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Possible effects of competition

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Introduction

A possible effect of overlap in habitat use and/or diet between species is interspecific competition, if the common resources are limited. Inverse population trends (or at least a decline in body condition) in sympatric species, or a shift in their realised niches in sympatry and allopatry are commonly regarded as evidence for competition (Redfield et al. 1977; Thompson and Fox 1993; Imperio et al. 2012). Here we relate population trends of ibex, chamois and red deer in Val Trupchun to each other.

Methods

Yearly ungulate censuses have been conducted by park rangers in the Swiss National Park since 1918. The surveys have been carried out from the same observation points each year. Ibex surveys were conducted in the first half of August along with censuses for red deer and chamois until 1989. From 1990 onwards, ibex have been counted during the first half of April, coinciding with the maximum number of individuals in the park. Only census sizes from 1990 onwards were therefore considered in this analysis.
Spearman correlations were performed between the difference in log-transformed census sizes from year n to n+1 of one species and year n+1 to n+2 of the other.

Results

Over the 24-year period, red deer numbers during summer have slightly increased within Val Trupchun despite yearly culling programmes while the animals were in their winter ranges

outside the Swiss National Park. By contrast, ibex numbers have generally decreased in the area over the same time period. Chamois within Val Trupchun have shown near cyclical variations in population size with an overall increase over the last 24 years (Fig. 1).

A significant intermediate negative correlation was found between the change in census size of red deer from year n to n+1 and that of ibex from year n+1 to n+2 (Spearman's r = -0.581, p=0.005). No significant relationships were detected in the comparisons between red deer and chamois, chamois and ibex, and vice versa.

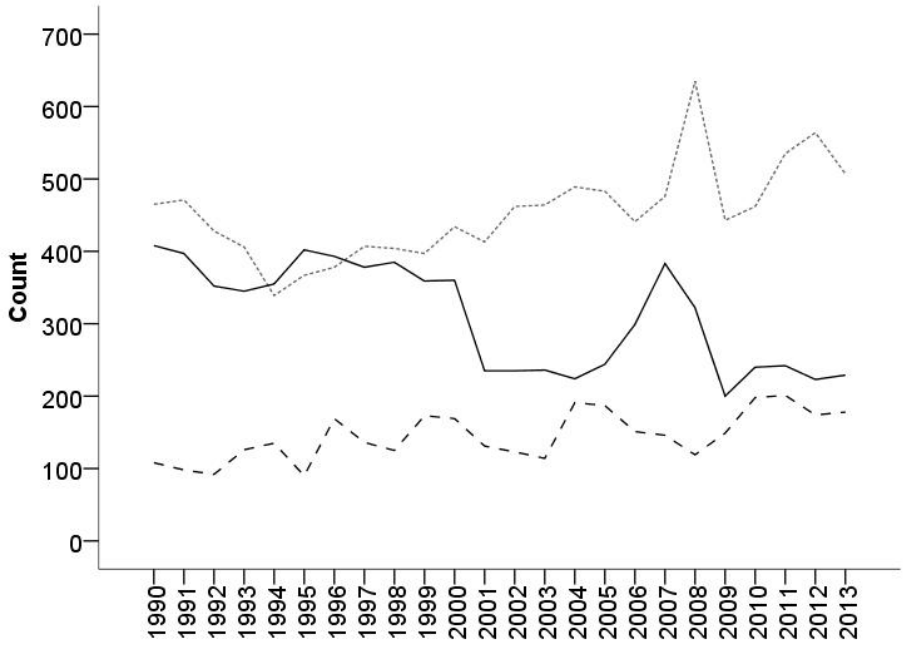

Fig. 1. Yearly census sizes of red deer (dotted line, top), ibex (solid line) and chamois (broken line).

Discussion

The results suggest that increases in the number of red deer from one year to the next have delayed negative effects (i.e. of one year) on the change in ibex population size within Val Trupchun, i.e. that the two species compete with each other with ibex being the inferior competitor. However, it is unclear whether this negative correlation is related to a decrease in winter survival of ibex caused by resource competition with red deer during summer, or due to ibex movements into or out of the study area.

References

Imperio S, Focardi S, Santini G, Provenzale A (2012) Population dynamics in a guild of four Mediterranean ungulates: density-dependence, environmental effects and interspecific interactions. Oikos 121(10): 1613-1626.

Redfield JA, Krebs CJ, Taitt MJ (1977) Competition between *Peromyscus maniculatus* and *Microtus townsendii* in grasslands of coastal British Columbia. J Anim Ecol 46: 607-616.

Thompson P, Fox BJ (1993) Asymmetric competition in Australian heathland rodents: a reciprocal removal experiment demonstrating the influence of size-class structure. Oikos 67: 264-278.