Reintroduction Projects of the Przewalski's Horse

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Przewalski's horse (*Equus ferus przewalskii*), also known as Przewalski's wild horse, the Asian wild horse, Mongolian wild horse, Takhi or Junggar Horses, is classified by the IUCN as Extinct in the Wild (EW) as no Przewalski's horse has been seen in the wild since 1969, despite efforts to find them in Mongolia or China. The wild horse has been successfully saved from extinction by captive breeding projects outside the historic range. Although multiple studies were conducted, the main problems such as loss of founder genes, inbreeding depression, hybridization with domestic horses, high morbidity and mortality, and a lack of reliable prevention strategies and treatment limitations of these problems are still unresolved and require further scientific effort.

Przewalski's horse extinct captive breeding reintroduction

1. Introduction

Przewalski's horse (*Equus ferus przewalskii*), also known as Przewalski's wild horse, the Asian wild horse, Mongolian wild horse, Takhi or Junggar Horses, is classified by the IUCN as Extinct in the Wild (EW) as no Przewalski's horse has been seen in the wild since 1969, despite efforts to find them in Mongolia or China [1][2][3][4][5][6][7]. Among the seven extant equid species, the Przewalski's horse is the only true wild horse in the world [4][8][9][10][11][12][13]. As a species the Przewalski's horse has been successfully saved from extinction by breeding in captivity [14][15][16][17][18][19] based on a carefully managed founder population [20][21][22]. All Przewalski's horses alive today are descendants of only 12 wild-caught horses and possibly up to four domesticated individuals [6][7][21][22][23][24][25]. These founders reproduced successfully through captive and reintroduction programs worldwide, and as of 2014 there was an estimated free-ranging population of over 1988 Przewalski's horses [26][27]. At present, 2500 Przewalski's horses live in about 112 breeding centers and zoos around the world [6][28]. Reintroduction projects of the species started in 1985 and 1992 in China and Mongolia respectively with a goal to return the horses to their former habitat from captive breeding stock [4][6][25][29][30][31].

2. Reintroduction Projects of the Przewalski's Horse

Reintroduction projects in China and Mongolia were proved to be successful in the restoration of the Przewalski horses which disappeared from their former habitats [18]. Semi-reserves were created by the European Conservation Project for preparation for returning wild horse to their original habitat [4][6][29][30][32][33][34][35][36][37]. The Hustai National Park in Mongolia has established which is large enough to maintain groups of Przewalski horses

throughout all seasons of the year without any supplemental provisioning. As far as possible, those wild horses are kept totally isolated from external influences, except for necessary interventions such as veterinary care [6][37]. All the reintroduction projects begin with an adaption period in semi-reserves [38]. As early as the 1980s, Przewalski's horses have been released into large enclosed (semi) reserves in Canada, The Netherlands, Germany, France, Holland, England, Hungary, Ukraine, Uzbekistan and China as a pre-adaption phase before their release to the wild [10][18][39]. By 1990, at least four projects in China and Mongolia have reached the stage of adaptation at the release site [4][10][19]. However, there was a poor coordination of these different reintroduction projects [6].

2.1. Reintroduction Projects in Mongolia

Reintroduction project of the Przewalski's horses into Mongolia was initiated by an expert consolation in 1986 [4][6][19]. Two sites were selected for the reintroduction of Przewalski's horses to the wild in their former range in Mongolia: Takhin Tal (45.3219° N, 93.3905° E), in the Gobi Strictly Protected Area, an International Biosphere Reserve in the south western part of Mongolia where Przewalski's horses were last seen in the wild; and Hustain Nuruu National Park, a smaller protected area north of the centre of Mongolia, about 130 km west of Ulaan Baatar [4][19]. The two projects were initiated and supported by different organizations: the former was initiated by the Ministry of Nature and Environment of Mongolia and supported by the Christian Oswald Foundation, Germany and the Mongolian government, subsequently being run by the International Takhi Group with the support of various international sponsors. In 1999 the International Takhi Group (ITG) was established to continue and extend this project in accordance with the IUCN reintroduction guidelines [40][41][42]. The latter was mainly initiated and supported by the Dutch Ministry of Development Aid [4][6][33][43][44][45].

The reintroduction site of Przewalski's horses in Takhin Tal is a typical semi desert area located in the western part of the Gobi National Park [4][6][19][41]. Five adult Przewalski's horses including two males and three females were transported from Ukraine in 1992, and released to the wild after a period of adaptation in enclosures, from which the first foal was born in 1992. Another transportation of eight individuals from Ukraine was taken place in 1993 [6]. Sixty horses in ten groups were transported, and 25 foals had been born by the new millennium, of which 14 survived [4][6][29]. In June 2000, seven foals had been born in the free-ranging harem group [41][42][44].

The reintroduction of Przewalski's horse in Hustain Nuruu is set within the context of the broader goals of the restoration and protection of biodiversity within the reserve [4][16][44][45][46]. In June 1992, first group of 16 captive born Przewalski's horses were transported to the Hustai National Park, where they were held in adaptation enclosures in view of a possible future reintroduction [45]. A second group of 16 Przewalski's horses was sent in July 1994 to the same site [4][6][47]. In total, 89 Przewalski's horses were transported to the park in the next eight years [40][41][42][43][48][49]. In 1997 the first harem group was released from the adaptation enclosures, and in 1999 the first foals were successfully raised in the wild [47][48]. The total number of the wild horses in the Hustai National Park reached 122 individuals belonging to nine groups by the new millennium, and became an important vehicle for national park development [42][49].

In 2004, 12 captive-born and carefully-selected horses were brought to Khomii Tal, buffer zone of Khar Us Nuur National Park, where they are being held in adaptation enclosures for possible future reintroduction. A second group of horses was shipped in the following year [6][33].

The return of the Przewalski's horses to their native steppes of Mongolia is proven to be successful as the species population has grown steadily in these semi-reserves [17][42][50]. The IUCN Red List of Threatened Species Working Group downgraded the Przewalski's horse to the status of Endangered in 2011, mainly based on the status of wild horses in Mongolia, for free ranging Przewalski's horses roaming these sites has reached approximately 350 [29][30]. Today, the number of Przewalski's horses in the wild in Mongolia has already exceeded 900 [28][51].

2.2. Reintroduction Projects in China

The current populations of the Przewalski's horses in China are distributed in three different localities. Among them, the population bred in the wild horse breeding center in Xinjiang Provence is the largest. The other two are the Wuwei–Dunhuang population in Gansu Provence and Beijing–Anxi population in Beijing City respectively [6][7][30][52][53].

2.2.1. The Xinjiang Population

The reintroduction projects in China has been carried out since 1985, immediately after a conservation action plan for the restoring re-wild population of the Przewalski's horses was proposed by the Chinese government [4][6][7][30][32]. From 1985 to 2005, 14 males and 10 females captive Przewalski's horses in five groups from captive facilities in Germany, the United Kingdom, and the United States were transferred to the wild horse breeding center which was established in the semi-desert region of the Junggar Basin in Xinjaing. [6][20][30]. In 2006, a group of six Przewalski's horses was brought to the center with the aim of improving genetic diversity of the captive individuals [6]. The first foal was born in 1988. Between 1988 and 2013, 339 foals were born and 285 survived at the Centre [32]. In the following year, 11 males and 16 females Przewalski's horses were released to the wild as a beginning of the restoration program of the species within its former ranges in China [6][30]. Thirteen more groups of Przewalski's horses have been released since 2013 [6].

In total 89 captive-born Przewalski's horses (32 males and 57 females) were transported to the Mt. Kalamaili Wild Ungulate Nature Reserve between August 2001 and December 2013 [6]. The first foal was born in 2003 in Mt. Kalamaili Wild Ungulate Nature Reserve by the group released in 2001, and by 2013, a total of 107 foals had been born, of which 88 survived their first year. In 2013, the total population of the released Przewalski's horses reached 127 individuals divided into 16 groups (13 breeding and 3 bachelor groups) [6][29][32][54]. A preliminary success of restoring the wild population of the Przewalski's horses has been achieved [30][32][53][54]. The numbers of captive and free-ranging populations in Xinjiang has reached 413 by the end of 2018, but the Przewalski's horse in China is still listed as Extinct in the Wild because their wild populations still depend on supplemental feeding for their winter survival [6][30][53].

2.2.2. The Wuwei–Dunhuang Population

The distribution sites of the Wuwei–Dunhuang population includes the Wuwei Endangered Animal Breeding Centre and the Dunhuang West Lake Nature Reserve [6]. Since 1990, 18 Przewalski's horses were brought to the Wuwei Endangered Animal Breeding Centre from the US and Germany as a part of the reintroduction project initiated by the former Ministry of Forestry of the Peoples Republic of China [6][52]. Two releases of wild horses were carried out on 25 September 2010 and 06 September 2012 respectively. Seven and 21 wild horses bred in captivity at the center were kept in enclosures of the west lake national nature reserve to allow them to adapt to the local environment, then they were released. Sixteen foals were born by the re-wildering horses [6]. By the end of 2018, the Wuwei–Dunhuang population increased to 60 as 41 foals were produced. However, the horses were driven into the paddocks to allow for supplemental feeding to increase winter survival, and to reduce competition with domestic horses of local herdsmen [6][52].

2.2.3. The Beijing-Anxi Population

The distribution sites of the Beijing–Anxi population includes the David's Deer Park in Beijing City and the extreme-arid desert national nature reserve in Anxi County, Gansu Provence [4][6]. Ten Przewalski's horses brought to the reserve from the United Kingdom in 1985 were kept in the David's Deer Park for a better acclimatization. In 1997, seven males and three females were translocated to the reserve, which is one of their original areas [6], the David's Deer Park retained two Przewalski's horses in the park. By 2018, the number of wild horses in the park increased to five [6], but decreased to one in 2021.

In 1999, the first foal was born in the translocated population in the reserve, and the 2nd, 3rd and 4th generations were born in 2004, 2008 and 2012 respectively. All the individuals introduced in 1997 bred and died before 2012. The number current population of the Beijing–Anxi Przewalski's horses has reached 23, which still depend on supplemental feeding as the other reintroduced populations do [6].

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