Regulation of meadow saffron 
(\textit{Colchicum autumnale} L.) 
in extensively managed grassland

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Problem: High population densities of the toxic *Colchicum autumnale* in extensively managed grasslands: 20 - 50 plants/m²

* C. *autumnale* profits from late mowing date in mid-June

Farmers have problems to market their hay

Risk that they intensify or abandon management
Objective

Reduce population density of *Colchicum autumnale* by mowing treatments, which differ in:

- Mowing date
- Mowing intensity = Number of cuts/year
Study area

Austria

Germany

Vienna

Frankfurt

Giessen
Methods

- Right point during vegetation period to extract most resources?

Vegetation period
Methods

- Mowing date and intensity

Jan    Feb      Mar     Apr    May    Jun    Jul     Aug     Sep     Oct     Nov     Dec
Methods

• 1 m² plots (with buffer)
• 4-5 different mowing treatments per population
• 4 replicates
Methods

- Record of every individual plant per year per plot
- Analysis by Matrix population models
Results Germany

Population Growth Rate $\lambda$

- Control (Jun Sep)
- May
- April June
- April June Sep

Intensity

Early

April May
Results Germany

Flowering plants [%]

- Control (Jun Sep): 40%
- May: 25%
- May | Jun: 20%
- May | Jun | Apr: 5%
- May | Sep: 10%

Comparison: 2008 vs 2009

- April: Decrease from 2008 to 2009
- May: Increase from 2008 to 2009

Note: The figure includes error bars to indicate variability.
Summary

• All mowing treatments led to population decline: population growth rate <1

• Mowing intensity had no influence

• **Most important influence**: Time of first mowing date
  ▪ Early mowing in April instead of May largely reduced flower production
Open Questions

• How many years of mowing are necessary until plant death?

• What is the impact of mowing treatments on other plant species?

→ Will be investigated in the following years.
Thank you for your attention!

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