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[Short Communications]

Impacts of Gray Wolf (*Canis lupus* Linnaeus 1758) on Wildlife and Domestic Animals in Great Gobi Strictly Protected Area Sector 'B' and Coordination of the Issues

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The following is a summary of a MSc. thesis in Biology submitted to the National University of Mongolia in 2001.

Introduction

The gray wolf is a member of the Canidae family. It is adapted to different ecological conditions and lives in a wide range of habitats and geographical locations throughout the world. In recent years the species has been hunted in large numbers in some European countries, and its numbers have dramatically decreased. In some places it is threatened with extinction. Wolves are widespread throughout Mongolia from the taiga to the desert zone. Depending on specific features of each natural zone, two types of gray wolf differing in appearance and body size are distributed throughout the country. One is dark grey, larger and is found in forests and mountainous regions, the other is light grey, smaller and found in the steppe and Gobi regions to the south.

The gray wolf plays a "cleaning" role within the ecosystem eating the oldest and weakest individuals and feeding on carrion. Wolves may help to (1) prevent wild species from contact with potential infectious diseases and (2) keep the balance of herd structure and numbers among hoofed animals. In comparison to other carnivores, numbers and distribution of the gray wolf can drastically increase within short periods of time and high wolf numbers may adversely impact livestock and game species.

Great Gobi Strictly Protected Area (SPA) is of international conservation significance. During recent years, vast areas in the Gobi region have been overgrazed. As a result the ecosystem is degraded and some plant and animal species have decreased - some of them are even threatened with extinction. Therefore, the conservation and research of rare species and the reintroduction of endangered species in south Altai and Djungarian Gobi region is necessary. Since 1992 the reintroduction of takhi (*Equus przewalskii*) has been successfully implemented, with assistance from Germany, Austria and Switzerland. Between 1990 and 1993 several comprehensive ecological studies were conducted in the Djungarian Gobi where the ancestors of takhi once lived. However, there is still a lack of information on predators. Grazing and movement of wildlife and livestock along the few available water points in Djungarian Gobi provide favorable conditions for predators such as the wolf.

To ensure the protection of habitat and favourable conditions for breeding of hoofed animals in the area, comprehensive studies on species habitat requirements and their interrelations within the ecosystem should be carried out. Simultaneously, there must be studies on the ecological impacts of predators on distributions, habitat use and population dynamics of a reintroduced species, particularly at the beginning of the reintroduction when they have no instinct to protect themselves and others in the herds from carnivores like wolves.

Aims

Main objectives of the study were to conduct surveys on the impacts of gray wolf on populations of wild species such as khulan (*Equus hemionus*) and black-tailed gazelle (*Gazella subgutturosa*) as well as on domestic livestock and to properly determine people's knowledge and attitude towards wolves. To achieve these aims the following actions were proposed:

- Determine distribution, movement areas, numbers and density of wolves in the "B" zone of Great Gobi SPA and identify percentage hunted
- Find wolf dens in the area and enter their locations in a GIS to produce a distribution map of the species
- With the help of interviews of residents of the "B" zone of Great Gobi SPA determine attitudes towards wolves
- Determine the total number of livestock within the area, document their movements, as well as

the number of livestock killed by wolves and natural disasters

- Conduct monitoring of wildlife in target areas and determine species killed and captured by wolves
- Develop management plans for the species in the region

As part of our field work we met with all herder families that move around the SPA and we discussed their ways of herding livestock, loss of livestock killed by wolf, levels of wolf impacts /effects, numbers and herds of wolf found within their movement areas, overall distributions and hunting of the species, and numbers/ herds of other hoofed animals found within the area . We used a questionnaire for discussions on the above. The questionnaire consisted of 75 questions in 7 sections. On average 45 to 60 minutes was spent for each interview. The interviews involved a total of 54 people, aged 20 to 78 years old. Of all people interviewed, 85.2 % (46) were males, and 14.8 % (8) were females. 24.4 % of the interviewees were 20–28 years old, 50 % were aged 31–49 years old, and 29.6 % were aged 50–78 years old. Results of the questionnaire were analyzed with the program *SPSS 9.0* that is widely used in sociological surveys.

We recorded the coordinates of locations where livestock and wildlife species were killed by wolves on a map of 1:100,000, showing locations, movement, and hunting tracks of the species. In cooperation with experienced hunters and herders we found and recorded wolf dens. All dens found were put on the map and information on habitat type and size were recorded. We obtained some information on wolf hunting within the area during our discussion with local herders. Wolf hunting takes place all year around and therefore numbers of wolves hunted in previous years are not counted twice. We discussed with local herders about livestock species raised, total livestock and livestock killed by wolf and by natural disasters.

During the study we conducted a census on wild prey species (such as khulan, black-tailed gazelle and takhi) in September, October, and November 1999 and July, August and September 2000. The census was conducted using standard methods each time. Information and data on the numbers of takhi killed by wolf (including injured foals) were obtained from takhi researchers.

Results

Number and distribution of gray wolf

The Djungarian Gobi lies in the southern part of the Altai mountains and it differs in its territorial size and the location of water bodies from the southern Gobi A. Its territory is smaller and water bodies are located closer to each other. The wolf plays a significant role within the ecosystem. The species has been studied within the scheme of the management of reintroduction of takhi in the protected area ecosystem and has become one of the focuses of this study. The wolf is mostly found in rocky areas such as Khondlon, Bambagar, Serven, and Shiree Khairkhan and also in areas near water points as well as tussocks, sandy hills and reeds. From the end of December to January is the mating period for the species. In spring at the end of April, the new pups are born. Up to the end of June, female wolves look after the young in their dens. Newly born pups are able to walk and play near their dens by the end of May.

Khondlon Mountain is important for wolves because of its rocky terrain. The mountain stretches north to the south, 7-8 km in length and 2-3 km wide, 1800-2100 m above sea level, with multiple peaks. We recorded locations of 11 carcasses eaten by wolf and determined movement patterns of wolves within 50 m from the location of each carcass. It was found that wolves came down from Khondlon Mountain. Wolves that inhabit Khondlon, Bambagar, and Serven Mountains usually come down to the southern and northern valleys and eat camels, horses, and khulan in the autumn. Local herder families with their livestock move to the Altai Mountain to spend their summer, from the beginning of June. During this time, the number of wolf tracks decreased in the study area. Wolf tracks were regularly recorded in Khonin Us area all year round. The area is inhabited in the winter by households of Bij bag with their livestock and by wild species such as khulan and gazelle in the summer. Wolves are widely distributed in the Altai Mountain range in the summer (from June) and autumn because of livestock presence and the distribution of marmot, considered a main prey species. We identified locations of carcasses eaten by wolves in the study area from August to November 1999, from May to October 2000 and from July to October 2001. According to our records: 47% of the total carcasses found were camels, 23% horses, 23% takhi, 5% khulan, and 2% adult cattle.

All domestic animal carcasses found were cattle. No carcasses of small livestock such as sheep, goats and black tailed gazelle eaten by wolves were found and recorded in the area. Body parts of small animals were entirely eaten or if there were any parts left, carnivorous birds had eaten or

taken away the remains. Therefore, it was impossible to find and record carcasses of small animals. 80 % of horses and takhi eaten by wolves were foals.

Surveys on hunted gray wolves

From 1999 to October 2001 a total of 42 wolves were hunted in the area. Of these 11 (27 %) were killed in 1999, 24 (58 %) in 2000, and 7 (17 %) in 2001. 45 % of the killed wolves were males, 43% were females and 12 % were unidentified. 58 % of them were adults, 36.5 % were 2-3 year old individuals and 5.5 % were young pups.

Knowledge and understanding by local communities of gray wolf

There were 54 local people involved in our survey. 77 % those surveyed gave correct answers to the first set of questions and most showed that they had a good level of knowledge and understanding on the species. 56.3 % of those surveyed considered the wolf to be an important species that plays a significant role in the ecosystem.

Impacts of gray wolves on livestock in the vicinity of the Takhi Steppe

The study area contained wildlife grazing areas and water points important either for wildlife or for livestock/human populations on seasonal movements throughout the area. In spring and autumn about 60 households move along the water points. Over 40 households and 60 % of the total livestock spend the spring and autumn in areas near Gun tamga, Khairkhan bulag, Tavan ovoonii bulag and Toodgiin Us water points and spend their winters in Takhi Shar Nuruu, mountain range. According to the information given by herders, there was a total 18,206 head of livestock: 876 horses, 347 camels, 187 cattle, 6,732 goats and 10,064 sheep. The number of small livestock killed by wolves is higher than the number of big livestock (Table 1).

According to the surveys on livestock killed by wolf, sheep and goats were killed regularly and usually during the night. There are higher numbers of camels killed by wolves from August to the middle of October in comparison to the rest of the year. Table 2 shows the total number of livestock species killed by wolf and the total loss of livestock in the area:

Impacts of gray wolves on wildlife species in Takhi Steppe area

Khulan: The population of khulan regularly migrates on a seasonal basis throughout the area. Herds of khulan are widely found in areas of Takhi steppe, Gun Tamgiin Us, and Khonin Us in the spring, when snow melts, but they are not seen in these areas in the winter. The species usually migrate in large sized herds. We found that the average size of the herds contained between 50 and 200 individuals. Additionally, we found herds with up to 900 individuals in Tavan Tolgoi, Dood Elsen Tolgoi, and Tsagaan Ders areas. According to the questionnaire responses given by herders, the majority (96.3 %) thought that numbers of khulan had increased within the last few years. We also carried out a census of wildlife species every month in 2001 and counted 0.42 khulan per km² in July, 0.51 in August, and 1.24 in September.

Black-tailed gazelle: In comparison to the population of khulan, the population of black-tailed gazelle is more stable. However,

Table 1. Loss of livestock and numbers of livestock killed by wolf

	sheep		goat		cattle		horses		camel		Total loses
Year	n	%	n	%	n	%	n	%	n	%	
2001	162	*64.8*	42	*16.8*	11	*4.4*	24	*9.8*	11	*4.4*	250
2000	355	*51.9*	197	*28.8*	14	*2.04*	104	*15.2*	13	*1.9*	603
1999	116	*39*	65	*21.8*	1	*0.3*	98	*32.9*	17	*5.7*	297

Table 2. Loss of livestock and numbers of livestock killed by wolf

	By wolves	All livestock losses
1999	297	952
2000	683	1191
2001	250	7639
Total	1230	11012

they also move around seasonally basis. Like the khulan, they appear in the areas mentioned above in the spring when snow starts melt, but they are not seen in those areas during winter. Herd structure of the species is different from khulan and herds numbered only 4 to 7 animals. According to our census there were 0.54 gazelles per km² in July 2001, 0.82 in August, and 1.71 in September. The result of the census conducted during 2001 was compared with the results of the census in previous years. Results seem to show that the number of black-tailed gazelle has decreased, while the number of khulan has increased suggesting that the two species might be in competition for grazing areas. There are on average 0.9 khulan per km² and 0.4 black-tailed gazelle per km² in the study area. Depending on seasonal climatic conditions and species movement patterns, the number of species fluctuates. In the summer, khulans form herds of 2-20 individuals, but in the autumn herd sizes contain 20-500 individuals, sometimes up to 900 individuals. Only 4.6 % of carcasses found and recorded were carcasses of khulan. However, we believe that wild ungulates (particularly khulan foals) living in uninhabited areas such as Khonin Us and Toodogiin Us are likely to be killed by wolf, but that there is a low probability that people discover these carcasses. Regarding the black-tailed gazelle, we did not find any kills at all. We think that carcasses of this species are quickly and completely consumed because of their small size.

Ibex: Ibex (*Capra sibirica*) are found in the Altai Mountain range, Serven and Khondlon Mountains. However, we have not carried out any census on the species. We saw several herds of ibex (with 5-10 individuals) in Khondlon, Serven, and Ulaan Uul Mountains. We saw 5 ibex with 2 kids in Serven Mountain almost every day from August to October 2001. There was a herd of over ten individuals in the Khondlon Mountain where wolves are widely distributed. There is much pressure from wolves on the small population of ibex.

Takhi: Since 1992 a project to reintroduce takhi has been successfully implemented in the Takhi Steppe and Bij river valley that once were inhabited by the species. Having adapted to severe winter and dry summer climatic conditions, herds of the species are distributed in the areas around Gun tamga, Khonin Us, and Shiiriin Us water points. In November 2000, there were 25 horses in PAS group around 5 hills, Shar Khar, and Khurgaljin, 8 horses in the BACHLOR group around Khondlongiin Ar, Shar Khotol, and Seruun baraan, and 7 horses in the YUENCH group around Gashuun, Tamga, and Bij river valleys. In total there were 48 free-ranging and 8 captive horses (JIGUUR group) in the study area.

In the winter of 2000-2001 it snowed heavily (35-40 cm snow depth) and in the Djungarian Gobi and Takhi Steppe winter conditions were very hard. This resulted in a change in the distribution and movements of wild species and livestock in these areas. Herds of takhi moved to the mouth of Khonin Us and proximity to the Khurgaljin area until middle of December of that year. Unfortunately, the herds experienced several wolf attacks during this period. This resulted in a loss of 90 % of all foals. From December 1st until 16th 2000, 14 takhi were lost. Of those, 7 were killed by wolves and 4 disappeared. In February 2001, the number of takhi was reduced to 45. From 1999 to 2001, 36 % of the total takhi losses were caused by wolves.

Discussion

The relationship between predator and prey is important to ensure ecological balance. Determination of density and impacts of grey wolves in the ecosystem is needed to decide on management issues. According to researchers the grey wolf is abundantly distributed in forest steppe, steppe and taiga regions, with fewer numbers occurring in mountainous areas and is rarely found in the Gobi desert areas (Bannikov 1954, Dulamtseren 1970). Although estimates researchers differ, the geographical location and current conditions of livestock and wild ungulates in the Djungarian Gobi have resulted in large densities of wolf in the area. According to our studies, domestic livestock are the most important prey for grey wolves. The impact of wolves on wild ungulates has not been well studied. It is thought that the impact of grey wolf on wild ungulate populations in the Djungarian Gobi is relatively low, wolves eating livestock that are grazed close to them rather than chasing after wild ungulates.

Within our studies we found that the number of ungulates in the area was relatively stable, but population movements (in and out of the 1200 km² study area) did occur on a seasonal basis. Within the study area wolves accounted for 11 % of the

total livestock killed (1.8 % of the total livestock grazed in the area). Numbers of grey wolves in the study area were drastically reduced in 2001 due to hunting activity in 2000. Interviews with local herders showed that the majority (75%) believed that the number of gray wolves in the Great Gobi SPA "B" zone has increased. Hence they disagree "to hunt the species only during the hunting season". Additionally, most of them agree to kill wolves by poison or removing pups from dens; herders regard this as necessary to protect their livestock from wolves. In the study area, young camels are susceptible to being killed by wolves and so closer attention should be paid to herding practice.

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References

Bannikov, A.G. 1954. *Mammals of the Mongolian People's Republic*. Research of the Mongolian Commission of the Academy of Sciences of the USSR. USSR Academy of Sciences Publishiing House, Moscow, USSR (In Russian)

Dulamtseren, S. 1970. *Guidebook to the Mammals of Mongolia*. State Press, Ulaanbaatar, Mongolia. (In Mongolian)