MAKING LONG-TERM MONITORING PROTOCOLS OF RAPTORS AS INDICATORS OF ENVIRONMENTAL CHANGES

Raptors have been recognized as good indicators of ecosystems as they are usually at the top of the trophic web community system. The response of raptors to environmental changes as the fluctuation of their main prey, not only results at population level but also at functional level, and this can be monitored directly within populations (census of individuals, survival, and fecundity) or indirectly (diet, contaminants,...).
In the recent decades great environmental changes occurred in European countries, even at global or local scale, therefore the monitoring of biodiversity is essential to obtain information of present impacts on it, but also to have early ecological signals of future changes. This kind of information permits not only to know how the global and local changes affect biodiversity but to develop adequate policies of sustainable management and conservation.
Europe has an important tradition of raptor monitoring usually at a large scale (region, countries) that furnish good information on global censuses and population trends of the different species involved. But not so much long-term studies have been developed at a local scale, using standardized monitoring protocols and in focal areas in which simultaneously biotic and abiotic factors are also monitored. Moreover, the areas where monitoring of raptors have developed usually have specifically protocols difficult to implement in other areas, ecosystems and species.

Some countries and researchers have a very long experience on monitoring raptors as the research team of Dr. Erkki Korpimäki (Department of Biology of University of Turku). This internationally recognized research team has developed different powerful and accurate methodologies of long-term monitoring of diurnal and nocturnal birds of prey, even in forest, agricultural or mountain habitats in boreal ecosystems.

The purpose of the visit was i) to know the protocols of long-term monitoring of raptors and their prey in boreal and cropland ecosystems; ii) to see how these protocols are applied in the field; iii) to exchange information of both protocols of Mediterranean and boreal raptors, in different scales; and finally iv) to discuss future projects and applications of monitoring raptors as indicators of global change and to disentangle ecological hypothesis.

Work carried, results, discussion and future collaboration.

The short visit had two temporal stages. The first stage was at the University of Turku and lasted 4 days. This stage consisted in knowing the basic projects at the Section of Ecology of the Department of Biology) directed by Dr. Erkki Korpimaki as:

-Land-use changes, trophic interactions and fitness components in top predators: implications for conservation planning in boreal forests. Species involved: Boreal Owl.

-Individual-Level approach to Animal Populations: Natural Variation and Responses to Human-Induced Changes in Forest and Agricultural Ecosystems

Species involved: Boreal owl, the pygmy owl, the pied flycatcher, red squirrel and bank vole, and in agricultural areas the curlew, the kestrel, some small passerine species, and voles.

-Individual responses to small-scale habitat heterogeneity and implications for the emergence of maladaptive habitat preferences in farmland habitats. Species involved: Common Kestrel.

The second part of the stage was carried out in the region of Kauhava, in the study area of Dr. Korpimaki.

The study area involves near 1000 square kilometres around the Kauhava city and is covered by fragments of boreal forest, cropland and peat bogs. In this area Dr. Korpimaki has more than 1.000 next boxes corresponding to Boreal Owl, Pigmy Owls, Kestrel, Ural Owls and passerines. So the work carried out was to check different nest boxes to apply yearly monitoring as to obtain vital rates for the different species, and also to see in the field how the methodological protocols were developed and carried out.

In the case of Boreal Owl of near 300 nest boxes, only two were occupied this year, and one failed, and the other nest occupied has 4 nestlings. This is a very low vole year so only few pairs maintain their territory and breed. The maximum observed in a year were close to 170 pairs nesting. In the case of Pigmy owls, 5 nests were occupied, nestlings were blood sampled and weighed, and controlled with a data logger. In the case of Ural Owl no occupied boxes were found.

During this period we checked the occupied nest of Kestrels, close to 70 nests boxes occupied. During this period all the pairs were with eggs from 4 to 6, and two with recently hatched nestlings. Nests were checked and eggs were flooded to know the stadium of incubation to establish the possible date of hatching. Parasites of recently nestlings hatched were estimated. The experiment was to know different vital life parameters and ecology of Kestrel in two different ‘habitats’: a landscape with small fields surrounded by forests and another with large fields with less forested area. During this stage, methodological protocols were exchanged and discussions were carried out with Dr. Erkki Korpimaki, Dr. Alexandre Villers, Dr. Julien Terraube; Dr. Chiara Morosinotto, Petra Sumasgutner and Rauno Varjonen. Discussion issues were related to compare monitoring protocols and ecological and conservation issues. Related with ecologic al issues, some aspects of nomadism and the demographic implications were discussed and compared in the case of non-stable (boreal) and stable (Mediterranean) ecosystems. Aspects of fitness of birds related with the features of their habitats (best quality habitats) were also discussed also with some aspects of competence and intragremial predation. And finally the important changes in the ecosystems that were developed in recent years like timber exploitation, intensive farmland, and climate change were discussed as important approaches of monitoring.

Because one of the main objectives was to exchange methodological protocols of monitoring raptors, interesting discussions were carried in this sense, comparing the monitoring in boreal areas and Mediterranean at different levels. First of all, in the case of boreal areas the monitoring usually is easier because less key prey species and relationships appeared. In the case of diurnal raptors are voles, and so because voles had cycles of abundances, they model populations of predators. While in Mediterranean areas food nets are more complex, so more diversity of different prey are available, with no abundance cycles and consequently top predators do not have cycle tendencies.

Moreover in the case of Finland, the features of orography (flat) and landscape (forest and crops), permits the implementation of monitoring systems and ecological studies on raptors. For one hand nocturnal raptors can easily studied using nest boxes, because natural cavities are scarce (young forest), and other potential nesting habitats like cliffs are absent. Are in the case of farmland areas were few undisturbed and usually farmers are willing to host nest boxes in they barns that are vey useful for Kestrels. So a future collaboration is thought to try to look for similar species in Mediterranean habitats to do long-term monitoring and to study similar ecological questions.