Elevated CO2 enhances short-term recovery after extreme drought and heat in a temperate grassland.

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Under warmer and drier climatic conditions, increase of atmospheric CO$_2$ concentration is expected to limit the negative effects of stress on grassland production. The capacity to recover after drought could also be favored by elevated CO$_2$, as it may improve plant growth through its primary effects on both leaf photosynthesis and stomatal conductance. The aim of this study was to evaluate a possible mitigation effect of elevated CO$_2$ on canopy C and water fluxes, and its consequences on forage production and quality, during and after an extreme event (soil drought x heat).

**RESULTS**

- **Higher GPP and WUE under elevated CO$_2$**
  - Before stress: above and below-ground biomasses were unchanged, and lower N and NDF
  - After stress: higher root biomass and lower N and NDF

**CONCLUSIONS**

Under future climatic conditions (warmer and drier) forecasted for 2040-2060

- **Elevated CO$_2$ mitigated the negative effect of drought x heat** by increasing GPP and WUE, and promoted recovery of this permanent grassland
- **These changes** led to higher root biomass with no effect on above-ground production
- **Forage quality** was affected: more digestible forage but containing less N
- **This study confirmed** the short-term recovery capacity of permanent grassland after severe drought and heat