Assessing trends in mammals in areas under land-use change

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Summery

(1) In the first part of the talk some peculiarities of mammalian life-histories were described and **suitability of mammals as indicators** was discussed. After some arguments were given, the author have decided that mammals are potentially good tool species to explore the effects of changes in habitats/landscapes and related resource availability.

(2) The second part of the talk was focused on several **case studies**, dealing with assessment of land-use change impact on different mammalian taxa:

1) Small mammals as indicators of land-use changes both in time and space. The results:
   - Trends in space - the degree of cultivation did not affect the richness and specific composition of the small mammal community, but there are variations in species frequency and specific dominant species, indicating different degrees of intensification.
   - Trends over time – there were significant changes in small mammals relative abundance over time and this changes were similar changes across land class groups.

   Conclusions: In general, small mammal responses are linked with habitat or landscape changes, but small mammals are no clear bioindicators of different intensification stages. There were some controversial results in the studies, which is not easy to interpret, so we would need more information about mammal ecology. We also should notice and critically evaluate our methods before making conclusions.

2) The response of bats to land-use changes and their vulnerability. The results:
   - Bats species are very sensitive to land-use changes, due to their K-selected life strategy. Very good knowledge of their ecology is necessary to manage their protection.
   - We can use *Rhinolophus* species as an indicator of traditional landscape and less intensive farming, while *Barbastella barbastellus* can be used as an indicator of forest management quality.

3) Reaction of large predators to changes in landscape. Large predators are very sensitive to land-use changes, because of their role of food pyramid top and also because of their direct competition with humans. Results:
   - Commensalis with man could provide more resources to predators (fast increase of predators´ body size during last 50 years in Israel).
   - In spite of competition with men, the area of wolfs has been increased since 1973 in Italy, maybe due to protection, reintroduction of ungulates and land abandonment (which means increase of cover and decrease of direct contact with men). According to habitat suitability model, further expansion into Alpine region can be expected. Of course it will mean higher impact on livestock, which must be resolve (preference for wild prey, return to traditional ways of defense).

- The most important thing is to change way of human thinking about large predators (tendency to panic).

(3) Some main **conclusions** were given in the last part of the talk:

- Land use change considerably affects mammal species/communities, the involved factors include habitat type, landscape structure and resources.
- The species response is shaped by life history of species, the reaction may be rapid.
- The research of mammals´ ecology has important conservation consequencies, we found out, that land management options are crucial.
- Conservation value of mammals is enhanced by their "flag species" and "umbrella species" roles.
- Mammals can be succesfully used as indicators of land use change, but there are some limits. Trends are not always obvious to interpret, so sufficient information on mammal ecology and also knowledge of methodological limits are needed.

Recommended background literature on this presentation:

- de la Peña NM, Butet A, Delettre Y, Paillat G, Morant P, Le Du L, Burel F (2003) Response of the small mammal community to changes in western French agricultural landscapes. Landscape Ecology, 18: 265-278.
- Russo D, Jones G (2003) Use of foraging habitats by bats in a Mediterranean area determined by acoustic surveys: conservation implications. Ecography 26: 197-209.
- Russo D, Jones G, Migliozzi A (2002) Habitat selection by the Mediterranean horseshoe bat, *Rhinolophus euryale* (Chiroptera: Rhinolophidae) in a rural area of southern Italy and implications for conservation Biological Conservation 107: 71-81.
- Breitenmoser U (1998) Large predators in the Alps: the fall and rise of man´s competitors. Biological Conservation 83: 279-289.