

Short Communication

The last populations of the Critically Endangered onager *Equus hemionus onager* in Iran: urgent requirements for protection and study

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Abstract The onager *Equus hemionus onager*, a wild ass endemic to Iran, is categorized as Critically Endangered on the IUCN Red List. Its biology and conservation requirements are poorly documented. We report our observations, made in 1997 and 2000, on the behaviour and ecology of the two remaining populations, located in the Touran Protected Area and the Bahram-e-Goor Reserve. Recent population counts by the Department of Environment of Iran (471 in the Protected Area and 96 in the Reserve) are markedly lower than the estimate of 600–770 made in the 1970s in the Touran Protected Area. We observed social interactions between stallions and mares outside the breeding season that contrasts with the known social structure of this subspecies. Poaching, competition with domestic animals, removal of shrubs

for domestic use, and land conversion have been identified as the main threats to the two remaining onager populations. In addition, geographical isolation could cause the loss of genetic variability in these two relatively small populations, and also makes them more susceptible to the potential effects of stochastic events such as drought or disease. Public awareness, appropriate protection, and scientific studies must be urgently supported by both national and international organizations in order to prevent the extinction of these two apparently dwindling populations of onager.

Keywords Ass, behaviour, conservation status, *Equus hemionus*, Iran, onager.

The Asiatic wild ass *Equus hemionus* is one of seven equid species, the others being *E. kiang* and *E. africanus*, the zebras *E. zebra*, *E. grevyi* and *E. burchelli*, and the wild horse *E. ferus przewalskii* (Moehlman, 2002). In historical times isolated populations of Asiatic wild ass ranged from Turkey to northern China, and from Kazakhstan to Saudi-Arabia and India (Duncan, 1992). *Equus hemionus* now occurs in China, Mongolia, Turkmenistan, Kazakhstan, Iran and India (Moehlman, 2002). Of the six subspecies of *E. hemionus* the Syrian wild ass *E. h. hemippus* is categorized as Extinct, the kulan *E. h. kulan* and onager *E. h. onager* as Critically Endangered, the Indian wild

ass *Equus h. khur* as Endangered, and the Mongolian wild ass *E. h. hemionus* and the Gobi khulan *E. h. luteus* as Vulnerable on the IUCN Red List (IUCN, 2002; Moehlman, 2002). Wild populations of onagers (*goor* in Farsi) occur only in Iran, and there is an introduced population in Saudi-Arabia and a hybrid population of *onager* * *kulan* in Israel (Duncan, 1992; Ziae, 1996).

The setting of conservation priorities for *E. hemionus* faces a number of problems: the taxonomy of the subspecies is still in debate, with the apparent occurrence of several morphologically indistinguishable subspecies, populations are widely dispersed, and little is known about any trends in population sizes. The Equid Specialist Group of the IUCN has highlighted the lack of data on demography, genetics and behavioural ecology of *E. hemionus* as being particularly critical (Duncan, 1992; Moehlman, 2002). Although there is an increasing interest in the zoology of Iran (Anderson, 2002), apart from some work carried out in the 1970s (Firouz, 1974; Groves, 1974; Fitter, 1975; Harrington, 1977; Pinder & Barkham, 1978), little information is available on the status of the remaining populations of onagers. In this paper we describe our observations of onagers, made in collaboration with the Department of Environment (DoE) of Iran, during short surveys in the two areas known to contain remaining wild populations of the

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subspecies: the Touran Protected Area in the province of Semnan in north-east Iran and Bahram-e-Goor Reserve in the Fars province in south-east Iran (Fig. 1). According to the DoE (DoE officials, pers. comm.) the populations reintroduced into Kavir National Park and Khosh-yeilagh Wildlife Refuge are extinct.

The Touran Protected Area was established in 1975, and one of the underlying objectives was the protection of the onager and its habitat (Harrington, 1977). It is located at an altitude of *c.* 1,000 m and covers an area of 14,000 km². It is characterized by semi-desert vegetation with shrublands of *Zygophyllum*, *Haloxylon* and *Salsola* spp. (IUCN, 1977). We spent 5 days in the Protected Area in March 2000, with 3 days in the Majarat area and 2 days spent crossing the reserve. Bahram-e-Goor Reserve was given the status of Protected Region in 1972. It is located at an altitude of *c.* 1,400 m and covers an area of 3,850 km². The shrub vegetation of this desert steppe plain is dominated by *Artemisia alba*, *Astragalus* spp. and *Zygophyllum* spp. (IUCN, 1977). We spent 5 days in November 1997 in the 600 km² of the reserve that is under complete protection from hunting, agricultural use and grazing. In both areas we observed onagers from a maximum distance 1.5 km, generally from the tops of hills and, when it was possible, we approached to <400 m in order to check the sex ratio and to age individuals using criteria from Feh *et al.* (1996).

In 1997 we observed a total of 84 individuals in the Bahram-e-Goor Reserve, and in 2000 a total of 57 individuals in the Touran Protected Area. Our observations indicate the continued presence of onagers in the two areas; the number of individuals seen is the

sample on which we made our observations, but does not correspond to an estimate of the total number present. In the Majarat area of the Touran Protected Area we observed 43 individuals over 3 days. During autumn 1996 and January 2000 the DoE made a 'total count' of 96 and 471 onagers in the Reserve and the Protected Area, respectively (Table 1); in order to do this the areas were divided into zones within which all individuals were counted, with communication by walkie-talkie between observers being used to prevent double counts. Although we consider it unlikely that absolutely every individual was counted by this method, it is probably close to a total population count. In comparison, a 3-week survey in November-December 1973 estimated that the total population of onagers in the Touran Protected Area was 600–770, with 110–140 in Majarat, which was then considered one of the most important sites for onagers within the Protected Area; no information is available about the methodology used for this estimate (Harrington, 1977).

The percentage of young was similar in our surveys and in that of the DoE in the Touran Protected Area (Table 1; the number of foals in the DoE survey of the Bahram-e-Goor Reserve is not available), being 16.7–18.5%. These values are also similar to the percentage of foals observed for *E. hemionus luteus* in the Gobi desert (Feh, 2001; 14.5%), and *E. hemionus kulan* in Turkmenistan (Solomatin, 1973; 15.6%).

We observed group sizes of 2–74 (mean = 18.9; median = 9) in the Bahram-e-Goor Reserve and 22 (mean = 5.3; median = 4.5) in the Touran Protected Area, with solitary individuals in both populations. During



Fig. 1 The location of the Touran Protected Area and Bahram-e-Goor Reserve, containing the only remaining populations of onagers in Iran.

Table 1 Population estimates and counts, and number of young, of onager in the Touran Protected Area and the Bahram-e-Goor Reserve, made by Harrington (1977), the Department of Environment (DoE) of Iran, and observed during this study.

	Touran Protected Area			Bahram-e-Goor Reserve	
	Harrington, 1977 (Nov.-Dec. 1973)	DoE (Jan. 2000)*	This study (Mar. 2000)	DoE (Autumn 1996)*	This study (Nov. 1997)
No. of adults (%)		384 (81.5)	47 (82.5)		70 (83.3)
No. of foals (%)		87 (18.5)	10 (17.5)		14 (16.7)
Total	600–770	471	57	96	84

*Surveys made by the DoE were 'total counts' (see text for details).

his autumn-early winter survey in the Protected Area, Harrington (1977) observed a group of 162 individuals, and wardens reported a second group totalling 550 individuals.

In November 1997 (outside the breeding season) in the Reserve we observed two mating attempts and one mating, involving the same pair. We saw the same stallion herding different mares 2 days earlier. In the Protected Area we observed herding behaviour (neck and head in one extended line towards the ground; Feist & McCullough, 1976; Feh *et al.*, 1994) on two occasions by a stallion towards mares after he was scared by a danger (unidentified by the observers) and drove the group away. We also observed two groups (1 male, 4 females and 6 young, and 1 male, 5 females and 3 young) drinking together at the same spring. No aggressive interactions were recorded between the groups, and when all animals finished drinking, the two groups separated and moved in opposite directions. *E. hemionus* is considered to be territorial; some stallions defend food and/or water resources, and no permanent bonds exist between male and female adults (Klingel, 1977) but information on the social behaviour of onagers in particular is scarce, although it has been suggested that some onager stallions are territorial (Denzau & Denzau, 1999). In equids both territorial and family-type social structures occur. A family-type social structure has been observed in the Gobi khulan in Mongolia (Feh *et al.*, 1994; 2001).

In decreasing order of importance, poaching, overgrazing by domestic animals, removal of shrubs and bushes for firewood, and land conversion were reported by Makhdoum *et al.* (1998) to be the four major threats to the protected areas of Iran. Concerning onagers in particular, conservation problems mentioned by the wardens that we met appeared to be the same (we spoke to a limited number of wardens in a non-systematic way). Poaching of onagers for medicinal purposes has been reported by Harper (1945) and was mentioned once to us by a local informant, but generally wardens and local people believed that the main purpose for poaching is to obtain meat. According to wardens and local people

there are no movements or migrations of onagers between the two protected areas or between the Touran Protected Area and the Turkmenistan border, where there is a population of *E. hemionus kulan* (Moehlman, 2002). Geographical isolation could cause the loss of genetic variability in the two relatively small populations of onager, and also makes them more susceptible to the potential effects of stochastic events such as drought or disease (Duncan, 1992; Primack, 1998; Moehlman, 2002).

Recent mitochondrial DNA analysis of *E. hemionus onager* and *E. hemionus kulan* has suggested that the two taxa diverged recently and that there is insufficient distinctiveness to separate them as subspecies (Oakenfull *et al.*, 2001). However, the taxonomic status is not clear because the DNA samples were collected from a limited number of captive animals that might have suffered from a founder effect (Oakenfull *et al.*, 2001). This effect is known to diminish genetic variability. Genetic material from wild individuals is required to further examine the relationship between the two subspecies.

Information on demographic parameters (population size and composition, reproductive rate), behaviour (social interactions, mating system, length of parent-offspring links), environment (location of resources, inter- and intra-species competition, human disturbance) and genetics of the species concerned is crucial for the implementation of effective conservation efforts. In the case of the onager this work could be conducted by the new generation of biologists in Iran (Kiabi *et al.*, 2002; B.H. Kiabi, pers. com.). Wardens and other employees of the Department of Environment are currently improving access to water for onagers and wildlife and counteracting the effects of overgrazing by the provision of artificial water ponds, the removal of domestic livestock, and the supply of supplementary feed such as hay, and the wardens are a major component of public awareness through their daily contact with local people. Public awareness, protection, and scientific studies in Iran need to be urgently supported by both national and international organizations in order to prevent the extinction of these two apparently dwindling populations of onager.

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Biographical sketches

Laurent Tatin is now studying the behavioural ecology of a semi-wild population of Przewalski horses in the Cévennes in southern France and participating to the reintroduction of this species into Mongolia.

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Christophe Tourenq works as an ecologist for a houbara bustard research programme in Abu Dhabi, United Arab Emirates, and he has also studied the Gobi khulan *Equus hemionus luteus* in the Gobi National Park in Mongolia.

David Tatin is working with a regional nature conservation organization in southern France, where his main interests are in the conservation management of species and habitats.

Bijan Azmayesh has particular interests in the cultural heritage of Iran, and especially in its architecture.