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Abstract: In the Alps, lynx densities have been reported to range from 1-2 lynx / 100 km². If the preferred prey of lynx are roe deer and chamois, we can estimate that they kill on average 1 ungulate every 1-2 km². For illustration of the impact we used a hypothetical example: the canton of Obwalden, where the first lynx have been reintroduced in the Alps in 1971.

Impact on wild prey populations

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The impact of lynx on its prey populations can vary widely as it depends on factors that change in space and time. Roe deer is the main prey of lynx in the Alps, followed by chamois and red deer. All other prey is of minor significance. In the Alps, ibex has rarely been reported as lynx kills and wild boar never. Although not important in the overall diet, introduced species like mouflon or fallow deer have locally suffered from heavy predation and have been reduced drastically by lynx. For species like capercaillie the impact is negligible, because it occurs in low numbers only and it is therefore not profitable. The impact is also negligible for species like red fox, who by far outnumber the lynx.

The lynx' kill rate depends on the sex and reproductive status of lynx (Molinari-Jobin *et al.* 2002). Males kill more chamois than females, females who take care of kittens kill more frequently than males (approximately 70 ungulates / year *versus* 55 ungulates).

In the Alps, lynx densities have been reported to range from 1-2 lynx / 100 km² (Haller and Breitenmoser 1986, Breitenmoser-Würsten *et al.* 2001). If the preferred prey of lynx are roe deer and chamois, we can estimate that they kill on average 1 ungulate every 1-2 km².

For illustration of the impact we used a hypothetical example: the canton of Obwalden, where the first lynx have been reintroduced in the Alps in 1971. With its size of 490 km², Obwalden could host about 5-10 lynx, of which 2-4 males and 3-6 females. The potential predation rate would average 200-400 roe deer and 100-200 chamois, e.g. 1 roe deer every 1-3 km² and 1 chamois every 2-5 km². Lynx predation would be responsible for 40% of known roe deer and 20% of known chamois mortality. Considering the recruitment potential of roe deer and chamois, together with the information on the known mortality, the minimal density in Obwalden is estimated at 4-5 roe deer and 6 chamois/km². Lynx would therefore kill 13% of the roe deer and 5% of the chamois population. Obwalden today is far from such a "high" lynx density, as in the official statistics of perished game during the last year only 2 lynx kills were reported. If lynx would kill an average of 300 roe deer and 150 chamois per year this predation would not go unnoticed.

The example of Obwalden is relatively simple, as some variables were kept constant and others didn't have to be considered. The impact of lynx depends on prey density, itself fluctuating from year to year. An important aspect is also the recruitment potential of the prey: roe deer can recover faster than chamois from low density. If the alternative prey is red deer instead of chamois, the number of prey killed per year decreases as red deer are heavier than chamois allowing lynx to feed longer on the same kill. Habitat features have been shown to be important (Molinari-Jobin *et al.* submitted), and the presence of scavengers might force lynx to kill notable more frequently. Another aspect is the presence of competitors, such as wolves. The impact of lynx on prey depends on many variables and they change permanently in space and time. For some we have good estimates, some can only be guessed empirically.

We definitely need more predation studies from the Alps including both predator and prey.

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