bushes in the foreground

Photo 9 : Escape terrain of Kiang





Photo 10 : A grazing herd of Kiang

**6.3. Food and Feeding :** Kiangs feed mainly on coarse grasses (*Festuca* sp.) and short plants, which are widely distributed and plentiful in the area. Their powerful lips and horny gums are suited to masticate the hard, sour grasses found in the area. *Stipa* spp. constituted almost 95% of Tibetan wild ass diets, significantly more than the proportion available even within the *Stipa* formation. Forbs were extremely rare in wild ass diets, and legumes were significantly avoided (Harris and Miller, 1995) (Photo 10).

**6.4. Herd :** Kiang herd is a stable unit consisting of adult female with its foal. However, the group of Kiang is not a watertight compartment instead the number of individuals in a herd keeps on changing.

Kiang's herd is a well-organized and regimented unit (Photo 11). The individuals in a herd form rows and columns. Led by an old female, the herds travel in a single file, and the members appear to do everything including eating, drinking, turning and running-in unison. When a herd runs through the plains, one animal runs right behind another. Unlike horses, however, there is little physical contact (like mutual grooming) (Photo 12) among animals, although as they graze and move about they bump and bite one another. Kiangs are good swimmers (Photo 13 & 14). During August and September, the only time when vegetation is plentiful, kiangs may gain up to 40-45 kg (Grzimek's, 1975; Brent, 2001).



Photo 11 : A regimented Kiang herd



Photo 12 : Kiangs seldom groom

**6.5. Herd size :** Studies on group size of Kiang in eastern Ladakh during summer revealed that it varies from 2 to 84 individuals (Julka *et al.*, 1999), 2 to 74 (Bhatnagar and Wanchuk, 2000), 2 to 28 (Tak and Sharma, 2004) (Photo 15). However, Shah (1994) in Sikkim observed an aggression of more than 500 individuals from autumn to spring. This might be the result of either shrinkage in foraging area due

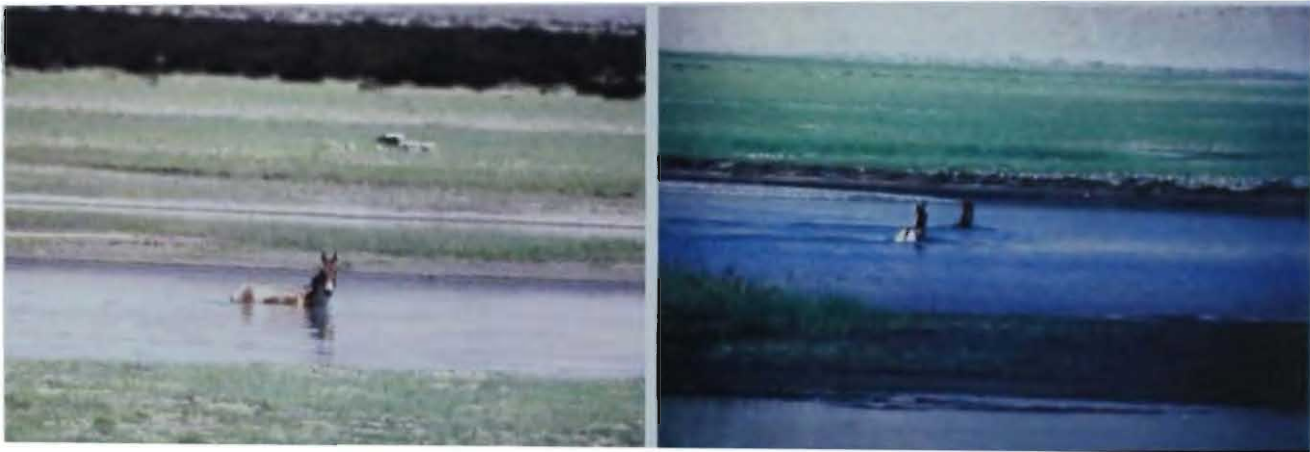


Photo 13 & 14 : Kiang (s) crossing the Indus water



Photo 15 : A Kiang herd

to snowfall, colder temperature and enhanced threat from predators or an anti-predatory strategy (Hamilton, 1971; Bhatnagar and Wanchuk, 2000).

**6.6. Predation :** Tibetan Wolf and Tibetan Wild Dogs are the main natural predators of Kiang (Pfister, 2004). However, in early 1900s, they have been hunted for meat and skins.

**6.7. Mortality :** Mortality can either be natural or unnatural. Predation, diseases, inclement climatic conditions, starvation etc. are some of the natural causes. Roadside accidents, hunting for meat and fur, competition for food, alteration of natural habitats due to various developmental activities, unregulated tourism etc. are some of the unnatural causes.



**Photo 16 :** A carcass of Kiang

During 2005 survey four carcasses of adult and sub adult kiangs were seen near Mankhang plains. Surprisingly, all the carcasses were seen within a distance of 2 km. It was difficult to ascertain the exact cause of death in all these cases (Photo 16). However, local inhabitants were of the opinion that possibly due to heavy snowfall in preceding winter there has been lack of grasses for foraging and they have witnessed many more kiangs dying of starvation.

**6.8. Breeding :** The adult males maintain small territories of about 1-2 sq km during mating season. They defend their territories from rival males and try to hold the passing mares in oestrus. Females attain sexual maturity after 2 to 3 years of age. Usually they have their first offspring at the age of 3 to 4 years. Gestation period is of about 11-12 months. The parturition takes place during July-August. Mare comes into oestrus once in two years. Normally a mare gives birth to one foal (Photo 17). Weaning is for a year but foal remains closely associated with the mother for about another year (Scahller, 1998; Pfister, 2004).



**Photo 17 :** Kiangs with foal

Non-breeding females comes into oestrus at the time when other females give birth. Mating starts from the last week of July and is over by the end of September.

**6.9. Uses :** As Kiang gets saddle-sore it cannot be used either for riding or as beast of burden. Also due to its refractory nature it cannot be tamed as a pack animal. In the past, a Russian traveller Nazarov did tame one, but it grew bad-tempered with advanced age (Rasool, 1992).

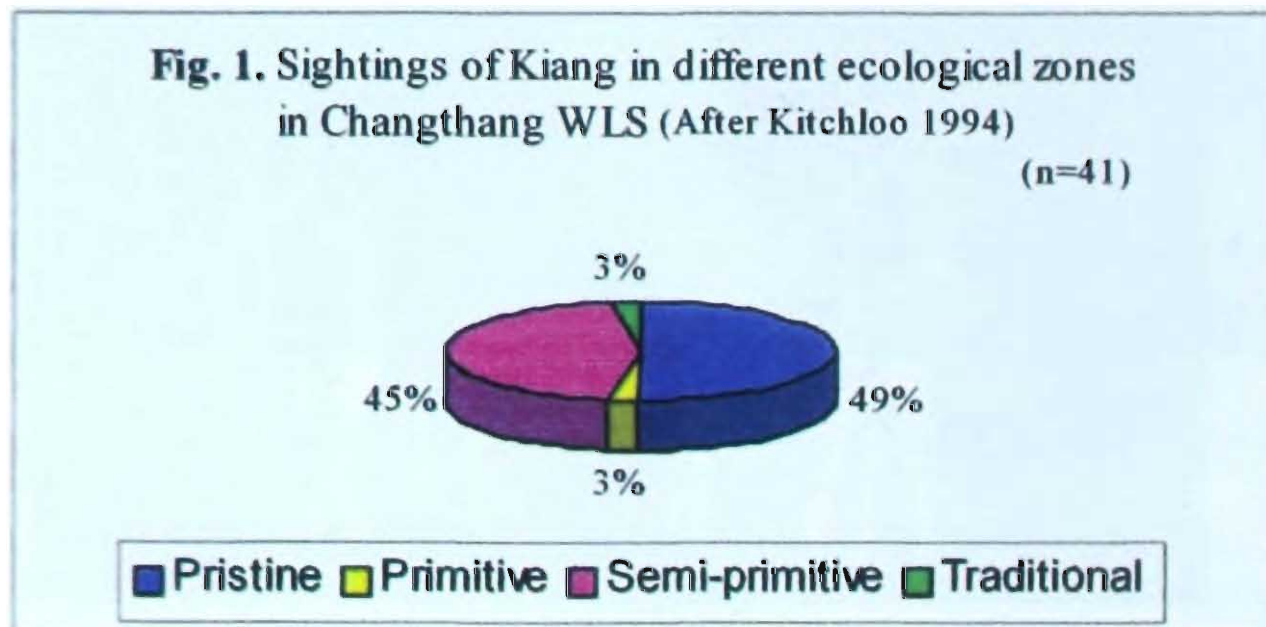
## 7. POPULATION STATUS

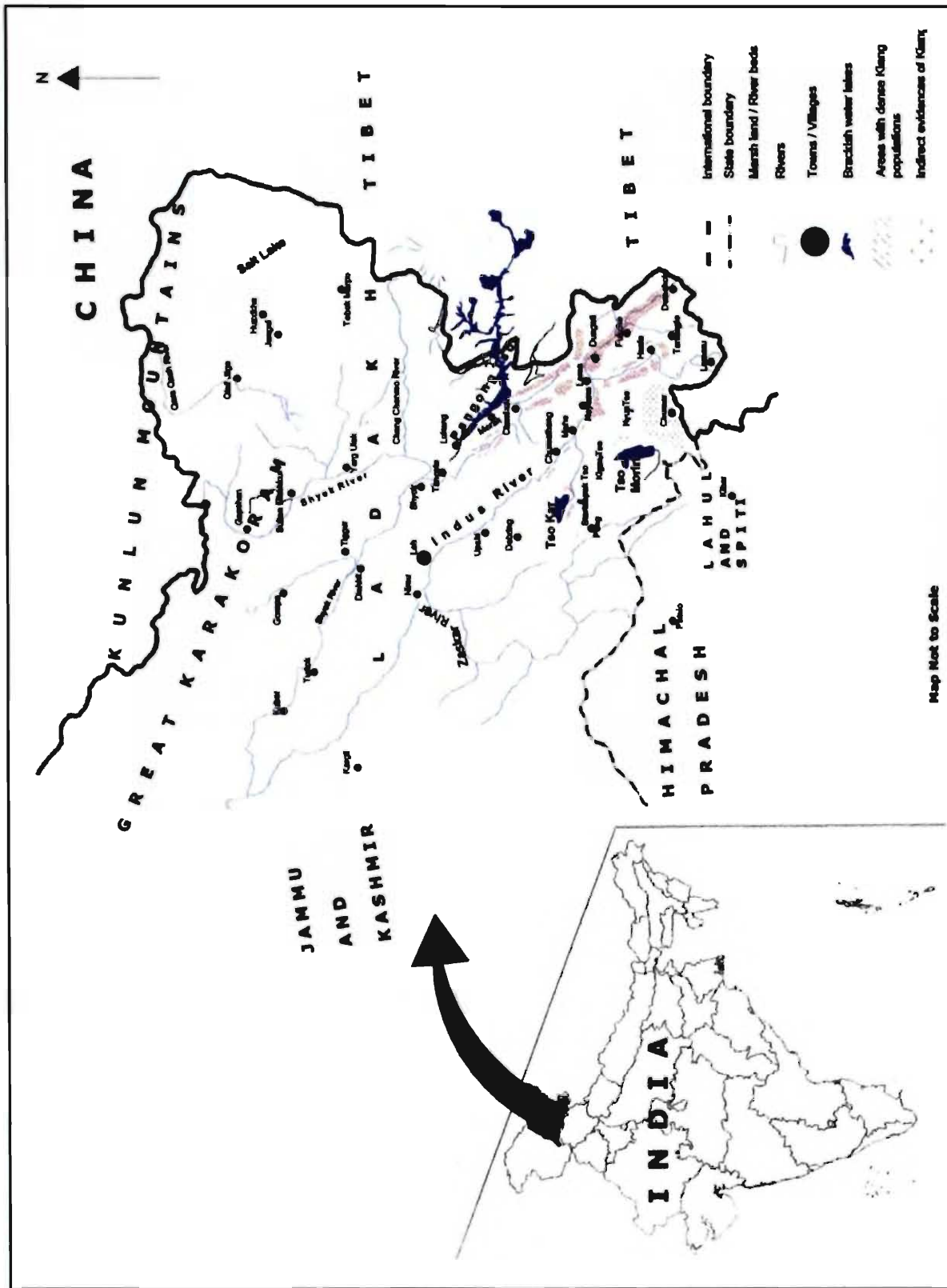
Kiangs were very common in eastern Ladakh in early 20<sup>th</sup> century (Sockley 1936). Consequently, due to aggression with China in 1962 and the subsequent build-up of armed forces within their habitat coupled with hunting and disturbance, their population started dwindling (Fox *et al.*, 1991).

The Department of Wildlife Protection, Jammu & Kashmir, estimated *c.* 1500 Kiangs in the year 1988. Fox *et al.* (1991) also provided the figure of 1500 individuals with a density of 0.25/km<sup>2</sup>. Alfred *et al.* (1994) stated the population of Kiang over 2000. Julka *et al.* (1999) estimated 1880 Kiangs in Changthang Wildlife Sanctuary. Pfister (2004) estimated more than 2000 kiangs in eastern Ladakh.

Kitchloo (1994) counted 229 Kiangs in Changthang Wilderness Area. Of which, 115 were recorded in pristine (unspoiled) ecological zone, 102 in semi-primitive, 6 each in primitive (minimum disturbance) and traditional (highly disturbed) ecological zones respectively.

Bhatnagar and Wanchuk (2000) counted a total of 365 individuals with an Encounter Rate (ER) of 0.94 and estimated Kiang population close to 2000 individuals. Tak and Sharma (2004) counted a total of 136 Kiangs with ER 0.59 in Changthang WLS.





Map 2. Kiang population sighting in Eastern Ladakh



Besides studies of Bhatnagar and Wanchuk (2000) and Tak and Sharma (2004) (earlier ZSI survey in 2002) substantial database was lacking. In accordance with the 'Annual Programme of Research Work' of Zoological Survey of India for the year 2005, status survey of Kiang was repeated to provide the current status of Kiang in Eastern Ladakh. During this survey, 10 sectors were covered and a total of 1293 individuals were sighted from 14<sup>th</sup> to 28<sup>th</sup>

August 2005 (Table 3) (Map-2). To our knowledge, the direct count of 1293 Kiangs is probably the highest record.

The highest number of Kiangs was encountered in Loma Dungti Tigermala (Demchok), the upper Indus region. In this sector, a total of 675 Kiangs with an encounter rate (ER) of 12.7 individuals were recorded on 23<sup>rd</sup> August 2005. Bhatnagar and Wanchuk (2000) also counted the highest of 249 kiangs (with ER of 2.18) on 28<sup>th</sup> July, 2000 (Table-3).



Photo 18 & 19: A view of upper Indus valley where maximum kiangs were observed

Shah (1996) also noted the high abundance of kiangs in this area during the survey in June, 1995.

The second highest concentration of 381 Kiangs with ER of 5.37 was noticed in Loma Hanle sector on 24<sup>th</sup> August 2005. But, Bhatnagar & Wanchuk encountered only 9 Kiangs with ER of 0.15 in 2000 and ZSI- survey counted only 7 kiangs with ER 0.11 in 2002. Out of 381 Kiangs, 200 were observed scattered over a small area of about 5 km<sup>2</sup> at c. 23 km (32°57'39.2" and 78°54'19") from Loma (Table 3).

The third highest count of 90 Kiangs with ER of 1.34 was recorded in Loma Chushul sector on 22<sup>nd</sup> August 2005, while in 2002 survey a maximum of 51 Kiangs were recorded

**Table 3.** A comparative account of encounter rates stated by various workers in eastern Ladakh

Sl. No.	Sectors	Encounter Rates								
		Bhatnagar & Wanchuk (2000)			ZSI-Survey 2002			ZSI-Survey 2005		
		Distance Travelled (km)	No. of Kiangs Sighted	Encounter rate	Distance Travelled (km)	No. of Kiangs Sighted	Encounter rate	Distance Travelled (km)	No. of Kiangs Sighted	Encounter rate
1.	Pang - Tanglang La (Moore Plains)	-	-	-	-	-	-	34	20	0.59
2.	Nyoma - Loma	-	-	-	55	29	0.52	19	40	2.10
3.	Mahe - Nyoma	-	-	-	55	29	0.52	23	14	0.60
4.	Loma - Chushul	49	19	0.39	49	51	1.04	67	90	1.34
5.	Chushul - Lukung - Thankunk (Pangong Tso)	70	10	0.14	45	21	0.47	70	2	0.02
6.	Chushul - Tangtse (Parma Valley)	54	9	0.17	-	-	-	88	45	0.51
7.	Chushul - Lol Yogma	-	-	-	20	28	1.40	-	-	-
8.	Loma - Dungti - Tigermale (Demchok) (Upper Indus)	114	249	2.18	-	-	-	53	675	12.73
9.	Loma - Hanle (Neelamkhul plains)	61	9	0.15	61	7	0.11	71	381	5.37
10.	Kalang Tar Tar Valley	40	69	1.73	-	-	-	-	-	-
11.	Mahe -Tso Moriri	-	-	-	-	-	-	70	1	0.01
12.	Sumdo - Tsokar	-	-	-	-	-	-	45	25	0.55
<b>Total</b>		<b>388</b>	<b>365</b>	<b>0.94</b>	<b>230</b>	<b>136</b>	<b>0.59</b>	<b>575</b>	<b>1293</b>	<b>2.25</b>

with ER of 1.04, whereas, Bhatnagar and Wanchuk counted 19 Kiangs in the same sector with ER of 0.39 (Table 3).

Bhatnagar and Wanchuk in 2000 recorded 69 Kiangs with ER of 1.73 in Kalang Tar Tar Valley. In Parma Valley (Chushul–Tangstse) a total of 45 Kiangs with ER of 0.51 were recorded during 2005 survey, whereas, Bhatnagar and Wanchuk sighted only 9 Kiangs with ER of 0.17 (Table 3).

The sector-wise analysis of the population data collected in the form of number as well as the Encounter Rate (ER) for abundance of Kiang revealed that the Loma Dungti Tiger mala (Demchok), the upper Indus region appears to be the region with the highest concentration of Kiang population (Photo 18 & 19).

The probable reasons could be the open flat and fodder rich Indus valley and also may be one of the migratory routes (cross border) for seasonal migration. The other possible reasons for their higher concentration in this area could be restricted access and least disturbance.

## 8. THREATS

The main threat for kiang seems to be loss of suitable habitat due to increasing human and livestock population. The marshes and meadows in the kiang habitat are extensively used for livestock grazing and although its effect is not fully known, there is little doubt that unchecked growth will adversely affect the habitat. An estimate shows that there are approximately 1,24,000 heads of livestock (sheep, goat, yak, mule, cow) in the kiang habitat under Changthang Wilderness Area of east Ladakh (Kitchloo, 1994). Pfister (2004) mentioned the dislike for Kiang by local people as they regularly invade their fields during nights.

Herds of kiang regularly migrate from Ladakh to adjacent territory of Tibet and vice versa. Although kiang is granted full protection in these areas, it is still suffering losses due to poachers who seek its leather and meat. Changthang Wilderness Area was greatly disturbed in 1962 because of extensive military activity, affecting its ecology and wildlife. Strategically placed along China border, the Changthang remained out of bounds to tourists. Since 1994 tourists have been allowed to visit Pangong Tso and Tso Moriri lakes in the area. As a result there has been tremendous increase in developmental activities like construction of roads and houses, leading to high disturbance in the kiang habitat. In some cases vehicular traffic passes through its grazing areas.

## 9. CONSERVATION

### 9.1. Conservation Status

*Equus kiang* Moorcroft, 1841- VU/N (B1, 2c; D2)- Tibetan wild ass). Family : Equidae. Taxonomic status : Species. Habit : Terrestrial. Habitat : Cold desert. Global Distribution : India, China and Tibet. Current Regional Distribution : Sikkim and Jammu & Kashmir. -

Elevation : 4,500m. – Range (Sq. km) : >20,000. – Area Occupied (Sq. Km) : >2,000. – Number of location : 2 (Sikkim and Ladakh); Fragmented. Population Trends % change : -% Decline : Not known. Time/Rate (Yrs or gens) : Not known. – No of Mature individuals : Not known. Global Population : Not Known. Regional Population : Not known. Data Quality : General field studies; Informal field sightings. Recent Field Studies : JM Julka, 1993-97 in Ladakh; (ZSI, Solan). Threats : Human interference. Trade : Not known. Other Comments : -. Status : IUCN : VULNERABLE (Nationally). DATA DEFICIENT (Globally). – Criteria based on : B1, 2c (Restricted distribution, limited location, severely fragmented, continuing decline observed in extent of occurrence, area of occupancy and/or quality of habitat); D2 (Population restricted to only 2 locations). – CITES : Appendix II. – IWPA (1972; 91) : Schedule I, Part I, RDB, National (1994) : Endangered. – RDB, International (1996) : No. Recommendations : Research management : Monitoring. – PHVA : Yes. Captive Breeding Recommendations : Captive breeding : Pending. – Level of difficulty : Not known. Existing Captive Population : None in India. Compilers : J.C. Daniel, N. Sivaganesan, A. Venkataraman, V. Menon, E.A. Jayson, W. Sunderraj, G. Ramaswamy, R.S. Lal Mohan, M.M. Mansoor, S. Paulraj (Sanjay Molur *et al.*, 1998).

## 9.2. Suggested conservation measures

- ☛ Discourage agricultural activity in core area.
- ☛ Restrictions on tourists in core area; regulated tourism in fringe area.
- ☛ Periodical monitoring of Kiang population and its growth rate.
- ☛ Regulate grazing activity.
- ☛ Identify migratory routes of Kiang to Tibet.
- ☛ Explore causes of heavy migration across the border.
- ☛ International approach for conservation measures involving India and China.
- ☛ Development of pasture to maintain both quality and quantity for meeting requirements of increasing livestock.
- ☛ Involvement of military personnel and local people in maintaining ecological balance.

## 10. ACKNOWLEDGEMENTS

We are thankful to the Deputy Commissioner, Leh for issuing inner line permission to conduct the faunistic surveys in eastern Ladakh. We are indebted to the authorities of the state Forest Department and Public Works Department, Jammu and Kashmir for various courtesies. We thankfully acknowledge the wholehearted support and co-operation extended by the staff members of the Zoological Survey of India, Solan throughout the survey programme. We are also thankful to Shri Rati Ram, Publication Production Officer, Zoological Survey of India for accomplishing the work of publication in time.

## 11. REFERENCES

- Achuff, P. and Petocz, R. 1988. *Preliminary resource inventory of the Arjij Mountains Nature Reserve, Xinjiang, People's Republic of China*. World Wide Fund for Nature, Gland.
- Alfred, J.R.B., Agrawal, V.C., Das, P.K., Chakraborty, S. and Ghose, R.K. 1994. Tibetan Wild Ass or Kiang (*Equus kiang* Moorcroft) : 161–162. *In : The Red Data Book on Indian Animals*. Zoological Survey of India, Calcutta.
- Ali, S.M. 1981. Ecological reconnaissance in Eastern Himalaya. *Tigerpaper*, 8(2) : 1–3.
- Bhatnagar, Y. V. and Wanchuk, R. 1999–2000. *Status Survey of Large Mammals In Eastern Ladakh & Nubra*. In: Mathur, V. B., Bhatnagar, Y. V., Qureshi, Q., Chundawat, R. S., Jackson, R. and Hunter, D. O. *Conserving Biodiversity in the Indian Trans-Himalaya: New Initiatives of Field Conservation in Ladakh*. *Wildlife Institute of India, Dehra Dun* (Unpublished Report). 169 pp.
- Brent, H. 2001. *An Ultimate Ungulate Fact Sheet- "Kiang, Tibetan Wild Ass"* Pp.1-4. <http://www.ultimateungulate.com/kiang.html>. (Nov 19, 2001).
- Butler, J., Achuff, P. and Johnston, L. 1986. *Arjin Mountains Nature Reserve, Xinjiang, People's Republic of China*. IUCN/WWF Report, Gland.
- Crandall, L. 1964. *The management of wild mammals in captivity*. University of Chicago Press, Chicago.
- Denzau, .G and Denzau, H. 2003. The Southern Kiang *Equus kiang polydon*. *J.Bombay Nat. Hist.Soc.*, 100 (2&3) : 322-340.
- Feng, Z. 1991a. On the status and conservation of wildlife resources in the Karakorum-Kunlun mountain region. *Chinese J. Arid Land Res.*, 4 : 65-74.
- Feng, Z. 1991b. Wild animal resources in Hoh Xil region. *Chinese J. Arid Land Res.*, 4 : 247-253.
- Feng, Z., Cai, G. and Zheng, C. 1986. *The mammals of Xizang*. Science Press, Beijing. (In Chinese).
- Fox, J. L., Nurbu, C. and Chundawat, R. S. 1991. The mountain ungulates of Ladakh, India. *Biological Conservation*, 58 : 167–190.
- Gao, X. and Gu, J. 1989. The distribution and status of the Equidae in China. *Acta Theriologica Sinica*, 9 : 269–274. (In Chinese).
- Groves, C. 1974. *Horses, asses and zebras in the wild*. Curtis Books, Hollywood, Florida.

- Groves C. 2003. Taxonomy of ungulates of the Indian subcontinent. *J. Bombay Nat. Hist. Soc.*, **100** (2&3) : 341–362.
- Groves, C.P. and Mazak, V. 1967. On some taxonomic problems of Asiatic Wild Asses; with the description of a new subspecies (Perissodactyla; Equidae). *Z. Saugetierkunde*, **32** : 321–355.
- Grzimek, B. 1975. *Animal Life Encyclopaedia*. Vol **12** : Mammals. Page 560.
- Hamilton, W. D. 1971. Geometry of the selfish herd. *Journal of Theoretical Biology*, **31** : 295–311.
- Harris, R. 1993. Wildlife conservation in Yeniugou, Qinghai Province, China. Ph.D. dissertation, University of Montana, Missoula. (Quoted from Schaller, 1998).
- Harris, R.B., and Miller, D.J. 1995. Overlap in summer habitat and diets of Tibetan Plateau ungulates. *Mammalia*, **59**(2) : 197–213.
- Hedin, S. 1898. *Through Asia, Volume 1*. Mehuen, London.
- Hedin, S. 1903. *Central Asia and Tibet, 2 volumes*. Hurst and Blackett, London.
- Hedin, S. 1909. *Trans-Himalaya, 2 volumes*. Macmillan, New York.
- Hedin, S. [1922] 1991. *Southern Tibet, volumes 3 & 4*. B.R. Publ. Corp., Delhi.
- Hodgson, B.H. 1847. The kiang and world of Tibet. *Calcutta Journal of Natural History*, **7** : 469–473.
- Julka, J.M., Alfred, J.R.B., Mehta, H.S. and Paliwal, R. 1999. Status survey of Kiang (Tibetan wild Ass) in Ladakh. *ENVIS Newsletter*, Vol. **5** : 2-4.
- Kaji, K., Ohtaishi, N. Miura, S. Koizumi, T., Tokida, K. and Wu, J. 1993. Distribution and status of white-lipped deer and associated ungulate fauna in the Tibetan Plateau. *In* : Ohtaishi, N. and Sheng, H. (eds). *Deer of China*. Elsevier, Amsterdam.
- Kitchloo, N.A. 1994 (Unpublished). Unified ecosystem management plan for the Changthang Wilderness Area, Ladakh. Department of Wildlife Protection, Jammu & Kashmir Government.
- Lachungpa, U. 1994. Tibetan wild ass or kiang not extinct in Sikkim. *Sikkim Science Society Newsletter*, **3**(3) : 7–9.
- Landor, H. 1899. *In the forbidden land*. 2 vols. New York : Harper.
- Mallon, D.P. 1991. Status and conservation of large mammals in Ladakh. *Biological conservation*, **56**(1) : 101–119.

- Mazak, V. 1962. Spring moult in *Equus hemionus kiang* Moorcroft (1841) and a contribution to the phylogenesis of moulting in the subfamily Equinae (Perissodactyla, Mammalia). *Zool. Anz.*, **168** : 164–170.
- Mazak, V. 1963. Asiatische Wildesel im Prager Zoologischen Garten nebst bemerkungen zur Systematik der Untergattung *Hemionus*. *Z. Säugetierkunde*, **28** : 278–293.
- Moorcroft, W. and Trebeck, G. 1819–1825. *Travels in the Himalayan Provinces of Hindustan and the Punjab; in Ladakh and Kashmir; in Peshawar, Kabul, Kunduz, and Bokhara*. Volume I pp. 459. Reprinted in India, Sagar Publications, New Delhi, 1971.
- Pfister, O. 2004. *Birds and Mammals of Ladakh*. Oxford University Press, New Delhi. ISBN 0-19-5657144 : 1-361.
- Pohle, C. (1991). Zur neueren Geschishte der Kiang-Haltung in Tiergärten ausseerhalb Chinas. *Zool. Garten*, **61** : 263-266.
- Prater, S. H. 1971. *The book of Indian Animals*. Bombay Natural History Society, Bombay, 324 pp.
- Prjewalsky, N. 1875 (ed. 1946). Mongolia and the country of Tanguts. Publ. House "OGIZ", Moscow. (In Russian).
- Rasool, G. 1989. Wildlife in the wilderness. *Natura*, March : 3–6. (WWF Pakistan Newsletter).
- Rasool, G. 1992. Tibetan Wild Ass-Verging on Extinction. *Tiger Paper*, **19(4)** : 16–17.
- Rawling, C. 1905. *The great plateau*. Edward Arnold, London.
- Ronaldshay, Earl of. 1902. *Sport and politics under an eastern sky*. Blackwood and Sons, Edinburg.
- Ryder, O.A. and Chemnick, L.G. 1990. Chromosomal and molecular evolution in Asiatic Wild Asses. *Genetica Dordrecht.*, **83(1)** : 67–72.
- Sanjay Molur, P.O. Nameer and Sally Walker (eds.) 1998. *Report of the Workshop "Conservation Assessment and Management Plan for Mammals of India" (BCPP-Endangered Species Project), Zoo Outreach Organization, Conservation Breeding Specialist Group, India, Coimbatore, India*. 176 pp.
- Schafer, E. 1937. Zur Kenntins des Kiang (*Equus kiang* Moorcroft). *Zool. Garten*, **9** : 122–139.
- Schaller, G. B. and Gu, B. 1994. Ungulates in northwest Tibet. *Research and Exploration*, **10(3)** : 266-293.
- Schaller, G. B. 1998. *Wildlife of the Tibetan Steppe*. The University of Chicago Press, Chicago and London. : 1-373.

- Schaller, G.B., Ren, J. and Qiu, M. 1991. Observations on the Tibetan antelope (*Pantholops hodgsoni*). *Applied Animal Behaviour Sci.*, **29** : 361–378.
- Shah, N. 1994. Status survey of southern kiang (*Equus kiang polyodon*) in Sikkim. Dept. of Zoology, Faculty of Science, Maharaja Sayajirao University, Baroda.
- Shah, N. 1996. Status and distribution of Kiang (*Equus kiang kiang*) in Changthang Plateau, Ladakh, India. Report M. S. Univ. of Baroda and Gujarat Nature Conservation Society, Baroda, Gujarat.
- Stockley, G. 1936. Stalking in the Himalayas and Northern India. Herbert Jenkins, London.
- Tak, P. C. and Sharma, R.M. (2004). Some Observations on Kiang *Equus kiang* Moorcroft in Changthang Wildlife Sanctuary, Eastern Ladakh, Jammu & Kashmir State, India. *Cheetal*, **42**(1 & 2) : 19-24.
- Trumler, E. 1959. Die Unterarten des Kiangs. *Saeugetierkundl. Mitt.*, **7** : 17–24.
- Walker, E. P. 1968. *Mammals of the World*. The John's Hopkins Press, Baltimore. Vol. II.
- Wilson, D. E. and Reeder, D. M. 1993. *Mammal Species of the World*. A Taxonomic and Geographic Reference. Smithsonian Institution Press, Washington and London in association with the American Society of Mammalogists, 1206 pp. ISBN 1- 56098-217-9.
- Zhang, C. 1984. Account of a survey of wildlife of the Quinghai-Xizang Plateau. *Chinese Wildl.* **1** : 43–46. (In Chinese).