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Indice

Mercoledì 8 Giugno 2022

First telemetry data on golden jackal (*Canis aureus*) in Italy: insights on the species' spatial ecology

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Understanding the spatial ecology and habitat requirements of a colonizing species is the main step to gain information on the species' behaviour which is useful to delineate adequate management and conservation strategies. The golden jackal (*Canis aureus*) has been showing a notable expansion in Europe over the last five decades and, in Italy, the highest population densities are reported in Friuli Venezia Giulia (hereafter, FVG) Region. Here, reproductive packs exert a pivotal ecological role as a source population for the colonization of the other Italian administrative Regions. Among the many factors which have been described as important for its expansion, the ecological plasticity (i.e., the capability to take advantage of different habitats) has been considered as crucial. However, few studies of habitat selection have been conducted using bio-logging technology (e.g., GPS collars). In the last 20 years, this technology has been frequently used and improved, enabling researchers to deeply investigate the ecology and behaviour of cryptic species, including carnivores. Using the first telemetry data obtained from collared individuals in Italy, the goal of our study was to investigate the spatial ecology of the golden jackal, with special focus dedicated on home-range estimation and habitat selection. Our results should provide better understanding on the ecology of a colonizing species in the light of its expansion within a highly anthropized environment, such as the Italian lowland.

Our study was conducted mainly in FVG, the north-easternmost administrative Italian Region, covering an area of 7921 km^2 with 1.2 million inhabitants. We fitted eight individuals (three females, five males) with radio- (VHF) (n=1) or satellite (GPS) collars (n=7) in 2019–2021. Two individuals were defined as dispersers, since they moved from their pre-reproductive territories (>20 km far away) toward new areas. Four jackals were live captured with Belisle snares or box traps, and the latest four were recovered and released after vehicle collisions. We acquired a minimum of two locations per day from the VHF monitoring, meanwhile the GPS fix schedule was set to acquire 3–4 locations per day. We performed the 50% and 95% home-range estimation through a minimum convex polygon (MCP) for the VHF collared jackal; and 50% and 95% utilization distributions (UD) home-range using a kernel density estimator with plug-in bandwidth selection for the GPS collared jackals. We used the Corine Land Cover 2018 reclassified into 11 land cover categories, to investigate the degree of habitat selection through selection ratios at the third-order of selection (Design III) within 50% and 95% UD on the seven GPS collared jackals. All computations were performed through the Software R (v. 3.5) and using `ks` and `adehabitatHS` packages.

The monitoring periods for each individual were highly variable, from a minimum of 36 days to a maximum of 342 days. Overall, we obtained 3827 locations, of which 67 were VHF locations. 50% and 95% MCP home-ranges for the VHF collared individual were 0.18 km^2 and 1.01 km^2, respectively. A high variability was shown in both the 50% and 95% kernel UDs, with a mean home-range of 3.24 km^2 (min=0.15 km^2, max=14.84 km^2) for 50% and 31.22 km^2 (min=2.22 km^2, max=135.92 km^2) for 95% UD. The pattern of global habitat selection by golden jackals significantly deviated from random both within 50% UD (χ^2=143.96, df=22, p<0.001) and 95% UD (χ^2=649.77, df=22, p<0.001). Within 50% UD, jackals selected coniferous forests and avoided areas without vegetation. Within 95% UD, jackals selected cultivations with natural elements, while they avoided mixed forests. However, contrary to the 95% UD, at 50% UD habitat selection at individual level was not statistically significant for all individuals.

Home-range estimation through the 50% and 95% UDs with kernel methods showed high variability most likely due to the different monitoring periods and individual variations (resident vs dispersal). However, 50% and 95% home-ranges were in line with other published studies with the exception of a young female who showed an extremely large home-range (135.92 km^2) due to dispersal patterns. Interestingly, the VHF collared individual displayed its 50% and 95% MCP home-ranges within those of its putative father (GPS collared). The habitat selection analyses provided interesting results: 50% UDs were inspected through field surveys and were mainly related to resting sites; as expected jackals selected for natural vegetated areas and avoided areas without vegetation, as they cannot provide shelter. At 95% UDs, habitat selection highlighted how jackals can exploit human resources since they selected for agricultural areas (all agricultural areas covered 35.10% of the overall land cover types, whereas vegetated natural areas covered 54.79%). Indeed, as reported by different studies in Europe, agricultural areas can provide abundant food resources. At the individual level, those jackals who showed non-random selection had different patterns due to the different ecological conditions. It is noteworthy that one individual showed selection at both 50% and 95% UDs for anthropic land cover types (i.e., urban areas, crops and complex cultivations), as it was feeding very close to human settlements and roads. At the same time, all the other individuals avoided urban areas at the 95% UD individual level. In conclusion, we point out the ecological plasticity of golden jackal which enables the species to exploit different habitats, even near human settlements, which might be one of the main factors which has been promoting the expansion in Europe in the last decades. Moreover, GPS collars provide high quality data collected over time useful to deeply investigate different topics (e.g., habitat suitability), compared to other limited techniques (i.e., camera-trapping and jackal-howling).