

# Effects of drought on yield and nutritive value of two permanent grasslands in the Jura Mountains

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## Context

Drought affects forage production (yield and quality). The effects are, however, difficult to predict due to potentially very diverse environmental conditions. The responses of grasslands to drought depend, among other things, on the timing of stress.

On each site: 5 rain shelters  
(= 5 blocks).

Plots under drought received 30% of  
the 30-year precipitation average.  
Control plots received 100%.

Continuous measurements of soil water  
content and meteorological data.

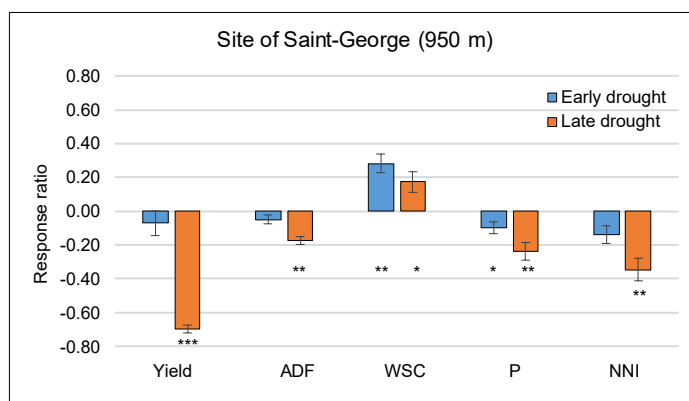
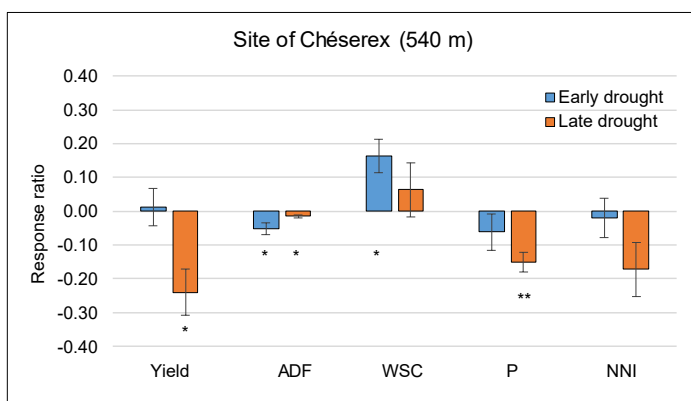


## Experimental design

The trial was carried out on two permanent grasslands, at Chésereux (540 m) and Saint-George (950 m). Two drought simulations were applied, either during the peak of vegetation (early drought) or after it (late drought), and compared to well-watered plots (control treatment).

## Main results

- Late drought had much more impact on yield than early drought; The higher site (Saint-George) was more affected than the lower site (Chésereux), with yield losses up to 70%.
- Drought lowered ADF and increased water soluble carbohydrates (WSC).
- The phosphorus (P) uptake was reduced under drought. The response to drought was more pronounced during the late season stress. The lower site (Chésereux) was less affected than the higher site (Saint-George), thanks to mycorrhiza symbiosis (data not shown).
- Drought impaired the nitrogen status of the plants (late stress at Saint-George); this effect was however of less importance than that observed on plant P.



Figures 1 and 2. Response ratios (RR)  $\pm$  sem of some parameters resulting from the precipitation manipulation experiment. Values significantly different from zero are indicated with \*\*\*  $p < 0.001$ , \*\*  $p < 0.01$ , \*  $p < 0.05$ . Note the differing y-scale!

## Conclusions

Drought can induce important yield losses. Although less affected, the nutritive value of the forage shows variations. The extent of the responses to drought differs between grasslands.