

FOREST STRUCTURE AND LANDSCAPE CONNECTIVITY OF THE CANTABRIAN CAPERCAILLIE HABITAT

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Abstract

The Cantabrian capercaillie (*Tetrao urogallus cantabricus* Castroviejo, 1967) is classified as Endangered since 2005 according to the IUCN Red List categories. This subspecies population has suffered an enormous decrease mainly due to the severe habitat fragmentation and consequently the loss of connectivity of forest patches. Capercaillie habitat was studied in the east of the Cantabrian Mountains at landscape scale. We evaluated the forested area within a circle of 2,3 km of radius around 123 display-grounds. The structure and composition of surrounding landscape was quantified within a 1662 ha area around each historical lekking place using ortophotos at a resolution of 10 meters. Landscape metrics variables (landscape fragmentation, spatial heterogeneity and size of forest patches) were assessed through landscape ecology techniques and multi-variable analysis. We obtained that beech forests within small open areas are the most important forest habitat patches for the capercaillie. Then we used a methodology based on habitat availability that integrate forest attributes like habitat quality to assess the connectivity of the fragmented habitat of capercaillie at 200 meters spatial resolution. These analyzes show us the patches that concentrate the highest accumulated connectivity importance although representing a small % of habitat capercaillie. The results are oriented to detect the high priority areas for improving the management of Cantabrian capercaillie habitat.

Keywords: *Tetrao urogallus cantabricus*, fragmentation, habitat availability, forest management, species conservation.

MATERIAL AND METHODS

The capercaillie is affected critically mainly due to the high habitat fragmentation (Suchant *et al.* 2003, García *et al.* 2005) and the loss of its habitat connectivity (Klaus 1994, Storch 2000, Graf & Kramer-Schadt 2007). This study makes an approach to describe the connectivity of the highly fragmented habitat of Capercaillie in the south-eastern area the Cantabrian Mountain (Leon province) at landscape scale (Fig. 1)



Fig. 1 - Distribution of the Cantabrian capercaillie in León and Palencia provinces.

We evaluated the forested area within a circle of 2.3 km of radius around 123 display-grounds (Fig. 3). The structure and composition of surrounding landscape was quantified within a 1662 ha area around each historical lekking place using orthophotos at a resolution of 10 meters (Fig. 4). Landscape metrics variables (landscape fragmentation, spatial heterogeneity and size of forest patches) were assessed through landscape ecology techniques (Fragstats 3.3) and multi-variable analysis. We obtained that beech forests within small open areas are the most important forest habitat patches for the capercaillie.

Then we studied variables like forest structure (species, density), relief, human influence, etc. to get the habitat quality of the capercaillie in these lekking places and analysed that variable with the program Conefor Sensidone 2.2 (Pascual-Hortal & Saura 2006). This methodology is based on graph structures (Fig. 5) and a habitat availability that integrate forest attributes like habitat quality (Quevedo *et al.* 2006) to assess the connectivity of the fragmented habitat of capercaillie at 200 meters spatial resolution.

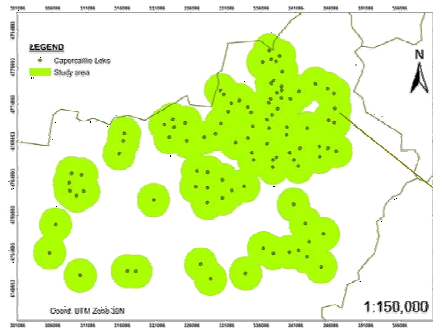


Fig. 3 Study area in the east of León

Fig. 4 Forest stand mosaic, the occurrence of forest gaps and the linear structures within 2,3 km radius of a lekking place

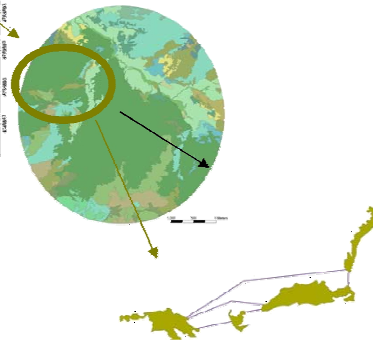


Fig. 5 Connectivity between the same type of forest patches

RESULTS

The graph connectivity analysis shows the areas with high availability according to the extension of patches plus connectivity between them.

In a preliminary study, we obtained the forest habitat areas that are essential for the landscape connectivity for the Cantabrian capercaillie in the east of León (Fig. 6).

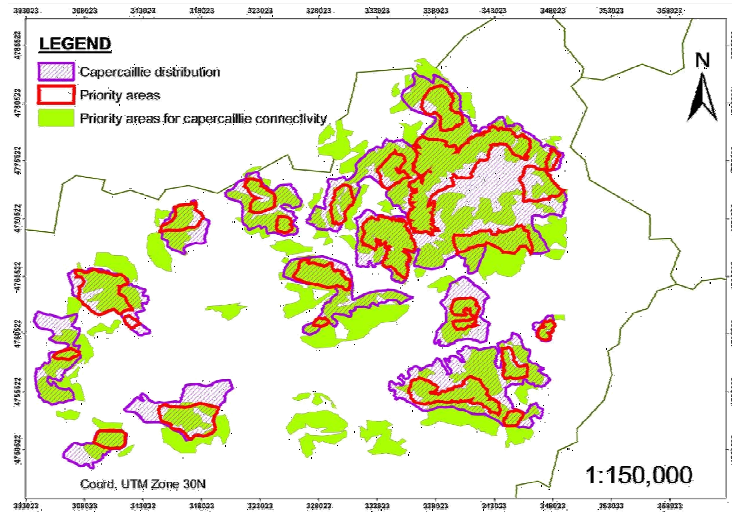


Fig. 6 – Distribution of the capercaillie with the actual priority areas and the critical forest areas to guarantee the conectivity

The results are oriented to improve the management of Cantabrian capercaillie habitat focusing conservation efforts on those forest habitats.

We obtained, for example, the public forests that concentrate the highest accumulated connectivity importance although could represent a small % of habitat capercaillie (Fig. 7). These analyses could be essential to improve the actual limits of Protected Birdlife Reserves (Fig. 7).

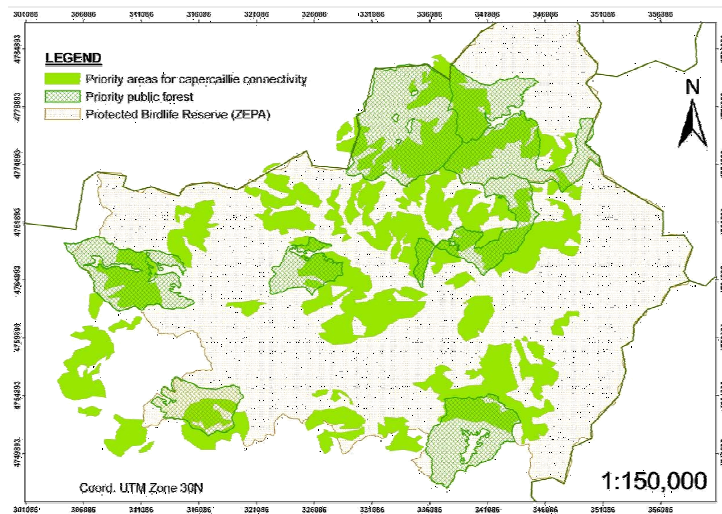


Fig.7 – Public forests with higher connectivity area for the capercaillie in the east of Leon

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