

## Recent history and status of the Mongolian gazelle in Inner Mongolia, China

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*In 1994 and 1995 the authors studied Mongolian gazelle *Procapra gutturosa* populations in Inner Mongolia, China, conducting interviews and making field observations in eight counties along the national boundary between Mongolia and China. Mongolian gazelle distribution was estimated to cover approximately 73,152 sq km, which was only 25.2 per cent of that in 1950–70. The adult male:female sex ratio was 1 : 4, and the average herd size 923.3 individuals in November/December 1994 and 23.1 in March/April 1995. The gazelles regularly migrate from Mongolia into China from October onwards and return to Mongolia in late February. Hunting is a major threat to the survival of the species.*

### Introduction

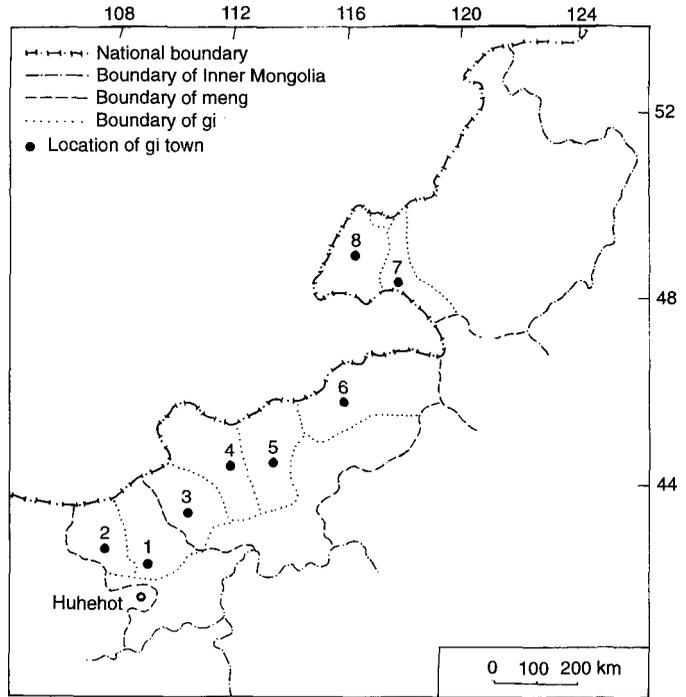
The Mongolian gazelle *Procapra gutturosa* is a characteristic animal of East Asian grasslands. The species was once widespread in south-eastern Siberia, Mongolia and northern China. Local economic development and mining have destroyed or damaged the quality of the vegetation of the great grassy plains, reducing and fragmenting the habitat of the Mongolian gazelle. In addition, from historical times, the gazelle has been commercially hunted in Mongolia and China and has been subject to heavy hunting pressure. In Mongolia, the animals killed are sold not just on the local market but are also exported to Europe (Luschekina, 1990). For example, 18,000 Mongolian gazelles were shot within a few days in the winter of 1992–93, according to official Mongolian figures (Mix, 1993). In China, the gazelle's situation is similar. About 2,500,000 Mongolian gazelles were killed in China between 1956 and 1961 (Tan, 1979).

It is clear that the expanding human population and commercial hunting have eliminated the species from parts of its range and greatly reduced its numbers but there are no reliable data on population size and distribution. The species has vanished from south-eastern Siberia and almost disappeared from western Mongolia (Luschekina, 1990) and

central Mongolia (Mix, 1993). The Mongolian gazelle formerly occurred throughout seven provinces in northern China: Gansu, Ningxia, Shanxi, Hobei, Inner Mongolia, Helongjiang and Jilin (Allen, 1940; Zhang, 1986; Ma, 1990; Wang, 1991, 1993; Li and Jiang, 1993). Today, as a result of overhunting, the species can be found only in limited areas and small numbers in Inner Mongolia.

The gazelle has been studied in Mongolia since the 1980s (Soma *et al.*, 1980; Luschekina *et al.*, 1985, 1986; Rothschild *et al.*, 1988; Luschekina, 1990; Mix, 1993) but little information has been published about the species in China.

In order to obtain preliminary information on the Mongolian gazelle in China, we conducted two surveys in the province of Inner Mongolia, from 10 November to 19 December 1994 and from 8 March to 16 April 1995. The survey area encompassed about 229,496 sq km in eight counties (*qi*) of three districts (*meng*): Siziwangqi and Darhanmumingganqi (Damuqi) in Ulanqabmeng; Sonidyouqi (Xisuqi), Sonidzuoqi (Dongsuqi), Abagqi and Dongujimqinqi (Dongwuqi) in Xilingolemeng; and Xinbaragzuoqi and Xinbaragyouqi in Hulunbuirmeng (Figure 1). According to Zhang (1982), the vegetation from Damuqi to Abagqi is classified as arid, barren grassland, lying generally at an elevation of 1000–1500 m.



**Figure 1.** Map showing the location and boundaries of the counties (*qi*) and districts (*meng*) surveyed.

- 1 Siziwangqi
- 2 Darhanmumingganqi
- 3 Sonidyouqi
- 4 Sonidzuoqi
- 5 Abagqi
- 6 Dongujimqinqi
- 7 Xinbaragzuoqi
- 8 Xinbaragyuoqi

Precipitation is scant, with 150–250 mm annually, and the plant community is dominated by *Stipa gobica*, *S. glareosa*, *S. klemenzi*, *Cleistogenes* spp. and *Allium* spp. True grassland is found from eastern Abagqi to and throughout Hulunbuir. Its elevation is 600–900 m in the north and 1000–1200 m in the south, where precipitation is 250–400 mm annually. The plant community is dominated by *Stipa grandis*, *S. krylovii*, *Aneurolepidium chinense* and *Agropyron cristatum*.

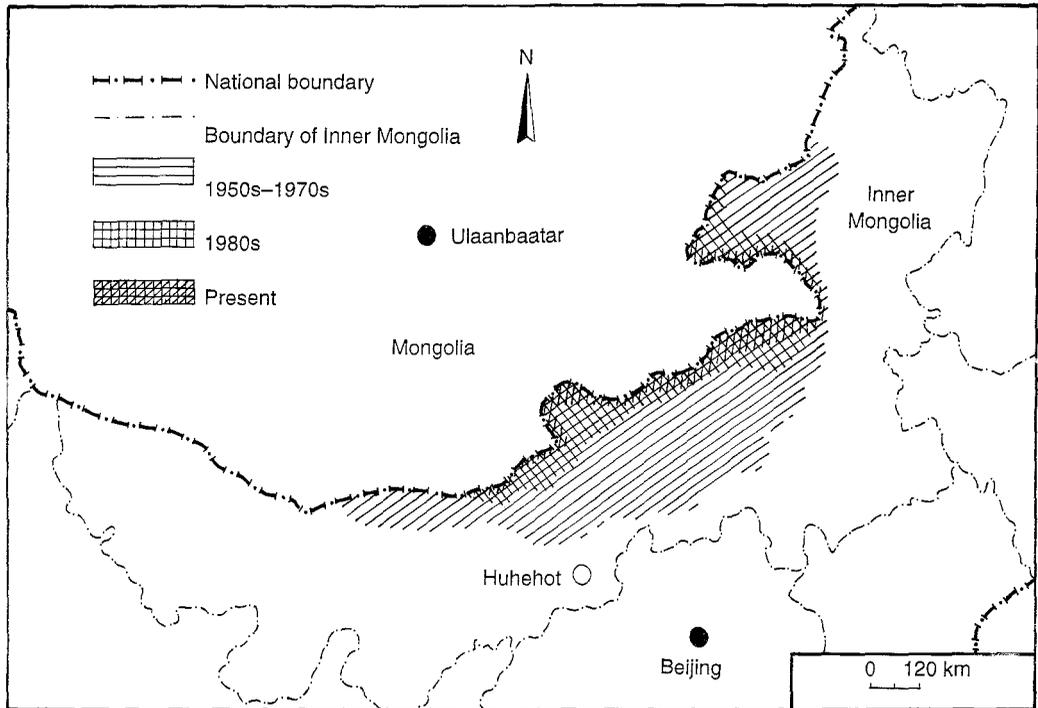
Information on the past and present status of the Inner Mongolian population of gazelles was obtained from interviews with local leaders of wildlife personnel, herdsmen and frontier guards in the counties we visited. Data on numbers of individuals per group, and the size, sex and ages of individuals were recorded from direct observations whenever possible. The adult males were identified by the horns, which are undeveloped in adult females. Young were identified by body size relative to adults. All observations were made using binoculars (8×) and a telescope (60×). In Hulunbuir snow and transport problems

prevented us reaching the national boundary, so information on the species in this district was obtained only from interviewees.

### Distribution

It is difficult to determine the precise distribution of the Mongolian gazelle in China because only a few naturalists visited its range in the past. From our enquiries, we produced approximate distribution maps for different periods of time in Inner Mongolia (Figure 2). Abundance in each period was estimated from annual harvest records and interviews with local leaders and herdsmen.

From the 1950s to the 1970s, the distribution of the Mongolian gazelle in Inner Mongolia was estimated to be about 290,592 sq km (Figure 2). The southern limit of the distribution coincided approximately with the demarcation line between pastoral and cultivated land in Inner Mongolia in the 1970s. Tan (1979) wrote that at least 500,000 individuals were killed each year between 1956 and 1961



**Figure 2.** Approximate distribution of Mongolian gazelle in the 1950s–70s, the 1980s and the present in Inner Mongolia, China.

in China. According to informants, the number killed each year amounted to about one-quarter of the total population; we estimated that the population of gazelles was about 2,000,000 individuals in China in that period.

In the 1980s, the distribution range of the gazelle was estimated to be about 123,840 sq km (Figure 2), which was about 42.6 per cent of that in the 1950s–70s, a considerable reduction. Heavy hunting pressure was largely responsible for the decline. For example, an annual harvest of 73,602 individuals was recorded in the department of foreign trade at Xilinhot, Xilingolemeng, in the 1980s and the highest annual kill (133,402) was made in 1988. The average harvest record per year was about 100,000 in the period 1987–89 in Xinbaragyouqi, Hulunbuirmeng (Tong, 1993). In fact, the number of gazelles killed was doubtless much higher than the official records indicate. According to informants, the number of individuals killed each year was about one-third of the total population in that

period, which we estimated to be at least 500,000 animals in Inner Mongolia. This was only about 25 per cent of the total population in the 1950s–70s.

According to our surveys and enquiries, the range of the Mongolian gazelle in China is now restricted to a narrow area near the frontier between Mongolia and China, from 43°30' to 48°48'N and from 110°30' to 119°10'E (Figure 2), estimated to be about 73,152 sq km (25.2 per cent of the distribution in the 1950s–70s).

During our cross-country transect surveys, we recorded a total of 30,151 individuals in Xilingolemeng and 41 in Ulanqabmeng. These counts probably only included a small part of the population in these districts because the gazelles migrate into Mongolia from late October to late February (Luschekina, 1990). In addition, because size, range and movement patterns of the Mongolian gazelle population remain unknown, we were not able to estimate the population size in its range during our short investigation. According to

**Table 1.** Herd size of Mongolian gazelles counted from November to December 1994 and from March to April 1995 in Inner Mongolia, China

Months	County	No. herds	No. individuals	Max. herd size	Min. herd size	Average herd size
Nov.–Dec.	Dongwuqi	11	4,077	2,000	11	370.64
		8*	12,121*	1,000*	10*	1,512.13*
	Abagqi	5	280	110	7	56.0
		3*	10,000*	610*	50*	3,333.33
	Dongsuqi	1	20			
Xisuqi	2	1,200	745	455	600.0	
Total		30	27,698			923.3
Mar.–Apr.	Dongwuqi	10	1,212	300	5	121.20
	Abagqi	2	105	98	7	52.50
	Dongsuqi	16	778	400	2	48.63
	Xisuqi	27	357	50	2	13.22
	Sizhiwangqi	2	40	34	6	20.0
Total		57	2,492			23.07

\* These figures were obtained from herdsmen.

The numbers in March–April 1995 do not include two lone adult males.

our surveys and informants, we estimated that there was a total of 250,000 individuals in Inner Mongolia in the winter of 1994–95.

### Herd size and composition

A total of 30,192 individuals was seen during our surveys. Of these, 27,698 were seen between November and December 1994, and 2494 between March and April 1995 (Table 1).

Of the 30 herds observed between November and December 1994, the largest comprised at least 2000 individuals and was seen on 4 December in Dongwuqi. The smallest herd was seen on 7 December in Abagqi and contained seven individuals. Average herd size was 923.3 individuals during this period. In contrast, of a total of 57 herds observed between March and April 1995, the largest contained only 400 individuals (26 March in Dongsuqi) and the smallest only two individuals. The average herd size was 23.1 individuals. In March–April we saw two herds of young containing five and four individuals, respectively, and one adult male alone on two separate occasions. In contrast to

November–December, Mongolian gazelles were scattered in small groups in March–April. Our informants confirmed that small herds were often found in spring, indicating that such herds form after the rutting season. Large migratory herds in November–December are thought to make more efficient use of resources and be less vulnerable to predation during the rutting season (Fryxell *et al.*, 1988). According to frontier guards and G. Schaller (pers. comm.) the gazelles regroup in large herds with thousands of individuals in summer. This large herd size is associated with synchronized births (Luschekina, 1990).

The Mongolian gazelle population is mainly composed of adult females (56.9 per cent and 64.7 per cent of the population in November–December and March–April, respectively). The male : female sex ratio for adults was 1 : 4 in both survey periods (Table 2).

The percentage of young in the population was 28.7 per cent in November–December 1994 and 20 per cent in March–April 1995, respectively. This suggests that after 2 months, juvenile mortality was 8.7 per cent. The ratio of young to adult females in the population was 1 : 1.98 and 1 : 3.24 in November–December

Months	County	No. females	No. males	No. young	Total
Nov.–Dec.	Dongwuqi	583	126	303	1,012
	Abagqi	99	27	44	170
	Dongsuqi	12	5	3	20
	Xisuqi	132	51	67	250
Total		826	209	417	1,452
Mar.–Apr.	Dongwuqi	281	72	117	470
	Abagqi	63	21	21	105
	Dongsuqi	284	54	44	382
	Xisuqi	107	27	45	179
Total		735	174	227	1,136

**Table 2.** Composition of Mongolian gazelle populations counted from November to December 1994 and from March to April 1995 in Inner Mongolia, China

and March–April, respectively. The level of juvenile mortality varies with hunting pressure, predation and severe winters, and was high during the winter of 1994–95.

The rutting season of the Mongolian gazelle occurs in early December. The first gazelle observed in oestrus was on 3 December 1994. We also observed that the adult male's neck thickened at this time. Local herdsmen told us that the rut is over by the end of December. Young gazelles are born from the end of June to July in Mongolia (Luschekina, 1990) and we were told that one newborn individual was found in July 1993 in Dongwuqi.

### Migration of the Mongolian gazelle

The Mongolian gazelle migrates regularly across the 120-cm-high border fences from Mongolia into China from October onwards, returning to Mongolia in late February, with the peak of the migration being from mid-November to mid-January. Thus, we hypothesize that the population found in China from March to April were probably permanent residents. Of 27,698 individuals observed in November–December, 1287 (4.65 per cent) were found between the boundary fences of Mongolia and China, which are about 2 km apart, the others (95.35 per cent) were within Chinese territory. In contrast, of 2492 individuals observed in March–April, 1538 (61.72 per cent) were found between the fences, the

others (38.28 per cent) near the frontier in Chinese territory. This suggested that about one-third of the gazelle population occurring in China remains within Chinese territory throughout the year.

The migration from Mongolia to China appears to be associated with the search for pasture (Allen, 1940) and with temperature in winter. It is said that the colder the winter, often with blizzards, the greater the number of migrants and the further south they migrate.

Apart from the known migration routes from north to south, there may be other migration routes from east to west in China. During our surveys, we observed that the animals also moved towards the west, a phenomenon that was confirmed by the frontier guards. However, we were not able to investigate these movements.

### Conservation

The Mongolian gazelle occurs in a narrow area along the boundary between Mongolia and China (Figure 2). No reserves have been established for the species in Inner Mongolia. Our surveys indicate that the gazelles were most abundant in Dongwuqi, about 53.7 per cent of the gazelles observed being found in this county (Table 1). The pasture there is very good and covers about 40,060 sq km, the largest area of pasture in all the counties that contain Mongolian gazelles. The national

border in Dongwuqi is about 500 km long, giving more opportunity for gazelles to migrate into China from Mongolia where they are abundant (Luschekina, 1990; Mix, 1993). In addition, in 1990 the Dongwuqi government established a series of local regulations for the protection of this species. It was our impression that local people were well-informed about the importance of wildlife. For example, five households we visited knew that killing Mongolian gazelles is illegal. We suggest that it is important to establish a reserve for Mongolian gazelle in Dongwuqi; if possible, an international reserve should be established jointly by Mongolia and China.

Although the Mongolian gazelle has been fully protected by law in China since 1989, hunting is still a major threat to the survival of this species. It is easy to find tracks of hunters' motor vehicles and spent rifle cartridges in the gazelle's range. In the winter of 1994–95 during our survey in Dongsuqi we found some skins, carcasses and skulls and 175 stomach remains, which had probably been discarded by hunters. Hunters are mainly officials, military personnel, herdsman and other people from outside the region. Gazelle herds are dazzled with spotlights at night making it easy to shoot individuals of all ages and both sexes. The hunting period in China is from November to January, which is the Mongolian gazelle's rutting and migration period, the worst time of all as far as the species's survival is concerned.

Although wolves were once the most important predators on the grassland, the wolf population declined sharply because of hunting in the 1950s. Eleven wolf droppings collected from our survey areas contained 17.6 per cent Mongolian gazelle, 43.5 per cent domestic livestock, 18.1 per cent hares and 20.8 per cent marmot remains by weight. We were told that eagles, *Aquila chrysaetos* and *A. rapax*, also attack young gazelles.

The wildlife department in Inner Mongolia does not have enough funds to enforce local regulations to protect the Mongolian gazelle. In order to protect this species and other steppe wildlife in the last intact portion of the Mongolian plateau, it is essential to establish

international co-operation and to attract international support.

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