8th WORLD CONFERENCE ON MOUNTAIN UNGULATES

Cogne (AO) 27-30th September 2022

PARCO NAZIONALE GRAN PARADISO

Abstract book
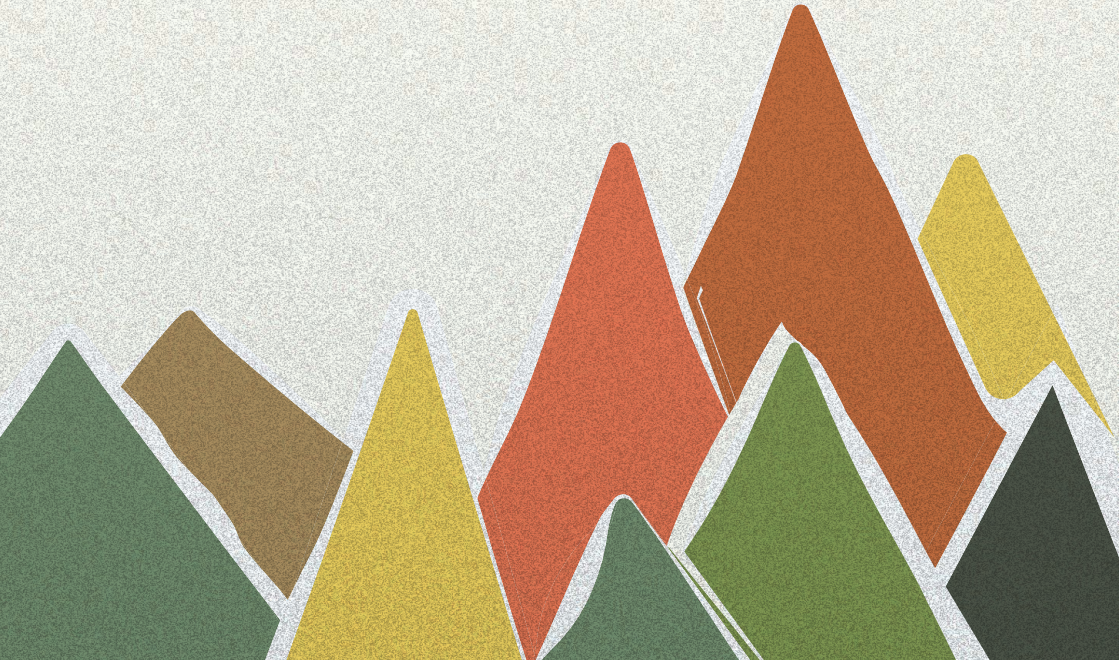
treeline. While recent research suggested that red deer compete with chamois under the interspecific interaction hypothesis, factors driving the spatial overlap of both species have not been tested.

Here, we estimated and compared densities of chamois and red deer in two study areas in the Bavarian Alps (Karwendel and Chiemgau) which differ in their habitat composition and human land use intensity. We expected densities of chamois to vary between study areas as a function of the amount of typical alpine habitats and predicted densities of both species to overlap when available alpine habitat is scarce. To test our hypotheses, we conducted a Bayesian spatial capture-recapture analysis (SCR) based on systematic faeces collection and genotyping, accounting for sampling effort and sex. To test for the effect of habitat composition on densities, we included spatial covariates (e.g., terrain ruggedness, canopy cover, landcover). We then tested for correlations of the resulting spatial predictions of local densities.

In both areas, chamois densities were primarily driven by topographic ruggedness and ranged from 3 up to 19 individuals per 100ha. Red deer densities varied less between the two study areas (4 - 6 individuals per 100ha). They avoided barren grounds and were more abundant in forested areas. In the area with less typical alpine habitat (Chiemgau), spatial segregation between the two ungulate species was low. In the study area with higher amounts of alpine habitat (Karwendel), chamois density was negatively correlated with red deer density indicating higher segregation of the two species.

Gaining a better understanding of the relationship between habitat and ungulate densities is crucial for sustainable management of ungulate species, especially when multiple stressors due to simultaneous environmental stressors, such as climate change, may interact.

Invited talk: Intense directional selective pressure from trophy hunting causes evolution of smaller horns, despite denials

Festa-Bianchet M.[1], Morrissey M.[2]

[1]Université de Sherbrooke, Québec, Canada. [2]University of St. Andrews, UK.

Intense, directional selection on horn size through quota-free trophy hunting based on a definition of minimum curl leads to evolution of smaller horns in mountain sheep. Recently, papers have questioned the generality of this result. One paper in Evolutionary Applications claimed that horn size declines in bighorn sheep were rare. A published re-analysis using appropriate statistics reveals that horn size declines are ongoing in nearly all of Alberta, Canada, but only in about half the hunting areas considered in the USA, where regulations typically result in lower selective pressure. A modelling paper in the Journal of Wildlife Management, supported by an Editorial, claimed to show that hunting-induced evolutionary change was unlikely. When that model is parameterized with values of phenotypic and additive variance estimated for bighorn sheep, it predicts an evolutionary change similar or greater than empirically measured for the pedigreed population at Ram Mountain. Together, recent literature on mountain sheep confirms that evolutionary declines in horn size are to be expected under intense selective hunting. The same literature suggests that these changes can be avoided by more conservative harvest regulations.

Diet and trophic niche overlap between wild ungulates and livestock in the Italian Alps

Lioce F.A.[1,2,3], Crestanello B.[1], Pertoldi C.[3], Traba J.[4,5], Corlatti L.[6,7], Partel P.[8], Mustoni A.[9], Donini V.[6], Bertorelle G.[2], Hauffe H.C.[1]

[1]Fondazione Edmund Mach, San Michele all'Adige, Italy. [2]University of Ferrara, Ferrara, Italy. [3]University of Aalborg, Denmark. [4]Universidad Autónoma de Madrid, Spain. [5]CIBC, Universidad Autónoma de Madrid, Spain. [6]Stelvio National Park, Italy. [7]University of Freiburg, Germany. [8]Paneveggio - Pale di San Martino Natural Park, Italy. [9]Adamello-Brenta Natural Park, Italy.

Understanding the process underlying interspecific competition is pivotal to investigating the future ability of animal species to adapt to changing environments. Coexisting species can avoid competition by partitioning resources, but when these are limited a potential for competition can occur, possibly resulting in a decrease of fitness. In the Italian Alps, red deer numbers have been increasing, which has been hypothesized to impact chamois populations through interspecific competition. In addition, as domestic sheep are moved to Alpine pastures in summer, and chamois share the same habitat with this livestock during this season, there is the potential for multispecific competition.

In this study, we used DNA metabarcoding of the chloroplast trnL intron and the ITS1 and ITS2 internal transcribed spacers to characterize diet and evaluate the niche overlap of chamois, red deer and domestic sheep. For each species, a total of 520 fresh fecal pellets were collected in three parks in the Italian Alps during two sampling seasons from seven areas characterized by one of three combinations of species interaction: i) areas where only chamois graze; ii) areas where chamois coexist with red deer; iii) areas where chamois share pastures with both red deer and sheep. At the taxonomic levels of family and genus, we detected high similarity in diet between the three species, but we observed diet segregation between chamois and domestic sheep and between chamois and red deer in periods when resource availability was expected to be limited. However, in general, the presence of potential competitors did not significantly affect the composition of chamois diet. In addition, hypervolume analysis was carried out to visualize the trophic niche of chamois, red deer and domestic sheep and to analyze diet overlap both for the total diet and for the preferred diet. In both cases, the three hypervolumes broadly overlapped and strong segregation was not evident. Overlap metrics between hypervolumes were always higher between chamois-red deer than between chamois-domestic sheep, suggesting a more problematic impact of coexistence between wildlife than between wildlife and livestock. We discuss the results considering ongoing climate change and habitat fragmentation and possible applications to wildlife management.

Chamois survival depends on their foodscape

Loison A.[1], Garel M.[2], Toïgo C.[2]

[1]University Savoie Mont Blanc, France. [2]French Office for Biodiversity, France.

Studies on habitat–performance relationships that require joint data on fitness and habitat use are still scarce in long-lived species most likely due to the discrepancy between the temporal scales at which spatial and demographic studies are performed. Here we overcame this limitation in females Alpine chamois, by combining databases on (1) habitat structure and food resources, (2) individual GPS monitoring, and (3) long term capture-mark-resighting data collected at different spatial and temporal scales. We show that the proportion of the most used habitat type in a home range (negatively correlated with individual home range size, in agreement with the habitat-productivity hypothesis). Then, we unveiled that, in addition to a significant year-to-year variation, adult survival rates varied among individual clans (i.e. individuals which home range overlapped) and were positively correlated with habitat quality. We discuss the implication of these findings, given that it could lead to a spatial structure in demographic patterns at the population level.