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Social network dynamics of Alpine ibex (Capra ibex) in Gran Paradiso National Park.
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Abstract

Alpine ibex (Capra ibex) is characterized by sexual segregation that lead males and females to form separate groups all year round except for the mating season. Group living leads ibex to form strong or weak associations with other individuals and the strength of the associations may be affected by the traits of the individuals involved. Males ibex seem to live in a fission fusion society; thus, groups formation is a highly dynamic process with size and composition of groups that frequently change. The aim of this study was to investigate the social network of male ibex and for this purpose we collected data on groups' composition during five years, from 2008 to 2012. Social network has been explored over different scales, from the group to the individuals, passing through sub-grouping patters. We found an high connected and cohesive network that showed a certain stability over the study period. Males ibex tended to associate with similar aged individuals and age seemed to be the most important factor in affecting social relationships. In fact, subgroups were formed by individuals similar in age and it was possible to distinguish sub-groups composed by young, adult or old individuals. Hierarchical status did not significantly affect the strength of the associations as well as genetic relatedness. Estimation of kinship may have been biased by the very low genetic variability of this population and this may bias the results found. Centrality of individuals was explored using different measures and we tested which factors affected the position of a male in the network. Eigenvector Centrality Coefficient was significantly correlated with age and the highest values were found in ibex from five to ten years old whilst trends of Clustering Coefficient according to age were less predictable.

Betweeneess Centrality Coefficient was not correlated with age or rank. In the comparison of individual measures of twenty males common over the five years of the study, eigenvector centrality decreased for individuals ageing from adult to old age, whilst it stayed stable from juveniles to adult age. Clustering Coefficient and Betweeneess Centrality Coefficient seemed to be strongly affected by the structure of the network and thus Eigenvector Centrality Coefficient is the most informative individual's measure for describe changes in individual centrality over a time scale.