

## Distribution update

### The golden jackal in Slovakia

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#### Abstract

Within a framework of its invasion to European countries that took place in two distinctive waves in the 1960s and 1980s, golden jackal *Canis aureus* also recolonised the southern parts of Slovakia. The first official record of its recent presence comes from 1989. In 2001, the Slovak legislative process categorised golden jackal into the game with year-round protection. Its controlled hunting was legally allowed in 2009. In this study, we present current findings on the golden jackal's current distribution in Slovakia. As a main data source, we used the Hunters' Statistical Yearbook of the Slovak Republic by the National Forest Centre. The golden jackal continues to spread northwards, and repeated reports on its presence suggest that the range of the species has expanded into Slovakia.

#### Introduction

The golden jackal *Canis aureus* is one of the most widespread canids in the world, and its range expansion has been widely recorded in recent decades (Arnold et al. 2012). This expansion has continued deep into the territory of Slovakia, however, it is likely that the species was present here historically. The range of golden jackal, described at the beginning of 20<sup>th</sup> century, included the area of Neusiedler See on the border of Austria and Hungary which is not far from Slovakia. At the same time, jackal was considered a small subspecies of wolf with scientific name *Canis lupus minor* (Koubek et al. 2008). There were also written records on "small red wolves" or "reed wolves" (e.g. from 1935) that were eradicated (Hell and Bleho 1995, Červený et al. 2004). However, golden jackal was added to the Mammal Checklist of Slovakia as late as 1947 (Sládek and Mošanský 1985), following the discovery of four raw furs (collected in Bratislava) most likely originating from Žitný ostrov (southeastern Slovakia) (Ferianc 1955). These furs, however, were not archived. The first official evidence of the recent species' presence dates back to 1989 and it is based on the specimen hunted down in the southeast of Slovakia (Mošanský 1995). From 1995 to 2001, a further five animals were hunted down, confirming the expansion of the species into Slovak territory together with several sightings (Danko 2012). In 2001, the Slovak legislative process categorised golden jackal (Anon. 2001a) with year-round protection (Anon. 2001b), which was in force until 2009. Since 2009, golden jackal can be legally hunted during the hunting season from 1

August to the end of February (Anon. 2009a). In the first season, three specimens were hunted down. Hunting statistics, particularly the spring stocks, show a yearly increase in golden jackal population. Between 2012 and 2015 the increase was fivefold (Anon. 2016). Golden jackal probably migrates to the territory of Slovakia from Hungary, where its return has been recorded since 1990 (Szabó et al. 2009). Koubek et al. (2008) consider the growth of Balkan populations to be behind this spread. According to the Slovak Red List of Mammals of Slovakia (Baláž et al. 2001), it belongs to the IUCN category Data Deficient (DD).

#### Methods

As a main data source for the presence and abundance of golden jackal, the Hunters' Statistical Yearbook of the Slovak Republic (HSY SR) by the National Forest Centre was used. Its data on abundance of particular game species are based on the game managers' expert estimates reported by hunting grounds. Besides spring stocks (SS) of game species, HSY SR contains also the numbers of hunted down and perished animals (carcasses, reported by a game manager during a season). Data on golden jackal hunting have been reported in HSY SR since 1997, and on spring stock since 2009. The reports on the hunted-down individuals are verified, as the hunter is obliged to present the trophy on the yearly trophy exhibition (Anon. 2009b). Nowadays, HSY SR represents the only official source of data on golden jackal distribution in Slovakia. As an additional source of data on the

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presence (sightings, carcasses) and population estimates of golden jackal, we used news and photographs in the regional press and websites, as well as unpublished information from interviews with hunters, foresters, conservationists and nature photographers. Based on these data, graphic outputs were elaborated.

## Results

### Occurrence of golden jackal in Slovakia

In HSY SR, spring stocks of golden jackal have been reported since 2009; however, a significant increase was recorded in the last three years (2013-2015) (Figure 1). While in 2012 the presence of only 15 specimens in seven districts was reported, by 2015 it was as many as 94 specimens in 21 districts. More than half (56%) originated from hunting grounds in Košice region (south-eastern Slovakia) and 20% from Prešov region (north-eastern Slovakia). An additional 10% of reports (nine specimens) in 2015 were from Nitra region (south-western Slovakia). As for golden jackal expansion, the list of key districts includes Trebišov, Vranov and Topľou, and Košice-okolie in the southeast, and Dunajská Streda and Veľký Krtíš in the southern part of middle Slovakia, from which golden jackal was repeatedly reported for four years or more. It is thought that after penetration through the Zvolenská basin (Danko 2012), golden jackal naturalised in Liptovský Mikuláš district in the north of middle Slovakia. Up to now, the northernmost authenticated sighting of golden jackal was reported in 2014 from Čadca district (Žilina region, middle Slovakia), which is near to the borders of the Czech Republic and Poland. A shot and sightings were also reported in 2015 from Bardejov district near the borders of Poland (Prešov region, north-eastern Slovakia), as well as a shot in 2015 above Dolná Maríková near the borders of the Czech Republic (Trenčín region, north-eastern Slovakia) (Websites 1, 5).

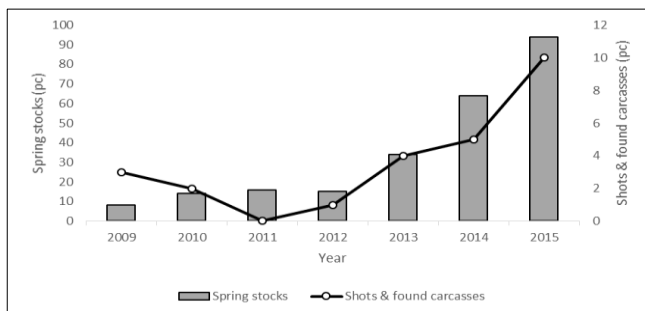


Figure 1. Spring stocks and shots, and carcasses of golden jackal in Slovakia in 2009 – 2015.

### Golden jackal hunting in Slovakia

Based on HSY SR, there were 27 specimens of golden jackal officially hunted down in Slovakia between 1997 and 2015 (Figure 2). Until 2010, it was as few as nine specimens, while since 2011 it was 18 specimens, the majority of which were hunted down in 2015 (ten specimens). More than a half of this number (16 specimens) was hunted down in eastern Slovakia (Košice and Prešov regions), 12 of which after 2011. In 2014, one carcass was found in eastern Slovakia. In western Slovakia (Bratislava, Trnava, Trenčín and Nitra regions), there were six specimens hunted down, while all the shots were reported after 2010. The data from middle Slovakia show a contrasting trend, as all the shots (five cases) were reported before 2010. The photograph of the jackal shot in Veľký Krtíš district in 2009 can be seen in Figure 3. A golden jackal carcass was found in Brezno district (middle Slovakia) (Figure 4). The history of the hunting golden jackal was documented in detail by Danko (2012). From 1989 to 2001, he documented seven shots; however, two of them have never been authenticated. Officially, in Slovakia the first golden jackal

was hunted down in 1989 in the southeast of Slovakia, recorded by Mošanský (1995).

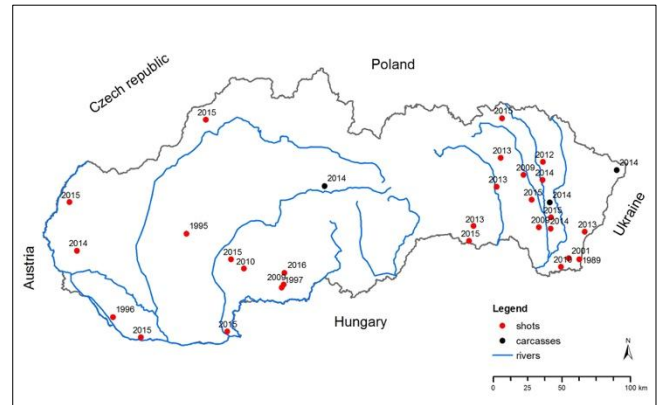


Figure 2. Sites where shots and carcasses of golden jackals were documented in Slovakia.



Figure 3. Golden jackal hunted in 2009 in Veľký Krtíš (VK) district (photo – authors' archive).



Figure 4. Golden jackal killed in a traffic accident in Brezno (BR) district (photo by Janto 2014).

## Discussion

The expansion of the golden jackal which we have observed in recent decades (Arnold et al. 2012) took place in two distinctive waves (Trouwborst et al. 2015). The first one was recorded in the 1960s and the second one in the 1980s. Since then, northwestward migration continues and golden jackal individuals are spotted more and more frequently and further away from their original range, and are starting to colonise these new areas (Pyšková et al. 2016). In 1987, two years before the first official record from Slovakia, the first golden jackal was hunted down in Austria (Koubek et al. 2008) and species reproduction was confirmed in 2007 (Arnold et al. 2012). In the Czech Republic, west of Slovakia, the first unverified sighting of the jackal dates back to 1998. It took eight years while the first officially approved species' occurrence in the Czech Republic was recorded, based on the finding of a dead 11.5kg male (Koubek et al. 2008). In the same period, more than 160 specimens were hunted down in Hungary (Szabó et al. 2009) and more than 1,800 in 2013 (Rajský et al. 2014). The second occurrence documented in the Czech Republic dates back to 2010 (Forejtek et al. 2011). In Ukraine, the presence of golden jackal was first reported in 1998 and now the species is spread over 50% of the Ukrainian territory (Zagorodniuk 2014). While Danko (2012) assumes the northern limit of the jackal's natural range passing through southern Slovakia, in 2015, a dead young male was found as northerly as western Poland (Kowalczyk et al. 2015) and it is thought that some stray individuals have already been observed in Estonia (Trouwborst et al. 2015). Slovak data presented in the article confirm the golden jackal's expansion as well as its population increase. The majority of the sightings were in the lowlands and lower hills, where wet habitats surrounded by anthropogenic agriculture land are usually common (Danko 2012). This is the most likely reason that the species is most abundant in southeastern Slovakia (Websites 2, 3, 4, 6, 7). In 2016, the hunting-down of a sub-adult individual was recorded in the south of middle Slovakia (Hudec, pers. comm.), and can be considered the first reference to a possible breeding of the species in our territory. As a result of the golden jackal population increase, the changes in game populations can be expected (based on experience from Hungary, Šuba interview, Koubek et al. 2008, Rajský et al. 2014), as well as increased rabies risk. Therefore, it is necessary to closely monitor the expansion of the golden jackal.

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## Biographical sketches

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