IX Congresso Italiano di Teriologia

Analysis of the distribution of hibernating bats in old gypsum quarry tunnels in relation with temperature variation

P. Priori[1,2], R. Margotti[3], D. Scaravelli[2,4]

[1] Dipartimento di Scienze della Terra, della Vita e dell'Ambiente, Università di Urbino, Campus Scientifico, loc. Crocicchia. 61029 Urbino, e-mail pamela.priori@uniurb.it
[2] Museo Ornitologico "F.Foschi" e STERNA, via Pedriali 12, 47121 Forlì
[3] Saint-Gobain GYPROC Italia, Milano
[4] Dipartimento Scienze Mediche Veterinarie, Università di Bologna, via Tolara di sopra 50, Ozzano Emilia (BO)

R100

The use of a GIS modelling of environments parameter for animal distribution is tested researching possible correlations between perceived temperature and location of hibernating populations of bats. Choosing a hibernating position is one of the key factors for individual survival in a species that could pass also 4 months per year in lethargy.
The backdrop where this study has been realized is the system of tunnels, largely disused, of gypsum quarry of Monte Tondo at Borgo Rivola (RA). There are around 15 km of large tunnels, resulting from past mining workings in the operating mode of "tunnels and diaphragms". This network of undergrounds work up on four altitude levels. Within these tunnels it is possible to recognize areas with different values of temperature, humidity and air flow that influence the vital functions of the community of bats. It is interesting to note that despite the quarry is still active with noises and tremors, the colonies are all year round present in the system that offers a wide variation of temperature and relative humidity conditions.
The species presents are *Miniopterus schreibersii*, that represents the largest group that and can reach the 4000 specimens during the reproduction period, *Rhinolophus hipposideros*, *R. ferrumequinum*, *R. euryale* also reproductive, *Myotis myotis* and *M. blythii* with few hundreds individuals during the breeding season.
Infrared cameras that incorporate temperature measurement (FLIR E30, Pergam Italy) were used in order not to disturb the hibernating bats. Every month, from December 2012 to the end of the hibernation, individuals or groups temperature have been measured to 0.1° C.
In nearly every case the temperature of bats proved to be the same temperature as the surrounding bedrock. Values of 7.5° to 8.5° C in bodies are the most common during the deepest hibernation.
Collecting measurements of temperature values of all individuals and evaluating the setting of roosting, will make possible in the future to represent the area of study like a semi-continuous variation of thermal values thus providing a model of the spatial-thermal distribution of individuals and groups in relationship with the microclimatic conditions of tunnels.

IX Congresso Italiano di Teriologia

The role of interspecific interactions in shaping small mammal communities in fragmented landscapes

G. Sozio[1], A. Mortelliti[2]

[1] Department of Biology and Biotechnology Charles Darwin, Sapienza University of Rome
[2] Fenner School of Environment and Society, Australian Research Council Centre for Environmental Decisions, National Environmental Research Program, The Australian National University, Canberra

R087

Habitat fragmentation is one of the main threats to biodiversity. This process directly influences individual populations by modifying, degrading and disrupting their natural habitats; it also alters interspecific relationships by modifying the competitive advantage of one species over the others. Theoretical models predict that generalist species may benefit from habitat fragmentation, increasing their competitive advantage over more specialized species, which are expected to decline. Nevertheless, very few empirical studies assess the actual role of interspecific interactions in determining the coexistence of species in fragmented landscapes. Understanding the ecological mechanisms underlying the effects of habitat fragmentation has relevant consequences for the conservation of animal species and communities as it allows to focus conservation efforts to the proper target. We studied a model system of three sympatric and potentially competing small mammal species (*Apodemus sylvaticus*, *A. flavicollis* and *Myodes glareolus*). Our aim was to understand the role of interspecific interactions, compared to habitat and landscape factors, in shaping small mammal communities in fragmented landscapes.
The study area included 29 wood patches in a fragmented landscape in central Italy; wood patches were selected following a gradient in size and habitat characteristics so as to be able to evaluate the response of each species to environmental factors. We surveyed the populations following a capture mark-recapture (CMR) protocol from April 2011 to February 2013, with trapping sessions every two months for a total of about 50000 trap-nights. Due to the strongly dynamic demographic pattern that these populations naturally experienced during the study period, we could directly measure the response of each species following a reduction or increase in the competitors. By conducting a CMR-based demographic study we measured the actual performance of individuals and populations on several biological parameters (survival rate, recruitment, reproduction rates, body mass, population density). We analyzed data with robust design CMR models (abundance estimates, survival rates and recruitment) and generalized linear models (density of individuals, body mass, reproduction rates).
We captured a total of 4645 individuals (1468 *A. sylvaticus*, 2056 *A. flavicollis* and 1121 *M. glareolus*). Our results support the hypothesis of spatial segregation of competitors, which responded to different environmental factors. More detailed analyses, however, revealed that the degree of interference between species was low, with negative effects at the individual level (e.g. body size, survival) that were not translated into population-level effects.
Our results suggest that the actual role of competition in shaping communities in fragmented landscapes may be weaker than expected, or may indicate that other mechanisms intervene in regulating the interaction between species before detrimental effects are expressed.