Status Survey of Endangered Species

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ZOOLOGICAL SURVEY OF INDIA

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STATUS AND REVIEW OF THE WESTERN TRAGOPAN *TRAGOPAN MELANOCEPHALUS* (J. E. GRAY) IN INDIA

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INTRODUCTION

The Western Tragopan, *Tragopan melanocephalus* (J. E. Gray, 1829), belongs to a highly specialized group of pheasants, Family Phasianidae (Order : Galliformes). Altogether five species of tragopans occur all over the world, of which four are found in India and the one in China. Globally, a number of Pheasanids are regarded as endangered and are on the verge of extinction. In the Indian region, sixteen species of pheasants, including the Western Tragopan, are considered as threatened and endangered. This species inhabits a relatively small range in the Western Himalaya with a limited variety of vegetation-coniferous, broadleaf, deciduous and/or mixed forests with ringal bamboo—in moist temperate and sub-alpine zones. Such areas are, at present, decreasing at an alarming rate. The Western Tragopan has been described, in details, by Hume and Marshall (1878-1880), Blanford (1898), Baker (1928), Bates and Lowthen (1952), Ali and Ripley (1969), Wayre (1969) and Singh & Singh (1995).

However, untill 1977 very little and scattered information was available on the status of this species. Thereafter, surveys and studies conducted by various workers such as Gaston (1980 and 1982), Gaston *et al.* (1981 a and b), Lamba *et al.* (1982), Gaston *et al.* (1983), Bland (1987), Mc Gowan (1987), Tak (1987), Narang (1989), Sharma and Pandey (1989), Chauhan and Sharma (1991), Javed (1992), Sharma (1993), Prasad (1993), Akhtar *et al.* (1994), Pande (1993 and 1995), Vinod (1999), Bashir (2000) and Kaul & Jandrotia (2001) in India; and Roberts (1970), Mirza *et al.* (1978), Mirza (1981), Islam (1982) and Gaston *et al.* (1983) in Pakistan have revealed substantial information on its current status and distribution. The present paper deals with the findings of surveys undertaken in Himachal Pradesh to assess the status of Western Tragopan in this state and also provides an upto date information on its taxonomy, ecology, behaviour and distribution pattern in India alongwith the recommendations for its conservation.

TAXONOMY

The Western Tragopan (Fig. 1) was first described under the genus *Phasianus* by Gray (1829) from Almorah in Kumaon Hills. Blanford (1898) accommodated this species under the genus *Tragopan*, characterized by its fleshy horns and wattles. Baker (1928) continued to use the term "Horned Pheasants" for these birds although he considered them closer

to partridges than pheasants. The genus *Tragopan* is represented by five species *viz.*, *Tragopan melanocephalus* (Gray) Western Tragopan, *T. satyra* (Linnaeus) Satyr Tragopan, *T. blythii* (Jerdon) Blyth's or Greybellied Tragopan, *T. temminckii* (Gray), Temminck's Tragopan and *T. caboti* (Gould) Cabot's Tragopan. Except the Cabot's Tragopan, a resident of China, rest are found in the Indian subcontinent.

Description

Like other horned pheasants, *Tragopan melanocephalus* resembles with partridges than true pheasants. It is a magnificent bird about the size of a village hen. Males are brilliantly coloured with predominantly crimson in the plumage, while females are brown, rufous and white. Its powerful legs are armed with a short blunt-spur. Details of colour, size and weight of male, female and young male (immature) birds are presented in Table 1.

Local Names

T. melanocephalus is called by different names in various regions of its distributional range. These local names relate to the beauty and grace of this magnificent pheasant. Some of its local names are as follows :

1.	Sing Monal	:	NW Himalaya
2.	Sonalu	:	Kashmir
3.	Rang rawal	:	Kistwar (J & K)
4.	Fulgar (male) and Fulgari (female)	:	Chamba district, H. P.
5.	Jujurana	:	Kullu & Manali, Kullu district, H. P.
6.	Jyazi Jahgi	:	Bushahr, Shimla district, H. P
7.	Pyara	:	Kinnaur district, H. P.
8.	Jewar	:	Garhwal Himalaya, U. P.
9.	Lungi	:	Kumaon Himalays, U. P.

DISTRIBUTION

T. melanocephalus is a resident bird endemic to the Himalayan ecosystem. It shows vertical movements during winter and summer. Its past distribution extended over a large area of 700 km length and 50-100 km width (Gaston *et al.* 1983), covering both

Table 1. Description of male, female and youngone of Western Tragopan*.

Character	Male	Female	Young male (Immature)
Colour			
General	Brilliant; red and black with white spots	Grey	As in female
Head	Black, face naked bright red, crown black, longer creast feathers tipped crimson	Tinged with rufous of crown blackish, feathers white centred	Variable black
Neck	Black, crimson red	Tinged with rufous	Variable red
Back & Rump	Greyish-ochre, vermiculated with black bars; and white, black edged ocelli, intrascapulars strongly tinged	Pale grey, irregularly streaked and spotted with black and white black patches on scapulars	White spots surrounded with black on upper back
Wing-coverts	Shoulder of wing crimson-red, wing-coverts and tertiaries finley vermiculated buffy grey and black and with rounded black bordered white spots or ocelli	Rufous-buff, vermiculated, bared and blotched with black and narrow pale ochre central streaks	-
Tail	Mottled buff and black with irregular black bars and tips	Vermiculated, black and grey with a black on broad sub-terminal band	-
Throat	Naked deep blue, foreneck bright light red	Vermiculated, grey and dark brown, spotted with fulvus	-
Breast & Abdomen	Black, oceliated with white and irregularly smeared with red, flanks and abdomen mottled with brown and black	Vermiculated grey and dark brown broadly streaked and splodged with white on the paler and greyer abdomen and flanks	Like females but marks more rounded; and less spaculate in shape
Size			
Body length	71 cm	-	-
Wing	255–290 mm	225–250 mm	-
Bill	17–20 mm	16 mm	-
Tarsus	78–97 mm	66 mm	-
Tail length	220–250 mm	190–200 mm	-
Weight	1.80–2.15 kg	1.25–1.40 kg	-

*(based on Baker, 1928; and Ali & Ripley, 1969)

temperate and sub-alpine forest zones of the western and northwestern Himalayas between 1800 and 3700 m. This range extends from Hazara-Kohistan and Swat regions of northwest Pakistan (Duber valley, west of Indus river c73° E) to the Indian region from Jammu and Kashmir, east through Himachal Pradesh as far as Tehri-Garhwal and Kumaon (?) in Uttar Pradesh (Baker, 1928; All and Ripley, 1969). The bird was local throughout this range and has been considered to be rarest among the Himalayan pheasants (as cited by Gaston *et al.*, 1983). But past distributional reports indicate existence of its sizable population in Hunza (Gilgit), Indus Kohistan, Hazara-Kohistan, Kaghan valley in Pakistan (Roberts, 1970); and in Salkhala, Kuttan and Machiara Game Reserve in northeast Pakistan with a breeding density of less than one bird/sq km during May-August, 1977 (Mirza *et al.*, 1978; Gaston *et al.*, 1983).

However, adequate reports are not available on its earlier population in the Indian region, particularly in Jammu and Kashmir. The Jhelum valley in Kashmir might have harboured a substantial population of these tragopans. From 1820 to 1945, there are scattered records of its status in various areas of Himachal Pradesh as enlisted by Chauhan and Sharma (1991). Whistler (1926 a and b) reported that the tragopan is the scariest and most local pheasant of the area above Dharmasala in Daula Dhar in Kangra district during 1920-24 and also a rare bird in Kullu district respectively. Western Tragopans were also recorded in the Sutlej, Bapsa and other nearby valleys in the 19th century (Blyth 1948 and 1951). Fairly high population has been reported in the Fir/Oak forest above Pulga area in Kullu district in 1963-64 by Chauhan and Sharma (1991). No reports are, however, available about its past population on Garhwal region in Uttar Pradesh, the eastern-most limit of the species. Further, there is also no substantial information available on its status throughout its distributional range between 1965 and 1976.

Present distribution and status

Since 1977, extensive surveys have been conducted to reassess the status and distribution of the Western Tragopan from Hazara in Pakistan to Uttar Predesh in India, (Table 2). Islam (1982) conducted a repeat survey in Salkhala, Kuttan and Machiara Game Reserve in northeast Pakistan from May to September 1982 and estimated a density of 1.3 bird/sq km. In adjoining Neelam valley a density of 0.8 to 1.6 bird/sq km has also been recorded by Mirza (1981) as cited by Gaston *et al.* (1983). Islam (1982) and Gaston *et al.* (1983) recorded positive reports of the Western Tragopan in several localities of Neelam and Jhelum valleys; and in Kaghan valley of Hazara district in Pakistan respectively. Javed's (1991) studies based on surveys conducted by Duke and others from 1988 to 1990, have recorded a good population of this pheasant in Machiara Game Reserve (100 birds) and Mid-Palas valley (400 birds—a single largest known population in the world).

In Jammu and Kashmir, some surveys have been carried out during the last 20-25 years or so. Lamba *et al.* (1982) could not sight any Western Tragopan during an extensive

Table 2. Review of Surveys of Western Tragopan (from 1977 onwards).

Sl. No.	Name of Locality	District	Month & Year	Area in sq km (approx.)	Altitude (in metres)	Sightings	Reference
1	2	3	4	5	6	7	8
	INDIA **(a) Jammu & Kashmir**						
1.	(i) Dachigam Biosphere Reserve	Srinagar	April-May 1981	141	1700-2950	Negative records	Lamba *et al.* (1982)
	(ii) Ovra Sanctuary	Anantnag	do	60.9	2250-3000	Negative records	do
	(iii) Naganari Reserve	Baramulla	do	24	2100-3000	Negative records	do
	(iv) Buniyar	do	do	60	1650-3100	Negative records	do
2.	Kishtwar, Bhadarwar	Doda	1980-1983	-	-	Species still occurs in undisturbed forest areas	Gaston *et al.* (1983)
3.	Limber velley Sanctuary (34°13'N lat. & 74°11'E long.)	Baramulla	1988, Mar. 1989 (in winter)	26	2200-3300	16 birds sighted (3 birds/ sq km) Estimated 70 birds	Javed (1992) Akhtar *et al.* (1994)
4.	Kishtwar and Doda area	Doda (in Jammu region)	1991-1993	-	-	Positive reports	Patnaik (1993)
	(b) Himachal Pradesh						
1.	(i) Upper Beas valley	Kullu	1979-1980	400	2400-3700	Estimated a total population around 1000 pairs	Gaston *et al.* (1981 a, b; 1983)
	(ii) Great Himalayan National Park, including Sainj & Tirthan velleys, Manali, lower Parbati valley	Kullu	do	620	-	Good population	do
	(iii) Ravi catchment area (several localities)	Chamba	do	-	-	Species occurs in small numbers	do
	(iv) Siul nalla, kugti	do	do	-	-	Positive reports	A. J. Gaston (*In*: Chauhan & Sharma, 1991)

Table 2. *(Contd.).*

1	2	3	4	5	6	7	8
2.	(i) Solang nalla, Manalsu, Hamta near Manali	Kullu	do	-	-	Positive reports	Chauhan & Sharma (1991)
	(ii) Kullu area	do	do	-	-	Positve reports	do
3.	Borders of Kinnaur (East of Satluj river)	Kinnaur	do	-	-	Species still occurs	Joginder Singh (*In* : Gaston *et al.* 1983)
4.	(i) Chhota Banghal, lower dam Ravi river	Kangra	July, 1985	-	-	Positive reports (in undisturbed forest)	Mc Gowan (1987)
	(ii) Bara-Banghal	do	do	-	-	Negative signs (disturbed forest)	do
5.	(i) Kugti Sanctuary, 80 km SE of Chamba (32°29' N lat. & 75°58' E long.)	Chamba	Sept. 1987	100	2450-3500	Negative sightings	Zoological Survey of India Party Tak (1987)
	(ii) Kalatop-Khajjiyar Sanctuary 25 km W of Chamba town (32° 35' N lat. & 75°58' E long.)	do	do	19	2000-2400	Negative records	do
	(iii) Saho-Sara Reserve forest in Saredi Khud (Pukhri block) (32° 40' N lat. & 76°15' E long.)	do	do	20	2425-3100	Family party of 5 birds (1 male, 1 femele & 3 young-ones) calls, feathers of Western Tragopan	do
6.	(i) Chail Sanctuary	Solan	Mar., 1987	-	1800 & above	Negative records	Sharma & Pandey (1989)
	(ii) Shogi, Ghanahati, Seri, Tara Devi, Kyari Bangla, Bhase, Koti, Thund, Moi, Jubbal, Hatoo, Kinoo, Shimla catchment area, Sarwan Dhar & Daranghati	Shimla	Feb., 1987-June, 1988	-	1800-3000	Negative sightings	Sharma & Pandey (1989)

Table 2. *(Contd.).*

1	2	3	4	5	6	7	8
	(iii) Kasha Pat, Moral Kanda forest	do	do	-	2000-3300	Negative records (but reports by local people)	do
	(iv) Thar Jot (adjacent to Daranghati Sanctuary)	do	Dec., 1987-May, 1988	-	-	5 birds (4 birds calling & one male sighted)	do
	(v) Pandrabis, Kaksthal (North bank of Satluj river)	Partly Kullu & Kinnaur	Mar., 1988	-	-	Negative records (but reports by local people)	do
	(vi) Barau, Shong areas in Sangla valley, Kaksthal	Kinnaur	June, 1988	-	-	Positive records (a partial skin of a male)	do and Narang (1989)
7.	(i) Daranghati Sanctuary, Part II (Chhoe Bita to Kewaliphali Dhar, to Mamalan)	Shimla	8-9 Nov., 1989	28 km covered by (Transect line index method)	2500-3200	9 birds (8 males & 1 female) sighted	Pandey (1995)
	(ii) Daranghati Sanctuary Part I (Bhajna-Deyon Dhar to Shashtri Dhar)	do	10 Feb., 1990	10.75 km covered (by transect or 12 sq km)	do	2 birds (one male & one female) sighted	do
	(iii) Daranghati Sanctuary Part II (Nogli Khad to Sathlu, to Gushra, to Mamalan, etc.)	do	19 Feb., 1990	100 km (by Transect)	2600-3259	18 birds (10 males, 8 females sighted) density of 1.5 bird/sq km, estimation of 150-250 birds in Sanctuary	do
	(iv) Daranghati Sanctuary (Dugi Phai, Dhari Thatin, Thar Jot, Kashapat, Komi Dhar, etc.)	do	20 to 29 May 1990	-	do	3 birds (2 males & 1 female) sighted & heard alarm calls of 8 birds	do
	(v) Daranghati Sanctuary Part II (Nogli Khad to Kewaliphali Dhar, Pateli Dhar, Battinda etc.)	do	19 Nov., 1990	45.8 km covered (by transect)	do	14 birds (9 males & 5 females) sighted	do

Table 2. *(Contd.).*

1	2	3	4	5	6	7	8
8.	(i) Upper Beas valley, Great Himalayan National Park and Manali; Kaise Khan Kan, Kanawar Wildlife Sanctuaries	Kullu	1990-1991	More than 900	-	Viable population	Pandey (1993)
	(ii) Nargu	Mandi	do	-	-	Reports (?)	do
9.	Sarhan Bushahr (Captive Breeding Centre)	Shimla	May-June 1993	-	-	One pair, 2 young-ones	Gupta (1993)
10.	(i) Tharoach, Gurar, Rajbhushan, Panjoo, Chachpur in Talra Wildlife Sancturay, Tehsil Chopal & Jubbal	Shimla	Sept.-Oct., 1992	38	2200-3250	Negative records (not even by local people)	Zoological Survey of India, Party by Authors
	(ii) Ramoi Village, larot, way to Chaishil Peak, Devidhar and Garsari, forest on bank of Pabbar river in Tehsil Chirgaon	do	July-Aug., 1993	26	2100-3300	Negative records (some positive reports by local people)	do
	(iii) Bir, Billing, Chehna Pass, and Rajgundha in Chhota Banghal on Dhaula Dhar range, Tehsil Baijanath	Kangra	Sept., 1994	15	1950-3000	Calls of birds at Chehna Pass (positive reports by local people)	do
	(iv) Barot, Kothikod forest range, Tehsil Jogindernagar	Mandi	Oct., 1994	7	2000-2500	Negative sightings (not even by local people, disturbed forest)	do
	(v) Kandi and Mandara forest in Kataula range; Bagi in Drang range	Mandi	do	6	2150-2850	Negative records (disturbed areas)	do
11.	Moral Kanda forest near Sungri	Shimla	May, 1993	-	3600	Male, female birds sighted and calls for number of times	Sharma (1993)

Table 2. *(Contd.).*

1	2	3	4	5	6	7	8
12.	(i) Great Himalayan National Park (Jiwa, Parbati, Sainj and Tirthan valley)	Kullu	Oct.-Dec., 1995	-	2440-2930	Negative records	Vinod (1999)
	(ii) Great Himalayan National Park (Chlocna, Dulunga-thach, Lordi thach, Chordwar Shilt)	Kullu	8 Feb. to 11 March, 1996	-	2440-2930	7 birds recorded at 5 sights	do
	(iii) Tirthan valley	Kullu	April, 1996	-	-	Negative records	do
13.	(i) Kugti Wildlife Sanctuary	Chamba	Dec., 1998	-	-	Negative records	Bashir Shahid (2000)
	(ii) Specka Reserve Forest & Riyali Forest	Chamba	19 Dec., 1998	-	2700	2 birds (One male & one female) sighted	do
14.	Sakri-Kandlote Forest, Saho-Sara	Chamba	April-May, 2000	-	2200-4200	2 birds sighted and heard number of calls	Kaul and Jandrotia (2001)
	(c) Uttar Pradesh						
1.	Rupin valley in Tons catchment area	Uttar Kashi	1987	-	-	Single female recorded	Bland (1987)
2.	(i) Kotigad, Sandra forest in Tons forest division	Uttar Kashi (Western U. P.)	Oct.-Dec., 1992	-	-	Calls of Tragopan	Prasad (1993)
	(ii) Govind Pashu Vihar Sanctuary	Eastern and Northeastern U. P.	-	-	-	Positive reports by local people of Western Tragopan as well as Satyr Tragopan	do

survey of Dachigam Biosphere Reserve, Ovra Sanctuary, Naganari and Buniyyar areas of Kashmir during April-May 1981. However, Gaston *et al.* (1983) have reported their occurrence in undisturbed forested areas of Kishtawar, Bhadarwar and Doda areas of Jammu region (Table 2 and Fig. 1). Javed (1992) and Akhtar *et al.* (1994) have estimated a population of 3 birds/sq km in Limber valley forest of Baramulla district. Recently, Patnaik (1993) has reported these birds from Kishtwar and Doda areas, thereby confirming the earlier sightings by Gaston *et al.* (1983).

In Himachal Pradesh a number of surveys were undertaken during 1979-1980 in the upper Beas valley, and areas of Great Himalayan National Park in Kullu district and Ravi catchment area in Chamba district (Gaston *et al.*, 1981 a, b; &. 1983) and in various localities of Kullu district (Chauhan & Sharma, 1991) (Table 2 and Fig. 2). They recorded positive signs of Western Tragopan in these localities with a good population in upper Beas valley and areas of Great Himalayan National Park. Mc Gowan (1987) reported positive occurrence of tragopans in areas of Chhota Banghal and negative signs in Bara-Banghal area of district Kangra in July 1985. The Western Tragopan Pheasant survey in Chamba district by Zoological Survey of India, in 1987 met with a family party of five birds in Saho-Sara Reserve forest but they were not sighted in Kugti and Kalatop-Khajjiyar Sanctuaries (Tak, 1987).

Sharma and Pandey (1989) undertook pheasant surveys in several localities of Solan, Shimla and Kinnaur districts during 1987-1988. They could sight Western Tragopan only at Thar Jot in Shimla and at Barau-Shong area of Sangia valley in Kinnaur district. A portion of skin of a male bird was also found in the village Barau (Narang, 1989). Sightings at Barau forest of Sangala valley demarcates the northeastern limit of its distributional range in Himachal Pradesh (Fig. 2). Pandey (1995) undertook tragopan surveys in several localities of Daranghati Sanctuary part I and part II in district Shimla during 1989-1990 and estimated population density of 1.5 birds/sq km in the sanctuary area (Table 2). During 1990-1991, repeat survey was conducted in the upper Beas valley. Great Himalayan National Park and various sanctuaries of the district Kullu (Pandey, 1993). He reported an increase in the population of the Western Tragopan and other pheasants in these areas. Further, Chauhan and Sharma (1991) have stated that Himachal Pradesh has the highest population of Western Tragopan in the world.

The present studies based on extensive surveys conducted in 1992, 1993 and 1994 do not indicate the presence of the Western Tragopan in the Talra Wildlife Sancturay, Chaishil Peak and banks of Pabbar river in Chirgaon Tehsil (district Shimla); Kandi and Mandra forest in Kataula range, Bagi in Drang range and Barot (district Mandi). However, this bird appears to be restricted to Chehna Pass area of Chhota Banghal in Dhaula Dhar range of Kangra district (Table 2). In 1993, few male and female tragopans were sighted at Moral Kanda forest of Shimla district by Sharma (1993). Vinod (1999) reported few birds

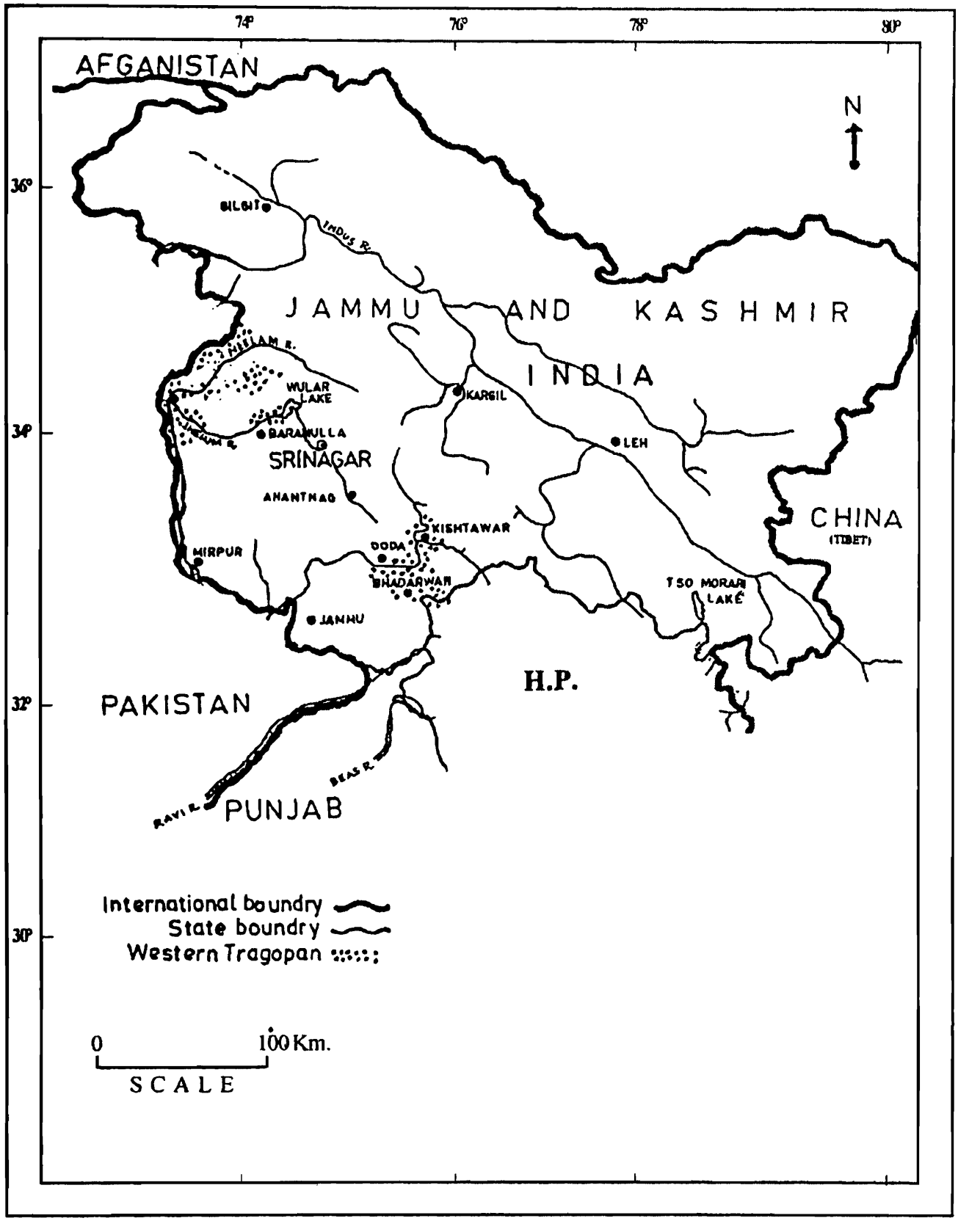

Fig. 1. Map of Jammu & Kashmir showing the distribution of Western Tragopan.

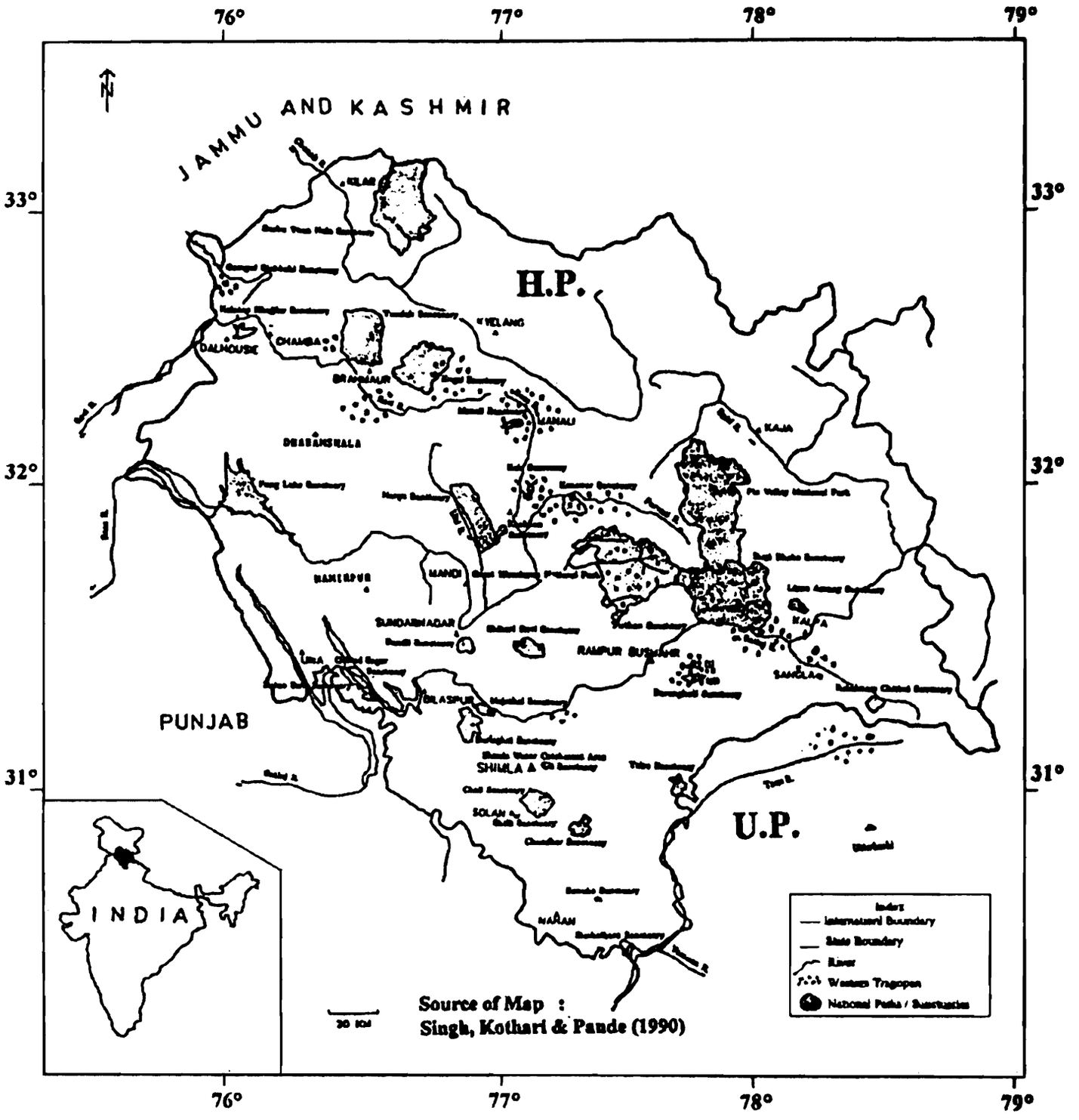

Fig. 2. Map of Himachal Pradesh and part of Uttar Pradesh showing the distribution of Western Tragopan.

at five sights having 20 to 30% tree cover, 40 to 60% shrub cover and 20-40% grass cover in Great Himalayan National Park (GHNP) in Kullu district during February-March, 1996 and negative records in some localities and Tirthan valley of GHNP during October-December, 1995 and April, 1996. In December, 1998 one male and one female tragopans were sighted at Specka Reserve forest and reported negative records at Kugti Wildlife Sanctuary in district Chamba (Bashir, 2000). Kaul & Jandrotia (2001) reported sightings and calls of tragopans in Sakri-Kandlote forested areas of Saho-Sara in Chamba district during April-May 2000.

Reports of the Western Tragopan in Garhwal area of Uttar Pradesh, the eastern-most limit, are sporadic. Bland (1987) reported a single female in Rupin valley of Tons catchment area. Calls of this bird have been recorded in Kotigad and Sundra of Tons forest divisions (Prasad, 1993) alongwith their positive reports in nearby Govind Pashu Vihar Sanctuary (now a National Park) and bordering forest tracts of Shimla district (Fig. 3). Based on informations provided by locals, Prasad (1993) reports a sympatric association between Western Tragopan and Satyr Tragopan in this area.

Gaston *et al.* (1983) estimate 10,000 sq km suitable forest cover in Himalayas of which only 2000-3000 sq km of undisturbed suitable forest habitat is available for the Western Tragopan in its known distributional range. Further, they have also assessed the world population of Western Tragopan between 1600 and 4800 birds.

ECOLOGY

Tragopans inhabit steep and thickly vegetated mountain slopes and valleys. They are restricted to the temperate and sub-alpine forest zones of India, particularly dense forests of spruce (*Picea smythiana*), silver fir (*Abies pindrone*), birch (*Betula utilis*), deodar (*Cedrus deodara*), walnut (*Juglans regia*), blue pine (*Pinus longifolia*), karsu or brown oak (*Quercus semicarpifolia*), with well developed undergrowth of rue and ringal bamboo (*Arundinaria fulcata*). The ground vegetation also includes *Viola, Fragaria, Berginia, Potentilla* spp. and a variety of ferns, moss and grasses.

In winter, these birds prefer northern faces of the mountain ecosystem, especially in ravines and nallas where a substantial undergrowth of shrub and bush is available, and are usually restricted to a zone between 1800 and 3000 metres. But in summer, they move into high and very precipitous mountain slopes (ranging between 45° and 60°) upto 3700 metres (Ali and Ripley, 1969; Gaston *et al.*, 1983 and Akhtar *et al.*, 1994).

BEHAVIOUR

The Western Tragopan is mostly seen in singles or in pairs, and at times in small family parties during non-breeding season. It is a very shy and secretive bird, sulking

away through thick undergrowth on the least disturbance and concealing itself in dense foliage where it roosts at night. Like other Himalayan pheasants, it is difficult to observe the Western Tragopan in wild state. Occasionally, it is seen in company with cheer, kalij and koklas pheasants, feeding in open glades and forested hill slopes. The Western Tragopan is highly sensitive to habitat interference. Its food comprises' mainly shoots of ringal bamboo, roots, seeds, acorns and fresh leaves of oak, *Quercus* sp. It is also known to relish red berries of *Skimmia laureola* and *Viburnum neruosum* in summer. In autumn, oak and corns form a major portion of its diet (Akhtar *et al.*, 1994). There are, however, reports of the Western Tragopan feeding upon insects (Ali and Ripley, 1969).

Before the first rays of dawn break across the ranges, males regale in the mear-darkness from their roosts, repeatedly uttering their peculiar calls 7 to 15 times in a row at very short intervals. Roosting calls are more loud and intense. At dusk the birds are at it again, calling across the mountains to potential mates (Akhtar *et al.*, 1994). The calls are more often in the pre-breeding and breeding seasons. When alarmed, the Western Tragopan uttars a curious cry of "*Waa, Waa, Waa*" monosyllabic sound resembling almost like that of bleating of lamb or wailing child or a cry of wild goose. The love call of male bird is resounding like "*way waah oo-oh oo aaah*"

Very little information is available on the breeding of Western Tragopan in the wild state. The hen is known to mature in its first year whereas the male attains sexual maturity not before two years, till they acquire breeding plumage. Breeding season is reported to commence in June. Nesting occurs at an altitude of about 2800 metres. It constructs its nest on the ground in undergrowth of ringal bamboo or on lower branches of trees. The nest is made of sticks, lined with grass. Most of its breeding biology is known from captivity. The male performs beautiful courtship displays before the hen. The clutch size is 3 to 6, eggs are pale buff and reddish in colour. Cocks are monogamous and take part in nesting and fledging activities. Incubation period is estimated to be 28 days (Ali & Ripley, 1969; Gupta, 1993). In May-June, 1993, a pair of Western Tragopan was successfully bred at Pheasant Breeding Centre at Sarhan Bushahr in Shimla district of Himachal Pradesh (Gupta, 1993). This is perhaps world's first even captive breeding record of the Western Tragopan. Earlier efforts were made in 1983 when a male captured from Swat area in Pakistan was sent to Antewarp Zoo in Belgium, but unfortunately it died after 6 weeks.

CONSERVATION AND MANAGEMENT

Threats

The type of vegetation and disturbance appear to be the main factors limiting, number of the Western Tragopan in its entire distributional range. Forests are being cut at an alarming rate for timber, fuel and cultivation resulting in shrinkage of its habitat.

Other causes of disturbances are increased human interference in form of collection of medicinal plants, 'guchhi'—an edible fungus, and other forests products; and overgrazing by cattle, sheep and goats. Besides, poaching is widespread, particularly during winter and early spring when these birds often come down from snow covered high altitude areas to lower elevations near human settlement. Sharma (2001) has pointed out the habitat destruction of Western Tragopan in Moral-Kanda forest of Shimla district in Himachal Pradesh at an alarming rate.

Conservation measures

Some areas of natural distribution of the Western Tragopan are already included in National Parks, Wildlife Sanctuaries and Reserve Forests. It is protected under Schedule I of the Wildlife (Protection) Act, 1972. It is also listed in ICBP/IUCN Red Data Book (King, 1981) and Zoological Survey of India Red Data Book on Indian Animals Part I : Vertebrata (Zoological Survey of India Publication, 1994). Its highly endangered status has been further highlighted by its inclusion in Appendix I to CITES (Convention in International Trade in Endangered Species of Wild Fauna and Flora). A legal ban has been enforced for cutting of forest in Protected Areas (PAS) by the State Forest and Wildlife Department, Govt. of Himachal Pradesh. For conservation of the Western Tragopan, its habitat can only be safeguarded by enforcement of effective conservation measures and management programmes in its entire distributional range.

Recommendations for management

Besides the measures already taken for its conservation as mentioned above, the following efforts are suggested :

- Exploration of new potential habitats and ecologically viable areas.
- Creation of new Wildlife Sanctuaries particularly between Chenab and Ravi river catchment areas and establishment of a network of Protected Areas (PAS).
- Long term monitoring of the Western Tragopan population by governmental and non-governmental organisations, trekkers and local people having good knowledge of natural history.
- Intensification of captive breeding programmes and their release in the natural habitat.
- Employment opportunities to local people who have sufficient traditional knowledge of wildlife, and incentives to the communities around the tragopan habitat.
- Proper implementation of Wildlife (Protection) Act. Total ban on entry permits for local and migrating graziers particularly "Gujjars" for grazing their livestocks in protected areas of the Western Tragopan.

- Education, and involvement of local people and army personnel in conservation efforts and operational research.
- An awareness programme to discourage hunting.
- Clear political decisions on ways to satisfy community needs from forests.

These conservation measures and management plans will not only be helpful in the survival of the Western Tragopan population but also will sustain other threatened Himalayan pheasants such as Monal, Koklas, Whitecrested Kalij and Cheer; and large and small mammals and other bio-species occurring in the same range.

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