Przewalski horses, wolves and khulans in Mongolia

Report August 2003, by Petra Kaczensky and Chris Walzer

ITG INTERNATIONAL TAKHI-GROUP

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1 The Przewalski horse population

Status of the population

Due to a rather mild winter, almost all horses survived in good condition and in April 2003 there were still 4 wild groups (*Pas*, *Mundol*, *Tuulai* and *Bachlor* group) and 3 captive groups (*Juguur*, *Mare/Khuchit* and *Stallion* group) in Takhin Tal. Unfortunately two of the members of *Pas* group - the adult female TOODOG and the young stallion MAIGA – disappeared in March and April 2003, respectively. Both horses had been in poor condition previous to their disappearance: TOODOG had an abortion and MAIGA had been expelled from the group by PAS.

During the winter, the mare SONJA had been moved from the *Mare* group to *Jiguur* group due to poor body condition. She recovered nicely in her new group. In March, the stallion KHUCHIT, from the captive *Stallion* group, after many attempts to do so, finally managed to jump into the *Mare* group enclosure and thus claimed his right to be the harem stallion. In April, JIGUURS aggressive behavior towards his son ZUUN made it necessary to move the later from *Jiguur* to the *Stallion* group.

In mid May the *Stallion* group and the newly formed harem (*Khuchit* group) - both had arrived with the large takhi transport last year (see: Kaczensky and Walzer 2002a) - were released into the wild. Before release the horses were treated for piroplasmosis. Several horses already started to shown clinical symptoms of piroplasmosis, but recovered rapidly after treatment except for one stallion. ERKHIM, the dominant stallion in the *Stallion* group died within 24 hours of acute piroplasmosis, in spite of treatment.

Vigorous interactions between the different takhi groups could be observed in Mai and June and group compositions changed several times. The released *Stallion* group joined the *Bachlor* group, while stallion TAYAN left and joined the newly released *Khuchit* group, which became a two-stallion group. Within the course of more than 3 months TAYAN slowly took over the mares from KHUCHIT and by the begining of August KHUCHIT was expelled from the group, leaving TAYAN in charge of the group now called *Tayan* group.

The newly released *Khuchit* group lost two mares shortly after release: mare ODON joined the *Pas* group and mare ERDENE the *Tuulai* group. PAS expelled his daughter ANGIRT, who first joined the *Khuchit/Tayan* group and then the *Tuulai* group. She eventually suffered a broken hind leg – most likely due to fighting between TUULAI, TAYAN and KHUCHIT – and died. Finally, begin of August the mare KHOKHOO and her foal changed from *Tuulai* to the *Mundol* group. For the most recent (August 2003) group composition see Table 1.

Between 2. April and 5. July 13 foals, 5 females and 8 males, were born in Takhin Tal. Hence overall reproductive rate for the 19 adult mares (≥4 years and not been transported the previous year) was 58%. In addition, 1 out of 7 (14%) 3-year old mares produced a foal. Of the 12 foals, 10 are still alive and in very good condition in August 2003, one foal was stillborn and another foal disappeared after 18 days (Table 1).

Unfortunately the planned transport of 6 additional captive bred takhis from Europe had to be postponed until next year due to the complications and restrictions imposed on travelling to Asia due to SARS.

Table 1: Most recent group composition, fate and reproductive success of the free roaming horses in the Gobi B strictly protected area (8. August 2003).

name	sex	born	age	origin	arrival	own	mother	father
Pas group - 13 adults/subadults + 4 foals								
KHOWCH /PAS	stallion	24.04.89	14	Askania Nova	22.06.93	1818	548	896
CHANADAGA	mare	11.05.91	12	Askania Nova	22.06.93	2130	600	1159
Chanadagas foal	mare	23.06.03	0	Gobi B		?	2130	1818
SHAGAI	mare	15.06.91	12	Askania Nova	22.06.93	2141	966	1008
Shagais foal	mare	02.06.03	0	Gobi B	-	?	2141	1818
UUGAN	mare	02.09.92	11	Tachin Tal	-	2398	1831	?
Uugans foal	stallion	12.06.03	0	Gobi B	-	?	2398	1818
BULGA	mare	07.05.95	8	Langenberg	18.06.96	2787	2018	1374
MICHID	mare	13.05.96	7	Tierpark Berlin	11.06.98	2921	744	2041
Mischids foal	?	30.06.03	0	Gobi B	-	?	2921	1818
TOOT	mare	11.05.97	6	Zoo Berlin	11.06.98	3072	1813	1618
OODON	mare	30.07.99	4	Whipsnade/London	14.06.02	3332	?	?
NOMKHON	mare	07.05.02	1	Gobi B	-	?	2141	1818
TELMEN	mare	15.05.02	1	Gobi B	-	?	3072	1818
JAVKHLAN	mare	20.05.02	1	Gobi B	-	?	2130	1818
BOSOO	stallion	21.05.02	1	Gobi B	-	?	2398	1818
OROO	mare	24.05.02	1	Gobi B	-	?	2787	1818
***o** lost mare TOODOG - was in poor condition after abortion and disappeared soon after*								
***o** lost stallion MAIGA after exclusion from the group - was in poor condition and disappeared soon after*								
***o** lost mare ANGIRT after exclusion from the group - died of broken leg due to fighting between Tuulai and Khuchit/Tayan group*								
Mundol group - 9 adults/subadults + 3 foals:								
MONDOL	stallion	10.05.97	6	Tachin Tal	-	3069	2130	1818
ZAGAL	stallion	10.05.02	1	Gobi B	-	?	3035	2866
IMJ	mare	02.08.94	9	Schwerin	04.06.98	2748	1436	1236
TSAGAADAI	mare	06.06.96	7	Tachin Tal	-	2940	1297	1772
MANDAL	mare	26.05.02	1	Gobi B	-	?	2940	2866
SOIR	mare	31.03.97	6	Langenberg	01.06.00	3045	2018	1374
MISHEEL	mare	28.05.97	6	Tachin Tal	-	3084	1977	1159
Misheels foal	mare	28.05.03	0	Tachin Tal		?	3084	3069
KHOKHOO	mare	19.11.96	6	Langenberg	01.06.00	2984	1359	1374
Khokhoos foal	mare	08.06.03	0	Gobi B	-	?	2984	2911
DOROTHEE	mare	06.06.99	4	Tachin Tal	-	3230	3035	2503
Dorothees foal	mare	06.06.03	0	Tachin Tal	-	?	3230	3069
***o** lost IMSCH male foal - disappeared*								
Tuulai group - 8 adults/subadults + 1 foals								
TUULAI	stallion	07.05.96	7	Tachin Tal	-	2911	1825	1159
YYL	mare	17.04.94	9	Oberwil	10.06.97	2712	486	1772
KHEREM	mare	28.07.02	1	Gobi B	-	?	2712	2866
TAGTAA	mare	05.05.98	5	Winterthur	01.06.00	3143	2483	1742
MARAL	mare	23.05.00	3	Tachin Tal	-	T202	3038	2363
KHERLEN	mare	26.05.00	3	Tachin Tal	-	T203	3035	2363
Kherlens foal	?	05.07.03	0	Gobi B		?	T203	2911
ORKHON	mare	15.07.00	3	Tachin Tal	-	T212	2645	2363

ERDENE	mare	19.02.98	5	Rotterdam	14.06.02	3040	?	?
o TAGTAA lost male foals (stillbirth)								
Tayan group - 6 adults:								
TAYAN	stallion	24.04.97	6	Tierpark Berlin	11.06.99	3066	1431	2041
MONDOR	mare	17.06.98	5	Springe	14.06.02	3194	?	?
MONGON	mare	06.05.99	4	Winterthur	14.06.02	3273	?	?
TSAKIR	mare	02.06.99	4	Tierpark Leipzig	14.06.02	3298	?	?
ZOGII	mare	15.05.00	3	Winterthur	14.06.02	?	?	?
ZORGOL	mare	20.05.00	3	Winterthur	14.06.02	?	?	?
Bachlor group - 8 adults/subadults:								
HUBSUGUL	stallion	21.05.97	6	Langenberg	11.06.99	3233	1320	1374
ZANDAN	stallion	28.05.98	5	Gobi B	-	3166	2398	1818
KHUCHIT	stallion	16.06.99	4	Langenberg	14.06.02	3320	?	?
MOOGII	stallion	08.10.99	4	Neusiedl/Wien	14.06.02	3342	?	?
MYANGAN	stallion	01.05.00	3	Tachin Tal	-	T204	1669	2866
MAGNAI	stallion	02.07.00	3	Rotterdam	14.06.02	T154	?	?
SELENGE	stallion	28.08.00	3	Marvel Zoo	14.06.02	T160	?	?
ZUUN	stallion	01.05.01	2	Tachin Tal	-	T214	2786	2363
o lost ERKHIM due to acute piroplasmosis before release								
Jiguur group (captive group) - 8 adults/subadults + 3 foals:								
JIGUUR	stallion	12.06.92	11	Langenberg	18.06.98	2363	486	1772
KHALIUNAA	mare	16.03.88	15	Australien, Monarto	05.06.95	1669	954	982
Khaliunaas foal	stallion	22.05.03	0	Tachin Tal		?	1669	2363
SOGOO	mare	01.12.92	10	Australien, Dubbo	05.06.95	2586	974	787
OSAMA	stallion	11.09.02	1	Tachin Tal	-	?	2586	1772 or 1818
OD	mare	23.04.94	9	Prag	18.06.98	2645	1847	1135
Ods foal	mare	09.04.03	0	Tachin Tal	-	?	2645	2363
GURGUUL	mare	07.05.95	8	Winterthur	10.06.97	2786	1879	1742
Gurguuls foal	stallion	03.04.03	0	Tachin Tal		?	2786	2363
KHONGOROO	mare	10.05.95	8	Tachin Tal	-	3038	1972	1159
SONJA	mare	13.06.00	3	Salzburg	14.06.02	?	?	?

Monitoring of the free-roaming groups with GPS/ARGOS transmitters

Since October 2002 monitoring of takhi with satellite collars had been restricted to mare SOIR (*Mundol* group) and stallion TAYAN (*Bachlor* group) due to collar malfunctions. Therefore in May 2003 we additionally collared the mares MONDOR (TAYAN group) and ORCHON (*Tuulai* group; Table 2). Unfortunately we were not able to replace the silent transmitter of UUGAN (*Pas* group) due to averse weather conditions and foaling. However, collar replacement is scheduled for late August / early September when the foal is more robust. The collar of TAYAN stopped transmitting shortly after he joined *Khuchit* group and we assume that this is a result of the frequent fighting of TAYAN with other stallions. This is the second case where a radiocollar was destroyed due to fighting between stallions - MUNDOLS collars was destroyed last fall during a fight with a domestic stallion (see Kaczensky and Walzer 2002b). We have therefore decided not to collar stallions in the future.

Unfortunately, due to technical problems the alternative GPS collar developed by Marcel Neusch and Martin Scheu from the Interstate technical University in Buchs, Switzerland, could not be deployed

one a takhi group. However, the approach is great – the collars uses an automated VHF download system – and it would be worthwhile to further develop the system.

Table 2: Locational data from GPS/ARGOS collars for takhi November 2001 until July 2003.

horse	monitoring period	number of GPS locations	mean number of GPS locations per day
MUNDOL (*Hubsgul/Mundol* group)	01.11.01-13.04.02	284	1.9
SHAGAI (*Pas* group)	04.11.01-15.10.02	1,080	3.4
SHAZGAI (*Tulai* group)	30.10.01-02.05.02	349	1.9
TODOOK (*Hubsgul/Mundol* group)	ARGOS failed	4	GPS locations are presently been recovered from collar
TAYAN (*Bachlor* group)[1]	24.06.02-26.05.03	262	0.8
UUGAN (*Pas* group)	ARGOS failed	0	GPS locations should be stored in collar
SOIR (*Mundol* group)	24.10.02-ongoing	728	2.6
ORCHON (*Tuulai* group)	12.05.03-ongoing	264	3.3
MONDOR (*Tayan* group)	11.05.03-ongoing	152	1.9
total		**3,123**	

[1] This horse received an ARGOS collar without GPS unit and location accuracy is much lower – between: 150 to 1000m

An additional 411 locations of the takhi groups were collected by the rangers between October 2002 and June 2003. Total area covered by all takhi groups from January until July 2003 was 1,160 km² (Fig. 1).

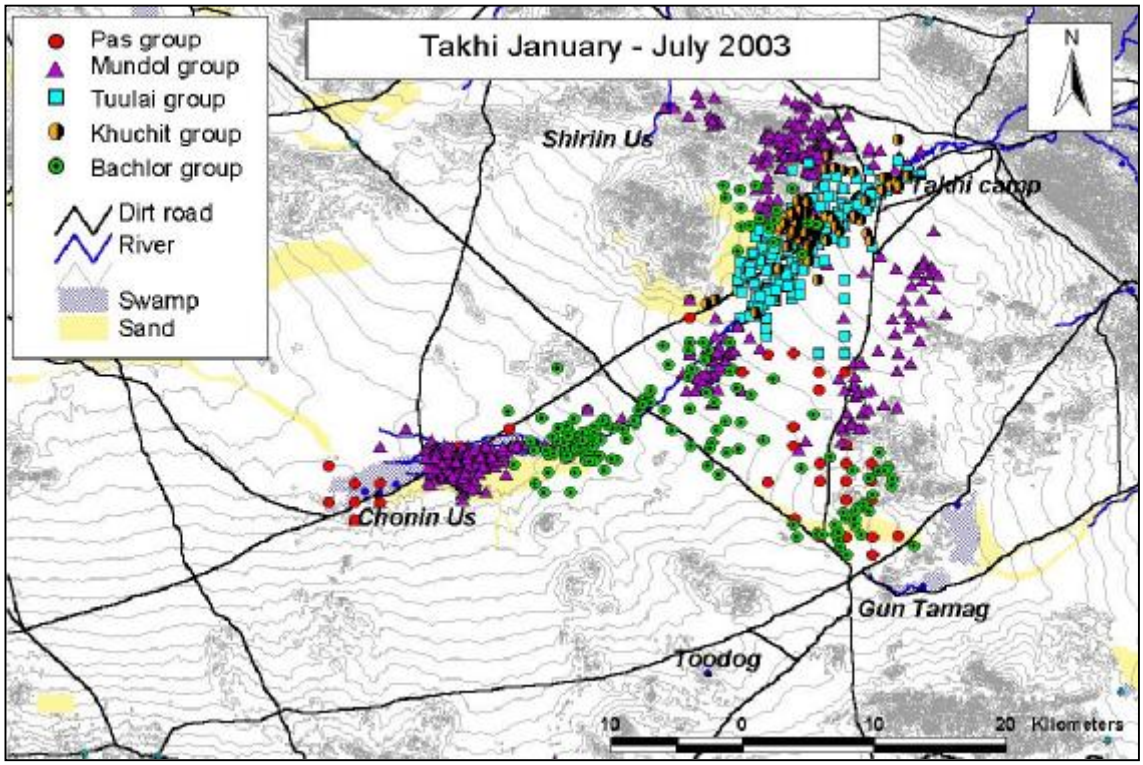

Fig. 1: Locations (telemetry + ranger observations) of 5 free-ranging takhi groups in Takhin Tal, Gobi B National Park from January until July 2003. Takhi groups covered a total area of 1,160 km² and made use of 4 water points (Shirin Us, Chonin Us, Gun Tamag, Gashurn Us) and the Bij River valley.

Behavioural monitoring of the newly released *Khuchit/Tayan* group

Anne-Camille Souris, a graduate student at the French Pierre et Marie Curie University in Paris is documenting the behavioural adaptation of the newly released *Khuchit/Tayan* group. Since begining of April, Anne-Camille is enthusiastically documenting the whereabouts, basic activity (scan samples every 10min; Fig. 2), group synchronisation and social interactions within this group. Besides the thrill to see how captive animals adapt to a life in the wild, she documented the raise and fall of stallion KHUCHIT: from "bravely" gaining access to the *Mare* group by jumping the fence, successfully defending his newly acquired mares from the wild *Bachlor* group to the moment when TAYAN joined the group and step by step took over KHUCHITs mares to finally being expelled by TAYAN and eventually joining the *Bachlor* group. Until mid July Anne-Camille spent 40 days observing "her" horses; on average 6 hours a day.

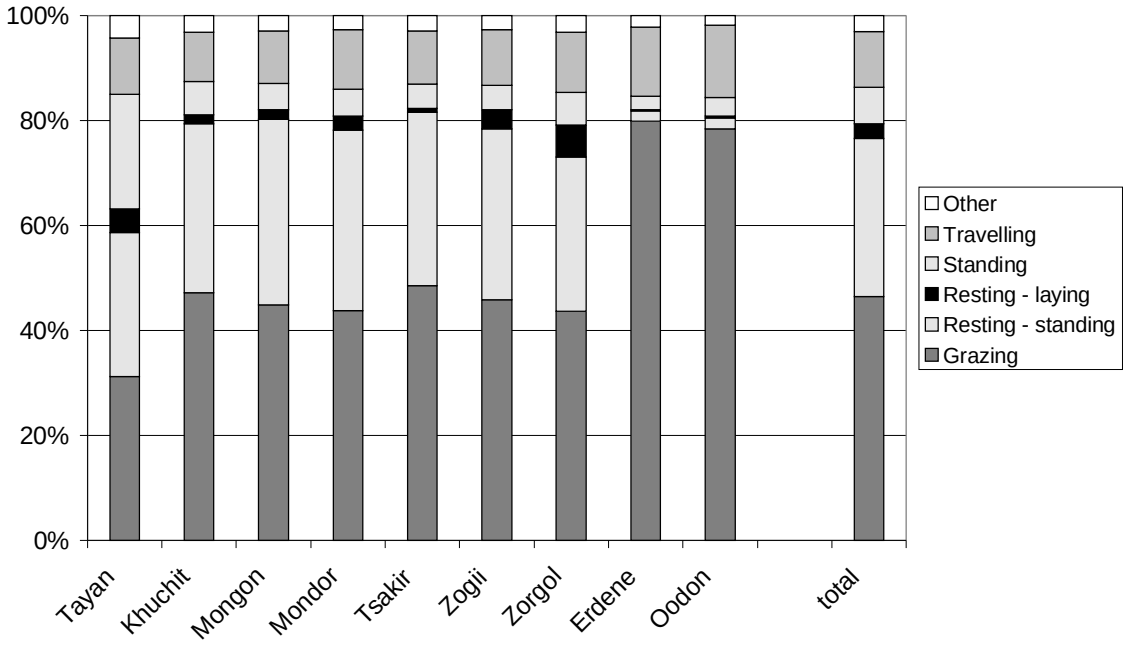

Fig. 2: Basic behavior from scan-samples of takhis in the Khuchit/Tayan group from 13 May until 16 July 2003. The number of observations vary among different horses from 282 to 1244 scans due to changes in the group composition. Whereas mares ERDENE and OODON left the group shortly after the release, the stallion TAYAN joined the group.

2 Wolf population status and feeding ecology

Wolf trapping

On 5. May 2003 we caught the first wolf in a Belise foot snare (Fig. 3). We had set the snare at a 2 week old horse kill at the foot of the Khundlen mountain range. The wolf was a 22 kg lactating female, thus most likely the alpha female of the *Khundlen pack*. The female was baptized BOROO, which means rain, reflecting weather conditions during the capture. BOROO received a ARGOS / GPS collars (800g; Telonics, USA) which is supposed to collect 3 GPS locations a day (at: 0:00, 8:00 and 16:00) and transmit them via ARGOS every second day. With this programming the collar should last for 19 month. Between 5. May and 30. July we acquired 149 GPS locations, or on average 1.6 locations per day. Generally, the chance to acquire a successful fix is higher at night or in the afternoon, than at noon: 60 locations were at midnight, 25 at noon and 62 in the afternoon (two out of schedule). Most likely the wolf is resting in or near her den during noon. So far the wolf covers an area of 310 km² (Fig. 4). The range of the *Khundlen wolf pack* overlaps, at least partly, with all free-ranging takhi groups. However, while the horse locations are predominantly in the steppe area, the wolf locations are predominantly in the mountains.

Fig. 3: Wolf BOROO during capture. The snare is attached to her back left leg, in the neck you see the dart.

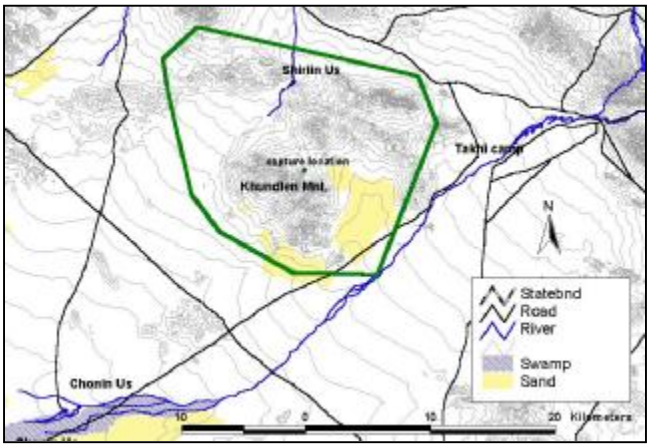

Fig. 4: Minimum Convex Polygon of the GPS locations of female wolf BOROO in Takhin Tal, Gobi B National Park May - July 2003. The total area encompasses 310 km², but most locations are confined to the mountain ranges.

Feeding ecology of wolves

We documented 3 kills of domestic horses and 2 of domestic camels within the range of the ***Khundlen pack***. In addition, we opportunistically collected >100 additional wolf scats during field work from Mai-July. Analysis had been postponed due to technical problems and is now scheduled for fall this year. Scat analysis will be performed by N. Enksaikhan. Thanks to an invitation from Yukon conservation officer Dan Drummond, N. Enksaikhan spent 2 months in the Yukon, Canada. He accompanied Dan during his work, experienced Canadian hospitality and did lots of travelling. In addition, Liz Hofer arranged for Saikhanaa to receive some training in scat analysis techniques in the scat lab of the University of British Columbia in Vancouver.

3 Khulan movements and habitat use

Radiotracking of khulans

In mid March khulan DSCHINGIS suddenly stopped moving. A search party found his shed collar next to the remains of two poached khulan. We assume that DSCHINGIS is no longer alive. The two surviving mares spent most of the winter and spring in the western part of the park and did not return to the vicinity of their respective capture sites before July (Fig. 5). This is in accordance with general khulan movements – only few khulan were seen in the eastern part of the park before July (Fig. 8).

In mid-July, we collared 4 additional khulan with satellite collars (Table 3). Because capture attempts from a blind and with a remote controlled tranquillizing gun at the water point Todoog were unsuccessful, khulan were in the end darted out of a pursuing jeep. This method, although not without risk for the capture team in the bumpy jeep, proved to be highly efficient. Chase time never exceeded 9-17min and animals did not show any adverse effects. After some initial problems, all collars presently seem to function very well.

Table 3: Locational data from GPS/ARGOS collars for khulan June 2002 until July 2003.

khulan	sex	monitoring period	type of collar	number of locations[1]	mean number of locations per day
ZAR	female	24.06.02 - ongoing	ARGOS	327	0.8
ATOS	female	28.06.02 – ongoing	ARGOS	925	2.3
DSCHINGIS	male	28.06.03 – 15.03.03	ARGOS	155	0.6
MORON	male	16.07.03 – ongoing	GPS / ARGOS	34	2.4
LEROY	male	16.07.03 – ongoing	GPS / ARGOS	21	1.5
SUTAI	male	16.07.03 – ongoing	GPS / ARGOS	3	0.2
KHALTAR	male	17.07.03 - ongoing	ARGOS	17	1.4
total				**1,462**	

[1]for ARGOS locations only quality: LC1 (± 1000m), LC2 (± 350m), and LC3 (± 150m)

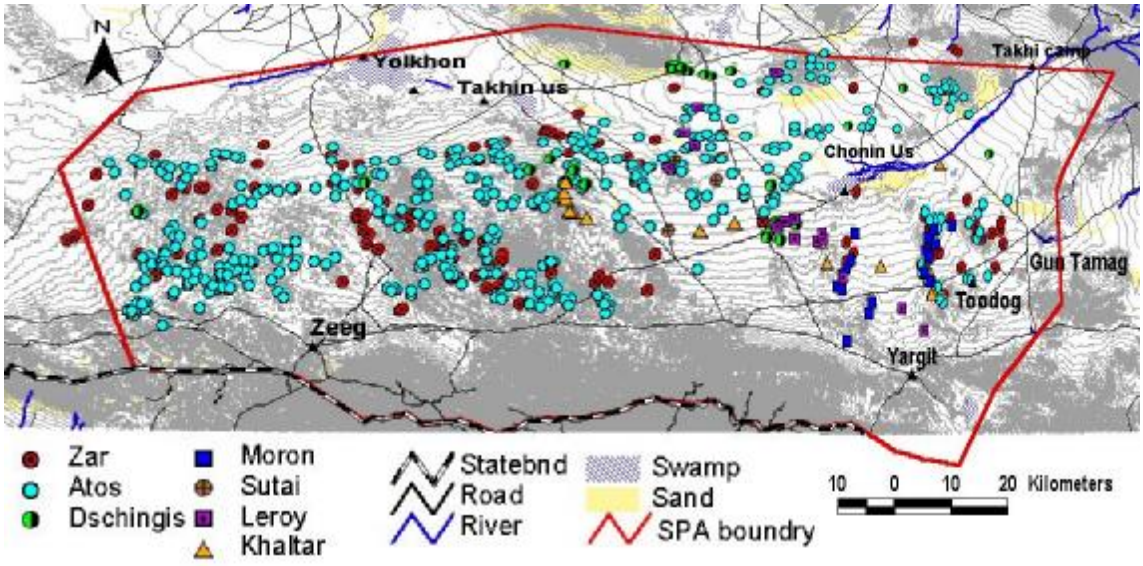

Fig. 5: Locations of 7 khulan monitored in the Gobi B National Park from January until July 2003.

Khulan situation in Gobi A and Southgobi

To assess the khulan situation east of Gobi B Strictly Protected Area (SPA) we visited Gobi Gurvan Saikhan Nationalpark (NP) and initiated a cooperation with Mr. Munkhjargal, director of Gobi Gurvan Saikhan NP and Small Gobi SPA A&B. His assessment of the khulan population is that numbers have decreased and that mining concessions and increased trading traffic is further putting pressure on the khulan in the Southgobi. We only got to see 8 khulan in 2 groups during our ~600 km trip through the western part of Gobi Gurvan Saikhan NP (Fig. 6).

The initial plan of our trip to Gobi A had been to collar 2 khulan to get some data on movement pattern for comparison with Gobi B. Despite the guidance by director Mijiddorj we were not able to achieve this goal. Unusual amounts of rain had made the gobi very green. Apparently khulans obtained sufficient moisture from the vegetation and hence did not come to the water points where we were hiding. Because we had a rather limited time window available, we finally had to abort the capture attempts. During our ~400 km trip through the western part of Gobi A (Fig. 6) we only came upon 5 single khulan and 2 small khulan groups of 6 and 3 animals, respectively.

Fig. 6: Trip to Gobi Gurvan Saikhan and Gobi A end of June / begin of July 2003.

Own observations, the data from our radiocollared khulan and the discussions with Mr. Mijiddorj and Mr. Munkhjargal make us suspect that the continuous distribution range presently drawn for the Asiatic wild ass in Mongolia is overly optimistic. In order to address our concern about possible population fragmentation we started to collect tissue samples from all khulan carcasses found in the Gobi B SPA and initiated sample collection in the Gobi A SPA and Gobi Gurvan Saikhan NP. In cooperation with Dr. Ralf Kühn, Conservation Genetics Department, at the Technischen Universität München, Germany we are presently analyzing these initial samples for genetic evidence of a possible isolation of these populations.

Wildlife monitoring

For sound management of wildlife populations a first prerequisite is to know population numbers or at least obtain reliable population trends. Hence we initiated a wildlife monitoring scheme based on distance line sampling techniques. In this pilot phase we covered the eastern portion of the Gobi B SPA, but eventually we plan to cover the whole park.
At the present we drive transects (total length ~350 km) at the begin of each month (Fig. 7). To test for reliability of the data we repeat the same survey two days later. We developed a standard protocol with 4 rangers driving in one jeep at a speed of 40 km/h. Any time a wild or domestic ungulate is spotted the driver has to stop, the position is marked on GPS, the distance to the animal when detected is estimated, and the angle to the animal is measured with a compass. All information is documented in a spreadsheet.

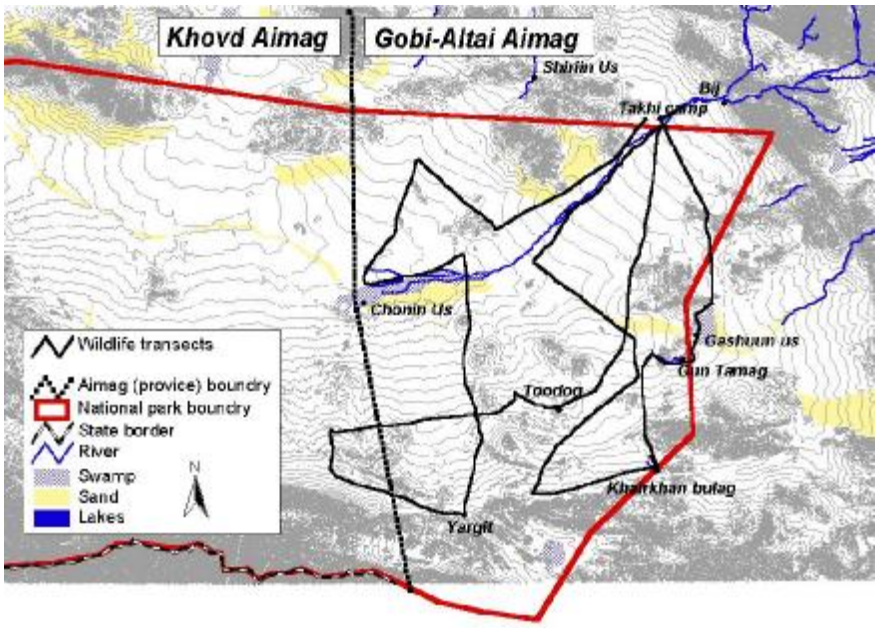

Fig. 7: Wildlife transects (350 km) for the estimation of seasonal density and distribution of wild- and domestic ungulates. To date the monitoring is restricted to the eastern part of the Gobi B Strictly Protected Area (Gobi-Altai aimag with 2500 km²).

First results are encouraging as the data not only provide us with monthly population estimates, but also gives an idea about the relative spatial distribution of wild- and domestic ungulates. Detailed analysis, including spatial modelling, of the data is planned for the winter. The raw count data nicely shows that domestic animals leave the park by the beginning of July, while khulans move in (Fig. 8). However, count data shown below should not be mistaken for population estimates! Remember: we did not do a total count, and for distance samplings the same clusters may be counted several times – as long as they are seen from different transects this is no problem in distance sampling.

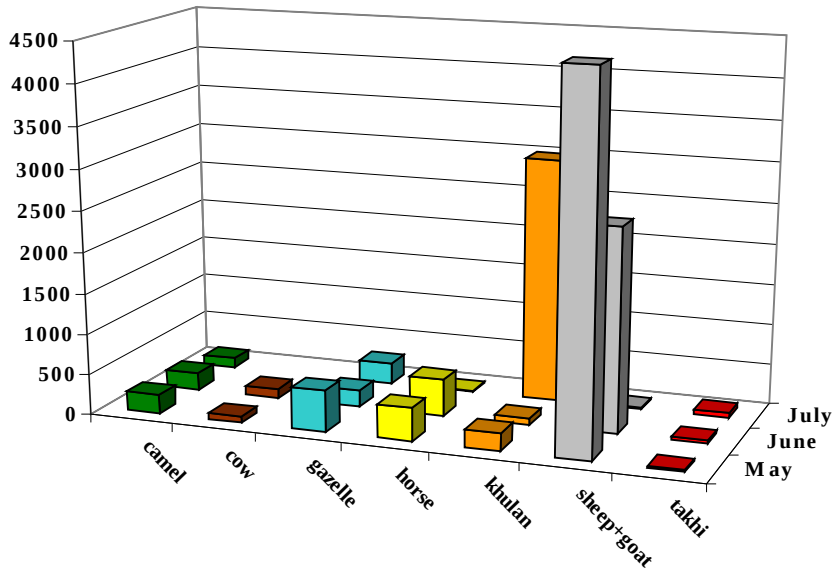

Fig. 8: Raw counting data from wildlife monitoring transects in May, June and July 2003 (for June & July mean of 2 surveys with a two day break in between) in the eastern part of the Gobi B SPA. ***!These numbers are no population estimates!***

Habitat mapping

Remote sensing

Based on two Landsat scenes from 1991 and 2000, Claudia Künzer from DLR (German Aerospace Agency) with help of Jens Wunderlich and Annicka Wachsmuth (interns) provided us with an unclassified landcover map of the Gobi B SPA in order to identify sample plots for an efficient ground proofing. Based on this preliminary land classification, they also derived the NDVI index, a measure for vegetation density. Although the data is old and ground proofing is still needed, the NDVI index map readily identifies the important summer pastures NE of the park and the winter pastures in the SW and SE of the park (Fig. 9).

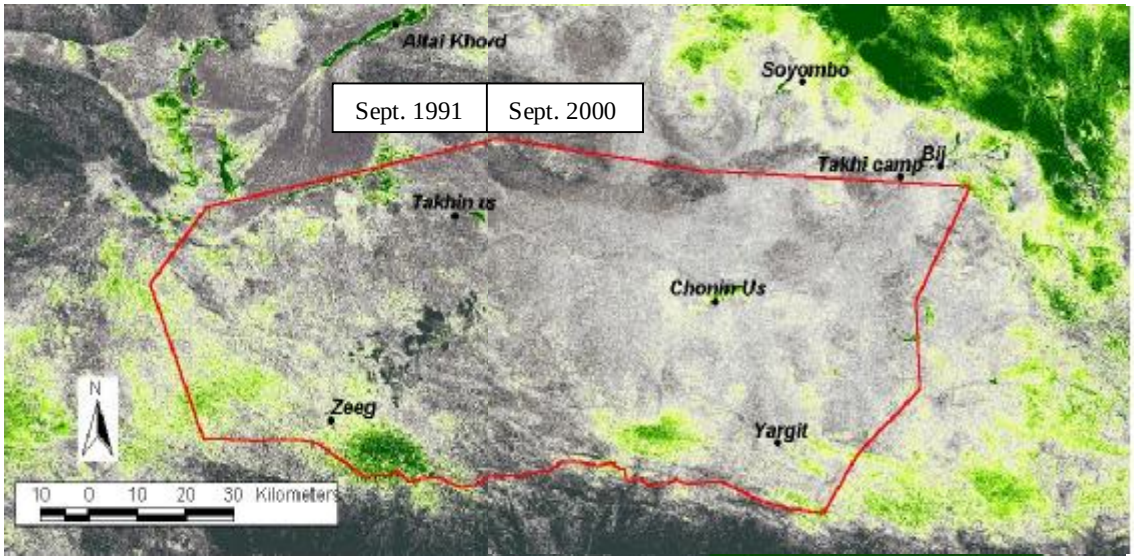

Fig. 9: Preliminary vegetation density map (NDVI index) of the Gobi B Strictly protected area. The darker green the area, the denser the vegetation. The information was derived from unsupervised data of two Landsat scenes; one from September 1991 (east side) and one from September 2000 (west side).

Plant inventory

In spring 2003 we initiated a further cooperation with Dr. Karsten Wesche University of Halle and Henrik van Wehrden University of Marburg. Both have mapped plant communities in the Gobi Gurvan Saikhan National Park. Plant inventory work was started by Henrik and Karsten in July and is still under way by Henrik and Mongolian botanist Tonga from the National University of Ulaan Bataar. After only a few weeks in the field, they were thrilled by the species richness and the high number of rare plants and the many plants never described for the Gobi B ecosystem. For the plant inventory work the wet summer proves to be a big success – despite the mosquitos and the cold nights in the field. Further analysis of the vegetation data is planned in conjunction with remote sensing techniques, eventually providing us with a supervised vegetation map of the Gobi B SPA.

4 Veterinary research

There was only few and imprecise data concerning the mortalities of Przewalski's horses in the Takhin Tal reintroduction project prior to the implementation of a disease-monitoring program in 1998. As of 1999 all dead horses are examined and samples are collected and submitted for further investigations. Equine piroplasmosis, a tick transmitted disease caused by ***Babesia caballi*** and ***Theileria equi***, is endemic in Takhin Tal and has been identified as cause of death of three stallions and one stillborn foal. In December 2000 wolf predation had been reported to be the cause of loss of several free-ranging Przewalski's horses. Thorough clinical examination, pathologic investigations and bacteriological cultures disclosed typical lesions compatible with strangles. The extreme Mongolian winter 2000-2001 is likely to be the primary cause responsible for the weakening of the horses, making them more susceptible to opportunistic infection and subsequently easy prey for wolves. Other identified occasional causes of death were exhaustion, wasting, urolithiasis and pneumonia. The pathologic examinations of the dead Przewalski's horses in Takhin Tal did not allow to draw a definitive diagnosis in each case, but they revealed the importance of several disease factors during the initial phase of the project, which could potentially jeopardize the establishment of a self-sustaining population. (Robert, N., C. Walzer, et al. (2003). "Pathological investigations of reintroduced Przewalski's horses ***(Equus caballus przewalskii***) in Mongolia - what can we learn?" J. Zoo Wildl. Med.: Submitted.)

Piroplasmosis has been identified as a possible cause of mortality in reintroduced Przewalski's horses (***Equus caballus przewalskii***) in the Dsungarian Gobi. Domestic horses and Przewalski's horses share the same pasture and water sources. Therefore a cross-sectional serological study was conducted in a representative sample of the resident domestic horse population and in 21 Przewalski's horses to asses the prevalence of ***Theileria equi*** and ***Babesia caballi***. A group of 16 foals and a group of 16 yearlings were monitored serologically over the summer period to determine the incidence and the age at first infection. In addition tick infestation, body score and icterus index were assessed. The data obtained indicated endemic stability for ***Babesia caballi*** and ***Theileria equi*** in the domestic population. Comparison of domestic and Przewalski's horses showed an equivalent prevalence of ***B.caballi***, however the prevalence of ***T.equi*** was much lower in Przewalski's horses than expected. The prevalence of presumably maternal antibodies in foals was 100% for both piroplasms. Since the foaling season is later than the period of tick activity, only one of 16 foals was infected with piroplasms in its first summer and showed a rising antibody titre. In domestic yearlings the prevalence of both piroplasms rose from 20% to 100% at the end of the investigation period, indicating that most domestic horses are infected with piroplasms at approximately one year of age. We conclude that Przewalski's horses are more prone to clinical piroplasmosis because they are reintroduced to an endemic environment in Mongolia at an age of two to four years and therefore have lost all innate resistance. Since they originate from piroplasmosis-free countries they neither have acquired immunity. Different methods for the management of this disease are discussed. (Ruegg, S. R., C. Walzer, et al. (2003). "Piroplasmosis at the reintroduction site of the Przewalski's horse in Mongolia."

J. Zoo Wildl. Med. Submitted; Ruegg, S. R., C. Walzer, et al. (2003). "Significance of piroplasmoses at the reintroduction site of the Przewalski's horse in Mongolia." Verh. ber. Erkrg. Zootiere, Rome, Italy **41**: 97-100).

On a more practical side Jochen Lengger devised a novel field anaethesia machine for rodent work in the Gobi B. Common anaesthesia machines use tanks as an oxygen source. In remote areas O_2-tanks are rare and shipment is very expensive. However, tank volume limits the duration use. In order to overcome this restriction an air pump replaced the oxygen tanks. As this pump is a customary aquarium air pump, it requires 220 volts AC at a rated frequency of 50 Hz as provided by a portable generator. Power was provided by either a car battery or a solar panel. A To run the 3 watts diaphragm air pump an AC/DC inverter was used to transform 12 volts DC into 230 volts AC. Alternatively a Honda EU 10i® (Honda Motor Co Ltd. Tokyo Japan) generator (there are many different brands on the market) was successfully used as an electric source. To date 58 anaesthesias in 12 different species have been carried out under Mongolian field conditions without any incidents. (Species list: *Crocidura suayeolens, Mus musculus, Eolagurus przwalski, Scirtopotta teleum, Microtus limnophilus, Meriones ungiculatus, Photopus roborovskii, Depus sagitta pallas, Allactaga bullata, Ellobus talpinus, Meriones meridianus, Rhombomus opimus*) (Lengger, J. and C. Walzer (2003). "Inhalation anaesthesia. a non re-breathing system for fieldwork." Verh. ber. Erkrg. Zootiere, Rome, Italy **41**: 379-382).

5 Other activities

Community involvement

In cooperation with Sabine Schmidt, Keith Swenson, Gansukh and Mendbaatar from IPECON (Initiative of People centred Conservation) of the New Zealand Institute, ITG initiated the community involvement project: Integrating takhi-reintroduction and park management with sustainable local livelihoods in the Great Gobi B. In a first session the most important target groups in Takhin Tal were identified and workshops were organized. The main goal in this first round was to assess the present situation and make people familiar with the concept of community involvement. The vegetable growers of Bij were the most excited about this project and immediately started to organize themselves as a community. A second session of workshops, further developing the idea and concepts of community involvement and initiating some small projects, is scheduled for October.

Education

Definitely not a luxury suite in some hotel – a simple bed, a few crates with Mongolian food, a laptop, a simple stove that burns dung and the pet Mongolian Hamster – this is the new educational Ger at the Salzburg Zoo. In order to explain our research activities to the zoo visitors we have created a replica of our field station next to the Przewalski`s horse enclosure. With the information provided by our two local "rangers", Nyambaa and Max Ruprecht, visitors are able to immerse themselves into this aspect of zoo work. We were particularly honoured that Mongolian president N. Bagabandi officially inaugurated this educational exhibit in July (Fig. 10). At the following luncheon ITG president J.P. Siegfried was able to explain many aspects of the project and formalize new cooperation's.

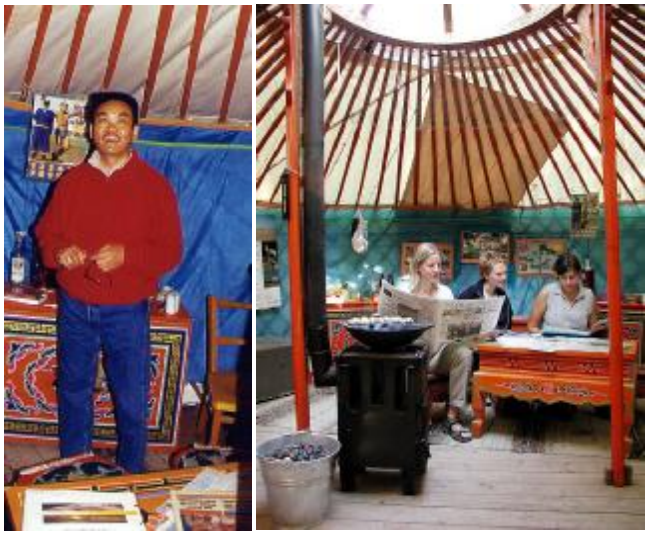

Fig. 10: Mongolian president N. Bagabandi (left) and visitors (right) in the education ger at Salzburg Zoo, Austria.

Guests in Takhin Tal

In April / Mai we had Kate Harris, a Canadian biology undergraduate at the University of North Carolina at Chapel Hill as an enthusiastic guest. While studying abroad in Mongolia with the School for International Training (http://www.sit.edu/studyabroad/), Kate travelled to Takhin Tal to do an independent study project on ITG's takhi reintroduction effort. Under www.takhi.org you can read what she learned.

In June Friedrich Kaczensky came to "supervise" the work of his daughter. It was great to have an electrical engineer in camp and Fritz spend a good deal of his holidays optimising the solar system in camp. Thanks a lot!

Due to generous financial support from the Vienna Zoo Schönbrunn (www.zoovienna.at) it was possible for Sepp Gölls and Regina Riegler to visit the project in Takhin Tal. Sepp had visited in 2002 and at the time promised to return in order to repair the defunct Russian water pipeline which runs from the dam to the village of Bij and on to the adaptation enclosures. Following the acquisition of a mobile welding unit, Sepp and Regina spent the following weeks repairing the badly damaged pipeline (Fig. 11). Enthusiastic Villagers who will now no longer have to walk the 2 km to the dam in order to collect water aided them throughout. Sepp and Regina trained several individuals who will be responsible for pipeline repairs in the future. The Welding machine will permanently remain in Takhin Tal and is proving useful in the repair of many other items.

Fig. 11: Sepp Gölls supersiving the repair of the defunct Russian water pipeline in Takhin Tal.

Dr. Peter Schopf from Austria visited the project in July. Peter a dentist with plenty of experience in providing aid and relief in remote locations (he also runs a project in Burkina Faso, Afrika) treated approximately 50 individuals in the village of Bij and in the field station (Fig. 12). The primary aim was to provide pain relief and initial education in dental hygiene. Unfortunately a total of 62 teeth had to be extracted. This has clearly demonstrated the importance of implementing a dental hygiene and education program for this area in the next spring. Peter has promised to support these efforts in the future – thanks from everyone in Bij!

Fig. 12: Dentist Dr. Peter Schopf providing dental treatment for a young patient in Takhin Tal.

Sponsoring

The rangers of the Gobi B SPA were very happy to receive jackets, sleeping bags and tents from the outdoor company VAUDE (http://www.vaude.de/). The equipment was much needed and greatly appreciated (Fig. 12).

Fig. 12: Rangers in Takhin Tal newly equipped with jackets, sleeping bags and tents by VAUDE.

4 Acknowledgements and Funding

The project is conducted within the framework of the Przewalski horse reintroduction project of the International Takhi Group (ITG), in cooperation with the Mongolian Ministry of Nature and Environment and the National University in Ulaan Baatar, Mongolia. Funding for the research part on takhis, wolves and khulans is provided by the Austrian Science Foundation (FWF project P14992) and the Austrian National Bank (Jubiläusfondprojekt Nr. 10301) through the Zoo Salzburg (Research for Conservation). In Mongolia work would not have been possible without the help of the rangers ("takhi men") and local people from Tachin Tal – many thanks for their help, patience and their incredible hospitality.