

# **Drought timing and cutting frequency impact community functional responses to water scarcity in permanent grasslands**

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Drought could occur at any time during the growing season but our predictive knowledge on drought timing impacts remains limited. Furthermore, management practices could potentially mitigate or amplify such negative drought effects but this has rarely been studied.

To fill this knowledge gap, we performed a two-year field experiment in three different permanent grasslands in the Swiss Jura Mountains under two mowing treatments (high *versus* low cutting frequency), representative of the management practices occurring in this region. Two drought treatments were applied per vegetation season, during and after the peak of biomass production, respectively. We used both the community weighted mean (CWM) traits and functional trait dissimilarity (FD) of leaf dry matter content (LDMC) and specific leaf area (SLA) to study the effects of drought on plant communities.

CWM LDMC increased while, in the opposite, CWM SLA decreased with drought during and after the peak of biomass production. Increase in FD LDMC with drought occurred only at one site after the peak of biomass while FD SLA was not affected. The effect of drought on CWM LDMC and CWM SLA was dependent on mowing intensity, with stronger impacts under high cutting frequency.

We conclude that, in a climate-change context with increased severity of drought events, grassland management should move towards earlier mowing to avoid strong loss of forage quantity and quality later in the season and lower cutting frequencies to avoid or limit the aggravating drought effects due to mowing intensity.

**Key words:** community weighted mean, cutting intensity, species turnover, plant functional traits, LDMC, SLA, growing season, climate change, adaptive management