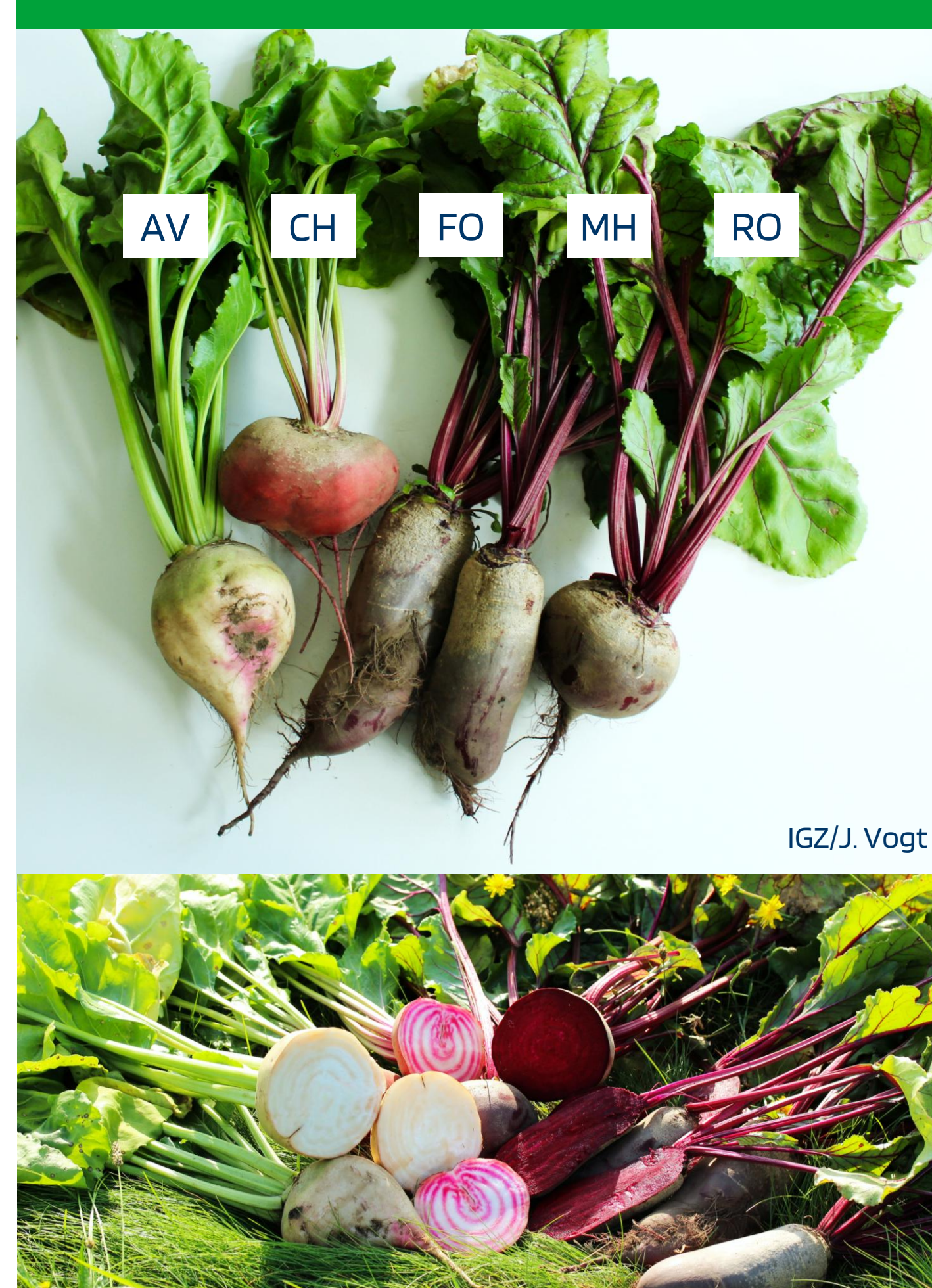


Introduction

Climate change in Brandenburg is characterized by increasingly irregular precipitation patterns and hot, dry periods in the summer.¹ Such climate variability creates uncertainty for field vegetable production. Beetroot (*Beta vulgaris* subsp. *vulgaris* 'Conditiva Group') is an important crop in organic systems and is known for its comparatively high stress tolerance.² This study aimed to evaluate cultivar-specific responses to drought stress and identify potential differences in yield, morphology and physiology.

Methods



Five different cultivars

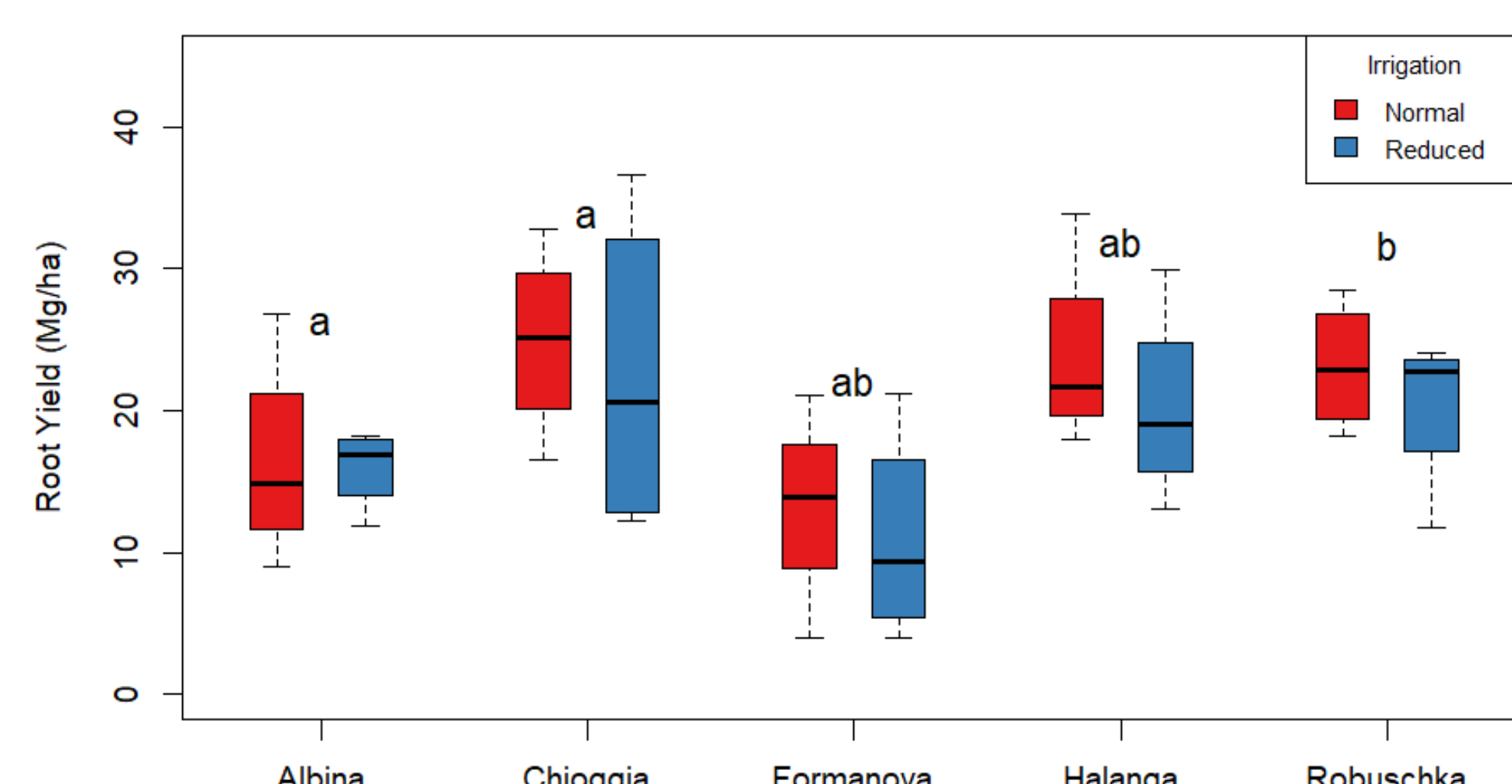
1. **Albina Vereduna (AV):**
→ white, spherical
2. **Chioggia (CH)**
→ red/white, spherical
3. **Formanova (FO)**
→ red, cylindrical
4. **Marner Halanga (MH)**
→ red, cylindrical
5. **Robuschka (RO)**
→ red, spherical

- Location and year: Großbeeren, Brandenburg in 2025
- Split-plot design with 4 replicates
 - Main-plot: irrigation (n=2)
 - Sub-plot: beetroot cultivars (n = 5)
- Irrigation regimes: 1) according to Geisenheim irrigation schedule (control) and 2) reduced by 30%, using a sprinkler cart
- Seeding 26th of May, harvest 28th of July
- Fertilization: 70 kg N ha⁻¹ via horn grit (2 weeks before seeding)
- Measurements: Yield and root diameter (n=30), stomatal conductance as parameter for drought stress tolerance

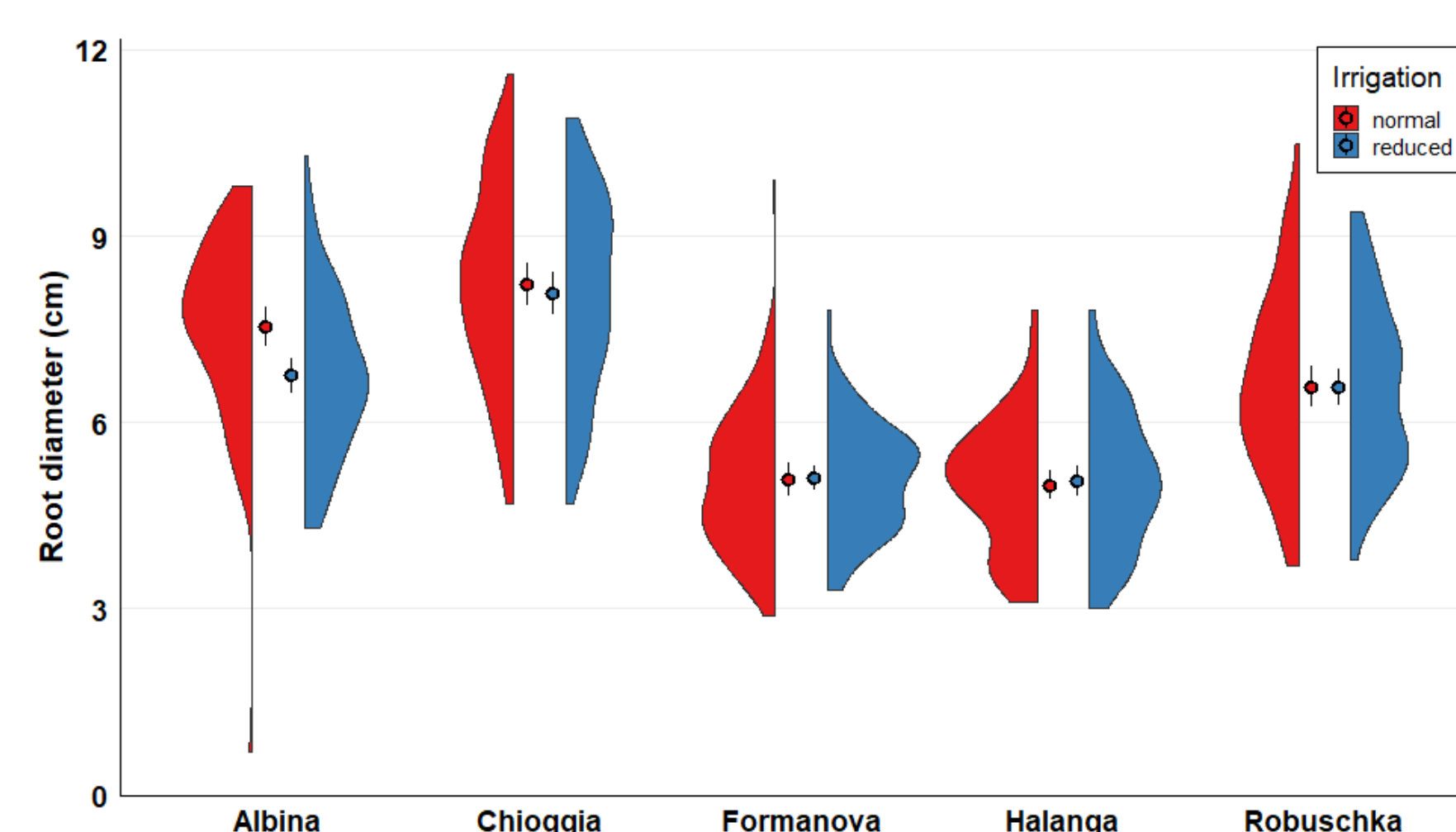
Results

High rainfall in July 2025 prevented the development of drought stress. As a result, irrigation had no significant effect on any measured trait. In contrast, cultivars differed significantly among each other: Total yield revealed differences in biomass formation, root diameter distributions clearly separated cylindrical (FO, MH) from round cultivars (AV, CH, RO) and stomatal conductance varied between cultivars.

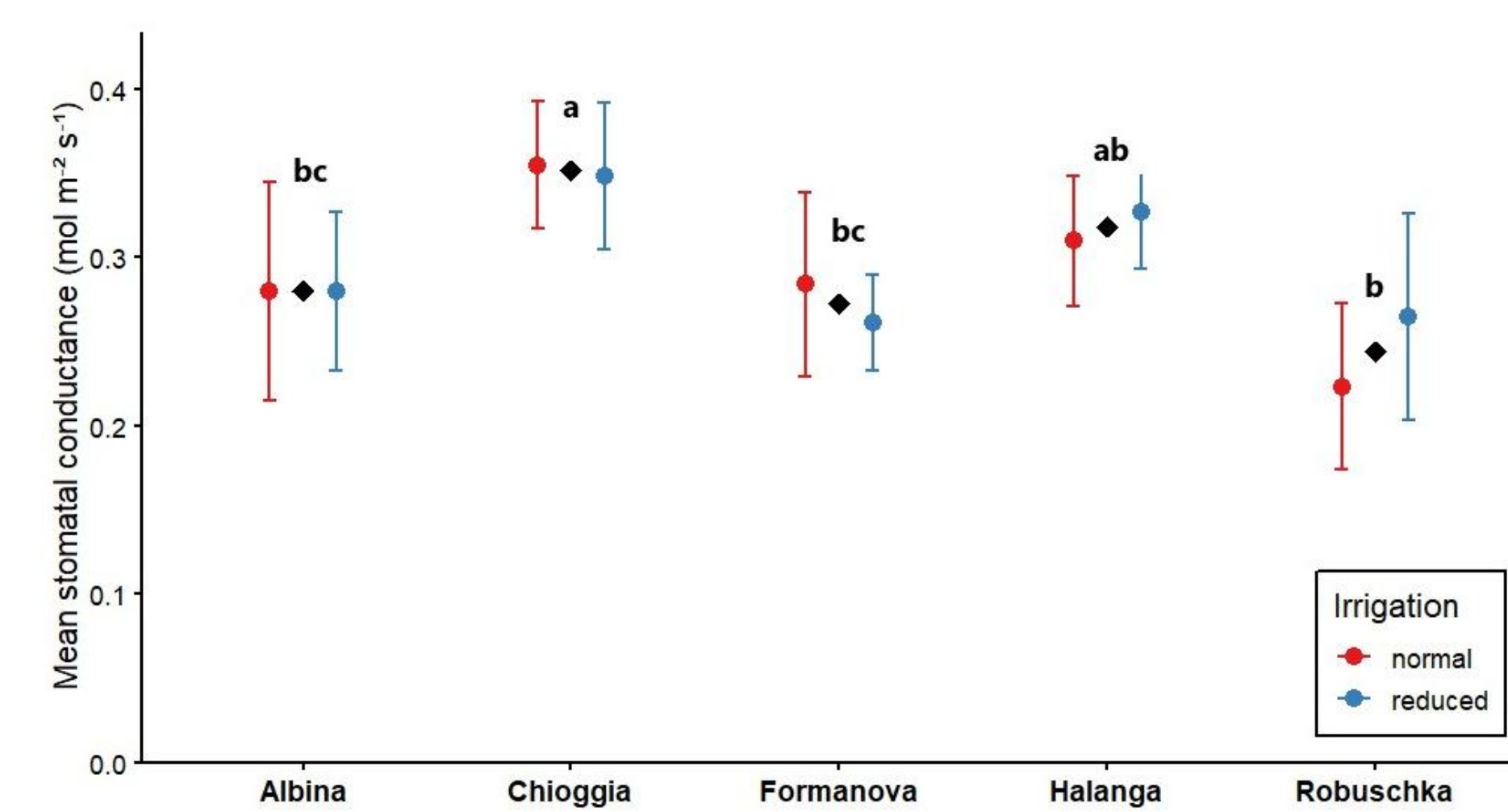
Root yield by cultivar



Root diameter distribution by cultivar



Stomatal conductance



Conclusion and Outlook

- Irrigation had no measurable effect under 2025 field conditions in Brandenburg.
- Cultivar strongly influenced yield formation, morphology and physiology.

For recommendations on drought stress tolerant cultivar selection (with regard to color and shape), a similar experimental approach is to be repeated in 2026. In order to increase the probability of drought stress, different sowing dates are to be selected.

Reference

1. Pohle, I., Zeifelder, S., Birner, J., & Creutzfeldt, B. (2025). The 2018–2023 drought in Berlin: Impacts and analysis from the perspective of water resources management. *Natural Hazards and Earth System Sciences*, 25, 1293–1313. <https://doi.org/10.5194/nhess-25-1293-2025>
2. Yolcu, S., Alavilli, H., Ganesh, P., Panigrahy, M., & Song, K. (2021). Salt and drought stress responses in cultivated beets (*Beta vulgaris* L.) and wild beet (*Beta maritima* L.). *Plants*, 10(9), Article 1843. <https://doi.org/10.3390/plants10091843>