

Responses of Alpine grassland plants to heat wave: analysis of selected physiological parameters

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1 INTRODUCTION

The Alps are experiencing more frequent summer heatwaves, which pose a threat to alpine ecosystems and biodiversity. Alpine grasslands, which play a crucial role in providing vital ecosystem services, are particularly vulnerable. Although recent studies have examined the influence of combined drought and heat stress on species and communities, the impact of the timing and duration of these stresses is still not well understood.

2 EXPERIMENTAL QUESTIONS

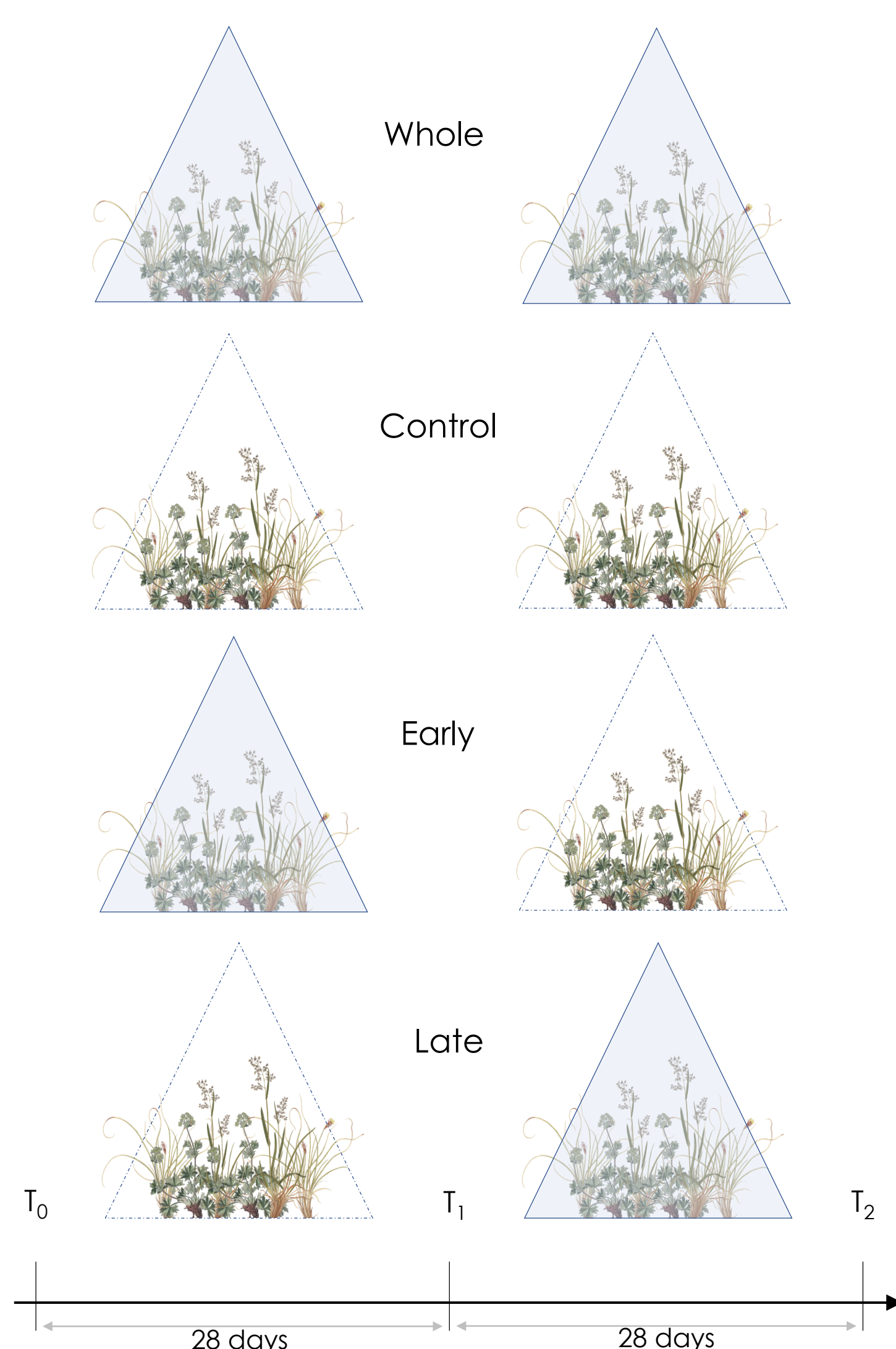
1. How does the timing of heat waves affect species response during different growth stages?
2. Do functional groups (sedges, grasses, forbs) respond differently to heat stress?
3. What is the effect of heat stress duration on species performance?

3 MATERIALS AND METHODS

STUDY AREA



EXPERIMENTAL DESIGN



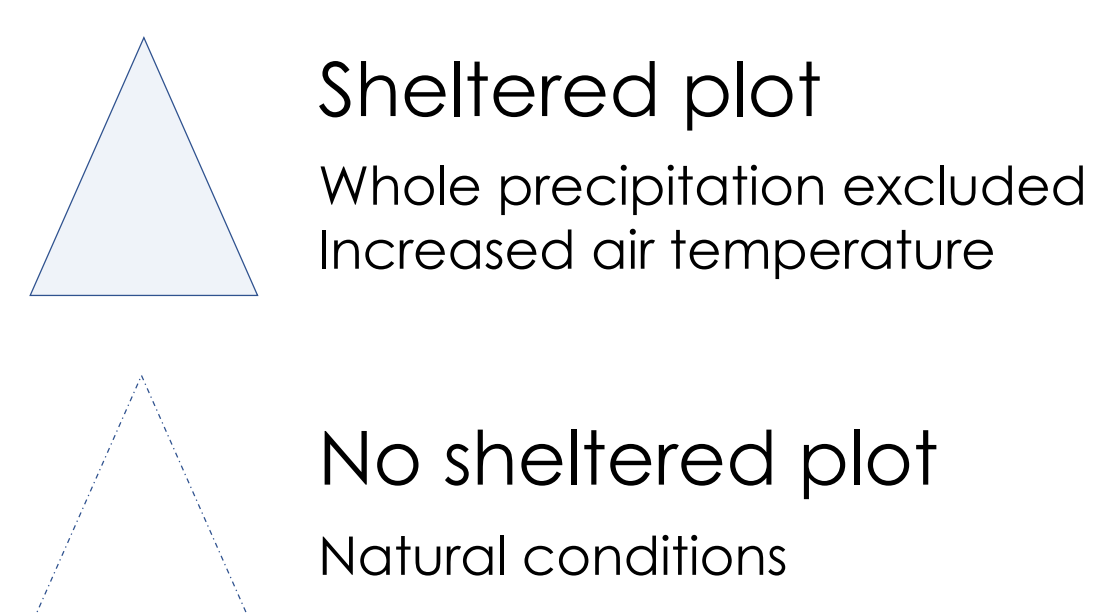
ANALYSED TRAITS

Leaf Traits:

- SLA
- DMC

Pigments:

- Chlorophylls
- Carotenoids



4 RESULTS

Sedge

Carex ornithopoda



Forb

Homogyne alpina

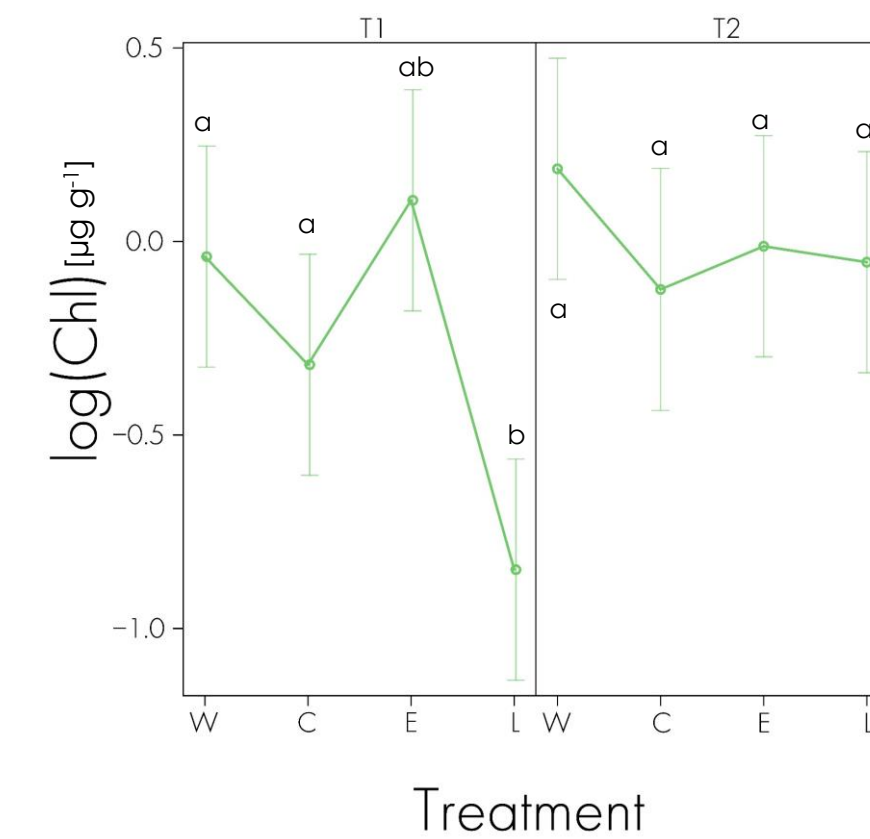


Grass

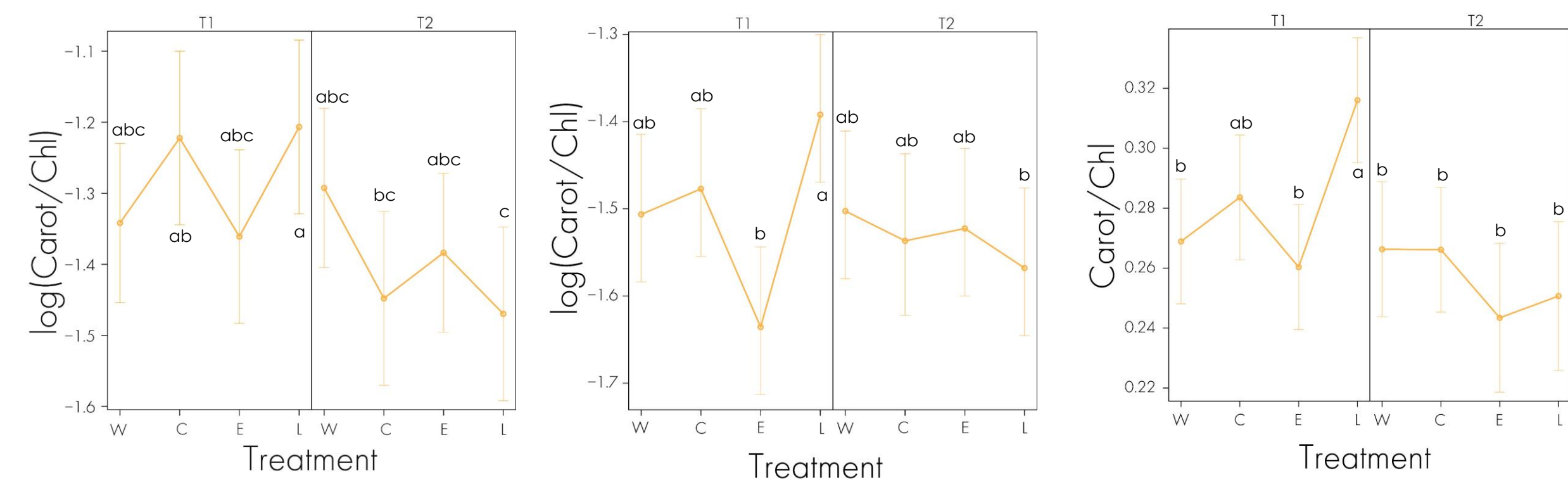
Sesleria caerulea



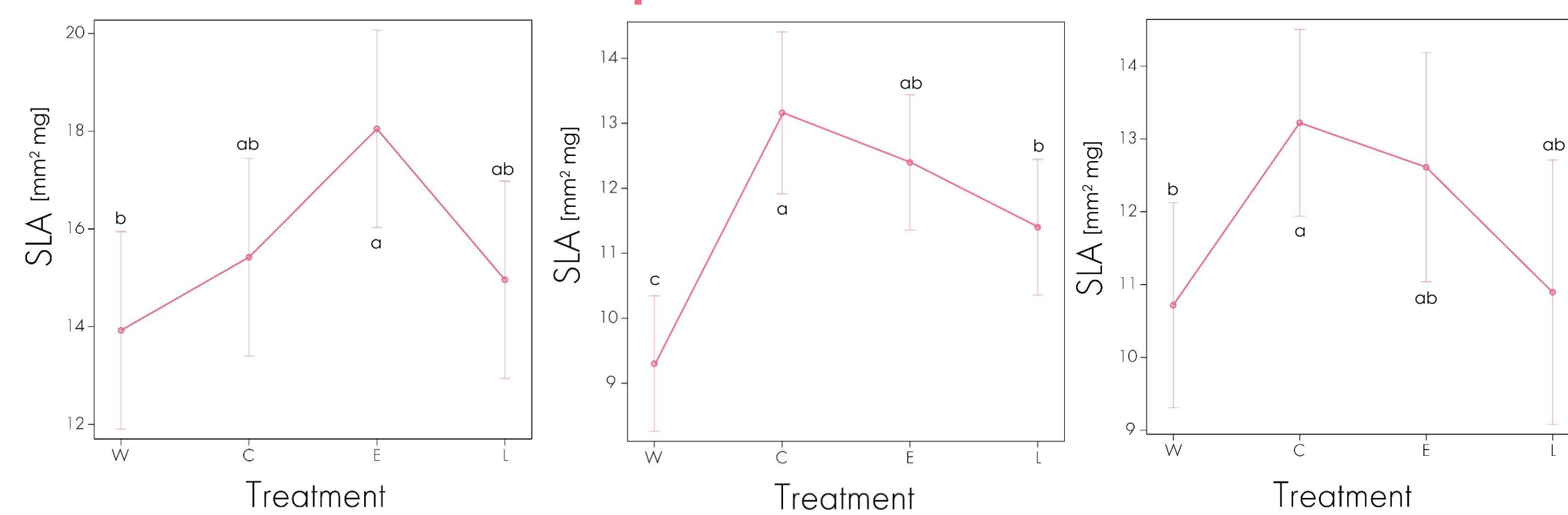
Chlorophylls



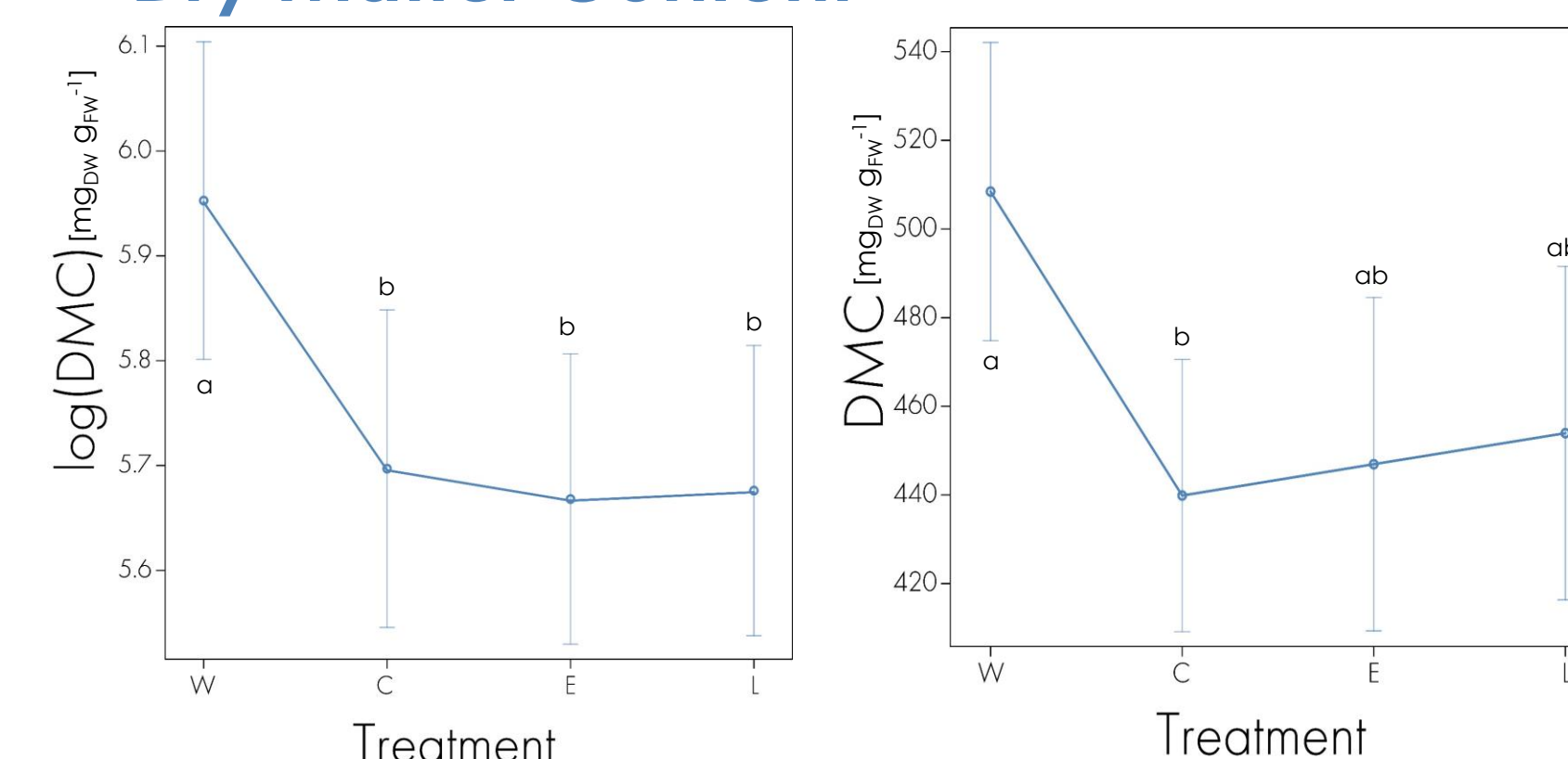
Carotenoids/Chlorophylls



Specific Leaf Area



Dry Matter Content



At T1 the **Carot/Chl** ratio was lower and the **Chl** level was higher in Forbs under the Whole and Early treatments compared to Control and Late treatments. By the end of the season (T2), the Whole treatment showed higher **Carot/Chl** ratios in all species compared to the other treatments. Specific leaf area (**SLA**) was lower in Whole and Late and higher in Control and Early, while dry matter content (**DMC**) showed an opposite trend, with higher values in Whole.

5 CONCLUSIONS

In summary, early heat waves creates a milder microclimate that benefits plant growth, whereas prolonged or late heat waves increases stress, resulting in denser tissues and lower photosynthetic efficiency.