

# Dietary and temporal partitioning facilitate sympatric coexistence of carnivore assemblage in the Everest region

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## Abstract

Carnivore communities are extremely important for maintaining the structure/function of ecosystems. Exploring the carnivore coexistence can provide the data needed for the development of effective conservation strategies for endangered species. We aimed to (1) reveal the dietary composition of a carnivore community that inhabits the Everest region by analyzing molecular diets, (2) assess activity patterns by analyzing camera-trapping records. Dietary analysis revealed 22 food MOTUs of 7 orders and 2 classes. Snow leopard and wolf mainly preyed on ungulate mammals (%PR = 61%, 50%), while lynx and red fox mainly consumed small mammals (%PR = 62%, 76%). Higher dietary overlap (Pianka's index = 0.95 ~ 0.97) was observed between similar-sized predators (snow leopard versus wolf, lynx versus fox); and there was no dietary difference between them ( $P > 0.05$ ). Lower dietary overlap (Pianka's index = 0.53 ~ 0.67) was observed between predators with large body size difference (snow leopard versus lynx, snow leopard versus red fox, wolf versus fox); and dietary difference was significant ( $P < 0.01$ ), indicating the existence of dietary partitioning. In activity pattern analysis, predators exhibited higher temporal overlap with the more frequently consumed prey species, indicating that predator activity can be regulated by prey availability. Snow leopard and wolf had the higher activity overlap ( $\Delta = 0.87$ ) suggesting the lack of temporal partitioning. Red fox had the lower coefficients of overlap with snow leopard and wolf ( $\Delta = 0.60$ ,  $\Delta = 0.59$ ), suggesting that fox temporally avoid snow leopard and wolf slightly. We revealed the coexistence mechanisms of a carnivore community in the Everest region, by confirming that sympatric coexistence was facilitated by both dietary and temporal partitioning. These results will help to increase understanding of carnivore communities, and provide the scientific foundation for the conservation of threatened species in the Mount Everest region.

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