ROOST SELECTION BY BARBASTELLE BATS (*BARBASTELLA BARBASTELLUS*, CHIROPTERA: VESPERTILIONIDAE) IN BEECH WOODLANDS OF CENTRAL ITALY

RUSSO D.[1, 2], CISTRONE L.[3], JONES G.[2], MAZZOLENI S.[1]

[1] Dipartimento AR.BO.PA.VE., Facoltà di Agraria, Università degli Studi di Napoli Federico II, via Università, 100, I-80055 Portici, Napoli, Italy; Email: danrusso@tim.it, tel. 081 2391636

[2] School of Biological Sciences, University of Bristol, Woodland Road, Bristol BS8 1UG, UK

[3] Dipartimento di tecnologie, ingegneria e scienze dell'Ambiente e delle Foreste (D.A.F.), Università della Tuscia, via San Camillo de Lellis, I-01100, Viterbo, Italy

The barbastelle bat, *Barbastella barbastellus* (Schreber, 1774) is a medium-sized, tree-dwelling vespertilionid classified as 'Endangered' in Italy; in western Europe it may be one of the rarest bat species. *B. barbastellus* shows roosting preferences that should be regarded as a key point in conservation protocols. We examined roost selection in a breeding population of *B. barbastellus* from the Abruzzo Lazio and Molise National Park (central Italy) at three levels: woodland structure and management type; tree characteristics; and cavity characteristics.

In 2001-2002, we fitted 31 adult *B. barbastellus* (29 lactating females, one pregnant female and one male) with 0.48g radio-tags and tracked them to their roost-trees. The bats were tracked for 4.5 ± 3.7 days (range: 0-12 days). We located 33 roosts used by 25 subjects (1.8±1.2 roosts/bat, range 1-5). The bats switched roosts frequently: 13 bats used more than one tree over the study period. A chi-square analysis showed that the roosts were not distributed at random across woodland categories: unmanaged woodland was positively selected, whereas shelterwood-harvested woodland was used in proportion to its availability, and 'pastures+scattered trees' was avoided.

Twenty out of 33 roost trees were dead *Fagus sylvatica* trees; conversely, living *F. sylvatica* dominated in a tree sample obtained at random; dead trees were used more than expected (χ^2 test, P <0.001). Overall, roost trees were significantly taller and had a larger diameter at breast's height and more cavities than random trees; they also had a lower percent canopy closure than random trees. To highlight which variables were actually associated with selection, we devised a logistic regression model. The full model was significant (P <0.001); removal of tree type and tree height affected the model significantly, but the other variables did not produce detectable effects. The bats roosted under loose bark in 20 of 27 trees, i.e. more fre-

quently than expected (χ^2 test, $P < 0.05$). *B. barbastellus* preferred cavities at a greater height (median roost height = 10.1 m, $n = 22$; median random cavity height = 4.5 m, $n = 30$; Mann-Whitney test, $P < 0.01$). Most roosts faced south (63.6% south facing: 91-270 degrees; 36.4% north facing: 271-90 degrees, $n = 22$; χ^2 test, $P < 0.05$). A logistic regression model including cavity type, height above ground and direction faced was significant ($P < 0.01$) and all variables were important for selection.

B. barbastellus is probably unable to find suitable roosting sites where intensive and non-selective logging is conducted: areas of ancient woodland should be protected to ensure optimal roosting conditions. In roosting areas, felling operations should be avoided as far as possible; in logged areas, selective timber harvesting protocols preserving dead trees and a significant fraction of mature trees should be adopted.

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