

The Przewalski horse, a symbol of preservation of the species

When the employees of the Brno Zoo in August 2005 added another species to our zoo's collection of *Equus caballus*, they mainly wanted to emphasize and remind us of the role that zoological gardens play in nature preservation. The new exhibit can clearly strengthen the effect of education on our visitors; this taxon has become the symbol of preservation of an endangered species by zoological gardens.

Forefathers of domesticated horses

The Przewalski horse was described by zoologist I.S.Poljakov in 1881 as an independent species – *Equus Przewalski*. This taxonomy is confirmed by later discovery of the fact that the Przewalski horse has more chromosomes than the domesticated horse. On the other hand, breeding the domesticated horse and Przewalski horse can be successful and its offspring can procreate. That is another reason why international organizations today classify the Przewalski horse as a subspecies of the ancestral wild horses – *Equus ferus przewalski*.

The Przewalski horse, called takhi or kertag in its native tongue, lived in ancestral times mainly in Mongolia and China; roughly 5000 years ago, it took part with other subspecies in the creation of the domesticated horse. Different breeds came from the kertag, but they were mostly primitive local breeds, with a smaller frame, robust, with large heavy head, but even-tempered, tough and tireless (the Kirghiz horse, the Mongolian horse).

From the other subspecies of the forefathers of the domesticated horse, we have to mention the tarpan, the so-called oriental or eastern horse (*Equus ferus gmelini*). Its part in the creation of the domestic horse was greatest; today there are about 150 breeds in existence which are tied to the tarpan, and we can say that horses used in sports, horse racing and the like exist mostly thanks to this predecessor. Another subspecies that helped with the creation of cold-blooded horses was *Equus ferus robustus*, the so-called western horse. And finally the fourth group of domestic horses – mainly the Shetland pony, fjord horse, Welsh horse and others – evolved from the northern kind of horses (*Equus gracilis*).

The story of the last wild horse

Let's get back to the Przewalski horse. This subspecies of wild horse has survived to the 20th century also thanks to the way of life of the Mongols. Inhabitants of Mongolia even today regard both wild and domesticated horses as a national treasure and part of their cultural heritage. Riding a horse is one of the skills they learn very early in their childhood. For example, there is an annual horse race for



Legendary Vaska was the first stallion of Przewalski horse captured in the wild, in the studbook of the species he has number one. He is also the only Przewalski horse which was ridden by people. He arrived in Askania Nova, where this picture was taken in 1904.

children, which is very popular and widely watched. However, the Przewalski horse survived mainly by human settlement of a small population of their biotope, although eventually its time came as well. And so the last sightings of the Przewalski horse in the wild is dated around the 1960s, most

of Takhin Sar Nuruu, a herd of 10 wild horses was seen. The last sightings were reported in 1967 at the Edrengin foothills and in 1968 near Chalzan Mountain. Since then, there have been several expeditions to these regions, but with no success; so by the criteria of IUCN, the Przewalski horse was declared as extinct in the wild even though some Chinese scientists argued otherwise.

Mysteries, Errors and Attractions

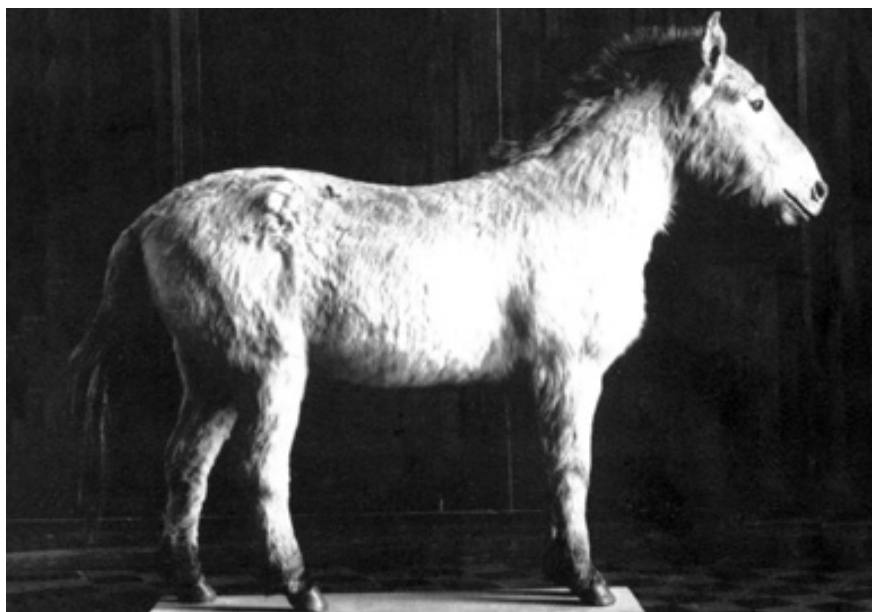
probably though in 1968, when the last eight specimens was seen in an area of today's Takhin Tal in the central part of the Gobi B National Park. This part of southwestern Mongolia is also named the Djungarian Gobi Desert, and in the 20th century it was the main region of presence of the Przewalski horse.

Some scientists are certain that the main reason underlying the disappearance of Przewalski horses was the development of pasturage which cut the horses off from their water source in the Djungarian Gobi. At the end of the 1950s, the number of Przewalski horses in the wild was estimated at 40 specimens. In border regions of Mongolia lived two herds. In 1964 fifteen horses were sighted in the Ulan Silin Cholaj Valley. In 1965 the zoological department of Ulanbator Museum received a message that on the northern slopes

History of catching the Przewalski horses

Although the discovery and description of the Przewalski horse – made by I.S.Poljakov on the basis of the discovery by N.M.Przewalski – caused a stir in the scientific world in 1881, the inaccessibility of central Asian steppes made an expedition impossible. It was not until 1889-1890 that a special expedition after the Przewalski horse was organized under the leadership of Russian naturalist brothers Grum-Grzimajl. They were the first Europeans that managed to see the wild horses and to hunt them.

Live Przewalski horses got to Europe for the first time in 1900; N.I.Assanov brought four mares from Mongolia to an acclimatization station at the Askania Nova Zoo in southern Ukraine, which belonged to Baron F.E. von Falz-Fein. Animals captured in the prior year wintered on the way to Askania on an estate owned by Assanov in a city of Bijsk in the Altaian republic. Assanov had already traveled to the wild horses in 1898 and managed to capture four adult males and eight foals. The hunters killed the mares to facilitate the capture of the foals. The foals were captured alive, however, they died of hives shortly after being fed sheep's milk. The four adults died because they could not adapt to captivity and the difficult transport. Assanov organized other transports as well, and those arrived in Askania



Przewalski horse holotype. Hide and the skull were sent in 1879 by N. M. Przewalski to a Zoological museum in Saint Petersburg.



Foals in the first Hagenbeck's transport in London Zoo, January 1902

Nova in 1902 and 1903. Aside from these, in February of 1901 he sent two foals and in 1902 one mare to the Moscow Zoo. These imports created a lot of attention among the scientists and the workers at the zoo because it was generally thought that this species was already extinct.

A well-known owner of a Hamburg firm, whose business was hunting and transporting exotic animals for zoological gardens all over the world, and also an owner of a Hamburg zoological garden, Carl Hagenbeck organized an expedition that brought back to Hamburg 28 foals of the wild horses. Assanov alleged that Hagenbeck bought the foals from him in Blijsk. It's known for sure that Hagenbeck bought 11 foals from him in 1902. That was the end of the large transports of Przewalski horses to Europe. The last hunting expeditions happened in 1942-1947, the captured specimens stayed in Mongolia; only one mare named Orlica III went to Askania Nova.

In the 1950s due to radically decreasing numbers of wild horses in the wilderness, scientists started showing more interest in active preservation in situ and also the employees of zoological gardens moved toward captive breeding programs and slowly worked on a plan to reintroduce the Przewalski horse to the wild.

Breeding of Przewalski horses in captivity

During the capture of the horses, zoological gardens in Europe received 54 wild horses. Even out of this, already a small number of many specimens died and many others did not reproduce. So all the specimens of the Przewalski horse, living in captivity today, are offspring of only 13 animals. It is clear that with so few specimens it would be impossible in future years to avoid interbreeding. Hagenbeck's transport in 1901 has had the biggest effect on breeding Przewalski horses in the world. Out of 28 foals, most traveled to England, some to the USA, one foal went to Paris and several foals went to different parts of Germany. As for the breeding of wild horses in Czechoslovakia, the breeding station of the agricultural university in Halle nad Skalou was very important. From here, professor F. Bilek from the Agricultural University in Prague in 1921 gained a four year old stallion "Ali" and in 1923 a three year old mare "Minka". The first foals in our country were born to this pair in 1928-1931 on the school estate in Netluka near Prague and were transported to Munich. In 1932 this pair

was moved to the Prague Zoo, where they had another foal. In 1933 Ali died and was replaced by the stallion "Horymir" from Washington. The newly established pair became the base for breeding wild horses at the Prague Zoo.

A number of wild horses remained the same during the first 30 years of the 20th century. Newly born foals were simply replacing specimens that died and there were around 30 wild horses living in captivity. In the 1930s the numbers slightly increased to about 50 specimens – only to fall back down during the Second World War. Since the 1950s the numbers started to climb mainly because many scientists and naturalists started to realize the critical situation of this species. They started to concentrate on the reproduction of Przewalski horses and their protection in captivity (ex situ). In this context in 1959 an international symposium was organized for the preservation of the Przewalski horse. As the most successful breeder, the Prague Zoo was entrusted with organizing it. The specialists at the symposium charged the Prague Zoo with keeping the international studbook of the Przewalski horse, which was created the following year in 1960 as the second oldest breeding book of a wild animal. For the next thirty years this studbook was kept by Jiří Volf. Thanks to internationally coordinated work, the numbers of wild horses in captivity started to rise, so for example in 1975 almost 60 zoological gardens around the world had about 250 specimens of the Przewalski horse. After 1990 the numbers reached 1000 specimens and toward the end of the 1990s, there were more than 1600 wild horses. That is when the growth of the population started to slow down and quality and genetic management started to take over.

In 1991 the third edition of the general studbook was released. It contains information about almost 2000 Przewalski horses. The fast growth of this population brings its first complications. The capacity of breeding stations is no longer adequate; the largest breeders are starting to build auxiliary stations and move extra specimens into other institutions.

One of the largest breeders in the world, the Ukrainian station of Askania Nova had a serious problem. Due to inconsistencies in the identification of specimens and large herds with several stallions on wide pastures, the origin of some of the specimens was unknown. Problems with mistakes and mismatches, even with those horses meant for export, were causing trouble. For these reasons an international group of specialists was organized to use DNA testing to reconstruct pedigrees of the Askanian Nova population of wild horses. Inconsistencies in origins of some specimens happened in other parts of the world, however, never on such a massive scale as in Askania Nova.

A fourth breeding book was released in 1995 with completely reworked information and repaired pedigrees. It contains all the changes established by the genetic analysis, deaths and transfers and included wild horses kept in acclimatization stations in China and Mongolia. The book shows the complete breeding history since 1899 and lists the names of 2523 specimens. The fifth general breeding book published in 1997 lists 2985 wild horses.

Genetic management

In 1985 as a reaction to the need of an even better coordination of rearing Przewalski horses, a European Endangered Species Program (EEP) was created for this species under the leadership of W. Zimmerman from the Cologne Zoo. One of the main objectives was to sustain the population at its current level, and to choose under-represented specimens for breeding. A very important

tool in managing the population has become genetic management, which allows much better strategy planning of breeding in individual breeding centers and leads to a higher quality population and maintenance – not growth – of the wild horses. Most breeders have stopped using the same stallion for the same mares in a herd, and they have started to rotate and exchange the stallions. This way the breeders have stopped producing specimens with identical genetic types and they have started a process of genetic divergence. Another way of population management is the creation of groups of mares. A group of mares without stallions lengthens the generation interval and also stops the production of foals with the same genotype.

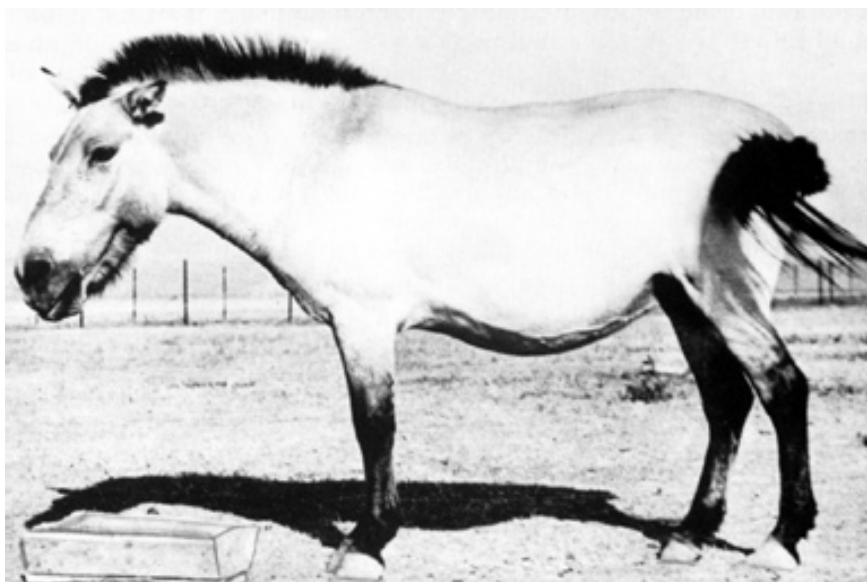
The 1990s meant a qualitative step in the right direction for the population of Przewalski horses. One of the turning points was the very thorough genetic analysis of the wild horse population carried out by scientists from the USA, Germany and the Ukraine. It helped to explain and solve many problems. One of the new viewpoints looked at the effect of domestic horses on the population of wild horses, both the population of the original wild horses in Mongolia and, as an option, the inclusion of some domestic horses or horses with domesticated parents in captive breeding. It was discovered that in almost all the genotypes of the wild horses in captivity some genes of the domesticated breeds can be found – not only well-known genes, for example the fox gene, which causes color variation, but a lot of others. It only confirmed the assumption that in historical times it was normal that freely kept domestic horses in Mongolia were able to join the wild herds. This seemed to be especially true of young mares which joined wild young stallions.

The current opinion regarding purebred status of the Przewalski horse is not so strict; it is not necessary to eliminate from breeding all specimens with some domestic horse genes, provided such specimen is otherwise genetically suitable and important for the whole population. Most important is the genetic diversity of the population and the cessation of any more domestic horse genes getting into the population.

Successful reintroduction

Our great success, which is based upon the coordinated breeding of Przewalski horses, is currently the accomplished effort to reintroduce the horses into their original habitat in Mongolia. The work of many scientists, professionals, workers at zoological gardens, owners of private foundations and patrons who contributed to the renewal of the original population of wild horses is paying off.

It is necessary to fulfill many requirements in order to succeed in establishing a viable wild population: instituted (reintroduced) population must be sufficiently numerous in order to survive attacks of predators, illness and other dangers; also a sufficiently large genetic diversity must be ensured. Places chosen for reintroduction also have to fulfill certain criteria. For example, to avert hybridization, it is necessary to prevent the released population to come in contact with domestic horses. Also, it is necessary to secure all dietary and other requirements for the released horses. This includes securing sufficient amounts of drinking water and making sure the predator population in the area is not too large. It is also necessary to collect large amounts of money for the construction of acclimatization stations, for transports, for the caring of the horses after transport to the stations, and for observing and treating the horses after release into the wild.



Last Przewalski horse born in the wild which joined the breeding in captivity. Mare Orlica III, captured as a foal in 1947, in picture year 1967 in Askania Nova



Three Przewalski horses out of a herd in a Mongolian steppe. Probably a last photograph of a specimen out of the original population.

The first reintroduction project was created in 1985. The European and North American Zoos were supposed to participate in the project with the financial support from the Food and Agriculture Organization (FAO) within OSN. The horses were supposed to be transported to acclimatization stations in Mongolia and their release into the wild was planned for 1990-1991. This enterprise failed due to an indecisiveness of some breeders and an unprepared Mongolian side, especially in choosing possible regions for the release. After this failure a new plan of reintroduction in China appeared. Various groups, foundations, and even some individuals embraced this project. German businessman Christian Oswald and his foundation succeeded in 1987 and 1988 in collecting nine horses from west European zoos and flew them to a breeding station in Urumqi in the Chinese province Xin Jiang. A year after the transport to Urumqi, Oswald sent Przewalski horses to a breeding station for endangered species of Chinese fauna near the city Wuwei in the province of Gansu. The horses in both stations soon started to have foals. Later, the horses were moved from Urumqi to 400 km farther; a newly built station Jimsar, which lay in the Dzungarian basin between Tan-san

and Altai – this area belongs to a region of the original habitat of the wild horses. The horses were released into the wild from the acclimatization station Jimsar in 1991.

The Mongolian government did not want to be left out. It decided to support a national tradition and contribute to the preservation of the country's cultural heritage and natural riches, so it agreed to cooperate and support the return of Przewalski horses to its natural home in Mongolian lands. Naturalists picked two locations: steppes in the mountain range Hustain Nuruu, located about 100 km southwest of capital city Ulanbatar, which subsequently gained the status of a national park, and the Takhin Tal desert in the Dzungarian Gobi (National Park Gobi B), where Przewalski horses were last seen in the wild around the 1960s.

Oswald's foundation transported the first five horses, chosen from the Askania Nova Zoo, to the acclimatization station in Takhin Tal on 6th of Juni 1992. By the summer of 1999, 58 horses out of 14 different parks and zoos were brought to Takhin Tal. The last transport in July of 2004 from the region of EEP consisted of 18 horses. Altogether there were 94 horses brought to the region since 1992.



1 – Probable area where I. S. Poljakov killed the horse by which this species was identified – Przewalski horse. 2 – Area from which Przewalski horses were brought to Europe in 1899–1902 by N. I. Assanovem and C. Hagenbeckem. Highlighted is the road they had to travel: from Kobdo to Bijsk on foot, than to Novosibirsk by boat and than by train



Area of population spread of Przewalski horses on the the break of 19th and 20th century. Circles – observation of horses 1955–1967. Dot – sighting of the last Przewalski horse in the wild 1968.



Areas of reintroduction of Przewalski horses into the wild in Mongolia and China: Hustain Nuruu (Hustain Nuruu National Park), Takhin Tal + Gobi B (Great Gobi Reserve), Khomiin Tal (Khar Us Nuur National Park), Jimsar (Xinjian Wild Horse Breeding Centre), Anexi (Anexi Gobi Nature reserve), Wuwei (Gansu Endangered Animal Breeding Centre)

The first release into the wild happened in 1997. The first foals were born in the wild in the Takhin Tal region in 1999. In summer 2005 there were about 100 horses in about 10 herds living in the wild in that area.

The most promising project in the last few years is ITG (International Takhi Group), created in 1997 in Austria. In addition to Mongolian individuals, the Salzburg Zoo and the Veterinary University in Vienna also hold an important position in this project. ITG manages reintroductions to Takhin Tal and is trying to continue the work of the Werner Stamm Foundation for the Preservation of Endangered Species of the Equid Family. This

foundation is based in Switzerland's Oberwil and has bred many Przewalski horses; it gave them all to the Takhin Tal project, including the breeding herd. The foundation also contributed financially to the transport of horses to Mongolia in 1995–1997 and to the construction of the acclimatization station Takhin Tal.

Sixteen horses were chosen by professionals at the Askania Nova Zoo for reintroduction to the second Mongolian area, Hustain Nuruu. The horses actually arrived a month later there than in Takhin Tal, on 5th July 1992. It happened thanks to the Foundation for the Preservation and Protection of the Przewalski horse (FPPPH) based in

Netherlands. After two years of acclimatization the horses in Hustain Nuruu received complete freedom. In 1994, 1996, 1998 and 2000 conservationists transported another 68 horses to Hustain Nuruu. Today there are about 150 horses living in the area. Together with the hundred specimens in Takhin Tal, this population gives the species a reasonable chance for a better future.

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