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The smaller felids of China

Pallas's cat

Otocolobus manul

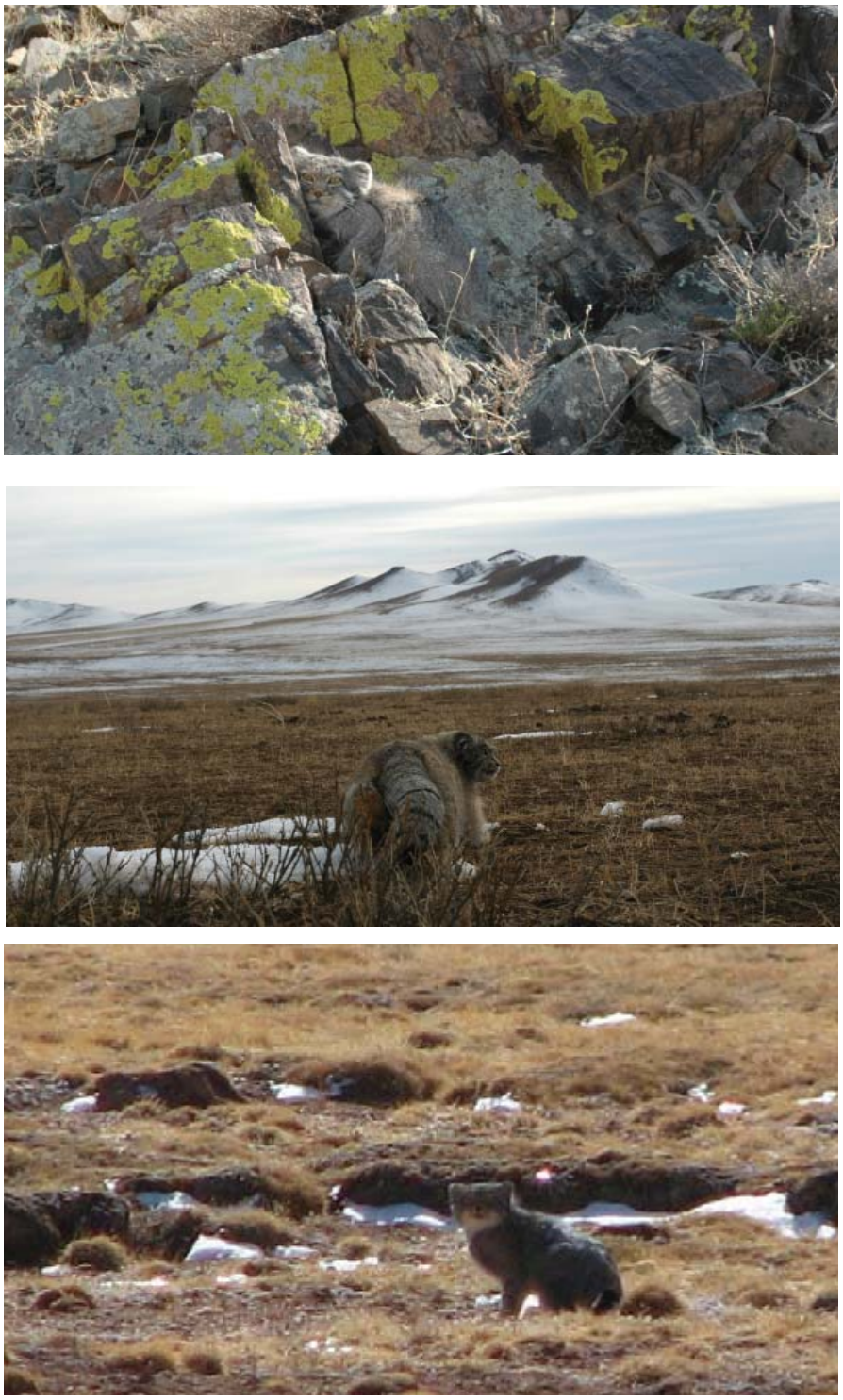

Fig. 1. Manuls use rock crevices and other habitat structures to escape from predation by sympatric carnivores and birds of prey. Photos taken in April 2007 (top) and December 2006 (middle) in the Hustai Nurru buffer zone in Mongolia (Photos S. Ross). Manul photographed in October 2006 in the Sanjiangyuan National Nature Reserve in Qinghai (bottom, photo F. Bøhler & Plateau Perspectives).

About the size of a domestic cat, the Pallas's cat, or manul *Otocolobus manul*, is a squat, rather short-legged felid with thick fur and a bushy tail about half the length of the body. It has a broad head; the ears are short, rounded, very wide apart and set low on the head. The general coloration is grizzled or silvery buff, although the fur of some forms is rusty red or ginger. The tail is marked with a black tip and with four to seven narrow black rings. The rest of the body is unmarked except for several dark transverse stripes on the loins and back and one or two dark horizontal stripes on the forelegs (Sunquist & Sunquist 2002). There are two subspecies in China: *O. m. manul*, and *O.m. nigripecta* (Smith & Xie 2008).

Status and distribution

The Pallas's cat is found throughout central Asia. The largest populations are thought to live in Mongolia and Inner Mongolia (Brown et al. 2003). On the Tibetan Plateau, it has been described as widespread but not common (Nowell & Jackson 1996). In Afghanistan, India and Pakistan, it is considered rare (Nowell & Jackson 1996). It occurs in Russia, southern Turkmenistan, Azerbaijan, Kazakhstan, Kyrgyzstan, Uzbekistan, Iran, Kashmir and as far west as Armenia (Belousova 1993, Sunquist & Sunquist 2002). Pallas's cats occur at altitudes ranging from 1,500 to 2,500m in the Altai mountains (B. Munkhtsog, pers. comm.) and have been reported from elevations up to 5,050m (Fox & Dorji 2007).

The manul is thought to be rare, but population size and status are largely unknown throughout its range, including China (Brown et al. 2003). Manul numbers in China are thought to have declined because of hunting and fur trade (Mallon 2002). Reports indicate that the species has been eliminated from the easternmost part of its range in China because of hunting (Nowell & Jackson 1996). However, the extent of the decline as well as illegal fur trade e.g. from Mongolia to China is unknown (Murdoch et al. 2006).

The Pallas's cat has been described in northern, western and central China (Smith & Xie 2008), in the Altai Mountains (IUCN 2010), on the Qinghai-Tibetan Plateau (Mallon 2002), and in Inner Mongolia (Nowell & Jackson 1996). It is also found in Gansu, Hebei and western Sichuan (Mallon 2002). Presumably, its range does not overlap with the Chinese mountain cat or the wildcat on the Qinghai-Tibetan Plateau (Mallon 2002). There are a few well documented sightings

Fig. 2. Manul habitat in the Hustai Nurru buffer zone, Mongolia, in April 2007 (top) and December 2005 (bottom). The manul is restricted to mountainous areas and ravines. Chinese habitat is likely to be similar (Photos S. Ross).

from China, e.g. in the Arjin Mountains Nature Reserve in Xinjiang in 1987, where it was reported to be commonly seen (Butler et al. 1987), on the Qinghai-Tibetean Plateau in November 2001 (Mallon 2002), and in Gertse County in the Ngari Prefecture of the Tibetan Autonomous Region in October 2009 (Fox & Dorji 2007).

Habitat

Most information about the manul's habitat (Fig. 1,2) comes from either Mongolia or Russia. The manul is adapted to winter-cold, arid mountain environments with little rainfall, low humidity, and a wide range of temperatures (down to -50°C in winter) (Sunquist & Sunquist 2002). It occurs in undulating alpine meadow-steppe (Mallon 2002), hilly areas, desert and semi-desert, cold grasslands, and low mountains (Sunquist & Sunquist 2002, Murdoch et al. 2006) but is absent from forested areas and lowland desert basins (Nowell & Jackson 1996). It is mostly found on south-facing slopes (Nowell & Jackson 1996). In the mountain steppe terrain of central Mongolia, the manul prefers steep, rocky hill slopes and ravine habitats. This habitat selection is likely an anti-predator strategy and is not driven by prey availability (Ross 2009). Pallas's cats appear to be most numerous where access to prey is not hindered by deep snow cover (Smith & Xie 2008). A continuous snow cover of 15-20 cm is thought to mark an ecological limit for this species (Heptner & Sludskii 1992).

Ecology and behaviour

Manuls are solitary and primarily crepuscular (Heptner & Sludskii 1992), but can sometimes be nocturnal (Murdoch et al. 2006). In winter, they may become more diurnal (Ross 2009). They use vacated marmot dens, rock crevices, small caves, or hide under large boulders as protection from predators and adverse weather conditions (Ross 2009). In the grass and shrub steppe of central Mongolia, mean home range sizes were about 100 km² for males and 23 km² for females, which is large for such a small felid. Home ranges of males overlapped the home ranges of 2-3 females on average. Several males were found to overlap the same females, suggesting a polygamous mating system (Ross 2009). Pallas's cats come into heat in February (trans-Baikal region), and most litters are born between April and May (Nowell & Jackson 1996). In Mongolia, litter size ranges between 3 and 6 (B. Munkhtsog, pers. comm.), with a record of 8 (Heptner & Sludskii 1992). Age at sexual maturity is in some reports one year for females, but in others 2 years. A single captive animal lived for 11.5 years, but in the wild life span is estimated at 8-10 years (Nowell & Jackson 1996, Sunquist & Sunquist 2002).

Prey

Manuls feed mainly on pikas (53,8% in Mongolia; Ross 2009) and small rodents such as voles in China or gerbils and jerboas in Mongolia (IUCN 2010). Hares, birds, more rarely marmots, carrion (Ross 2009) and during the spring months even lambs of argali sheep make up a smaller part of their diet (Reading et al. 2009).

In captivity

Keeping manuls in zoos in China was often not successful, as the cats were comparatively short lived (1-3 years), the majority dying of digestive or respiratory problems. A total of 16 manuls were kept in the Beijing Zoo from 1951 to 1979, and in May 1979, the first breeding occurred. They have also been kept by zoos at Xining, Lanyhou, Urumqi, Tianjin, Shanghai, Harbin, etc. (Tan 1987c). In 1984, there were 4 in the Urumqi Zoo and 4 in the Beijing Zoo (Sunquist & Sunquist 2002). Current numbers are not known. In North American zoo breeding programmes, the manul breeds very poorly in captivity, with high kitten mortality (80%) primarily due to *Toxoplasma gondii* infection. This disease is much more common in captive individuals than in

wild populations, probably because the captive population is highly inbred (Swanson 1999, Brown & Munkhtsog 2000).

Otocolobus manul
Fact Sheet

Names:
兔狲 [tu sun]
Pallas's cat, manul

Head and body length:
45-65 cm
Tail length:
31-35 cm
Weight:
3-5 kg

Global Population:
<50,000 (IUCN 2002)
Chinese Population:
unknown

Distribution in China:
C, N and W China

IUCN Red List:
Near Threatened (2008)
CITES:
Appendix II

China Red List:
EN A1c; B1ab (i, ii, iii)
China Key List:
Class II

Photo A. Sliwa

Main threats

In Mongolia and China, Pallas's cats are threatened mainly through hunting and poaching (Nowell & Jackson 1996, Brown et al. 2003, Murdoch et al. 2006). The manul is a Class II protected species in China. Despite their Near Threatened status, Pallas's cats can be legally hunted for 'household purposes' in Mongolia, provided that hunters obtain a permit from local governments. However, permits are rarely obtained in rural areas and there are no regulations on number of animals hunted per permit and number of permits obtained by each hunter (Murdoch et al. 2006). Manuls are trapped and poached for their fur, for the live trade, for medicinal purposes, or as incidental bycatch in traps for other animals (IUCN 2010). From Mongolia, fur is mainly sold to Chinese traders. In both Mongolia and China, law enforcement is weak (Sunquist & Sunquist 2002, Murdoch et al. 2006) and Pallas's cat fur exports have increased since 2000 (IUCN 2010). In Mongolia, Pallas's cats are also frequently killed by domestic dogs (Ross 2009, B. Munkhtsog, pers. comm.). A major problem is destruction of their prey base, namely pika poisoning in Russia and China, where pikas are considered to be vectors of the bubonic plague and to compete with livestock for grazing (Nowell & Jackson 1996, Smith et al. 1990, Mallon 2002). Furthermore, wild individuals have died of toxoplasmosis; increasing feral domestic cat populations may be a reservoir for diseases such as FIV (Brown et al. 2003, Troyer et al. 2005). Finally, habitat fragmentation and degradation due to overgrazing through livestock has a negative impact on the habitat of the manul (A. Barashkova, pers. comm., S. Ross, pers. comm.).

Current and future protection

Hunting is prohibited in all range states except Mongolia (IUCN 2010). China is a signatory to CITES and hunting is prohibited without a special licence (Lu et al. 2010, this issue). There is no specific reserve for the manul, but in the provinces where it occurs, at least 25 natural reserves for wild animals offer relative protection. Recommendations for the conservation of the Pallas's cat in Mongolia include improvement of law enforcement, reorganization of the hunting permit system, and establishment of monitoring programs in order to determine population status and harvest rates (Murdoch et al. 2006). Scientific research is needed to better understand habitat requirements and the land tenure system of the Pallas's cat (Murdoch et al. 2006). There are currently research projects on Pallas's cats in Mongolia (B. Munkhtsog, pers. comm.), in the Daurskij Biosphere Nature Reserve (Zabaikalsky Region; O. Uphyrkina, pers. comm.) and in the Russian part of the Altai mountains (A. Barashkova, pers. comm.), but non in China. Research and monitoring programs should also be established in China, which hosts 50% of the manul's global distribution range.

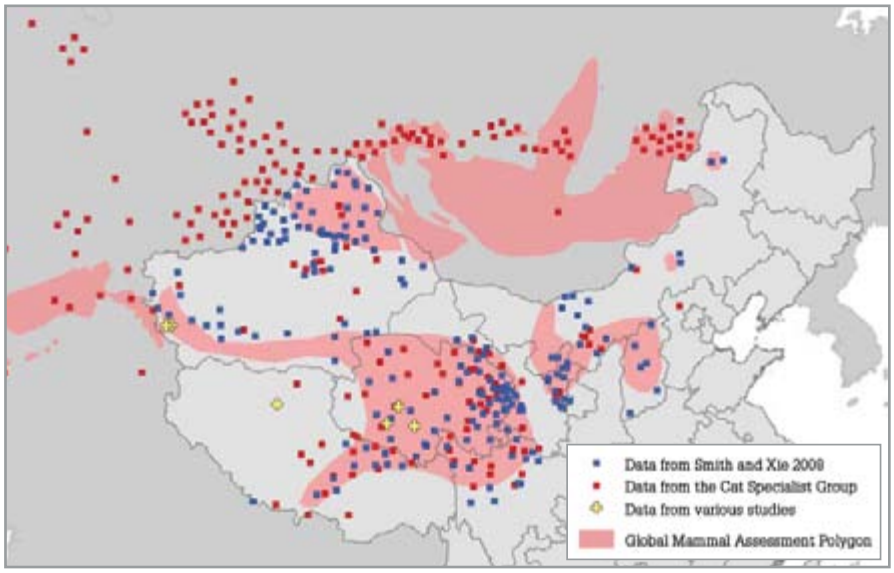

Fig. 3. The distribution of the manul in China.