

Unconfirmed presence of the territorial golden jackal *Canis aureus* and grey wolf *Canis lupus* groups in the Poljanska Sora river valley and Škofjeloško hribovje hills in July 2020

Nepotrjeno pojavljanje teritorialnih skupin zlatega šakala *Canis aureus* in volka *Canis lupus* v Poljanski dolini in Škofjeloškem hribovju julija 2020

Rudi KRAŠEVEC¹, Aleksander TRAJBARIČ¹, Špela HOČEVAR¹, Monika MOŽINA¹, Urša FLEŽAR^{1, 2}
¹Društvo Dinaricum, večna pot 111, SI-1000 Ljubljana; E-mail: rudi.krasevec1@gmail.com
²Univerza v Ljubljani, Biotehniška fakulteta, Oddelek za gozdarstvo in obnovljive gozdne vire, Večna pot 83, SI-1000 Ljubljana

The grey wolf (*Canis lupus*) is one of the world's most widely distributed mammals and the most studied large carnivores (Ripple et al. 2014). In Slovenia, wolves were nearly extirpated in the 20th century, but have made a strong recovery in the last 10 years (Potočnik et al. 2010, Bartol et al. 2020). In 2019, newly established territorial packs of wolves were recorded in the pre-Alpine and Alpine regions of Slovenia for the first time after more than 100 years of absence (Jonozovič 2003, Bartol et al. 2020), though wolves have been present regularly and reproducing in the adjacent Dinaric plateau Trnovski Gozd since 1995 (Turk 2006).

On the other hand, the Golden jackal (*Canis aureus*) (hereinafter referred to as the jackal) started increasing its distribution and abundance during the late 20th and early 21st centuries and is considered widespread in Slovenia (Throuwburst et al. 2015, Potočnik et al. 2019). Hard data on territorial jackals in the pre-Alpine and Alpine regions of Slovenia are scarce, although jackals are present in some alpine valleys (Mihelič & Krofel 2012, Potočnik et al. 2019). The current distribution of the two canid species in Slovenia is largely segregated, with wolves mainly (but not exclusively) occurring in forested and hilly landscapes further from human settlements, while jackals are most widespread in fragmented

agricultural-forested lowlands near human settlements (Krofel et al. 2017, Potočnik et al. 2019).

Due to the lack of finances needed for further systematic surveillance of the two canids in the 2020's (Potočnik et al. 2010, Bartol et al. 2020), our goal was to check the status of the two species in the pre-Alpine area, specifically in the Poljanska Sora river valley and Škofjeloško – Cerkljansko hribovje hills.

Standardized acoustic surveys were used for detecting both territorial groups of jackal and grey wolf, considering the differences in the spatial scale at which each survey needed to be performed for target species (Fig. 1). For the jackal survey, we followed slightly modified protocol described in Potočnik et al. (2019) using recordings of jackal vocalization. The survey was performed at night on 18 and 20 July 2020, surveying nine locations (4 and 5 locations per night on the first and second nights, respectively) along the Poljanska Sora river. The survey points were placed between 1 and 4 km apart, each covering approximately 3–4 km² in forested, agricultural, or semi-urban habitats (Fig. 1). The survey points were denser than suggested in Potočnik et al. 2019 due to the very diverse terrain in the narrow Alpine valley. The micro location for acoustic survey was determined on-site with regard to human settlements, pastures, vegetation, road activities and overall topology of the terrain. We used playback of territorial group call, and calling pattern with intermediate listening times as in other jackal acoustic survey studies (Giannatos et al. 2005, Krofel 2008). For the grey wolf survey, we performed howling surveys in 6 squares of a standard 3×3 km grid (Hartington & Mech 1982, Potočnik et al. 2010) (Fig. 1), covering 3 locations per night (23 and 24 July 2020). Owing to the limited time and manpower, we could not cover all points in the area but chose the most suitable points instead, based on the national wolf monitoring data (Bartol et al. 2020), where we predicted the species' most probable presence. Also, we did not repeat the survey for three consecutive nights due bad weather conditions. Sudden weather changes also terminated howling session at survey point No. 6 (Fig. 1).

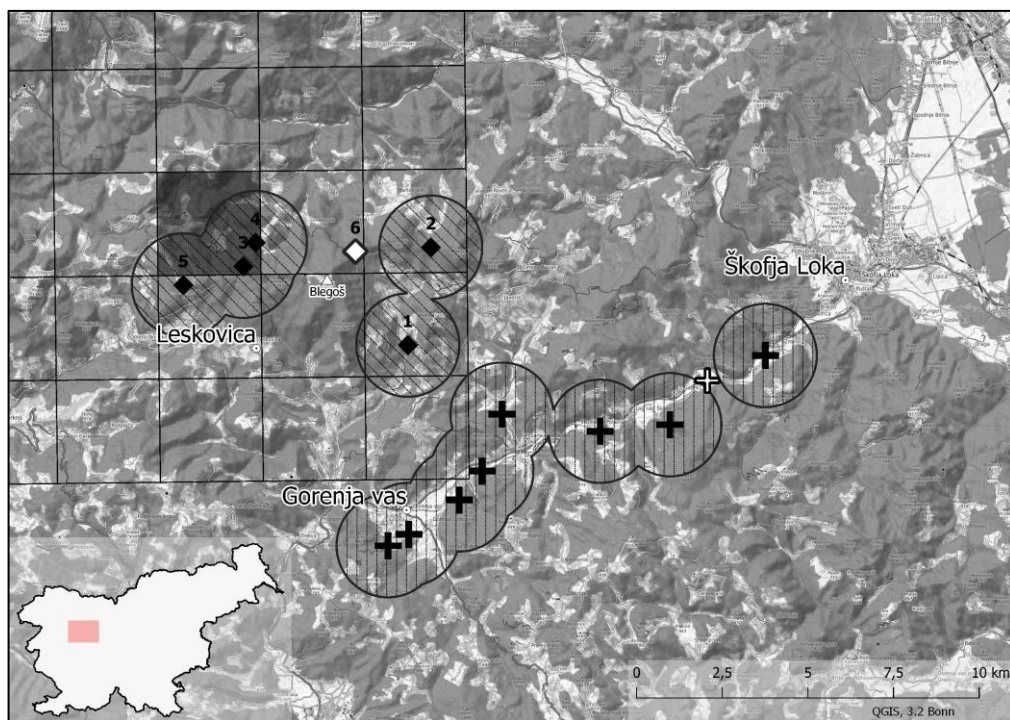


Figure 1: A map showing locations where we performed howling survey of the Eurasian golden jackal (*Canis aureus*) (plus signs) and grey wolf (*Canis lupus*) (diamond signs) territorial groups, with wolf national monitoring 3×3 km grid shown. Dark grey shows forested areas in the Poljanska Sora river valley and Škofjeloško hribovje hills. The empty signs of both plus and diamonds show locations where we could not perform the survey due to too excessive human activities or rough terrain. Shaded area shows the area surveyed with acoustic methods. Coloured square shows location of wolf pack recorded with howling survey in 2019 (Bartol et al. 2020).

Slika 1: Zemljevid s prikazom lokacij in okvirno popisane območja v Poljanski dolini in Škofjeloškem hribovju, kjer smo predvajali posnetke tuljenja zlatega šakala in volka. Temno siva označuje gozdna območja. Polno obarvani plus znaki prikazujejo mesta predvajanja tuljenja šakala (*Canis aureus*), polno obarvani karo znaki pa mesta predvajanja tuljenja volka (*Canis lupus*) z mrežo kvadrantov 3×3 km, uporabljeno pri nacionalnem monitoringu volka. Nebarvane oznake prikazujejo predvidene lokacije za popis, a ta tam ni bil opravljen zaradi preveč motečih dejavnosti človeka ali nedostopnega terena. Senčena območja prikazujejo območje, pokrito z zvočnimi popisi. Obarvani kvadrant prikazuje lokacijo volčjega tropa, zaznano leta 2019 (Bartol et al. 2020).

This study confirms the results of the national scale jackal survey from 2019 (Potočnik et al. 2019), which reported only occasional sightings of jackals in the Poljanska Sora valley. Those were most probably sightings of young individuals in dispersion, which can travel several hundred kilometres far (Spasov & Acosta-pankov 2019). The closest territorial groups were detected in a field near Škofja Loka NE of our study area and in the Idrija valley SW of it. The models of habitat suitability recognized the study area of the Poljanska Sora river valley as a less appropriate

habitat for jackal occurrence (Potočnik et al. 2019). However, with current population expansion rate (Trouwborst et al. 2015), we can expect that it is only a matter of time when jackals will inhabit also less suitable areas like this valley. We could therefore assume that the number of jackal groups have not yet reached their maximum in the adjacent areas with higher habitat suitability.

On the contrary, the grey wolf population in Slovenia has only recently expanded towards the pre-Alpine and Alpine regions; the first territorial

packs were detected in 2019 (Bartol et al. 2020). The newly established pack caused some damages on livestock, and thus quickly generated conflict with the livestock herders (ARSO 2021). The presence of a large carnivore species has also induced fear among local residents. Due to the reluctance of the locals to the wolves, also shown in public opinion questionnaires (Bartol et al. 2020), or seen on social media, there were several appeals on intensifying the population control measures, and showing dissatisfaction with national management plans. Until prevention measures could be properly introduced to the area, the government allowed limited cull of several individuals at sites where most damages to livestock occurred. This resulted in death of the reproductive male, which most probably caused pack disintegration (Brainerd et al. 2008, Bartol et al. 2020). Though there are no hard facts of it, the wolves in this area could also have been subjected to poaching. Whatever the underlying cause, our survey results suggest that a territorial pack of wolves, which has formed in the pre-Alpine region after decades of absence only a year ago, might have disappeared.

In conclusion, our findings highlight the importance of continuous monitoring which enables us to evaluate the effects of management measures, especially if they involve lethal control of a protected species. Immediate feedback on the outcome of culling is especially meaningful in situations where species is re-appearing in a geopolitically important area, such as the Alps, after decades of absence. Even if the status and consequently the management regime of a species changes, such as it did in the case of the jackal (Ur. l. RS 2019), it is even more important to monitor the development of the population and evaluate whether the main management measure (culling) has the desired effect or not. Only using baseline data from uninterrupted, standardized monitoring, management decisions can be informed rather than politically driven, which is too often the case for large carnivore species (Darimont et al. 2018).

References

ARSO (2021): Odsev - evidence odškodninskih zahtevkov. <https://sirena.arso.gov.si/odsev/> [accessed on 3. 1. 2021]

- Bartol M., Boljte B., Černe R., Črtalič J., Hanc Ž., Jelenič M., Kljun F., Konec M., Kos I., Kuralt Ž., Kraševac R., Mavec M., Majič Skrbinšek A., Skrbinšek T., Potočnik H., Simčič G. (2020): Spremljanje varstvenega stanja volkov v Sloveniji v letih 2017/2020, končno poročilo. Zavod za gozdove Slovenije, Univerza v Ljubljani - Biotehniška fakulteta, Društvo Dinaricum, Ljubljana, 76 pp. http://www.natura2000.si/fileadmin/user_upload/knjiznica/raziskave/Spremljanje_varstvena_ga_stanja_volkov_v_Sloveniji_v_letih_2017-20_koncno_ver2_LR.pdf [accessed on 25. 7. 2021]
- Brainerd S.M., Andrén H., Bangs E.E., Bradley E.H., Fontaine J.A., Hall W., Iliopoulos Y., Jimenez M.D., Jozwiak E.A., Liberg O., Mack C.M., Meier T.J., Niemeyer C.C., Pedersen H.C., Sand H., Schultz R.N., Smith D.W., Wabakken P., Wydeven A.P. (2008): The effects of breeder loss on wolves. *Wild. Manag.* 72(1): 89-98.
- Darimont C.T., Paquet P.C., Treves A., Artelle K.A., Chapron G. (2018): Political populations of large carnivores. *Cons. Biol.* 32(3): 747-749.
- Giannatos G., Marinos Y., Maragou P., Catsadorakis G. (2005): The status of the Golden Jackal (*Canis aureus* L.) in Greece. *Belg. J. of Zool.* 135(2): 145-149.
- Hartington F.H., Mech L. D. (1982): An analysis of howling response parameters useful for wolf pack censusing. *J. of Wild. Manag.* 46: 686-693.
- Jonozovič M. (2003): Volk (*Canis lupus* L.) Strokovno izhodišče za vzpostavljanje omrežja NATURA 2000, Agencija RS za okolje, Ljubljana, 50 pp. http://www.natura2000.si/fileadmin/user_upload/Dokumenti/Strokovne_podlage/volk.pdf [accessed 25. 7. 2021]
- Kraševac R., Hočevac Š., Trajbarič A., Možina M., Fležar U. (2021): Poročilo skupine za zveri, RTŠB 2020. In: Plut M. & Grgurevič S., Zbornik Društva študentov biologije, Ljubljana (in press).

- Krofel M. (2008): Survey of golden jackals (*Canis aureus* L.) in Northern Dalmatia, Croatia: preliminary results. *Nat. Cro.* 17(4): 259-264.
- Krofel M., Giannatos G., Ćirović D., Stoyanov S., Newsome T.M. (2017): Golden jackal expansion in Europe: a case of mesopredator release triggered by continent-wide wolf persecution? *Hystrix* 28(1): 9-15.
- Mihelič M., Krofel M. (2012): New records of the golden jackal (*Canis aureus* L.) in the upper Soča valley, Slovenia. *Nat. Slov.* 14(2): 51-63.
- Potočnik H., Krofel M., Skrbinšek T., Ražen N., Jelenič M., Žagar A., Kos I. (2010): Monitoring volkov z izzivanjem tuljenja 2010: Poročilo projekta SloWolf (LIFE08 NAT/SLO/000244 SloWolf). Univerza v Ljubljani - Biotehniška fakulteta, Društvo Dinaricum, Ljubljana, 5 pp. <http://www.volkovi.si/wp-content/uploads/2014/10/2010-potocnik-et-al.-howling-porocilo-slowolf.pdf> [accessed on 25. 7. 2021]
- Potočnik H., Pokorny B., Flajšman K., Kos I. (2019): Evrazijski šakal. *Lovska Zveza Slovenije, Ljubljana*, 256 pp.
- Ripple W. J., Estes J. A., Beschta R. L., Wilmers C. C., Ritchie E. G., Hebblewhite M., Berger J., Elmhagen B., Letnic M., Nelson M.P., Schmitz O.J., Smith D.W., Wallach A.D., Wirsing A.J. (2014): Status and ecological effects of the world's largest carnivores. *Science* 343(6167): 1241484.
- Spassov N., Acosta-pankov I. (2019): Dispersal history of the golden jackal (*Canis aureus moreoticus* Geoffroy, 1835) in Europe and possible causes of its recent population explosion. *Biod. Data J.* 7(e34825): 22.
- Throumburst A., Krofel M., Linnell J.D.C. (2015): Legal implications of range expansions in a terrestrial carnivore: the case of the golden jackal (*Canis aureus*) in Europe. *Biod. Cons.* 24: 2593-2610.
- Turk N. (2006): Ocena možnosti za širjenja volka v SZ Slovenijo. Diplomsko delo. Oddelek za gozdarstvo in obnovljive gozdne vire, Biotehniška fakulteta, Univerza v Ljubljani, Ljubljana, 75 pp.
- Ur. l. RS (2019): Uredba o spremembi in dopolnitvah Uredbe o zavarovanih prosto živečih živalskih vrstah. *Uradni list RS* 62(29): 7579-7580.