

EFFECT OF IRRIGATION ON VEGETATIVE AND GENERATIVE GROWTH OF SEA BUCKTHORN (*HIPPOPHAE RHAMNOIDES* L.) — RESULTS OF THE FIRST HARVEST

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Introduction

Plant primary productivity as well as plant vitality and health are affected by different abiotic factors including water availability. Even sea buckthorn is generally considered as drought tolerant, cultivated plants were shown to respond positively to supplemental irrigation (BOIVIN, 2007; HÖHNE, 2013; ROCKSCH, 2009). Aim of the study was to quantify general relationships between water supply level and different plant growth and yield parameters from which irrigation recommendations can be derived.

Material and Methods

Site: Loamy sand; temperate climate; 9.2 °C and 552 mm average annual temperature and precipitation; Gülzow, Germany: 53°49'04"N, 12°03'52"E

Plant: *Hippophae rhamnoides* 'Habego': One year old rooted cuttings planted in spring 2019 and 2020, first harvested in 2021 and 2022, respectively

Design: RCBD with five irrigation variants (V1-V5) and two replicates (each planting year); in-row plant spacing 1.5 m; row distance 4.5 m

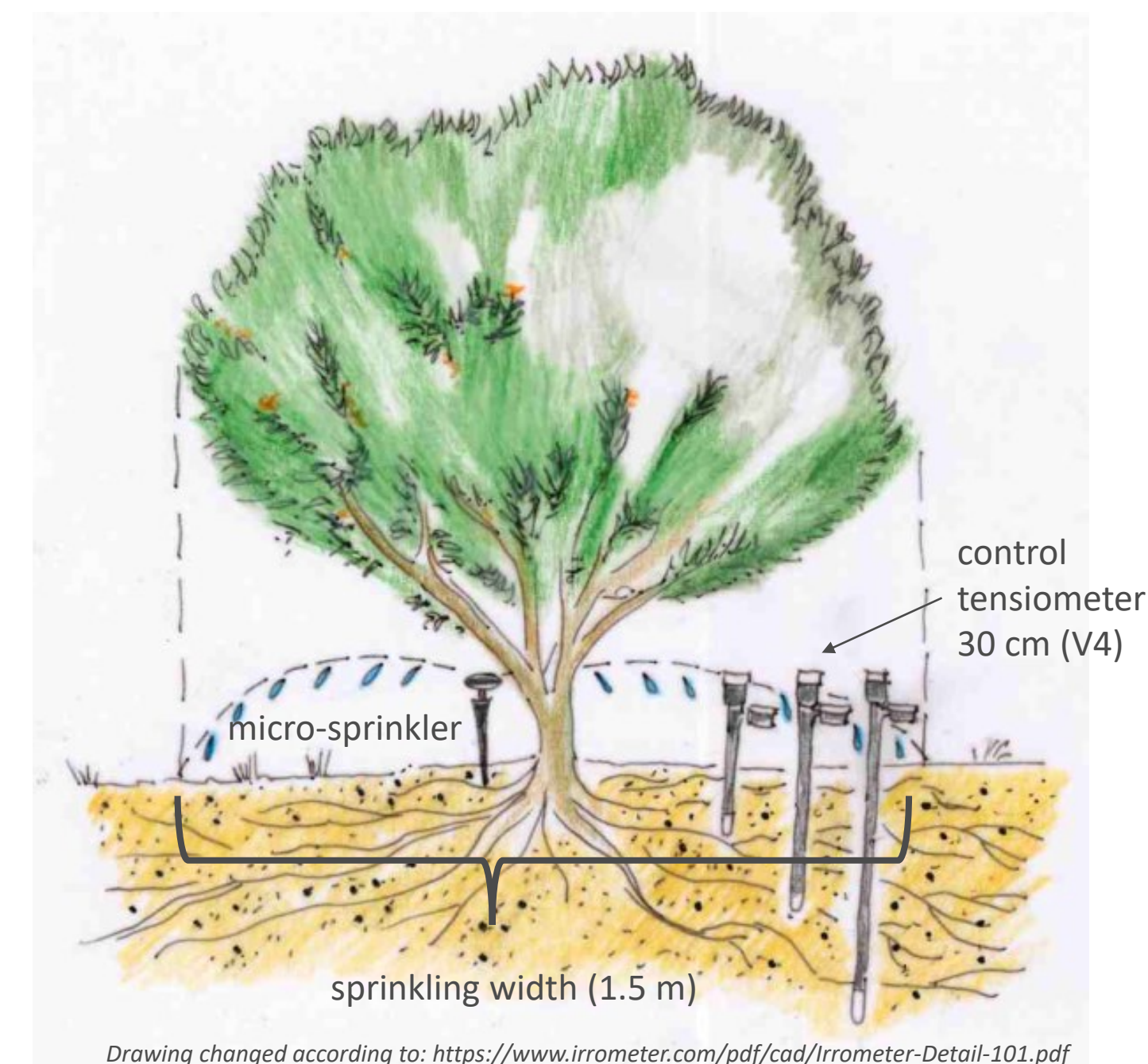
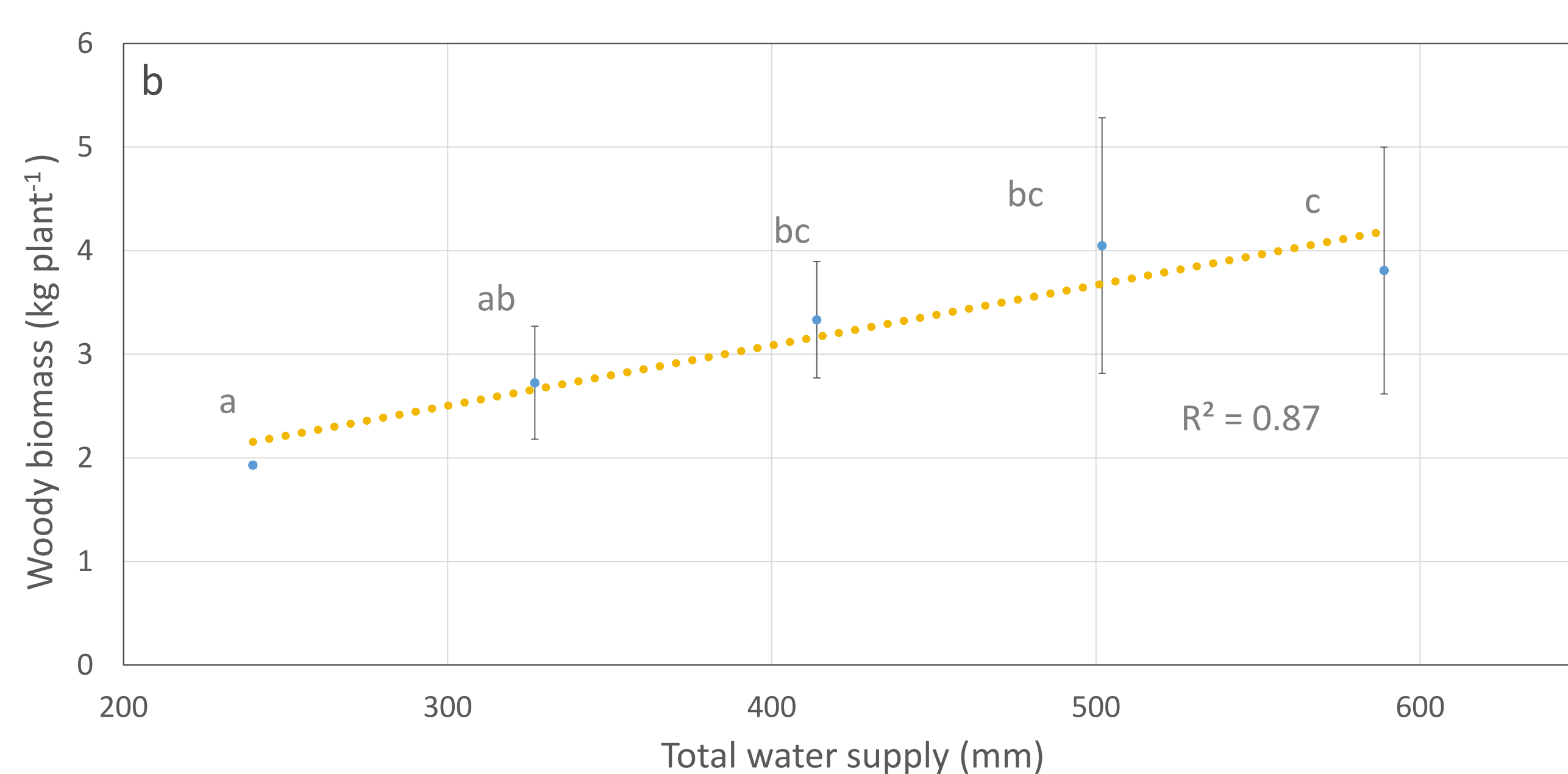
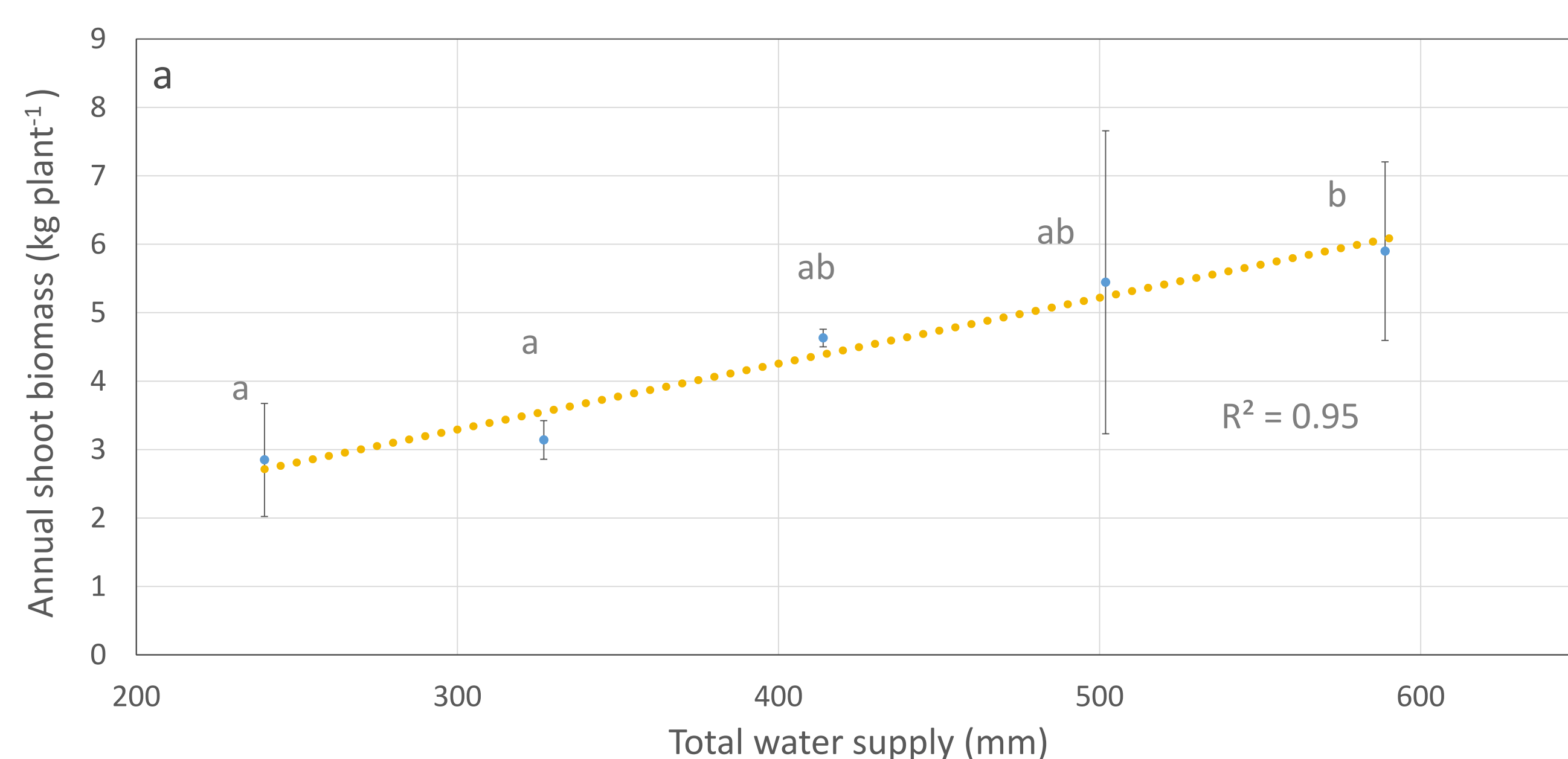
Water: Differentiation between variants starting in spring of each harvest year by different micro-sprinkler flow rates: 0, 20, 40, 60, 80 l/h; scheduling of irrigation by soil water tension

Harvest: Removal of ~70 - 80 % of total plant volume; final plant height after pruning ~0.80 m; separation of plant biomass into vegetative (annual shoots, leaves, wood) and generative (berries) fractions

Results

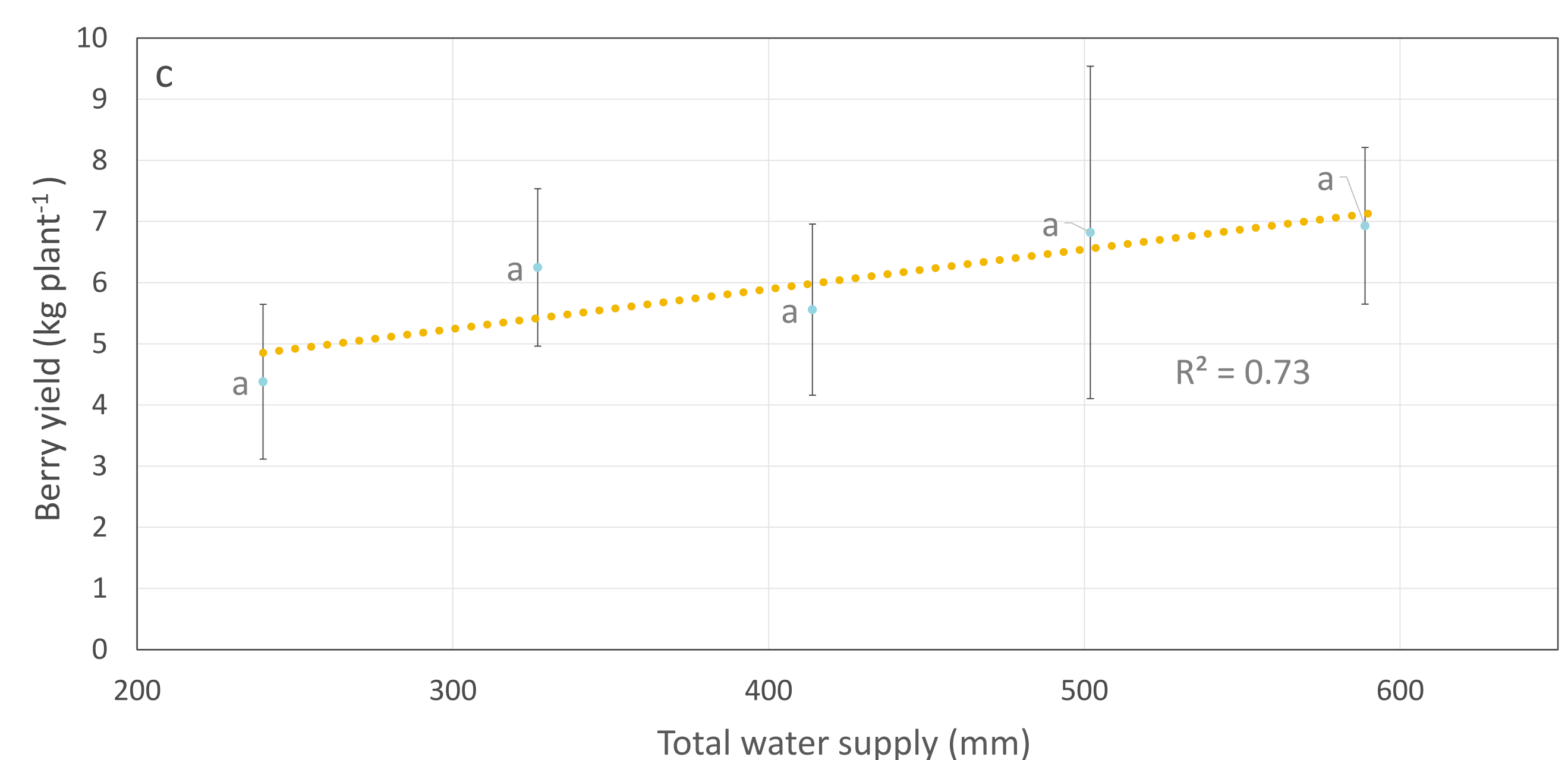
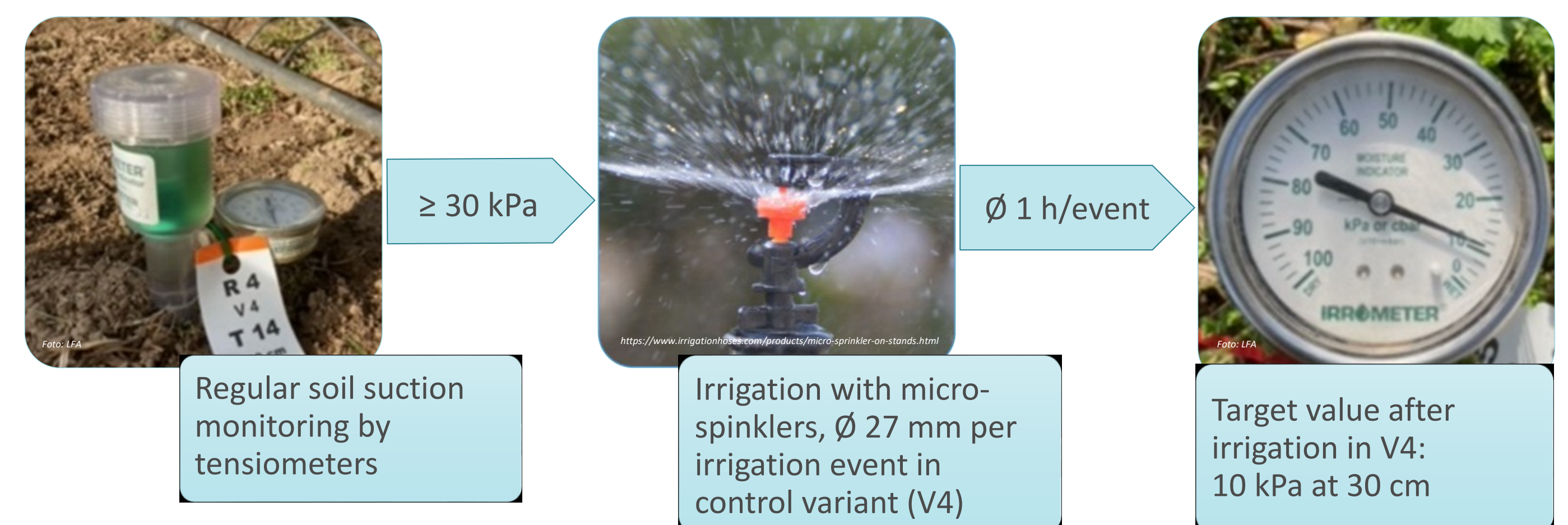
On average of both years, annual shoot biomass including leaves increased strongly and successively with increasing irrigation water from 2.8 kg plant⁻¹ (V1) to 5.9 kg plant⁻¹ (V5). Similarly, the woody biomass fraction (>1 year old) was doubled by irrigation, amounting to 1.9 kg plant⁻¹ in V1 and peaking at V4 with 4.0 kg plant⁻¹. Average berry yield ranged between 4.4 kg plant⁻¹ (V1) and 6.9 kg plant⁻¹ (V5). Even though berry yield was not significantly different between variants, there was a close positive linear relationship between berry mass and total water supply.

Diagrams show relationships between total water supply related to the total field including the grassy between-row area (sum of precipitation and irrigation between April 1st and August 31st) and a) annual shoot biomass including leaves, b) woody plant biomass (>1 year-old) and c) berry fresh matter yield. Dots and error bars represent average values and standard deviations of two experimental years, respectively. Means sharing same letters are not significantly different (Tukey-test; $p=0.05$).



Research question

How do different degrees of soil moisture affect vegetative growth and berry yield of cultivated sea buckthorn?



Conclusions

- Berry yield is less sensitive to the water supply level in the first harvest year than vegetative growth parameters. However, higher amounts of woody plant biomass due to supplemental irrigation can be expected to result in increased berry yields in future harvest years.
- Obtained results underscore the relevance of irrigation in sea buckthorn plantations for cultivating vital plants with high biomass productivity also under climatic condition of Northern Germany.

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