ADVANCING PLANT PHENOLOGY CAUSES AN INCREASING TROPHIC MISMATCH IN AN INCOME BREEDER ACROSS A WIDE ELEVATIONAL RANGE

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Study Description

To avoid trophic mismatches, large herbivores should reschedule the breeding timing to keep in synchrony with the recent advance of plant phenology caused by climate change. This study clearly demonstrates a consistent, but small, trend toward more advanced parturition dates through time across all elevations in a mountainous, forested area. However, this rate of advance was less than that of the plant phenology indicators. Thus, at the lowest elevations, parturition timing has already fallen outside the optimal time window for high-quality forage while at high elevations, parturitions are still synchronized with the peak availability of quality forage.
Photo 1. Marked roe deer fawn within the project “Rehkitzmarkierung Schweiz.” We used information from 8986 parturition events recorded during the period 1971–2015 to study phenotypic plasticity on birth timing in a densely forested lowland area and evaluated its ability to track resources along a wide elevational gradient (288–2,366 m a.s.l.). These photographs were taken in Switzerland. Photograph credit: Maik Rehnus.
Photo 2. Roe deer doe and fawn. Here, we studied roe deer (*Capreolus capreolus*), an income breeder that has demonstrated a lack of phenotypic plasticity on birth timing. Photograph credit: Rolf Giger.
Photo 3. Adult roe deer doe with plastic tag in the right ear. We hypothesize that the mismatch between roe deer parturition dates and peak resource availability will increase over the study period. In addition, we expect this mismatch to be larger in lower elevation areas compared to higher elevation areas. Photograph credit: Rolf Giger.
Photo 4. A roe deer jumps into an uncertain future. We did find a consistent, but small, trend toward more advance parturition dates through time across all elevations. However, this rate of advance was less than that of the plant phenology indicators, resulting in an increasing mismatch at all elevations. Parturition dates changed on average at a rate between 7.5 times slower than the Growing Season Start and 5 times slower than the Flowering Start. Thus, at the lowest elevations, parturition timing has already fallen outside the optimal time window for high-quality forage while at high elevations, parturitions are still synchronized with the peak availability of quality forage. Photograph credit: Rolf Giger.
These photographs illustrate the article “Advancing plant phenology causes an increasing trophic mismatch in an income breeder across a wide elevational range” by Maik Rehnus, Marta Peláez, and Kurt Bollmann published in *Ecosphere*. https://doi.org/10.1002/ecs2.3144