Ecology, physiology and behaviour

How does climate change-induced drought affect European roe deer (*Capreolus capreolus*) fawn growth?

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The body mass of European roe deer (*Capreolus capreolus*) fawns reflects the condition/fitness of populations, but it can also reveal which environmental factors have significant influence on body growth and consequently on population dynamics. Therefore, body mass data and knowledge about environmental effects are important indicators for wildlife managers. When climate change-induced events are becoming more frequent, it is important to understand their impact to make wildlife management more efficient, sustainable, and up-to-date.

In this study, we analysed the body mass of roe deer fawns culled during the regular hunting period in Slovenia between September and December in the 14-year period 2010-2023 (in a very large sample set of 148,432 individuals: 67,161 males and 81,271 females). Data was collected from the Central Slovene Hunting Information System (OSLIS), in which several data on every culled individual are registered. We focused on interannual differences in body mass of fawns in four geographical regions: (i) Pre-Alpine, (ii) Pre-Pannonian, (iii) Sub-Mediterranean, and (iv) Karstic-Dinaric region.

On the country level, data showed that the body mass of fawns significantly increased from September to November in both sexes, while there was no significant increase between November and December. Interannual differences as well as differences among regions were statistically significant. Although interannual variability of body mass was generally low, we observed larger drops in years 2013, 2018, and 2022, which were all years with extreme hot and dry weather events during the summer months. In 2013, the dry period lasted from 11 June until 10 August, resulting in severe damage in agriculture due to drought. In 2018, the phenological development in summer was premature, fruits of some plants and wheat ripened up to one month earlier, and the drought was observed mostly in August. Similarly, the summer of 2022 was 2.8°C warmer and the precipitation reached only 59% of the normal (average) level. Multiple factors could affect the body mass of fawns. On average, female roe deer in Slovenia give birth in May, although there are slight regional differences. More importantly, roe deer is an income breeder, therefore individuals do not store body reserves for reproduction as they mostly rely on the availability of food resources during the rut period. Therefore, it is expected that interannual variability in food availability and/or quality due to weather-related effects would affect body mass and growth of fawns in a particular year. In accordance, our results showed that there are connections between body mass of fawns and the summer weather (drought), especially when comparing variability of body mass per year and region; however, we were neither able to statistically prove these observations nor connect fawn body mass with precipitation, mean temperature, and/or max July temperature.