

Current situation of the golden jackal *Canis aureus* in the transboundary Prespa Park

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Abstract

We collated recent records of golden jackal in the transboundary Prespa Park and adjacent regions and combined them with a meticulous search in scientific publications to assess the current status of the golden jackal in the area. A group of a few golden jackals apparently established itself in the period 2000-2011 around the village of Stenje and then vanished. In the period 2014-2020 three more cases of golden jackal presence within Prespa were recorded. These records are of particular interest, because of the high altitude of the area, since golden jackals occur mainly in lowlands. Additional records indicate that golden jackals are currently increasingly met in the previously un-occupied central mountain part of the southwest Balkan Peninsula, but it is not yet clear where they are coming from. The Prespa Park holds permanent populations of grey wolves and thus, it remains to be seen whether the golden jackal will manage to establish permanent presence in this highland area and in the presence of grey wolves.

Key words: golden jackal, transboundary Prespa Park, trap cameras, high altitude area, grey wolf, expansion.

Introduction

The golden jackal *Canis aureus* is one of the most widespread canids, with a range covering areas of central, eastern and southern Europe, northern Africa and parts of Asia. The distribution of the golden jackal in Europe has shown dramatic declines and recoveries and a clear expansion from the early 1980s onwards (ARNOLD et al. 2012, KROFEL et al. 2018). It is mostly distributed from sea level to 1,000m and avoids mountains. In Europe, the species prefers wetlands and cultivated areas in lower elevations and heterogeneous habitats with adequate cover for hiding and breeding (ŠÁLEK et al. 2014).

The estimated population size for Europe is between 97,000 and 117,000 individuals, of which approximately 84,000 are within the EU 28 (RANC et al. 2018). These are distributed in five subpopulations, one of which, the largest, is the Pannonian-Balkan subpopulation estimated to be between 95,000 and 114,000 individuals and increasing rapidly (RANC et al. 2018).

In this study we report on various golden jackal records in and around the transboundary Prespa area, some of them at unusually high altitudes and very far away from the closest known populations and we discuss on its expansion pattern in the southwest Balkans.

Material and methods

Study area

Prespa is a mountain basin shared by three countries – Albania, Greece and North Macedonia – and enclosing two upland lakes, Great and Lesser Prespa (Figure 1). The area is known for its globally significant biodiversity, especially waterbirds, but it is also important for large mammals. It holds a substantial brown bear *Ursus arctos* population (KARAMANLIDIS et al. 2015), as well as roe deer *Capreolus capreolus*, wild boar *Sus scrofa* and grey wolf *Canis lupus* populations. The mammalian fauna of Prespa basin consists of over 60 species, and is fairly well known (CATSADORAKIS & KOLLAROS 1985, MERTZANIS et al. 2000, KRYŠTUFEK 2008, PAPADATOU et al. 2011), but the golden jackal had never been a part of it before the 21st century. The international ecological significance of the area led to the establishment of Prespa Park in 2000, the first transboundary protected area in the Balkans, which includes the whole Prespa basin. The Prespa basin extends from an altitude of ca 845 m at lake level to over 2,600 m at the highest mountain peak and is characterised by semi-dry summers and harsh winters. The two lakes and marshy areas around them dominate the landscape. Beyond the reedbeds there are areas of dry land, periodically flooded wet meadows and intensively cultivated farmland, mainly on the eastern side of Lesser Prespa Lake and the northern part of Great Prespa Lake. Coppiced mixed deciduous forests and oak woodland cover the lower mountain slopes in the eastern part of the area, whereas beech forests dominate above an altitude of 1,300-1,400 m. Shrubland with junipers *Juniperus* spp. and oak woodland occupy the western side of Lake Lesser Prespa (CATSADORAKIS 1997, VRACHNAKIS et al. 2011).



Figure 1: Map of the Prespa lakes and part of the basin, with indicated locations of of the hearing record (A) and the trap cameras (B, C), and contours of 1,000, 1,500 and 2,000 m altitude and Stenje village in North Macedonia (square).

Methods

Through a meticulous search in scientific publications and in electronic data bases we collected all published information on the occurrence of the golden jackals in the Prespa basin and adjacent areas, but also tried to compile all pieces of evidence contained in unpublished documents and “grey” literature sources. In 2010 one of us (MP) interviewed five inhabitants of Stenje, North Macedonia, regarding the occurrence of golden jackals in their area and their degree of knowledge about identification features, behaviour and ecology. Furthermore, between 2014 and 2020 several camera trap projects were carried out in the Prespa basin targeting mainly to investigate the occurrence of brown bear *Ursus arctos* and the Balkan lynx *Lynx lynx balcanicus*. In spring 2016, a joint pilot project was launched in co-operation between the environmental NGOs Society for the Protection of Prespa - SPP (Greece), Callisto (Greece), Macedonian Ecological Society - MES (North Macedonia) and Protection and Preservation of

Natural Environment in Albania - PPNEA (Albania), the Prespa National Park in Greece and local volunteers. The aim of the project was to test the effectiveness and efficiency of trap cameras in collecting particular data on the distribution of large carnivores – particularly the Balkan lynx – in the Prespa basin.

Results

In 2010 all interviewees at Stenje (Figure 1) claimed that golden jackals had arrived in their area ca. 8-10 years earlier (i.e. around 2000-2002) and that they possibly relied on offal and corpses of chickens thrown out of a newly established chicken farm. They were also seen feeding, among others, on fallen apples from the extensive apple orchards met in the area. They also described that in the early days jackals had been more numerous but then declined due mainly to persecution. Locals stated clearly that they had been repeatedly watching, hearing, capturing with snares and shooting golden jackals. They were definitely able to distinguish between golden jackal and grey wolf howls. In 2005 a wildfire burnt a 17.6 ha marsh with dense aquatic vegetation just outside the village, at the SW, where golden jackals were repeatedly observed, and subsequently a few golden jackal corpses were found there. Jackals allegedly vanished from the area after the closing of the chicken farm around 2011. Interviews with Galicica National Park staff (rangers and scientific personnel), confirmed that after 2012, there have been no signs or indications for the presence of jackals in and around Stenje or elsewhere close. Although active searching for jackals was not included in their various survey and monitoring activities for mammals, there had been no capturing of jackals at camera traps nor any other sign of jackal presence as well as no testimonies from local inhabitants.

On 23/05/2013 at around 8:00-8:30 pm, one of us (OA) permanently living and working in the area, was walking with another conservation biologist colleague on a forest road crossing the riparian forest on the southern shore of Great Prespa Lake (lat 40.844868°, lon 21.11943°, Figure 1-location A) in Greece, at ca 844 m asl, when they heard howling for 2-3 minutes. The howls were attributed to at least four golden jackals, which subsequently moved NNE. It had not been possible to find tracks or other signs.

On 21 March 2014 one golden jackal was camera-trapped at the periphery of Pelister National Park, North Macedonia (lat 40.967892°, lon 21.159575°), at an altitude of 1,490 m a.s.l. (Figure 1 - location B). The camera was placed on a hiking trail in an old-growth beech forest. Red fox *Vulpes vulpes*, wild cat *Felis sylvestris*, beech marten *Martes foina*, European hare *Lepus europaeus* and roe deer were also camera-trapped on the same location.

On 3 November 2016 a golden jackal was recorded on a trap camera which was placed overlooking a forest road on the sides of Mt Sfika, Prespa National Park, Greece (lat 40.728480°, lon 21.116530°) at an altitude of 1,233 m a.s.l. (Figure 1 - location C, Figure 2). The area is predominately covered with mixed thermophilous broadleaf woodland with hop- and oriental hornbeams and oak, while there are also some patches of beech woodland and dry grasslands (VRACHNAKIS et al. 2011). On the same camera there were also records of grey wolf, brown bear, wild boar, roe deer, wildcat and European hare.



Figure 2: The golden jackal captured on 03/11/2016 in the Greek Prespa National Park at an altitude of 1,233 m moving E on a forest road.

Discussion

In North Macedonia, golden jackal presence had been confirmed in 2006, 2007, 2009 and 2010 through a questionnaire to 740 people, and in 2014–2015 using Cuddeback, Ambush trap cameras (IVANOV et al. 2016). The confirmation of occurrence came mainly from the western part of the country down to the south, the southernmost area being the vicinity of Stenje village, on the shore of Great Prespa Lake. This area is 30 km straight distance from the location C in the Greek part of Prespa and also 30 km distance (round the lake) from the location B where the golden jackal was photographed in the North Macedonian part (Figure 1). According to the most recent review of its geographical distribution in Greece (MIGLI et al. 2014), until very recently, the closest permanent presence of golden jackals in Greece was found at Lake Kerkini National Park, which lies 175 km straight distance from Prespa to the ENE, at an altitude of less than 50 m. Furthermore, since 2010 there have been rare records of golden jackals in the (marine) coastal area (below 100 m altitude) in the Kalamas and Aherontas National Park, exactly on the borderline between Greece and Albania (MIGLI et al. 2014, KOMINOS et al. 2018). However, in 2020 there were six records of golden jackals from camera traps placed at underground passages of the Egnatia highway (at and around lat 40.30463° , lon 21.43510°) in the part that connects north-western Greece with Albania, in an altitude of 650 m a.s.l., ca 50 km straight distance from Prespa to the SSE (Mertzanis G., unpublished data).

From all the above mentioned information it seems that golden jackals had colonised the Stenje area probably coming from the north and an unknown number of them, probably less than 20 animals had established a permanent

presence in the area of Stenje for a short period between 2002-2011. After the disappearance of that population there had been three additional records in other spots in the Prespa basin indicating that there are still individuals moving through the area. These records are interesting mainly for two reasons. Firstly, the animals were photographed at altitudes of 1,490 and 1,233 m a.s.l., whereas the golden jackal, for example in Greece, is rarely observed above 600 m a.s.l. (GIANNATOS et al. 2005). Nevertheless, in a similar manner, SOYUMERT & ERTÜRK (2018) have argued that in Western Anatolia, Turkey, although the golden jackals were distributed lower than 800 m altitude, they had started colonising highlands above 900 m that were already occupied by the grey wolf, and establishing permanent populations at above the expected elevation limits. Additional to our records in Prespa basin, in Mavrovo National Park, North Macedonia, golden jackals were camera-trapped twice in an altitude of 1,150 and 900 m a.s.l. in 2015 and 2018 respectively (A. Stojanov & D. Melovski, unpublished data). Furthermore, one more golden jackal was camera-trapped in Albania in an altitude of 1,509 m a.s.l. in Guri i Zi, ca 65 km W of Prespa (A. Trajçe, unpublished data).

All these records of jackal occurrence at high altitude areas in Albania, Greece and North Macedonia strongly indicate that golden jackals are currently actively expanding also in the Balkans and they are doing so by moving not only within lowlands but through extensive mountain areas of high elevations.

The second point of interest is the origin of these animals. Since the closest permanent populations in Greece are very far away, it is probable that the animals that colonised and were recorded in Prespa originate from the population to the north of Lake Great Prespa in North Macedonia (e.g. Serbia) as indicated by the research of IVANOV et al. (2016). It is much less likely, that these animals have come from the nearest populations of Bulgaria and Greece, which, however, are over 100 km away. However, the very recent records of jackals in semi-mountain areas SSE of Prespa show that jackals have appeared in areas so far void of the species and so the origin of Prespa animals even from the south cannot be overruled despite the long distances and unfavourable habitats.

Last, it is well known that the absence of larger predators like the grey wolf seems to favour the establishment of the species (KRYŠTUFEK and TVRTKOVIČ 1990, GIANNATOS 2004, KROFEL et al. 2018), but in the Prespa basin the grey wolf maintains a well-established presence and occurs frequently along the whole altitudinal spectrum around the lakes. It is underlined that in the same locations where jackals were recorded, wolves have been recorded many times. Thus, it would be interesting to carry out systematic surveys to see if they will finally manage to establish a viable population in this highland area and in the presence of grey wolves and check genetically the origin of the founders.

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