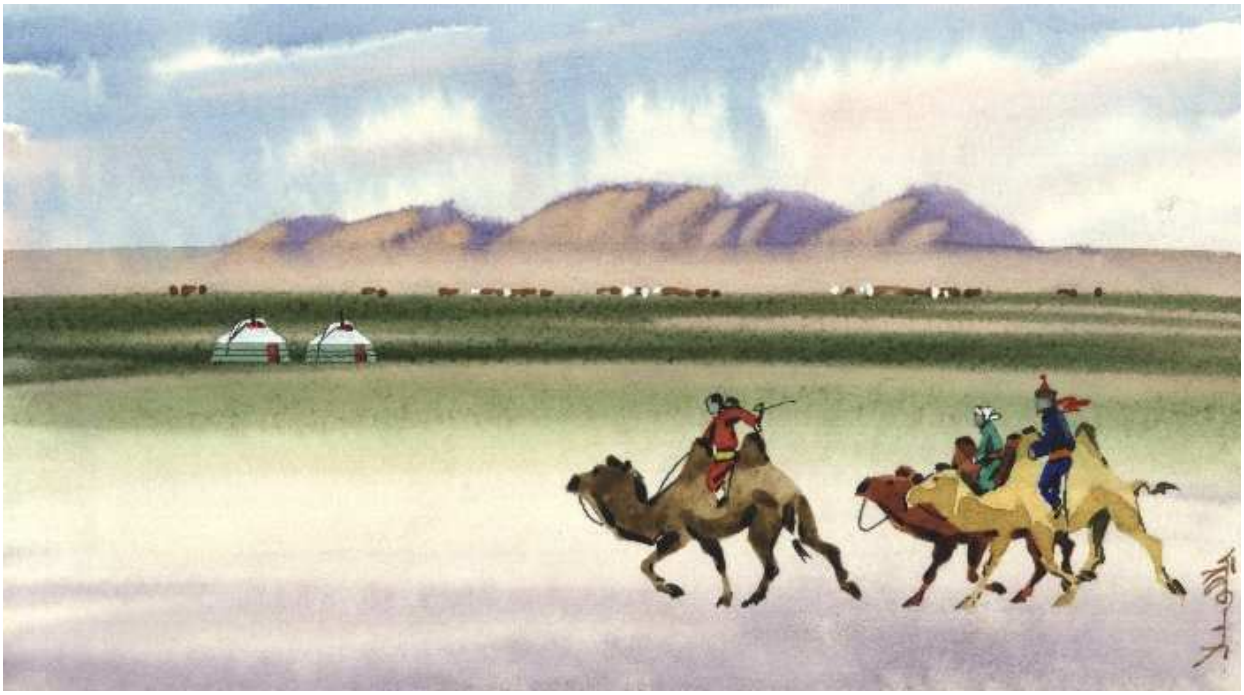
Przewalski horses and wolves in Mongolia

Report December 2001, by Petra Kaczensky



ITG INTERNATIONAL TAKHI-GROUP

FWF

RESEARCH for CONSERVATION
SALZBURG ZOO

1 Project background

The Przewalski horse (*Equus przewalskii*), or takhi in Mongolian, was extinct in the wild by the mid 1960´s and the species has only survived due to captive breeding. Since the early 1990´s two projects in Mongolia have focused on the reintroduction of the species into its former range with the aim to re-establish sustainable and viable populations. Since 1997, five herds were released into the desert-steppe of the Gobi-B Strictly Protected Area and International Biosphere Reserve. Four additional herd releases will follow in the next three years. For the reintroduction to be successful 1) it has to be socially and culturally accepted by the local people, and 2) it is necessary to implement a monitoring program to study takhi interactions with other wildlife and the vegetation. The reintroduction of captive-born Przewalski horses into their former range also brings them back into contact with their main natural predators, the grey wolf (*Canis lupus*). Even though takhis can defend themselves against predators, losses have happened, and predation could become an important factor limiting the population size. The main objectives of this 3-year study are to:

1) examine spatial organization and habitat use of reintroduced takhi in a desert-steppe environment
2) evaluate the impact of wolf predation on the takhi population demography and
3) evaluate interspecific competition with wild ungulates and livestock.

To investigate the proposed research aspects we will use the following general techniques: a) capture and collaring of takhi and wolves with GPS / ARGOS radio-telemetry; b) on-site visual and ground tracking of both species; c) prey search and scat analysis of wolves; e) wildlife surveys using distance sampling techniques; f) livestock inventories using interviews of nomadic herders; g) a predator-prey model approach for the Gobi B ecosystem.

2 First evaluation of GPS / ARGOS transmitters

Horses present and horses marked

We decided to use GPS / ARGOS transmitters to monitor the released Przewalski horses, as the collection of data using standard VHF telemetry and direct observations over the past two years was greatly hampered by:

- poor infrastructure and vehicle access
- seasonal inaccessibility of some areas due to low temperatures (-40 ^{o}C) and snow cover
- aeroplanes / helicopters for aerial telemetry are not available in Mongolia
- large home ranges and mobility of the observed species

In October 2001 three different herds of Przewalski horses were roaming free in the Gobi B strictly protected area: *Tulai*, *Pas* and *Hubsgul* (Tab. 1). The *Hubsgul* group formed after their harem stallion disappeared on 27. September 2001. The young stallion HUBSUGUL from the *bachelor* group took over the position of the harem stallion. Additionally, the remaining two young stallions from the bachelor group also joined this newly formed harem group.

Table 1: Free-roaming horses in the Gobi B strictly protected area and horses equipped with GPS / ARGOS collars in 2001.

name	sex	age (years)	capture date	collar type
Pas group				
CHOUWTSCH (PAS)	m	12.6		
UUGAN	f	9.3		
SHAGAI	f	10.5	04.11.01	1 year collar
TSCHANDAGA	f	10.6		
BULGA	f	6.6		
ZANDAN	m	3.5		
ANGIRT	f	1.5		
MAIGA	m	1.5		
MITSCHID	f	5.6		
TOOT	f	4.6		
Hubsgul group				
HUBSGUL	m	4.5		
ZAGAADAJ	f	5.5		
YUL	f	7.6		
MYANGAN	m	1.6		
MISCHEEL	f	4.5		
IMSH	f	7.3		
DOROTHEE	f	2.5		
TOODOG	f	7.6	01.11.01	1 year collar
SOIR	f	4.7		
TAYAN	m	4.6		
MUNDOL	m	4.6	01.11.01	2 year collar
Tulai group				
TUULAI	m	5.6		
KHOKHOO	f	5.0		
SHAZGAI	f	4.5	30.10.01	2 year collar
TAGTAA	f	3.6		

In the two established harem groups *Pas* and *Tulai* we marked one adult female each with a GPS / ARGOS radiocollar (North Star®, USA) and in the newly formed *Hubsgul* group one adult female and one of the subdominant young stallions - as we expect the latter to be expelled from the group eventually. To allow easy removal of collars, all collars were equipped with remote release mechanisms (LOTEK®, USA), that can be remotely triggered any time, but will come off automatically after 1 and 2 years, respectively.

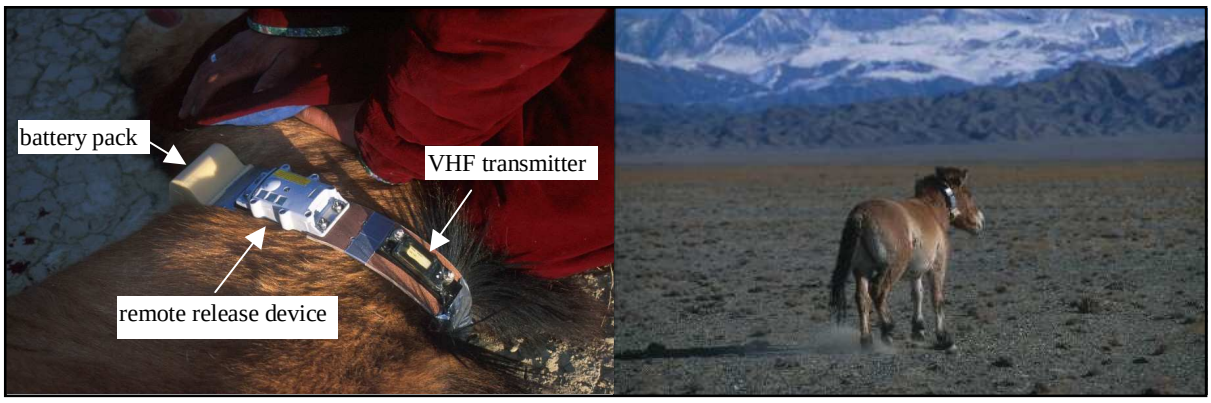


Fig. 1: North Star® GPS / ARGOS collar during mounting (left) and on a standing Przewalski horse (left) in Takhin Tal, Mongolia.

First data evaluation of the performance of North Star GPS / ARGOS collars

Testing of the four collars in Salzburg, Austria and Tachin Tal, Mongolia prior to deployment on the horses suggested that there might be some technical problems with one of the 1-year collars. Our doubts were unfortunately correct and after deployment (on TOODOG, *Hubsgul* group) this collar stopped transmitting to ARGOS altogether. However, we hope that the collar is still collecting GPS locations, which, additionally to being transmitted to ARGOS, are stored in the collar. North Star will provide a replacement collar and this will be deployed in spring 2002.

Initial evaluation of the data from the three other collars shows that they are working very well. We obtain GPS locations during approximately 70% of location attempts, which averages to 1.8-1.9 locations within 24 hours for the two 2-year collars and 3.3 locations for the 1-year collar. GPS units have to perform a complete cold start every time they attempt a GPS location. In order not to drain the battery, the cut off time is set to 180 seconds; this means if the GPS receiver cannot determine its location within three minutes it will shut down. Average time needed to acquire a successful location was 83, 103 and 115 seconds for the three collars, respectively. Locations are evenly distributed over all 24 hours (Fig.1). This will finally allow us to look for potential differences of movement patters and habitat use between day and night time. In the past, locations were almost exclusively restricted to daytime hours.

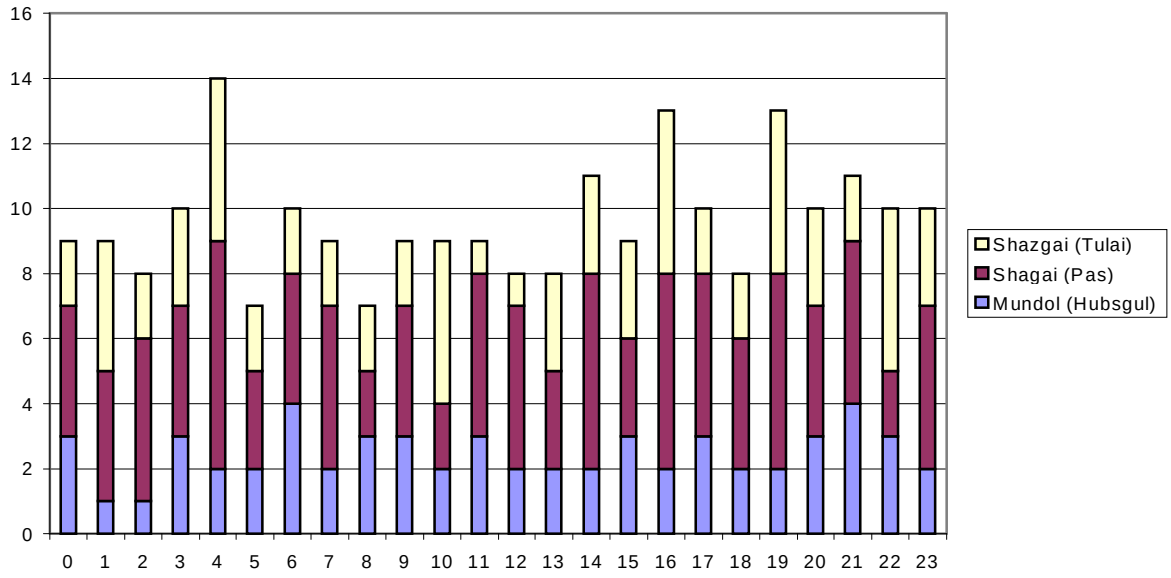


Fig. 2: The distribution of GPS locations over time shows that all hours are sampled about equally (3.Nov. – 4.Dec. 2001; n=231).

In addition to collecting GPS locations, our collars transmit the GPS data every three days to the ARGOS satellites. During these 9-10 hours of ARGOS transmission (transmission session), the ARGOS satellites not only pick up the data transmitted by the collars, but also determine the location of the collars (ARGOS locations). During each transmission session we get an average of 5-6 ARGOS locations of which 33% are of quality 1-3. Quality 3 means an average location error of ±150m, quality 2 of ±350m and quality 1 of ±1000m. However, the distribution of the quality of ARGOS locations varies between collars, probably due to small differences in output power (which was set to 500mW) (Fig.3).

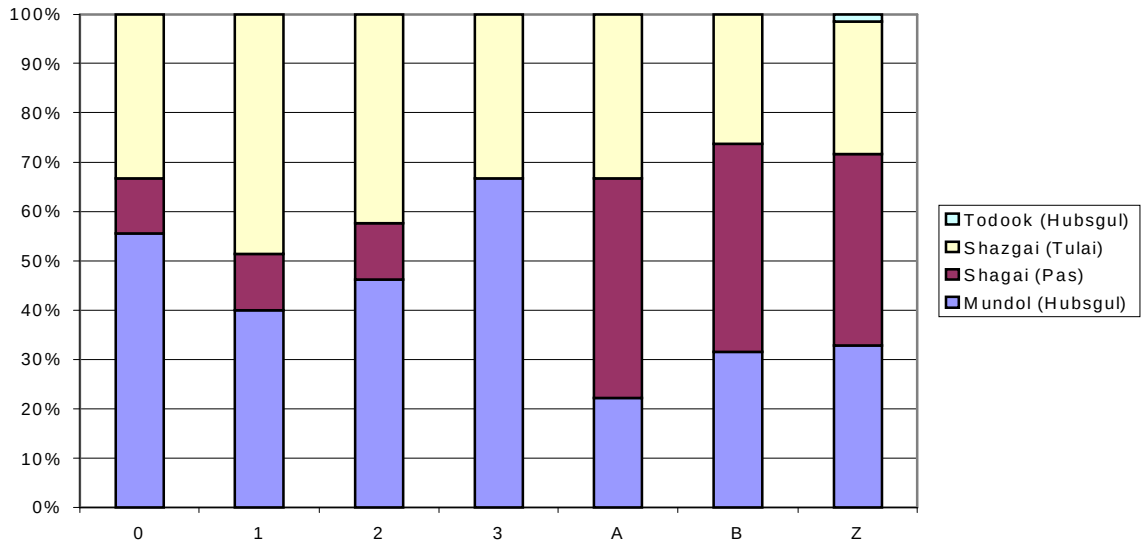


Fig. 3: Distribution of the quality of ARGOS locations (12.Nov – 5.Dec 2001; n=229). The two 2-year collars (SHAZGAI and MUNDOL) are very similar, but the 1-year collar (SHAGAI) does not succeed in any quality 3 ARGOS locations.

One month of data collection is inadequate for any meaningful analysis of spatial data. A first visual comparison of the GPS and ARGOS location data suggests, that general patterns of

movements can also be seen with ARGOS locations. However actual movement patterns and habitat use are difficult to evaluate due to the much larger error range of the ARGOS locations (Fig.4).

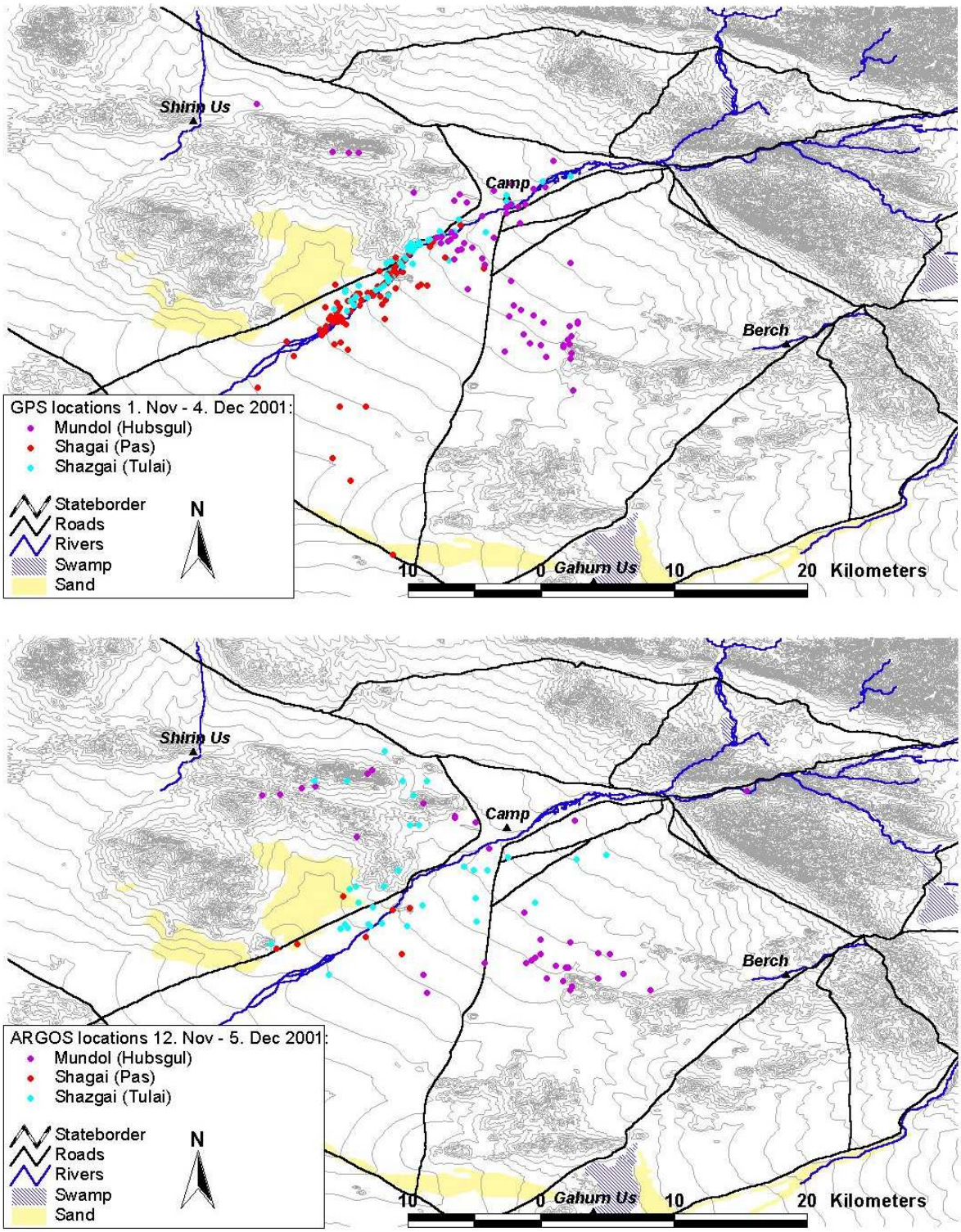


Fig. 4: GPS locations (top; n=231) and ARGOS locations (bottom; quality 1-3 only; n=76) in November / December 2001.

3 Conclusions

In general we are very pleased with the performance of the North Star® ARGOS / GPS collars. They allow us the regular collection of locational data, regardless of time of the day, weather conditions and distances covered by the horses. The ARGOS uplink enables regular access to the data without the need to locate the Przewalski horses in the field (which would be needed with a duplex system, where the data is downloaded via VHF link) or to wait for the data until the collar has been retrieved (which would be the case with the "store on board" collars). Using the uplink we can regularly check whether the horses are still moving (a sign that they are still alive) and in addition can pass on the most recent data to the Mongolian rangers in Takhin Tal. In this way rangers can find the Przewalski herds on a regular basis and can check whether all members in a herd are still present and in what condition they are.

Acknowledgements and Funding

The project is conducted within the frame of the Przewalski horse reintroduction project of the International Takhi Group (ITG). It takes place in tight cooperation with the Mongolian Commission of Endangered Species and the National University in Ulaan Baatar, Mongolia. Funding for this research project is provided by the Austrian Science Foundation (FWF project P14992) through the Salzburg Zoo (Research for Conservation).
We would like to thank Blake Henke from North Star and Fabienne Vigier and Pascal Chicot from ARGOS France for their support with the many technical details and questions. In Mongolia work would not have been possible without the help of Z. Suchebaatar, N. Saikhanaa and the rangers ("takhi men") from Tachin Tal – many thanks.