

Takhi's (*Equus przewalskii* Polj., 1883) Home Range and Water Point Use

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The following is a summary of a Master's thesis in Biology submitted to the National University of Mongolia in 2002.

Introduction

The takhi herd of the Takhi Research and Adaptation Center along Bijiin Gol (Bij River basin) has been under constant supervision of researchers i.e. in a semi-wild condition from 1992-1997. During this period, veterinary aspects, protection from causes of mortality and animal husbandry matters were of main concern. The first herd was released to the wild from the adaptation enclosure in 1997. Although some aspects of takhi biology and ecology have been researched, water and pastureland use have not been a main research area. This MSc focuses on the importance and significance of water and pasture for reintroduction of takhi, and on research comparing takhi demands with that of khulan (*Equus hemionus*, Asian wild ass) and black-tailed gazelles (*Procapra subguturosa*) in "Great Gobi B". This is of importance since the takhi population has been expanding since 1999 and because of the possibility to release takhi into other parts of the park (Takhi Us, Baitag, Yolhony Gobi) – we therefore need to know about the use of water sources by takhi and to study the dependence of other hoofed animals on this limited resource. The research was conducted from 1999-2002.

On 6 June 1992 the first 5 takhis (2 stallions and 3 mares) arrived in Takhin Tal, Mongolia (Fig 1). On 22 September of that same year a mare named "Bij" gave birth to a female foal who named "Uugan" - the first reintroduced foal born on Mongolian soil. Ten years have passed since that time and the takhi have now acclimatized and many more foals have been born. During previous years but with the exception of 1994 and 2001, more takhi were flown in from zoos and national parks from different European countries.

Study area - The Great Gobi National Park (GGNP)

Research was conducted in Bij bag of Bugat

soum and Altan Soyombo bag of Tonkhil soum of Gobi-Altai aimak (province). Some research work was also carried out on the territories of Barlag bag of Altai soum of Khovd aimak. GGNP is divided into two parts indicated as "A" and "B". Part "A" consists of 4.419 million ha. and part "B" consists of 881,000 ha. The study area belongs to part "B" of GGNP. The highest point is at 3100 m a.s.l. and the lowest is at 1000 m a.s.l. The harsh climate of the region is characterized by dry, cool summers and cold, windy winters. The average annual temperature is 2-4°C, average temperature in January is -16°C with minimum temperature around -40°C, average temperature in July is +18°C with maximum temperature of around +40°C. Annual precipitation averages 44.5-100mm of which most falls as rain. One of the climatic peculiarities is high wind speeds, especially in spring, summer and autumn, due to large differences in day and night temperatures.

The boundaries of the research area had been defined before research began. It included the takhi reintroduction centers, i.e. territories with total size of 1600 sq.km, including Bijiin Gol, Gashuun Us, Gun Tamga, Khairkhan Bulag, Toodog Us, Khoni Us, Shiiriin Us and the valleys bordering the Bijiin Gol. In some cases the takhi left the pre-defined research area and we had to follow them to get information outside the study area.

The research region is located in the eastern part of the national park where there is an absence of herdsman. However during spring and autumn herdsman use the park and move to water sources located in the study area. There are 8 springs and water sources in the research regions, which are especially important for the hoofed animals inhabiting the eastern part of the national park. These water sources are located comparatively close to each other, which creates suitable conditions for feeding of wild animals. Most of the springs have a constant water supply, but freeze in winter.

Flora and fauna of the region

Takhiin Gol region has 233 species of plants belonging to 135 genus and 42 families. 23.6 % (56 species) of these plants belong to the order of monocotyledons and 75.4 % (175 species) belong to dicotyledons. From 1999-2001 A.Oyunbolor conducted research on the territories near Takhiin Tal and registered 184 plant species of 107 genus and 35 families. Dominant families were *Gramineae*, *Compositae*, *Leguminosae* and *Chenopodiaceae*. There are also 12 endemic species, 15 sub-endemic species and 27 species of native and semi-native vegetation in the territories near Takhiin Tal. 70% of the land is covered with *Nanophyton erinaceum* - *Stipa glareosa* which are the dominant desert plants and *Haloxylon ammodendron*-*Reaumuria soongorica* which are the dominant vegetation of the true desert. The collected vegetation can be divided into 66 species of medicinal herbs (35.8% of total vegetation), 18 species food herbs (9.7%), 21 species of soil protecting vegetation (11%), 15 species of decorative plants (8.1%), 18 species of poisonous plants (9.7%), and 117 species of fodder vegetation (63.5%).

204 vertebrate species have been recorded in this region: 1 amphibian, 6 reptiles, 156 birds and 44 mammals. 45-50% of the more than 30 protected animals listed in the red book of Mongolia, such as takhi, khulan, black-tailed gazelle, argali sheep (*Ovis ammon*), ibex (*Capra sibirica*), snow leopard (*Uncia uncia*) and the uncommon birds such as Altai snow cock (*Tetraogallus altai*) and bearded vulture (*Gypaetus barbatus*) live in the Gobi B National Park.

Aim and Purpose of the Research

Identification of the role of water sources in the pasture land utilization by the takhi herd released into the wild from the Takhi Reintroduction Center at Bijjin Gol:

Identification of constantly used water sources and water points by each herd

Identification of preferred pastures and home ranges

Mapping of water points and locations of water sources

Timing and frequency of drinking by takhis in respect to climate, season and other reasons

Pasture utilization by herds of takhi, sizes and borders of pastures, changes and movements

Possibilities of expanding the present borders

of takhi pastures based on water availability for the reintroduction of takhi:

Acclimatization of takhi to new land (depending on location of water source, human and their livestock, pasture condition and the presence of other wild animals)

Identification of factors associated with choosing water source and pasture (Honi Us, Takhi Us, water sources of Yolhkhon Gobi). Changes of behavior and structure of herd.

Influence of khulan, black tail gazelle, and domestic herds which are using the same water sources and pastures as takhi - define the relationship between the animals:

Changes in the numbers of khulan and black-tailed gazelle depending on water availability and pasture quality

Study of movements, utilization of pasture and feeding of khulan, which is similar to takhi by its ecological niche and may be competitor

Features of water source utilization by domestic animals

Possible competition over water sources and pasture land between takhi, khulan, black tail gazelle and domestic animals

Methods

Hoof prints in the dirt were used for defining the time and frequency of drinking by takhi herds. In order to establish the frequency and timing, old prints were erased. Takhi foot prints and khulan foot prints were differentiated. In order to define the influence of khulan, black-tailed gazelle and domestic animals on pasture used by takhi we counted all other hoofed animals using binoculars or by transect and point count methods. Observation times were standardized. We conducted a questionnaire survey among local herdsman to learn from the biological and ecological knowledge of khulan and black-tailed gazelle by local people. We also documented the utilization of water sources and pastures by domestic animals as well as the time and frequency of confrontations between domestic and wild animals.

Results

Number of takhis and takhi herd composition
The highest number of takhi was reached in 2000

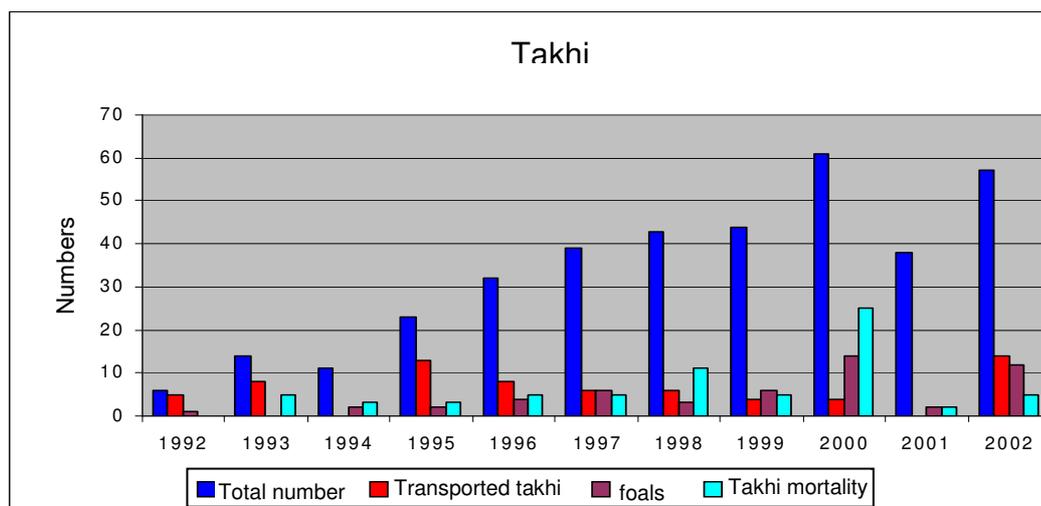


Fig.1. Takhi numbers in Takhin Tal, Gobi B.

(Fig. 1). However, due to the hard winter in 2000/1 and wolf predation up to 40% of the takhis were lost during this winter. The remaining 60% have become the selected herd with an ability of surviving harsh winter conditions and attack by predators.

The number and survival of foals born in Takhiin Tal is shown in Fig. 1. Over the last 10 years 54 foals were born of which 24 (42%) survived. Among the foals born in Mongolia, stallions "Tuulai" and "Mundel" have become harem stallions and are in charge of their own herds. Of the mares that have born foals, "Uugan" gave birth 5 times, "Toodog" 3 times, "Tsagaadai" 3 times, "Khongoroo" 2 times, and "Misheel" 1 time. There are currently 57 takhi living in the Takhi Tal, among which 36 takhi in 4 herds are free-ranging. One herd consisting of 8 takhi is permanently kept as a breeding group in the enclosures. In 2002, 14 new takhi were transported from Europe and will be kept separate in a stallion and mare group until the end of the year.

Water supply for takhi

Takhi drink from the river and other water sources during all seasons of the year, except in winter. During the period when water is available in the form of snow and ice, herds use the most distant pastures from any water source. During the warm seasons Bijiin Gol river supplies the fenced takhis with water. However, during July and August of 2000, 2001 and 2002 the dams water reserves were fully dried up. During these periods takhis

were watered with water transported to the adaptation enclosures. The wild herds had to move to the water sources of Shiiriin Us, Gun Tamga, Gashuun Us. They sometimes even used water ahead of Bijiin Gol river, passing by Bij village, to reach the water of Gunangiin Gol. At this river many herdsmen spend the dry season.

Takhi are drinking daily in spring and autumn and are drinking every other day during summer, when the vegetation is still green and rich in water content. However, the newly released herds Uyench and Shonkhor used to drink 2-3 times a day when it was very hot – a sign that they were not yet well adapted to life in the desert. Compared with khulan and black-tailed gazelle, takhi use a water source very conservatively – they do not easily switch between different water sources: drinking frequency, presence in the same place and movements to another place depend on season, weather changes and pasture conditions.

The water sources used by wild takhi

Every takhi herd has a different drinking frequency and drinks from different water sources. All takhi herds drink from Bijiin Gol river during spring and autumn. In the summer time Pas group used water of Gun Tamga, whereas Mundel group used water of Shiir Us and Tuulai group and Bachelor group drank water from Bijiin Gol. During some winters the herds fed near Choni Us in the Gobi, but it is not clear if they drank water from the springs at this place, or merely ate snow.

Utilization of Pasture

During my research the takhi herds used a variety of different pastures. However, compared to khulan and black-tailed gazelle, takhi have a weak ability to feed far from the water sources and hence are somewhat more restricted to move in accordance with the vegetation conditions – they tend to feed on the pastures they already know. The most recently free-ranging herds tend to feed near ‘five-hills’ at the end of Bijiin Gol river during most of the year and drink water from Bijiin Gol and Gun Tamga during summer and autumn seasons. Snow fall normally begins at the end of November, resulting in snow covered pastures. During this time takhi tend to leave the stipa pastures and move to pastures with saxaul bushes and other kinds of grasses growing near Choni Us and Khurgaljin. The pastures used by takhi herds between 1999-2002 show that herds seem to feed in the same places from year to year, however they do move from pastures with dry grasses to pastures with woody plant in the winter time.

Discussion

We have to pay special attention to the takhi winter pastures – takhi should adapt to the harsh winter conditions as well as khulan and black tail gazelle. Otherwise, the disaster of winter 2000/1 might happen again. However, it will be difficult to teach the takhi herds to follow the westward migration of khulan and black-tailed gazelles during the winter season. Therefore it is important to train and/or release takhi herds to places like Choni us, Takhi Us, Yolkhon. It will also be important to teach them places like Baitag Bogd, Khavtag, Khukh Under etc., where there are very good winter pastures.

Conclusions

Ten years have passed since the reintroduction of takhi into their native land and takhi have already adapted to the new environment and began to feed in the wild. Free-ranging takhi need daily access to open water in spring, summer and autumn seasons, but are capable of moving between two water sources.

The drinking frequency of takhi, duration at one water source and migration between home ranges depends on the following factors: season; weather;

location of humans and their livestock; time since release from the enclosure; other takhi herd location, time and drinking frequency; distance to water source from the herd pasture; pasture condition near the water source

Takhi herds come to drink water during any time of the day, but need to drink every day during spring and autumn. The stallion group normally drinks water at a different time than the other herds. It was noted that the established Pas group and Bachelor group drank water every day or every other day during the summer grass season, while the newly released Shonkhor and Uench groups drank water 2-3 times each day.

Takhi are social animals that live in herds and utilize a herd home range. The first pasture for most takhi is the adaptation enclosure. Takhi herds are feeding at a distance from each other, each group choosing a different home range.

The ability to choose a home range after release seems to depend on the following factors: time since release into the wild; group composition, namely if the group has a member that had been living in the wild before; weather condition

The first choice of home range by the herd will depend on the following: location of other herds’ home range (dominant herd); water source distribution; human and livestock presence and pasture condition; behavior of the stallion and the leading mare

Acclimatization of takhi to wild pasture begins with feeding on the river banks, fields and meadows with grasses dominated by broomgrasses as the pasture in the enclosure is dominated by such grasses. From time to time newly released takhis also choose pastures with feather-grass, saxaul and other bushes. The location and sizes of the herds’ home range changes by season. During the mating season the border of the territories are guarded keenly and different herds use different water sources. If the same water source is used, it is at different times of the day.

The takhi harem stallions mark their territories with dung. They constantly drop dung when they meet another stallion or on the border of their territory.

Khulan and black tail gazelle use water sources constantly during spring and autumn and drink every day or every other day. However, in summer, especially when the pasture is rich in feather-grass and onion type vegetation, black-tailed gazelles almost don’t drink water. Both species are

migratory and move to the western part of the park in winter time.

The water points such as Bijiin Gol, Honi Us, Toodog, Gun Tamga, Shiiriin Us are considered the most important water sources for wild animals.

Sociological studies have been conducted with 42 herdsman and we gathered information on the number of wild animals, their drinking behavior and pasture use.

Taking into consideration the importance of water source location on pasture use and acclimatization of takhi to a new environment, we propose to move some of the new takhi herds to Choni Us and suggest further re-introductions towards Yolkhon, Tsonjiin Gobi, Baitag and Khavtag

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