

**Hirzel and Arlettaz**

**BIOMAPPER: A TOOL FOR MODELLING ECOLOGICAL NICHE AND MAPPING HABITAT SUITABILITY**

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Biomapper is a user-friendly set of computer tools that allows biologists and wildlife managers to build up a better understanding of a species' ecological niche, to make spatial predictions about its potential geographic distribution, and to evaluate their reliability. Such predictive maps are of great importance in many conservation projects, e.g. to define areas to protect, to decide where to reintroduce individuals of an endangered species, etc.. In contrast with most habitat modelling approaches, Biomapper does not need data about species absence. It is thus recommended in situations where absence data are not available (many data banks), unreliable (most cryptic or rare species) or meaningless (invaders, extinction/recolonisation dynamics).

The approach is based on the Ecological Niche Factor Analysis (ENFA, Hirzel *et al.* 2002; Hirzel & Arlettaz 2003). Building on Hutchinson's concept of the ecological niche, this multivariate analysis compares, in the multidimensional space of ecological variables, the distribution of the localities where the focal species was observed, to a reference set describing the whole study area. The first factor extracted maximizes the marginality of the focal species, defined as the ecological distance between the species optimum and the average habitat within the reference area. The following factors maximize the specialization of this focal species, defined as the ratio of the ecological variance in average habitat to that observed for the focal species. The coefficients of these factors can be readily interpreted from an ecological view point, and can be used to build habitat-suitability maps. In this presentation, I shall expose the principles of the analysis and illustrate my point with an application to the reintroduction of the bearded Vulture (*Gypaetus barbatus*) in the Swiss Alps (Hirzel *et al.* 2004).

Hirzel, A. H., and R. Arlettaz. 2003. Modelling habitat suitability for complex species distributions by the environmental-distance geometric mean. *Environmental Management* 32:614-623.

Hirzel, A. H., J. Hausser, D. Chessel, and N. Perrin. 2002. Ecological-niche factor analysis: How to compute habitat- suitability maps without absence data? *Ecology* 83:2027-2036.

Hirzel, A. H., B. Posse, P.-A. Oggier, Y. C. Glenz, and R. Arlettaz. 2004. Ecological requirements of a reintroduced species, with implications for release policy: the Bearded vulture recolonizing the Alps. *Journal of Applied Ecology* 41:1103-1116.

**STATUS & TREND REPORTS CONCURRENT SESSIONS- Northern Spotted Owl and Marbled Murrelet**

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