

Modelling Alpine ibex (*Capra ibex*) habitat suitability: have been the reintroductions carried out in the most suitable areas?

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Following the reintroductions occurred in the last century, the Alpine ibex has reached a widespread but fragmented distribution over the Alps. The present distribution is likely to be closely related to the location of the reintroduction sites, but it may be not representative of the actual suitability of the Alpine territory. Our purpose was to compare the current distribution of the species to the suitability of the Alpine territory, estimating its relation with releasing sites and its potential expansion in the future. We used presence-absence data from the 1999 census carried out in the Gran Paradiso National Park (GPNP; Valle d'Aosta, north-western Italy), as it represented the only natural population survived in the Alps and that was likely to have reached an ecological equilibrium. Suitability has been predicted from land use coverage (CORINE LandCover 3rd level, 1:100.000) and landscape metrics, modelling potential distribution (presence-absence) by the Discriminant Function Analysis. The model was then applied to a 5x5 km grid over imposed to the whole Alpine territory, and the suitability of 45 areas actually occupied by stable Ibex populations (Ibex-areas) was compared to that of 56 randomly selected hexagonal areas where the species was not present (not Ibex-areas). The mean proportions of suitable territory in the two samples was compared by Mann-Whitney test, whilst differences in the occurrence of suitable and unsuitable cells in areas with or without ibex were tested by Pearson Chi-square test. The predictive model correctly classified the 89.2% of the original sample units in the GPNP, with a sensitivity (correct classification of true positive) of 79,0%. The application of the model to the Alpine territory showed that the ibex-areas contained a significantly higher proportion of suitable areas (0.461 ± 0.044 , mean \pm SE) than not ibex ones (0.180 ± 0.032). Furthermore, suitable cells occurred more frequently inside ibex areas (74.1%) than outside (33.8%). As the prediction of our model, the current Ibex sub-populations actually occurred in more suitable alpine areas than outside, although other suitable areas still have to be occupied, and the species has also occupied less suitable areas. A more in-depth spatial analysis is required to highlight dispersion phenomena, and to correctly evaluate the actual effectiveness of reintroduction programs in different suitability habitats.