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The status of wildcat in Iran - a crossroad of subspecies?

The wildcat *Felis silvestris* is one of the least-known felid species of Iran with limited information on its taxonomy, distribution, ecology and threats available. In this paper, for the first time we conducted a review on the literature and other available resources to create baseline information for future research and conservation. Also, we gathered recent records of wildcat presence from across the country. By analysing 57 images of this species, contrary to earlier beliefs, wildcat in Iran appears to solely belong to the Asian (*ornata*) subspecies. However, future genetic analyses are essential to backup this finding and to clarify the taxonomic status of wildcats in south-west Asia. Wildcat was recorded in 27 out of 31 provinces of Iran, in a variety of natural habitats to the vicinity of human landscapes, except for extremely high altitudes or deserts. Two newly established provinces (Alborz and Qom) are suspected to have wildcat populations, but lacked any reports. However, there have been no historical or recent records from Gilan and Mazandaran Provinces, which are mainly covered by the Hyrcanian forests. The reason behind such distribution pattern requires further investigations. Road accidents, poaching as a retaliatory action against poultry depredation and by-catch in illegal snares are the main reported threats to the existence of wildcats in the country. Potential threats from shared diseases and hybridisation with domestic cats are unknown and needs further research.

We conducted a review on the status, distribution and ecology of wildcats in Iran by using scientific and grey literature, information databases, IUCN/SSC Cat Specialist Group library, websites and technical reports to create baseline information for future research and conservation. Also, we gathered recent records of wildcat presence from provincial offices of Department of Environment DoE and conservation projects throughout the country. We collected wildcat images from biologists, DoE officers, rangers, camera trapping projects, wildlife photographers, zoos and museums for identification of subspecies existing in Iran by comparison of coat patterns. Also, images of wildcat from neighbouring countries (Armenia, Azerbaijan, Iraq and Turkey) were gathered. The images were then cross checked with a number of researchers specialized in wildcat biology and coat patterns (U. Breitenmoser, A. Kitchener & N. Yamaguchi pers. comm.). Only photos of wildcat taken far from human landscapes were taken into account to reduce the chance of making any false judgments based on feral or hybrid individuals.

Fig. 1. An Asiatic wildcat from Naeen, Isfahan Province. (Photo Hossein Akbari).

Description

The wildcat, which is known to be the ancestor of domestic cats, is classified as a polytypic wild species with up to five interfertile subspecies in Asia, Europe and Africa (Driscoll et al. 2007). There is no agreement on how to relate geographical variations to the morphology and genetics of wildcat to its taxonomy and systematic (Kitchener & Rees 2009). The situation is also confusing in Iran, since it is located at a crossroad of distribution ranges of up to three different subspecies of wildcats: African *F. s. lybica*, Asian *F. s. ornata* and European *F. s. silvestris* (Driscoll et al. 2007). Wildcats of Iran are suggested to have different coat patterns, categorising them into different subspecies in the past (Ziaie 2008). However, in this paper for the first time, the status of wildcat in Iran has been reviewed systematically and by comparison of 57 images of wildcats from across the country, they all morphologically appear to belong to the *ornata* subspecies or Asiatic wildcats (U. Breitenmoser, A. Kitchener & N. Yamaguchi pers. comm.). This is contradictory to the latest mtDNA genetic study by Driscoll et al. (2007), which had considered the Asian subspecies to extend to the east of the Caspian Sea. However, in that study there were no genetic samples from Iran. Further genetic analyses are essential to backup these findings, to help clarify the taxonomic status of wildcat in south-west Asia.

Wildcat images from Iran show that they have tawny-grey, light grey or sand-coloured pelage, marked distinctly with spots, which is typical for the *ornata* subspecies. They differ from other wildcat subspecies mainly in their black or red-brown spots (Fig. 1). The spots are sometimes fused into stripes (Nowell & Jackson 1996), especially on the flanks. Asiatic wildcats have small body size comparing to the other wildcat subspecies weighing between 3-4 kg, with females smaller than males (Table 1; Nowell & Jackson 1996). They have a long, tapering tail, always with a short black tip, and with spots at the base. The forehead has a pattern of four well-developed black bands. A small but pronounced tuft of hair up to one cm long grows from the tip of each ear. Paler forms of Asiatic wildcat live in drier areas and the darker, more heavily spotted and striped forms occur in

more humid and wooded areas. The throat and ventral surface are whitish to light grey to cream, often with distinct white patches on the throat, chest and belly. Throughout its range the Asiatic wildcat's coat is usually short, but the length of the fur can vary depending on the age of the animal and the season of the year. Compared to domestic cat, Asiatic wildcats have relatively longer legs.

Felis silvestris

Names:
گربه وحشی Gorbe Vahshi
Wildcat, Wild cat

Head and body length:
45-80 cm
Tail length:
25-38 cm
Weight:
2.5-5 kg

Global Population:
N/A
Iranian Population:
N/A

Distribution in Iran:
Widespread throughout Iran, with limited reports from Caspian forests and arid deserts

IUCN Red List:
Least Concern (2015)
CITES:
Appendix II

Country Red List (or similar listings):
Non-protected species by Iranian Department of Environmentl

Photo S. B. Musavi

Status, distribution and development of the population

The wildcat has the widest distribution among all the felid family in the world (Macdonald & Loveridge 2010) with the Asiatic subspecies occurring from Iran to India in the south and Mongolia and Russia to the east and north. Some recent discoveries through camera trap photos reveal the presence of the *oranta* subspecies of wildcat in the Caucasus (Armania and Azerbaijan's Nakhchivan), Iraq's Kurdistan and south-east Turkey (Batur Avgan & Igor Khorozyan pers. comm.). Nowell & Jackson (1996) based on Ognev (1930) suggested that the west of Iran and the Caucasus are the transitional zones between the three subspecies of wildcat; however, it appears that the transition line needs to be revised and moved further west.

In Iran, wildcats occupy different types of habitat, almost throughout the country and are only absent from northern Iran (Fig. 2). There is not enough data to clarify whether the distribution range of wildcat has changed dramatically in the past. However, as the wildcat is widespread throughout the country (except the mentioned areas), the range seems not to have been reduced recently. Wildcat occupies the largest range among the felids of Iran. There is no estimate on population size of wildcat in Iran, and it seems that it is present in suitable habitats. There is no information on population trend. However, Ziaie (2008) claims that the wildcat population has declined in most of Iran. Poaching related to livestock predation, road accidents and by-catch in illegal traps are among the main causes of loss in population of wildcat in Iran.

Habitat and extension

From arid plains to lush forests, coastal areas and mountains to vicinity of human landscapes, wildcats occupy different habitats (Firouz 2005), except for extremely high altitudes or deserts of Iran. However, from the gathered data through this research, wildcat appears to be absent from the Hyrcanian (Caspian) forests of Gilan and Mazandaran Provinces in the north of Iran. There is no recent report of this species in the area and historical data are also lacking. Surprisingly, wildcat is present in Golestan National Park NP and further west in Golestan Province, which is the easternmost extent of the Hyrcanian forests (Fig. 3). The reason behind such a distribution pattern needs further investigation. It has been suggested that competition with jungle cat *Felis chaus* in the Caspian forests is the cause of absence of this species in this highly productive forest habitat of northern Iran (B. Nussberger, pers. comm.). However, jungle cat is also present in Golestan NP and the rest of Golestan Province. Wildcat coexists with high number of other predator species in a variety of habitats (e.g. brown bear *Ursus arctos*, leopard *Panthera pardus*, cheetah *Acinonyx jubatus*, wolf *Canis lupus*, etc.). There is not much understanding of the role of these species in regard to the distribution pattern of wildcat in Iran.

Wildcat presence has been confirmed in 27 out of 31 Provinces of Iran with possible occurrence of wildcat in the two newly established Provinces Alborz and Qom (Fig. 4). Presence of wildcat in the remaining two Provinces, Gilan and Mazandaran, is doubtful and needs further research (see above). Wildcat can be found up to an elevation of 2,000-3,000 (Heptner & Sludskii, 1992). Because of the wide range of wildcat habitats in Iran, it is difficult to identify a prime habitat for this species in the country. It has been reported from 39 of the 140 reserves of DoE (Darvishsefat 2006). However, it is likely that they have been overlooked in many reserves. Because of its plasticity in habitat preference, it appears that slight habitat changes might not influence the survival of this species. Wildcats are often reported in the vicinity of human landscapes throughout Iran, depredating on domestic poultry (Etemad 1985).

All the wildcat photos from the different Provinces of Iran gathered through this research

Table 1. Biometric information on wildcats in Iran.

Body part	Sample size	Average length (range) cm
Head and Body	12	66.5 (45-80)
Tail length	12	29.9 (25-32)
Foot	3	12.7 (12-14)
Ear	3	6.0 (5.5-6.5)

have been identified as belonging to the *ornata* subspecies. The taxonomic status of wildcats in Iran may also justify the absence of this species in lush Caspian forests, as the Asiatic subspecies (Asiatic steppe cat) is commonly a steppe-dweller (Kitchener & Rees 2009).

Ecology and behaviour characteristics

Ecological aspects of the wildcat have not been studied in Iran. General ecological information on this species can be derived from other studies throughout its range. Wildcat hunts solitarily, is active at day and night and lives in borrows of other species (Novikov 1962). They have been observed frequently in the daytime and appear to be highly territorial (Heptner & Sludskii 1992). Female home ranges vary with habitat, from 52.7 km^2 in the United Arab Emirates (Phelan & Silwa 2005) to 1-2 km^2 in France and Scotland (Stahl et al. 1988, Macdonald & Loveridge 2010). However, there is no original ecological data on this subspecies throughout its range.

Mating season has been reported in various months of the year for Asiatic wildcat (Nowell & Jackson 1996). The gestation period is 58-62 day with a mean litter size of 2.75 (Nowell & Jackson 1996). Life span in captivity is 15 years (Ziaie 2008).

Prey species

The diet of the wildcat hasn't been studied in Iran and because of wide variety of habitats for wildcat a high plasticity in prey choice of this species is expected. From studies of wildcats in other parts of its range, rodents are considered as the preferred prey: members of Dipodidae (jerboas) and Muridae families (gerbils Gerbillinae, voles Arvicolinae, and mice Murinae; Heptner & Sludskii 1992) making up to 81% of its diet (Novikov 1962). The diet also includes hares, young ungulates, birds, insects, lizards and snakes (Heptner & Sludskii 1992). During the years with decline in rodent numbers, diet constitutes of insects, reptiles and even vegetables. They are frequently reported to raid poultry farms in different parts of Iran (Etemad 1985).

Fig. 2. A camera trap photo of an Asiatic wildcat in steppes of Touran Biosphere Reserve. (Photo Persian Wildlife Heritage Foundation).

Fig. 3. A camera trap photo of an Asiatic wildcat in the Hyrcanian forest of Golestan National Park. (Photo Plan for the Land Society).

Collections

This species can be found in several private and governmental museums of the country, namely in Haft-Chenar, Tandureh National Park, Shiraz Natural History, Sabzevar, etc. On the other hand, there is not much data on the presence of wildcat specimens in zoos and private collections in Iran. There is only information on the presence of one wildcat individual in Mashhad zoo. Captive wildcats in Iran are not included in any studbook or breeding programme.

Harvest and threats

There is no legal harvest of this species undergoing in Iran. However, road accidents, poaching as a retaliatory action against poultry depredation and by-catch in illegal traps (mostly for Houbara bustard; Fig. 5 are the main threats to the existence of wildcats in the country. Wildcats also have been reported to get chased and killed by shepherd dogs in different parts of Iran.

Additionally, one of the main global threats to wildcats is their close relative, the domestic cat (Macdonald & Loveridge 2010). Domestic cats can transmit feline diseases to the wild animals, and more importantly, domestic cats cat hybridize extensively with wildcats. Such a threat may result in gradual and cryptic extinction of the wildcats in the wild (Macdonald & Loveridge 2010). Also, it can lead to misidentification of 'pure' wildcats, which make conservation efforts for this species difficult. There is no evaluation of this threat in Iran; however, several records of domestic cats being present in reserves in Iran are available.

Despite documented fur trade of this species in the region, there is no report of such action in Iran, since the pelt of wildcat is not considered of high value. Thus, there is little chance that fur trappers threaten the species.

Current and future protection measures

The wildcat is listed as "Non-Protected Species" by the Iranian DoE laws. The species is the only member of the felid family not listed as "Protected Species" in Iran. Considering the increase in level of threats to wildcats, such exclusion needs to be revised. As of new amendments to DoE laws, illegal killing of wildcat has a fine of ca. 2000 euro (1 euro: Rials 40,000).

The wildcat is generally an overlooked species by most researchers and managers and further efforts must be undertaken to raise awareness on the status and importance of this species. Hybridization is a threat that can confuse scientists and decision-makers in how to distinguish between wild, feral and hybrid cats and this can reduce the conservation efforts for this species. Level of hybridisation needs to be evaluated as one of the priority conservation measures for wildcats in Iran. Regarding poaching, there is a need to educate farmers on the significance of wildcats and introduce them to methods to prevent wildcat attacks on poultry. Finally, there are a number of ecological and taxonomic questions regarding wildcats in Iran, which need further investigations.

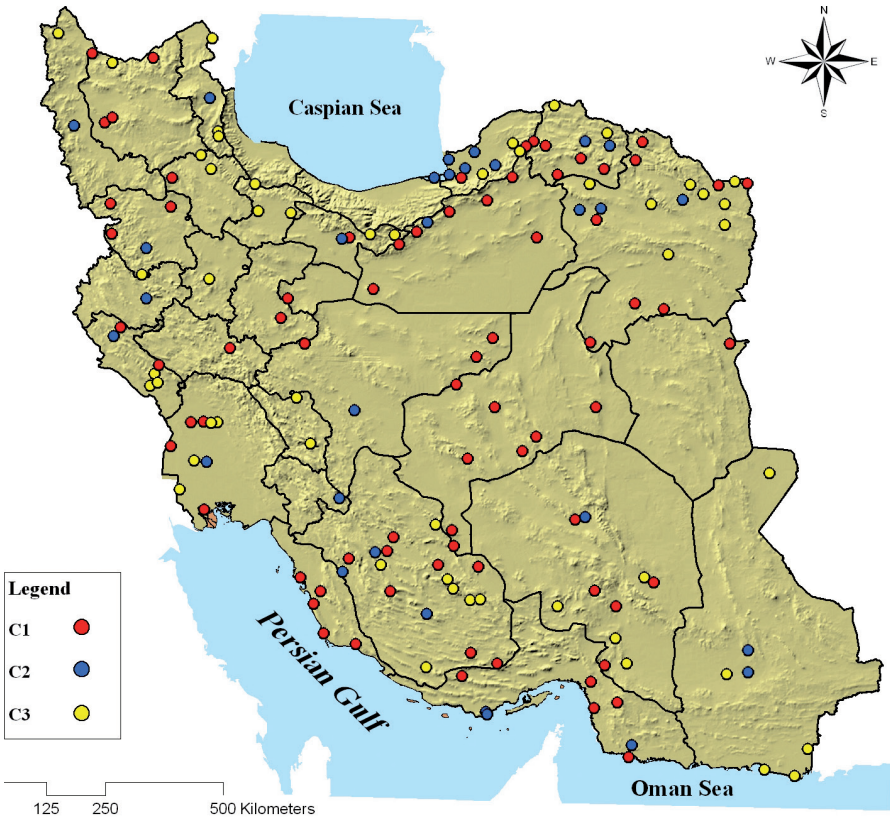

Fig. 4. Distribution of wildcat records in Iran.

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Fig. 5. A wildcat captured in a Houbara bustard trap in Southern Khorasan Province. (Photo M. Besmeli).

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