The study of hazel grouse (*Bonasa bonasia*) in the Trudner Horn Natural Park (Bozen, Northern Italy)

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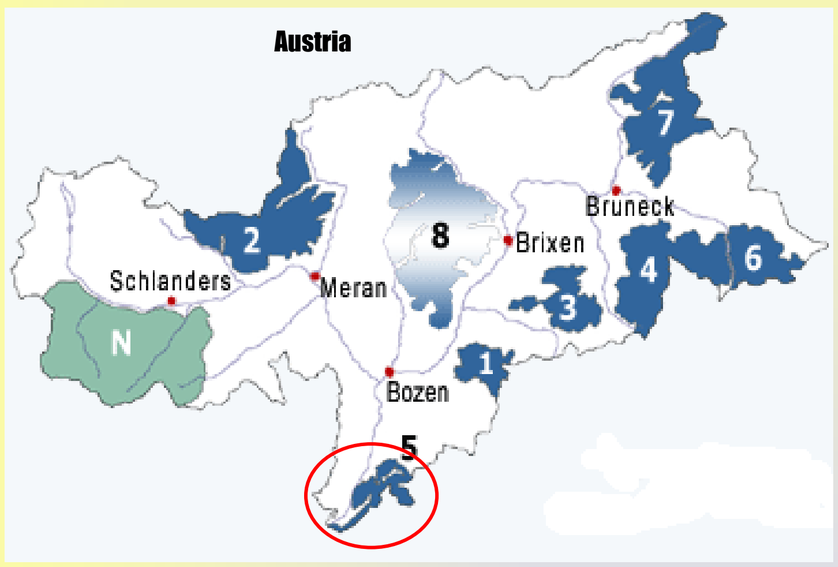
Where is Trudner Horn Natural Park?



The Trudner Horn Nature Park was expanded in the year 2000 and now extends over an area of around 6,866 hectares belonging to the villages of Altrei, Montan, Neumarkt, Salurn and Truden. The park is located in the south of Bozen, on the left side of the Etsch river. It is situated between the end of the Fleims Valley in the north, the Cembra Valley in the south-east and the Etsch Valley from Neumarkt to the defile of Salurn in the west. The species diversity of both fauna and flora in the Trudner Horn Nature Park is unique compared with other South Tyrolean nature parks, because this park is the only one to host also plants and animals typical to the sub-Mediterranean climatic zone.

In the Trudner Horn Nature Park , coppice with hop hornbeams, downy oaks and manna ashes reaches its northern climate limits. At first sight, this "coppice" may seem a rather monotonous landscape.
Scots pines, which need much light, predominate in barren places.
On the northern and the western slopes of Königswiese and Cislon, there are magnificent beeches and firs. In valleys and basins with high air humidity, beeches grow also in the sub-Mediterranean climatic zone and co-exist with yews, little leaf linden, hop hornbeams and maples.

Two research spatial scales:

- To find the relationships, and their implications on conservation, between the habitat selection of hazel grouse and that of capercaillie (*Tetrao urogallus*)
- The capercaillie have been studied previously and occurs sympatrically with the first throughout part of its distribution in the Park.
- To provide suggestions on silvicultural practices that would allow to maintain suitable habitats for both species
- To allow rapid assessment of grouse occurrence by foresters and land managers by means of key structural attributes.

- Investigating spatial patterns of hazel grouse presence with special regard to selviculture
- Identification of three study areas with increasing hazel grouse density
- Implementation of a field protocol for the study of the most important environmental and management attributes in plots distributed in a grid
- Choice of an appropriate spatial scale to investigate the landscape perception by hazel grouse
- Statistical analysis on distribution and characteristics of the grid plots
- Management proposals

Prediction of the possible spatial patterns in the habitat selection of hazel grouse and of the relationships with the habitat selection of capercaillie involves some stages:

Systematic sampling, within the capercaillie's range in the Park (~ 1000 ha) of: 1) summer habitat of adults; 2) wintering habitats; 3) nest sites; 4) active leks; 5) abandoned leks; 6) sites with absence

N = 84 capercaillie presence

N = 40 capercaillie absence

N = 45 hazel grouse presence

N = 41 hazel grouse absence

N = 15 sympatric sites

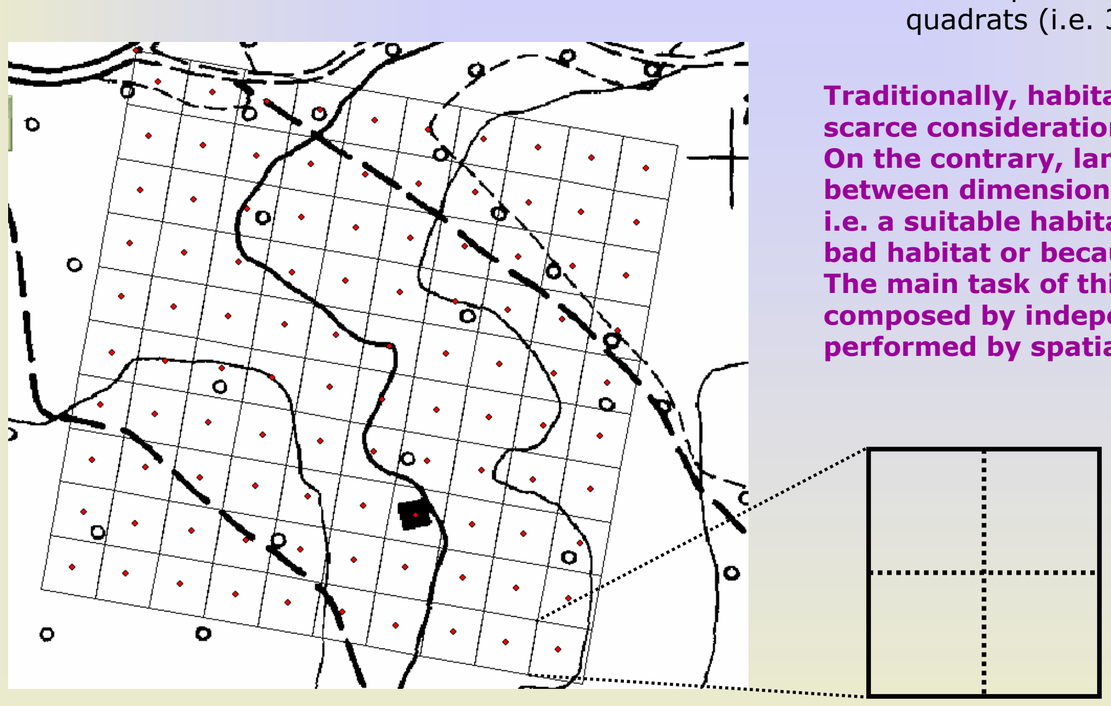
Capercaillie and hazel grouse sympatric in 15 sites. 30 sample of hazel grouse presence and 41 of hazel grouse absence were randomly selected.

Choice of three sites with increasing hazel grouse density

Analysis of landscape-level habitat selection by hazel grouse and of the relationships between hazel grouse and capercaillie habitat selection

The study areas for landscape-level analysis of hazel grouse habitat selection:

At the end of this process, a total of 206 sample areas, distributed throughout the Park was provided, together with three square landscape-level study areas, each composed of 100 contiguous quadrats (i.e. 300 quadrats).



- 9 hectares (approximately equal to mean home range)
- 100 quadrats with 30 m long side: the side of the grid have a length of 300 m
- horizontal distance corrected in the field
- GPS and traverses to locate the points

Traditionally, habitat selection by animals has been studied with little or scarce consideration for space.
On the contrary, landscape ecology approach look for relationship between dimensional, shape and spatial distribution of habitat patches → i.e. a suitable habitat could not be occupied because it is surrounded by a bad habitat or because it does not reach a surface threshold.
The main task of this work is to join a classical sampling survey composed by independent samples with a landscape-level survey performed by spatially-dependent samples

- 2 orthogonal transects
  - point intercept method to estimate plant herb species cover and canopy cover every 1 meter
  - registration of presence indexes along the transects
  - forest structure every 5 meters
- quadrat
  - woody species cover and top height
  - evidence of cuttings
  - *Rufa* ants nests
  - selvicultural practices

The study areas for capercaillie, hazel grouse and their relationships in habitat selection:

Circular sample areas with a 20-m long radius

- altitude, aspect, slope;
- ground sinusya map;
- cuttings evidences and selvicultural practices;
- canopy vertical structure, mean canopy height;
- presence/absence of *Formica rufa* ants nests;
- dead wood amount;
- distance from human features and clearances;
- all plant species with their relative frequencies, vegetation layers (trees, shrubs, heath species, herbs, mosses, litter);
- top canopy height.

A female in her net (photo: S. Mattedi)

State of the art:

- Three study areas at hazel grouse landscape-level were located and two are completed.
- Approximately a quadrat needs 20 minutes to be surveyed and a study area 8 days (two surveyors).
- We plan to complete the surveys of the three study areas until the end of September and then to start with the analysis: 1) calculating ecological attributes of every plot; 2) ascribing every plot to a category (vegetation type, forest structure, selvicultural practice) according to the results of point 1); 3) applying landscape ecology concepts, using GIS, to the spatial referenced attributes to test for spatial patterns in habitat preference by hazel grouse e.g. spatial indexes, mean habitat patch surface, contagion and connectivity indexes; 4) based on the results of point 3), giving landscape-scale applicable guidelines to maintaining the species in the managed forests of the Park
- Definitive results will be reached until January 2006.