

Distribution update

New distribution record of dhole from southern Kyrgyzstan using non-invasive genetic sampling



Imogene A. Cancellare^{1*}, Shannon M. Kachel², Zairbek Kubanychbekov³, Rahim Kulenbekov³, Kristine L. Pilgrim⁴, Kyle P. McCarthy¹, Byron V. Weckworth²

¹ Department of Entomology and Wildlife Ecology, University of Delaware, Newark, Delaware, USA. Email: imogene@udel.edu

² Panthera, New York, New York, USA

³ Ilbirs Foundation, Bishkek, Kyrgyzstan

⁴ USFS National Genomics Center, Missoula, Montana, USA

* Correspondence author

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Abstract

The dhole (*Cuon alpinus*) is a globally endangered social canid with a declining population trend throughout its range. Once widely distributed across Asia, this habitat generalist now occupies a very fragmented range, with no confirmed reports in more than 30 years across the Altai, Tian Shan, and Pamir mountain ranges. Here, we report a new record of the species using non-invasive genetic sampling in the Bek-Tosot Conservancy in the Min-Teke area of Chon Alai of the Osh region in southern Kyrgyzstan. This new genetic record may represent the most northern published detection to date. Our finding adds important knowledge on the potentially expanding range of this little-studied species and marks the possible presence of an undetected dhole population in the Pamir mountains.

Article

The dhole (*Cuon alpinus*), also called the Asiatic wild dog, red dog, red wolf, or whistling dog, is a habitat generalist carnivore distributed across most parts of South, East, and Southeast Asia (Zhang and Chen 2011). Widespread across North America, Europe, and Asia until the late Pleistocene Epoch, this globally endangered carnivore's range is reduced to Bangladesh, Bhutan, Cambodia, China, India, Indonesia, Laos, Malaysia, Myanmar, Nepal, and Thailand (Kamler et al. 2015). Listed as Endangered by the IUCN, dholes have disappeared from >75% of their historic range, and their populations are severely fragmented, with only 949 – 2,215 mature individuals estimated in the global population (Kamler et al. 2015). Dhole habitat includes a variety of forest, shrubland, grassland, and high elevation mountain steppes (above 3000 m; Zhang and Chen 2011). There have been no confirmed reports in more than 30 years from the Russian Federation, Mongolia, Kazakhstan (formerly in the Altai and Tian Shan mountains), Kyrgyzstan (formerly in the Tian Shan and Pamir mountains), Afghanistan (formerly in Pamir Mountains), Tajikistan (formerly in Pamir Mountains), or Uzbekistan (formerly in Tian Shan Mountains) (Durbin et al. 2004). We report a new occurrence record of the dhole in the Bek-Tosot Conservancy in the Osh region of southern Kyrgyzstan.

Min-Teke Conservancy was created in 2015 by the initiatives of Zhar-Bashi village residents in the Chon-Alai district of the Osh region. Later, the Min-Teke Conservancy was joined to the local Bek-Tosot Community-Based Conservancy (CBC) of the district in 2019 and renamed as Bek-Tosot CBC to combat illegal wildlife hunting and increase the socio-economic development of the local community (Zairbek Kubanychbekov, personal communication). Situated a few kilometres from the Tajikistan border, the conservancy lies within the Pamir-Alai Mountains. This northernmost range of the Pamirs is heavily glaciated and comprised of varying landscapes that include arid alpine and sub-alpine steppes interspersed with broad river valleys rising to peaks of over 7000 m. In August 2019 we conducted opportunistic, non-invasive scat collection surveys for snow leopards (*Panthera uncia*) at multiple sites throughout southern Kyrgyzstan. As a result, all search efforts were based on previous snow leopard and/or snow leopard prey sightings by local herders and rangers, and distances travelled per location or transect varied in length. On 15 August 2019, a scat sample was found by a son of Bek-Tosot CBC ranger Toozbek Toktogul uulu near Ters-Agar pass (approximate geographic location 39.23774, 72.24225, elevation 3603 m; Figure 1), approximately three kilometres from the border of Tajikistan (Figure 2). The sample was stored in desiccant and shipped to the USDA National Genomics Center for Wildlife and Fish Conservation in Missoula, Montana, USA, for genetic analysis in 2021. Genomic DNA was extracted using the QIAGEN Qiaamp DNA Stool Mini Kit (Qiagen, Valencia, CA) according to manufacturer's instructions. To determine species, we

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amplified a region of the mitochondrial cytochrome b using carnivore specific primers (Farrell et al. 2000). We obtained 147bp of sequence data which was compared to GenBank to confirm the species to which the scat belonged. Our sequence data matched 100% with *Cuon alpinus* cytochrome b (cytb) gene (Accession number MW911472.1). We believe this is a new record of the purportedly extirpated dhole in the Chon-Alai district and marks a northward extension of its previously published distribution by approximately 1,000 km (Figure 2). Our data has been deposited in Genbank, Accession number MZ813093.



Figure 1. Ters-Agar Pass in southern Kyrgyzstan. Photo by Imogene Cancellare.

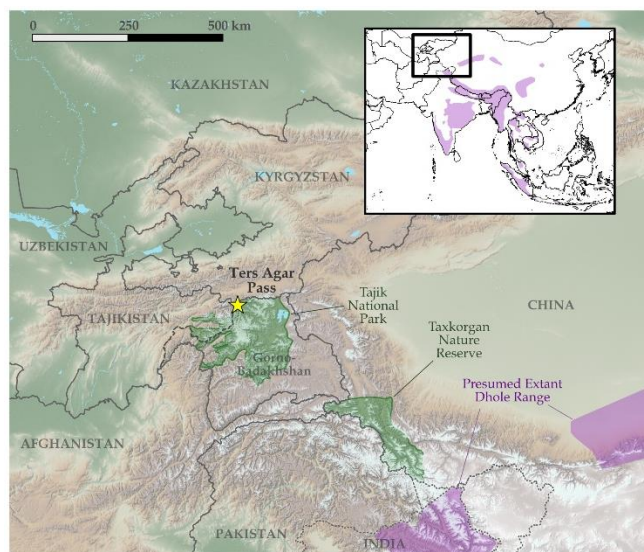


Figure 2. Study area map with current record location and presumed extant dhole range. Our record (marked with a yellow star) is from Ters-Agar Pass in southern Kyrgyzstan, 500 km from the nearest confirmed dhole sightings in Taxkorgan Nature Reserve and 1000 km from the IUCN extant range (purple).

Dhole spatial distribution is limited by sufficient prey availability, and possibly levels of human disturbance, water availability, the presence of other carnivores, and breeding site suitability (Steinmetz et al. 2013, Kamler et al. 2015). The Chon-Alai district has a total population of 23,598 people (Konovalov 2009). The high elevation mountain ranges south of settlements in the Alai Valley, including the Bek-Tosot Conservancy, likely have reduced human disturbance, although seasonal livestock grazing remains common. The conservancy and surrounding areas also support other carnivores. Our non-invasive surveys also detected snow leopards, Eurasian lynx

(*Lynx lynx*), brown bears (*Ursus arctos arctos*), and red foxes (*Vulpes vulpes*) (Cancellare et al., unpublished data on genetically identified scat samples), suggesting sufficient prey abundance exists to support a diverse carnivore community, including the exclusively carnivorous dhole.

This new occurrence is adjacent Tajik National Park, Tajikistan. Established in 1992, this national park and nature reserve in eastern Tajikistan comprises a total area of 2.6 million hectares of the Pamir mountains, and supports snow leopards, brown bears, wolves (*Canis lupus*), as well as potential dhole prey species ibex (*Capra sibirica*), argali (*Ovis ammon*), and marmots (*Marmota sp.*) (Schaller 1987). Given the extreme remoteness of this region, and the lack of human habitation in the northern portion of the park between the Academy of Sciences and Pamir-Alai Ranges, it is possible that dholes have persisted in a relic population or become re-established without detection. This may be the most northern published detection to date. Alternatively, although there is no available evidence in the literature for long-distance dispersal movements by dholes (Srivathsa et al. 2019), we cannot dismiss dispersal as an explanation for the documented occurrence. Multiple lines of evidence gathered in the last ten years (interviews, camera trapping, and non-invasive genetics) suggest dholes are not typically present in the populated regions of the Gorno-Badakhshan Autonomous Province (GBAO), which comprises 226,900 km² of the eastern Pamir mountains in Tajikistan (Kachel et al. 2016, Karimov et al. 2018, Kachel 2021). Dholes have been credibly confirmed 500 km from our sample in the remote Taxkorgan Nature Reserve in the Karakorum/Pamir Mountain region of Xinjiang Autonomous Region, China (bordering Afghanistan, Pakistan, and the GBAO border in Tajikistan; Riordan et al. 2015, Wang et al. 2019). Little empirical data exists on dhole population extirpations and extinctions outside of anecdotal correlations between dhole extirpation and rubber plantation expansion (Huang et al. 2020). Land requirements for sustainable dhole populations may be larger than for other Asian mammals due to their complex social structure and dietary requirements (Kamler et al. 2012), suggesting habitat fragmentation and human activity may have contributed significantly to their decades-long disappearances from the aforementioned countries. To our knowledge, there are no ongoing studies of dhole status and distribution in this area. We recommend that future carnivore monitoring efforts in this region include surveys for dholes to confirm the possible presence of a dhole population(s). Taken together, the Pamirs may be an important landscape for dhole recovery, particularly if previous threats are mitigated. This finding highlights the usefulness of non-invasive genetic sampling for conservation research, and the importance of community-based and transboundary conservation efforts for wide-ranging species such as the dhole.

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Biographical sketch

Imogene Cancellare is a wildlife ecology PhD candidate at the University of Delaware, Delaware, USA, and a partner of the Conservation Genetics Program at the US-based NGO Panthera. She researches snow leopard genetic connectivity.

Shannon Kachel is a conservation scientist for the Snow Leopard Program at Panthera. He researches ecological dynamics among large carnivores and their prey in Central Asia.

Zairbek Kubanychbekov is the Director of the Kyrgyz NGO Ibirs Foundation. He has been active in supporting the establishment of the very first community-based conservancies in Kyrgyzstan as well as working with the Kyrgyz Customs Service to train wildlife detection dogs.

Rahim Kulenbekov is a wildlife biologist with Ibirs Foundation. He is the field lead for snow leopard and prey surveys under the UNEP Vanishing Treasures project in Kyrgyzstan.

Kristine Pilgrim is the laboratory supervisor for the National Genomics Center for Fish and Wildlife Conservation in Missoula, Montana, USA. Her research focuses on exploring genetic tools and technologies and their applicability to wildlife research and conservation.

Kyle McCarthy is an associate professor of wildlife ecology at the University of Delaware, Delaware, USA. He applies quantitative ecology in the pursuit of conservation of rare and elusive species.

Byron Weckworth is the Director of Panthera's Snow Leopard and Conservation Genetics programs. His research addresses ecological and evolutionary questions pertinent to conservation action.