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XI Congresso Italiano di Teriologia

Firenze, 20–22 Giugno 2018

edited by
G. Guidarelli, G. Sozio, D.G. Preatoni

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edited by
G. Guidarelli, G. Sozio, D.G. Preatoni

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Should I eat or should I go? Patterns of use of supplemental feeding by roe deer in an alpine environment

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Introduction Winter supplemental feeding is a widespread management practice across Europe and North America, however few studies have quantitatively analyzed the utilization pattern of feeding sites. In species with intense and continuous metabolic needs such as roe deer (*Capreolus capreolus*), feeding sites represent concentrated resources that are likely exploited when the conditions are more limiting for the species. Indeed, this small ungulate has minimal physiological and morphological adaptations to cope with harsh winter conditions. Here we evaluated the daily and seasonal patterns of supplemental feeding stations use in an alpine population of roe deer, and the biotic (intra-specific competition, human disturbance) and abiotic (temperature, alternative resources availability) determinants that drive these patterns.

Methods We performed the study in a moderately-mountainous area (600–1000 m a.s.l.) of 45 km^2 in Val di Cembra (TN), Eastern Trentino. The area is characterized by an ongoing management project of intense, all-year-round supplemental feeding. We used camera traps to monitor the attendance of five feeding stations by six roe deer, marked with individual-specific ear tags to allow visual recognition. Between January and May 2017 we collected 63852 pictures. We generated a database of individual presence and behavior by coding individual pictures in the Aardwolf software. We modelled patterns of use of supplemental feeding by roe deer by means of Generalized Additive Mixed Models (GAMMs), which allowed us to take into account non-linear temporal patterns of resource use.

Results Roe deer daily use of feeding stations followed a bimodal pattern, with two peaks associated to crepuscular hours. Feeding station use was negatively affected by temperature and positively by the actual presence of food at the stations. The seasonal use of feeding stations significantly decreased towards the spring, due to a combination of availability of alternative natural resources and increase of average temperature. The seasonal pattern was more evident when the feeding stations were provided with forage, with a significant avoidance during weekends. Lastly, we found that the time spent at the feeding sites increased in presence of conspecifics, especially when these were feeding.

Discussion The opportunistic use of feeding stations by roe deer confirms the high ecological plasticity of this ungulate. Roe deer rapidly responded to spatio-temporal dynamics in resource availability, as well as to environmental changes and human disturbance. To our knowledge, this work represents one of the first empirical study assessing the use of feeding stations by roe deer in continuum. Indeed, the implementation of high-resolution camera traps for monitoring the use of punctual sites such as feeding stations overcomes the limitation of GPS telemetry, for which the temporal resolution is limited by battery constraints. Also, camera traps allow detection of other individuals, and therefore the assessment of intra and/or inter-specific relationships occurring at feeding stations. Our results can inform wildlife managers and ecologists in relation to the potential negative impacts of supplemental feeding on animal welfare and fitness, especially in terms of disease transmission and competition-mediated stress.