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First Results of Wild Ass Research in the South Gobi Aymag/Mongolia in 2003 and 2004

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First results of Wild Ass research in the South Gobi Aymag/ Mongolia in 2003 and 2004 [1]

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Abstract

The population of the Mongolian Wild Ass belongs to the nominate form *Equus hemionus hemionus* described by Pallas in 1775. This species is adapted to semidesert habitats in the Gobi region and is listed in the Red Book of Mongolia as well as on Appendix I of the Washington Convention (CITES). Mapping of the northern border of the distributional range showed a remarkable decrease in size in comparison to the maps of Murzaev (1954) or Bannikov (1954). The pressure of civilization, settlements, motorization, and increasing numbers of domestic livestock in connection with the occupation of water resources and illegal hunting are the main reasons for the decrease of population density of Dschiggetajs in the neighborhood of herdsmen.

Nearly 100 % of the studied dead animals were poached. It can be assumed that thousands of killed Wild Asses can be found in the Gobi zone. Analysis of the population structure of 1830 alive Wild Asses resulted in a reproduction rate of 23 % in September/October 2003. In July 2004 out of at total of 3387 observed Dschiggetajs 611 were foals, therefore reproduction rate was 21.2 %. First coprological investigations showed a high level of endoparasites.

The collected material is a valuable basis for morphometric and genetic analysis in the near future. We will study the age structure of the found skeletons and the genetic diversity of *Equus hemionus*.

At the other hand possibilities for a better protection and management have to be discussed with all experts, local authorities of nature conservation services, organizations of Somons and Aymags, as well as in the international context. This includes management of water resources, new wildlife reserves, control of hunting weapons and a higher protection by national law.

Keywords *Equus hemionus hemionus*, South Gobi, ecology, distribution, reproduction, mortality, parasites, management

Introduction

The Dschiggetaj (English also chigetai) in Central Asia belongs to the nominate form of *Equus hemionus* Pallas, 1775. In the Russian and Mongolian literature the Wild Ass is called kulan or chulan (English khulan), but in the taxonomic sense this is the common name of the Turkmenian subspecies of *Equus hemionus* (see also Denzau & Denzau 1999).

In the 19th century the range of the Wild Ass extended up to the Great Western Mongolian Lakes, and to all types of deserts and desert steppes with enough water resources in south, middle and eastern Mongolia (Bannikov 1954; figure 1). There are also reports of Wild Ass in the steppes of Transbaikalia (Zevegmid & Dawaa 1973).

In the last century, especially in the last five decades, the distribution range of Wild Ass in Mongolia decreased remarkably (figure 2). The first hunting law of the Mongolian People's Republic was established in 1924. In 1930, 1962 and 1972 the hunting legislation was revised and extended and 27 species were protected. Already in 1926, the hunting of Przewalski Horse and Wild Ass was forbidden (Zevegmid et al., 1974), and high fines were imposed for illegal hunting. In the last 30 years, the protection of these especially valuable elements of the Mongolian wilderness was continued by listing the Wild Ass in the Red Book of Mongolia (1997) as well

[1] Results of the Mongolian-German Biological Expedition since 1962, No. 244.

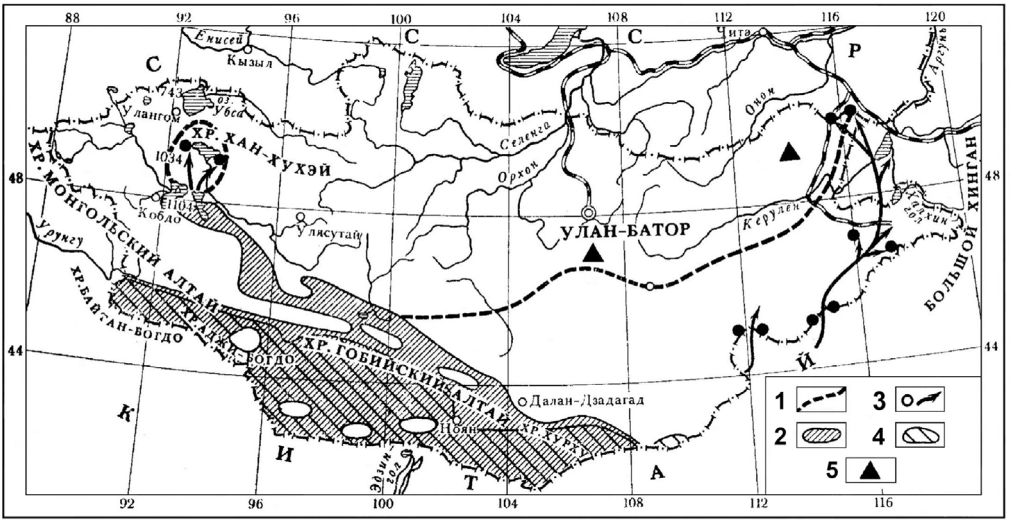

Figure 1: Distribution of Wild Ass in the 19^{th} century up to the middle of the 20^{th} century (Bannikov, 1954, 1981). 1 = distribution in the 19th century; 2 = distribution in the 20^{th} century; 3 = expanding tendencies in the middle of the 20^{th} century; 4 = areal borders in the middle of the 20^{th} century; 5 = archaeological findings (Pleistocene) from Bannikov (1981).

as in Appendix I of the Washington Convention (CITES 1973), which should secure the highest level of protection for endangered species.

Altogether the original range of the species has diminished by about 50 %. Zevegmid & Dawaa (1973) have described this area regression up to the early 1970s. Possibly, the Wild Asses once inhabited the steppe zone in a wide range and were displaced by humans and their domestic animals. This development included increased human populations, enormous enlargement of herds of domestic livestock, changes in agriculture, industrialization and mining, all of these continue up today. Hopefully, the established reserves of the Gobi zone can stand up against this pressure.

Up to 1948 Wild Asses were living in the Valley of Lakes between Changaj and Mongolian Altaj. The last animals in this region were dying in the extended drought of 1948. Since that time Wild Asses were not able to re-establish a population in this area.

Some authors report on seasonal migrations of big herds. For example Zevegmid & Dawaa (1973) describe regular migrations of Dschiggetajs from the semi-deserts to the eastern steppe regions up to the Dalaj-Nuur as late as in the middle of the 20th century. Within the whole distribution range of Wild Asses migrations over large distances are known, which are usually explained with respect to the availability of food resources. Whether there are periodic migratory movements, also in the Mongolian-Chinese border crossing region, is yet unknown. Future effective protection and management on the territories of Mongolia and China requires extensive knowledge on the migration of the species based on telemetric studies.

In two books, "Rare Animals of Mongolia" (Sokolov et al., 1996) and in the Red Data Book of Mongolia (Shiirevdamba et al., 1997), the number of Wild Asses in the country was estimated at the end of the 1960s as 15,000 animals and in the 1970s as 8000. 1500 of these were located in the "Great Gobi Protected Area B" of the Dzungarian Gobi, and about 500 in the Transaltaj-Gobi. As causes for the loss in area the competition on water places with humans and their livestock as well as illegal hunting are named. Also, high mortality in strong winters and predation of juveniles by wolves are mentioned.

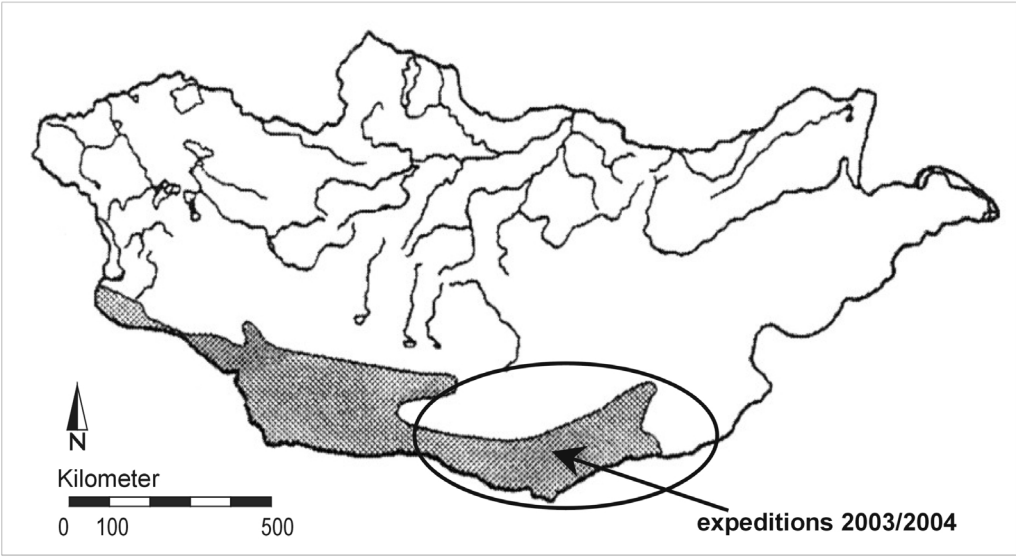

Figure 2: Distribution of Wild Ass at the end of the 20^{th} century (Sokolov et al., 1996).

In the 1990s the Wild Ass population was estimated at 4000–5000 animals and in other publications at 6000–7000 animals (Sokolov et al., 1996). However, the extreme difficulties of establishing a reliable population census were shown in the report of Reading and co-workers (2001). They summarized results of aerial surveys by line-transects in autumn 1994 and spring 1997, as well as of five ground surveys between 1994 and 1997 by vehicle and foot. In their publication, the population size was estimated at 33,000—63,000 Wild Asses in Mongolia. The population density ranged from 4.2 ± 1.3 to 19.1 ± 3.2 per $100\,km^2$, and the recorded densities varied in a range from 4 to 35 animals in the south-western Gobi, 4 to 7 in the southern Gobi, and 3 to 18 in the south-eastern Gobi. Moreover, such data have to be discussed with greatest care, because they were collected over a relatively long period of 4 years without any knowledge on migrations in this time.

It seems that the Dschiggetaj is rare in adjacent areas of China, especially Inner Mongolia (Gao & Gu 1989, Wang & Schaller 1996). Although data are scarce and probably insufficient, there is a need that ministries of Mongolia and China and international organizations such as the IUCN and others develop a conservation strategy for the protection of the Wild Ass. Therefore, further intensive studies on Dschiggetaj behavior, biology, and ecology are required and should be promoted.

We were confronted with all these problems in the last five years, when we studied Dschiggetajs in addition to studies on biodiversity and especially on reproductive strategies of raptors and jerboa-communities in the South Gobi district.

Aims of the ongoing studies

In co-operation of the National University of Ulaanbaatar, the Martin-Luther-University Halle-Wittenberg/Germany, and the WWF Mongolia a study on ecology of the Wild Ass in the South Gobi Aymag was started in 2003, which has the following aims:

- mapping of the northern distribution border in the South Gobi Aymag
- registering the population state

- securing of skulls of dead animals
- analyzing the mortality sources
- investigating the distribution of feeding resources
- collecting data on the reproduction rate
- developing recommendations for protection and management.

Results

For the South Gobi Aymag the recent northern distribution border could be determined very exactly (see figures 3 & 4). Also, greater migrations of Dschiggetajs were confirmed. In the summer of 2001 some hundred animals were observed in the area of the Bordzongiyn Gobi, but in the same season in 2002 and 2004 as well as in autumn 2003 there were only single animals or, very rarely, small groups. In informal interviews with local herdsmen we asked about the migration behavior in connection to feeding grounds. Spatially heterogeneous rainfalls result in remarkable mosaics of plant growth. At the other hand it seems that there is a trend of increasing population densities and quantities of Dschiggetajs towards the east. However, to assess whether there are dynamics of regular and/or irregular Wild Ass migrations intensive telemetric studies are urgently required.

The assessment of the whole population of Wild Ass on Mongolian territory is very difficult and needs a very well-organized staff, supplemented by long-term monitoring data of observations by herdsmen and rangers. A census by plane or helicopter is very expensive and faces the danger of large counting mistakes in a landscape with high relief energy, and mirages due to the high solar radiation. Therefore, it is impossible to gather exact data on population densities at the scale of large landscapes. Therefore, all data on population densities must be used with greatest care. In 2003, a team of scientists of the Mongolian Academy of Sciences and the Ministry of Environment started a census of *Equus hemionus* in all southern Aymags in the distribution area of Dschiggetaj with the result of an estimated number of about 19,000 to 20,000 animals (unpublished data).

In comparison to these large-scale data our short studies can hardly add valuable information on population numbers. However, as all living Wild Asses along our route (see figures 5 & 6) were noted, valuable data on the reproduction rate derived from the percentage of young foals in eastern Ömnögobi and western Dornogobi Aymag could be gathered.

In September/October 2003, we observed some 1830 alive Wild Asses of which 1488 were adults including yearlings as well as 342 foals. This results in a reproduction rate of 23 %. In July 2004 we observed 3387 Dschiggetajs with a relationship of 2876 adults to 611 foals which yields a proportion of 21.2 % young animals which is about the same level as in the previous year. At that time of the year the proportion of juveniles of the total number of observed asses was 18.7 % in 2003, and 19.8 % in 2004.

Exact data on the causes of mortality of dead foals are missing. In 2004 we found 3 carcasses, which were either killed by wolves or died of other unknown causes. The main foaling season covers the last decade of May until the middle of June (Bannikov, 1954; Stubbe & Chotolchu, 1968; Sokolov & Orlov, 1980). Andrews (1932) mentioned a killed female discovered on June 28th, which carried an embryo shortly before birth. Rarely, new born foals can be found up to the end of July (Sokolov et al., 1996). Young foals can drink with an age of two month or earlier beside mother's milk sometimes just water (observed 15th of July). The rutting season follows between July and the beginning of September (Sokolov & Orlov 1980). In the second decade of July 2004 we observed high sexual activities of stallions in the South Gobi (Galbyn Gobi). Denzau & Denzau (1999) observed in the South-eastern Gobi still 30th of June pregnant mares as well as copulations. During the whole night from 15th to the 16th of July we heard braying asses trying to find females in heat (locality of our camp: 42° 44' 08.8" N, 107° 58' 31.8" E, 966 m NN). During the next days we frequently observed struggles of rivals for harems of 3 to 5 mares.

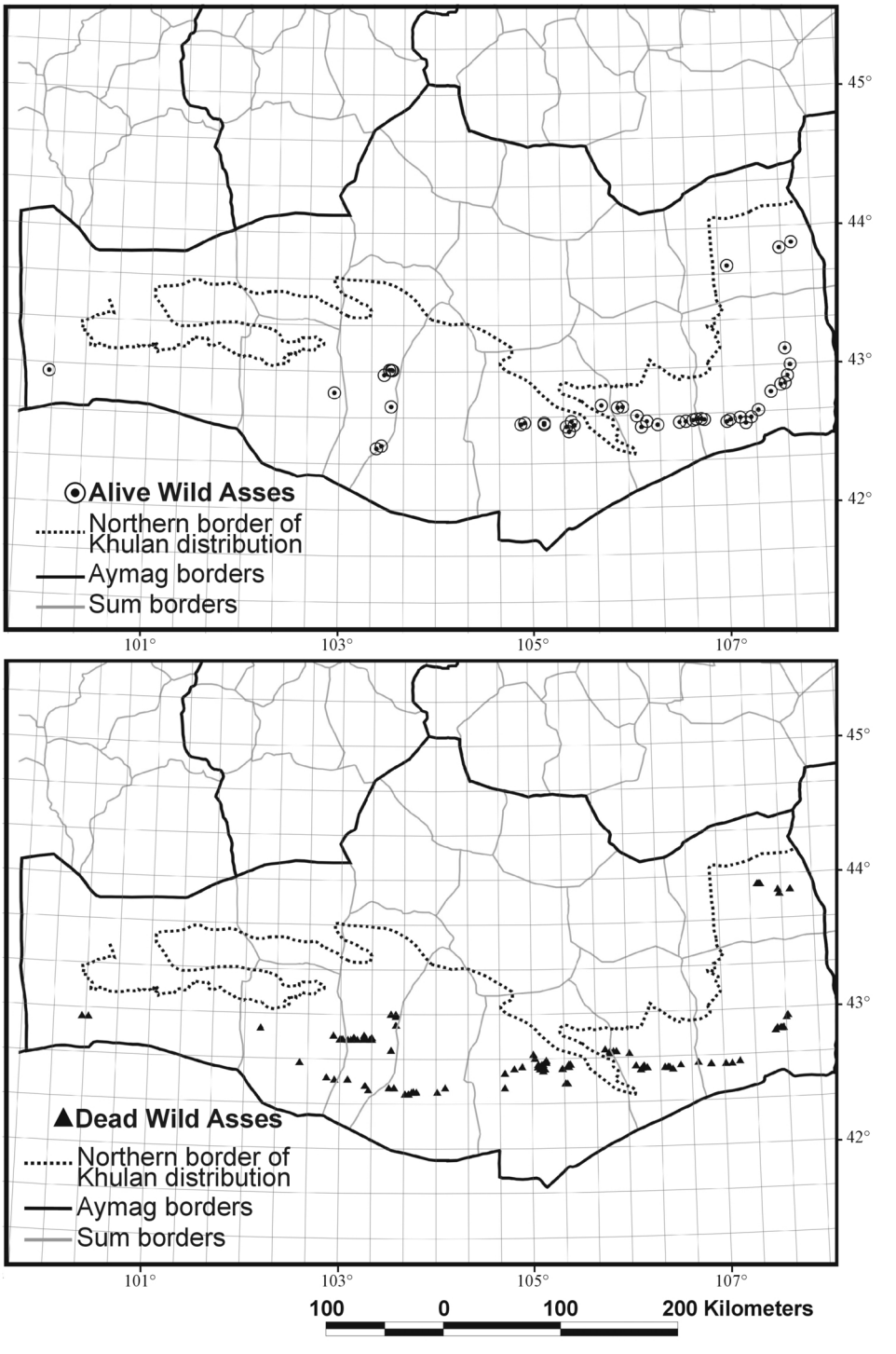

Figure 3: Observation of alive (above) and registration of dead (down) Wild Asses in the South Gobi, autumn 2003.

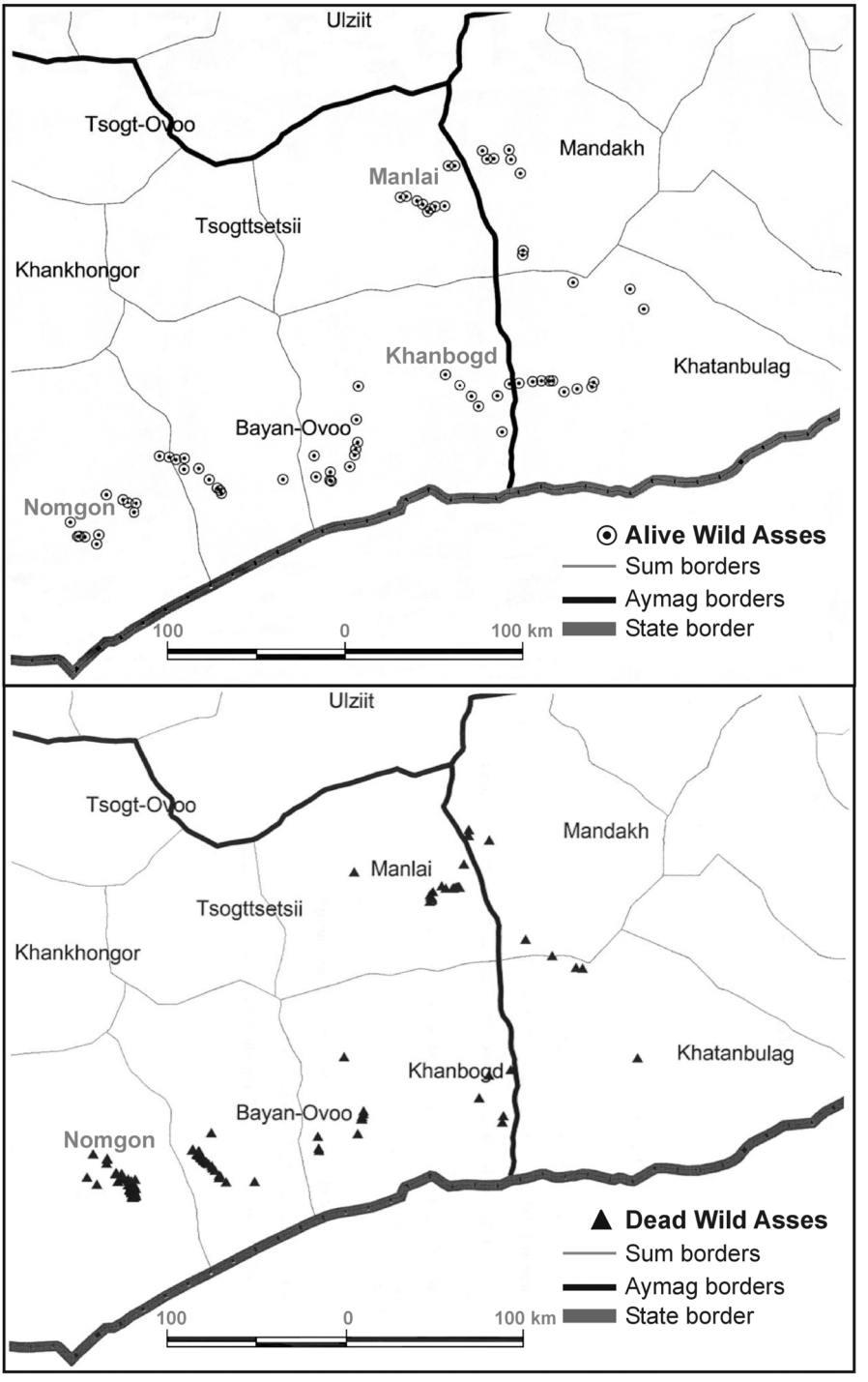

Figure 4: Observation of alive (above) and registration of dead (down) Wild Asses in the South Gobi, July 2004.

Figure 5: Bordzongiyn Gobi – a Wild Ass habitat.

Cover acts of stallions were noticed on the 4th of July in 2003 (Bordzongiyn Gobi) and on the 13th of July 2004 (Galbyn Gobi). Gestation on average takes 342 days and the lactation period 8–10 months, sometimes also 14–16 months when females skip a reproductive season. According to Sokolov et al. (1996) stallions defend their harems about 5 years up to an age of 9 to 10 years.

Sexual maturity is reached at 2 to 3 years by females and 3 years by males, but they will not reproduce before an age of 4 to 5 years (Sokolov & Orlov 1980). Females remain reproductive up to an age of 13–15 years.

The distribution of asses is tightly bound to the availability of water resources because the animals must drink nearly every day. At places without open water or springs the asses seek for sajrs with ground water near the surface and dig holes up to about 50 cm in depth with the hoofs of the forelegs in order to find water (see figures 7, 8 & 9).

Preliminary observations on forage plants are described below and in Bannikov (1954, 1981). In 2003/2004 the use of the following forage plants was noticed: *Anabasis brevifolia, Allium mongolicum, Aristida heymanii, Salsola passerina, Micropeplis arachnoidea, Bassia dasyphylla, Artemisia scoparia, Reaumuria soongorica, Stipa gobica, Peganum nigellastrum, Sympegma regelii, Ajania fruticulosa, Nitraria sibirica, Amygdalus mongolica, Ephedra* spec., *Zygophyllum xanthoxylon.*

It did not seem suitable to calculate a mean group size (see Reading et al. 2001) because sometimes some hundred Dschiggetajs gathered in loose communities over a greater terrain (5–10 km^2). These are open associations with irregular immigration and emigration of smaller or bigger groups of animals.

In order to analyze mortality, age structure, secondary dentition, morphometric parameters and allometric dimensions as well as teeth anomalies etc., we collected skulls and registered all skeletons starting in 2001 . Based on this studies, it is to be accepted as a fact that thousands

Figure 6: A herd of Wild Asses in the South Gobi.

of killed Dschiggetajs can be found in the South Gobi area. At the relatively flat desert plains, where jeeps can easily drive with 60 and more km/hour the Wild Ass has no chance to escape from the poachers. In such places skeletons are found frequently; sometimes four to five or more carcasses can be found in a small spot, especially in the surroundings of water places.

Findings of cartridges, knifes, bullet holes and typical signs of skinning indicate that nearly 100 % of these animals were poached. Next to almost every "ger" (Mongolian tent, in German known as "jurte") a motorcycle or car, usually four-wheel-drives can be found. The production of cashmere wool with a high percentage of goats in the domestic livestock brought the money for new richness and progress in occupation of desert wilderness with all negative influences of civilization. On the other hand herdsmen reported on cases of Dschiggetaj killing by wolves (see also Feh et al., 1994). At the 22nd of September 2003 we observed a hot pursuit of two wolves groups (4 and 8 animals) on a herd of 4 Dschiggetajs (42° 40' 11.6"" N, 103° 24' 2.0" E).

Between 2002 and 2004, skulls of about 400 dead/killed Dschiggetajs were collected and analysed, and 112 older carcasses were noted (see figures 9 & 10). For 411 of these the season of death could be determined. 83.5 % (n = 343) of the asses were killed in winter and 16.5 % (n = 68) in summer fur. The age and sex structure of the collected material will be discussed later.

In some regions excrement samples were gathered for parasitological investigations. We have to thank Dr. habil. St. Rehbein (MERIAL GmbH in Rohrdorf/ Germany) for the first results (table 1). The Asses are heavily parasitized by Strongylides, especially Strongylus vulgaris. However, no eggs of trematodes and larvae of lungworms (Protostrongylidae) were found. Further research in comparison with parasite state of domestic horses would be of interest. Sokolov et al. 1996. observed the infestation of Dschiggetajs with larvae of the horsefly *Castrophyllus*

Figure 7: Wild Asses drinking at opened water holes (social group of 1 stallion, 2 mares with foals and 1 yearling).

Figure 8: Water place after rainfall with sleds of Dschiggetajs.

Figure 9: Pass of Dschiggetajs (above,left), water holes opened by Wild Asses (above, right), Mare with foal (below left), collecting of skulls of dead found Wild Asses (below, right).

Figure 10: Documentation of some Wild Ass skeletons in the South Gobi, autumn 2003.

Table 1: Investigation of Khulan excrements on Strongylid endoparsites, first results from Southern Mongolia. Location 1 = 42° 30' 45.9" N, 107° 03' 33.3" E; location 2 = 42° 33' 25.1" N, 107° 42' 22.4" E; location 3 = 42° 48' 47.5" N, 107° 30' 55.8" E. Eggs per 1 g excrement, larvae per 30 g excrement, subdivision in different species (%).

Nr.	eggs	larvae	differentiation of larvae (%)			
			small Strongylides	*Strongylus vulgaris*	*Strongylus edentatus*	*Strongylus equinus*
1[1]	0	40 000	91	0	5	4
2[1]	30	67 500	98	0	1	1
3[1]	3	40 000	99	0	0	0
4[1]	10	82 500	100	0	0	3
5[1]	0	22 500	97	0	0	0
6[1]	0	46	100	0	0	0
7[1]	0	30 000	100	0	0	0
8[1]	0	1 000	100	0	0	0
9[1]	20	37 500	100	0	0	0
10[2]	0	15 000	100	0	0	0
11[3]	0	42 500	99	0	0	1

pectorum. Further details on parasites of *Equus hemionus* ssp. in captivity can be found in Dvoinos et al. (1992, 1994), Yasynetska et al. (2002) and Zvegintsova (2003).

Outlook: First ideas for recommendations on a better protection of Wild Asses in Mongolia

The present situation of *Equus hemionus hemionus* in Mongolia can be summarized by the following main points and questions:

- Considering the present pressure of increasing domestic livestock, occupation of water resources, motorization of herdsmen, and current progress in coal and ore mining, further decreases of the distribution area, population size and population density of the Dschiggetaj are to be expected.
- Poaching of Wild Asses is the main source of mortality. Therefore control and registration of all hunting guns are necessary.
- Further possibilities for the protection of Wild Asses by national laws have to be explored.
- A Mongolian-Chinese monitoring system for endangered species in the Gobi region should be established.
- Research programmes are urgently necessary to study the social behavior and population structure, the natural mortality under the influence of large carnivores, the migration behavior and interactions with the plant biodiversity (feeding grounds), global change of climate and landscape of the region.
- It would be useful to discuss a reintroduction programme in the West-Mongolian Basin of the Great Lakes and eastward of the railway line Ulaanbaatar-Beijing.
- It should be checked whether the currently existing network of protection areas is sufficient for the protection of the species, whether new areas of protection need to be created, or the existing areas need to be better coordinated.

- It should by examined which financial input for research and control programmes is needed.

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