A shifting carnivore's community: habitat modeling suggests increased overlap between the golden jackal and the Eurasian lynx in Europe.

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**Supplementary Files**

**Supplementary Document 1.** The set of the nineteen bioclimatic variables considered as candidate predictors (from Worldclim.org), with their codes and explication. In bold, are the ones selected for the modelling process of *Lynx* *lynx* and in italics the ones selected for *Canis aureus*.

***BIO1 = Annual Mean Temperature***

***BIO2 = Mean Diurnal Range (Mean of monthly (max temp – min temp))***

BIO3 = Isothermality (BIO2/BIO7)\*100

***BIO4 = Temperature Seasonality (standard deviation\*100)***

BIO5 = Max Temperature of Warmest Month

*BIO6 = Min Temperature of Coldest Month*

BIO7 = Temperature Annual Range (BIO5-BIO6)

***BIO8 = Mean Temperature of Wettest Quarter***

***BIO9 = Mean Temperature of Driest Quarter***

BIO10 = Mean Temperature of Warmest Quarter

**BIO11 = Mean Temperature of Coldest Quarter**

BIO12 = Annual Precipitation

BIO13 = Precipitation of Wettest Month

***BIO14 = Precipitation of Driest Month***

***BIO15 = Precipitation Seasonality (Coefficient of Variation)***

BIO16 = Precipitation of Wettest Quarter

BIO17 = Precipitation of Driest Quarter

***BIO18 = Precipitation of Warmest Quarter***

***BIO19 = Precipitation of Coldest Quarter***

**Supplementary Table 1.** The sources (a) research articles, and (b) datasets and projects, used to take the occurrences for the golden jackal (*Canis aureus*).

(a)

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| **Title** | **First Author** | **Year** |
| Lo sciacallo dorato (*Canis aureus*) in Italia: sintesi delle conoscenze aggiornata al 2021 | Lapini | 2021 |
| Range expansion of the golden jackal (*Canis aureus*) into Poland: first records | Kowalczyk | 2015 |
| Golden jackal (*Canis aureus*) in the Czech Republic: the first record of a live animal and its long-term persistence in the colonized habitat | Pyšková | 2016 |
| The rise of a carnivore, the evolution of the presence of the golden jackal in Slovakia | Guimarães | 2019 |
| Az aranysakál (*Canis aureus* Linnaeus, 1758) új elıfordulásai Magyarországon | Heltai | 2004 |
| Golden jackal in Lithuania, a consideration of its arrival, impact and status | Stratford | 2015 |
| A European Concern? Genetic Structure and Expansion of Golden Jackals (*Canis aureus*) in Europe and the Caucasus | Rutkowski | 2015 |
| *Thelazia callipaeda* in wild carnivores from Romania: new host and geographical records | Mihalca | 2016 |
| Filarioid infections in wild carnivores: a multispecies survey in Romania | Ionică | 2017 |
| Data on the parasitological status of golden jackal (*Canis aureus* L., 1758) in Hungary | Takács | 2014 |
| The golden jackal (*Canis aureus*) in Bosnia and Herzegovina: density of territorial groups, population trend and distribution | Trbojević | 2018 |
| Golden jackal (*Canis aureus*) in Ukraine: modern expansion and status of species | Zagorodniuk | 2020 |
| Golden jackal (*Canis aureus* L., 1758) – a new species in the theriofauna of Belarus | Grichik | 2018 |
| Role of golden jackals (*Canis aureus*) as natural reservoirs of *Dirofilaria* spp. in Romania | Ionică | 2016 |
| Northernmost record of reproduction of the expanding golden jackal population | Kowalczyk | 2020 |
| Survey of golden jackals (*Canis aureus* L.) in Northern Dalmatia, Croatia: Preliminary results | Krofel | 2008 |
| Golden jackal (*Canis aureus*) in Bulgaria, current status, distribution, demography and diet | Stoyanov | 2012 |
| The golden jackal *Canis aureus* L. 1758 (Carnivora: Canidae) on the Tuscan Apennines | Bacci | 2022 |

(b)

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| **Datasets, projects and links** |
| GBIF (year: 1970-2022; Basis of records: human observation, machine observation, occurrence) |
| GOJAGE |
| https://wilderness-society.org/unique-video-of-golden-jackal-in-the-netherlands/ |

**Supplementary Table 2.** The sources (a) research articles, and (b) datasets and projects, used to take the occurrences for the Eurasian lynx (*Lynx lynx*).

(a)

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| **Title** | **First Author** | **Year** |
| Distribution and minimum population size of Eurasian lynx (L*ynx lynx*) in Croatia in the period 2018–2020 | Gomerčić | 2021 |
| Status and Conservation of the Eurasian Lynx | von Arx | 2004 |
| Eurasian lynx (*Lynx lynx*) in the Austrian Alps in period 2005–2009 | Fuxjager | 2012 |
| Status and distribution of Eurasian lynx (*Lynx lynx*) in Slovenia from 2005 to 2009 | Kos | 2012 |
| *Troglostrongylus* brevior in an Eurasian lynx (*Lynx lynx*) from Bosnia and Herzegovina | Alic | 2015 |
| Genetic data confirm critical status of the reintroduced Dinaric population of Eurasian lynx | Sindičić | 2013 |
| New insights into the distribution of cardio-pulmonary nematodes in road-killed wild felids from Romania | Deak | 2022 |
| Environmental correlates of Eurasian lynx occurrence in Poland–Large scale census and GIS mapping | Niedziałkowska | 2006 |
| Long‑distance Eurasian lynx dispersal – a prospect for connecting native and reintroduced populations in Central Europe | Gajdárová | 2021 |
| Distribution and Conservation Status of the Balkan Lynx (*Lynx lynx balcanicus* Bures, 1941) | Melovski | 2013 |
| Incorporating natural and human factors in habitat modelling and spatial prioritisation for the *Lynx lynx martinoi* | Laze | 2016 |
| Evidences for the Lynx recovery in Bulgaria: the Lynx discovered in Western Rhodopes. | Spassov | 2015 |
| First Hard Evidence of Lynx (*Lynx lynx L.*) Presence in Bulgaria | Zlatanova | 2009 |
| Action Plan for Eurasian lynx *Lynx lynx* Conservation and Management (Figura 19) | Ozoliņš | 2017 |
| Citizen Scientists Showed a Four-Fold Increase of Lynx Numbers in Lithuania | Balˇciauskas | 2020 |
| Status of Game populations in Estonia and proposal for hunting in 2021 | Veeroja | 2021 |

(b)

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| **Datasets and projects** |
| GBIF (year: 1970-2022; Basis of records: human observation, machine observation, occurrence) |
| ROVDATA |
| SKANDOBS |
| LifeLynx |