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Agronomical comparison of sweet basil cultivars: hydroponic vs. conventional

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Introduction

- Pilot farm launched in 2021
- 1000 m² cultivation area per layer
- 7 layers
- Circular economy

Zurich University of Applied Sciences

fenaco

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Introduction

- Comparison of cultivation system
  → Hydroponic vs. Soil

- Physiological parameters
  - Transpiration
  - Stomatal conductance
  - Chlorophyll content
- Mineral contents
- Essential oil
- Yield

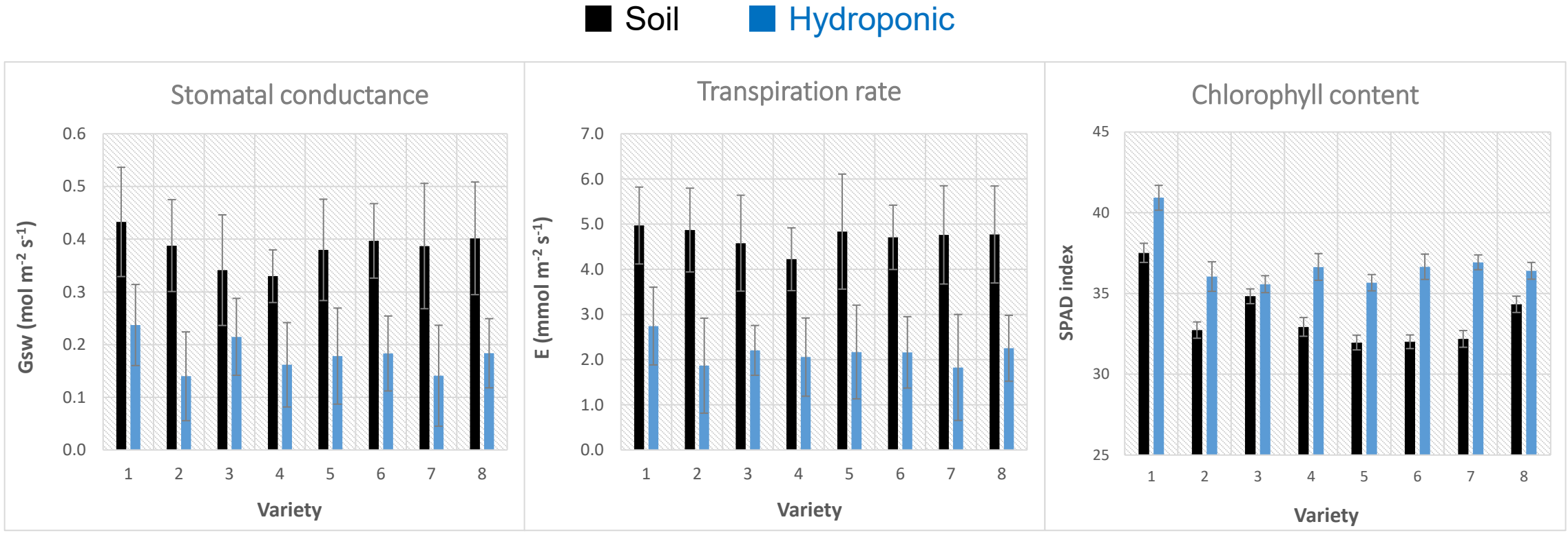
Experimental set-up
Hydroponic

- Growth chamber
  - 6 layers - 1.92m^2 / layer
- Fertilization (Nido one)
  - pH: 5.8-6 - EC: 1.6
- Climate:
  - T: 24°C/21°C, RH: 65%/60%
  - CO_2: 900 ppm
  - Photoperiod: 16h/8h (~250 µmol.m^{-2}.s^{-1})
  - Kroptek led (131 Wh/m^2)
- Substrate : Growfoam®
- Density: 96 plugs/m^2
- Parcel: 1m^2 – 4 replicates

Experimental set-up
Soil

- Glasshouse
  - 1.50m^2 / parcel – 3 replicates
- Fertilization: 1x / week
- Growing period: April to june 2023
- Density: 16 plants/m^2

Results
Physiological comparison



→ Higher stomatal conductance and transpiration rate in soil

→ Higher chlorophyll content in hydroponic

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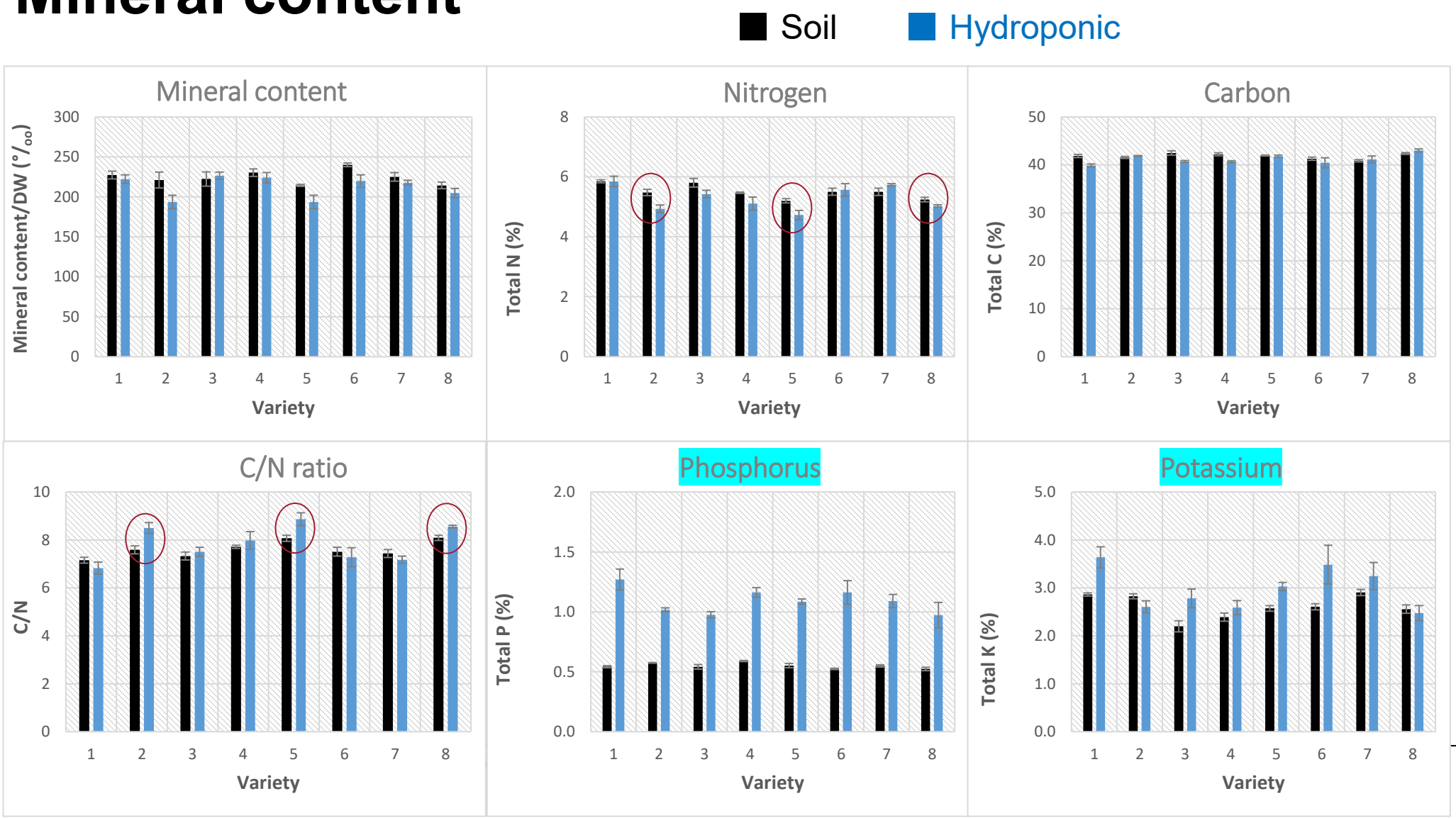
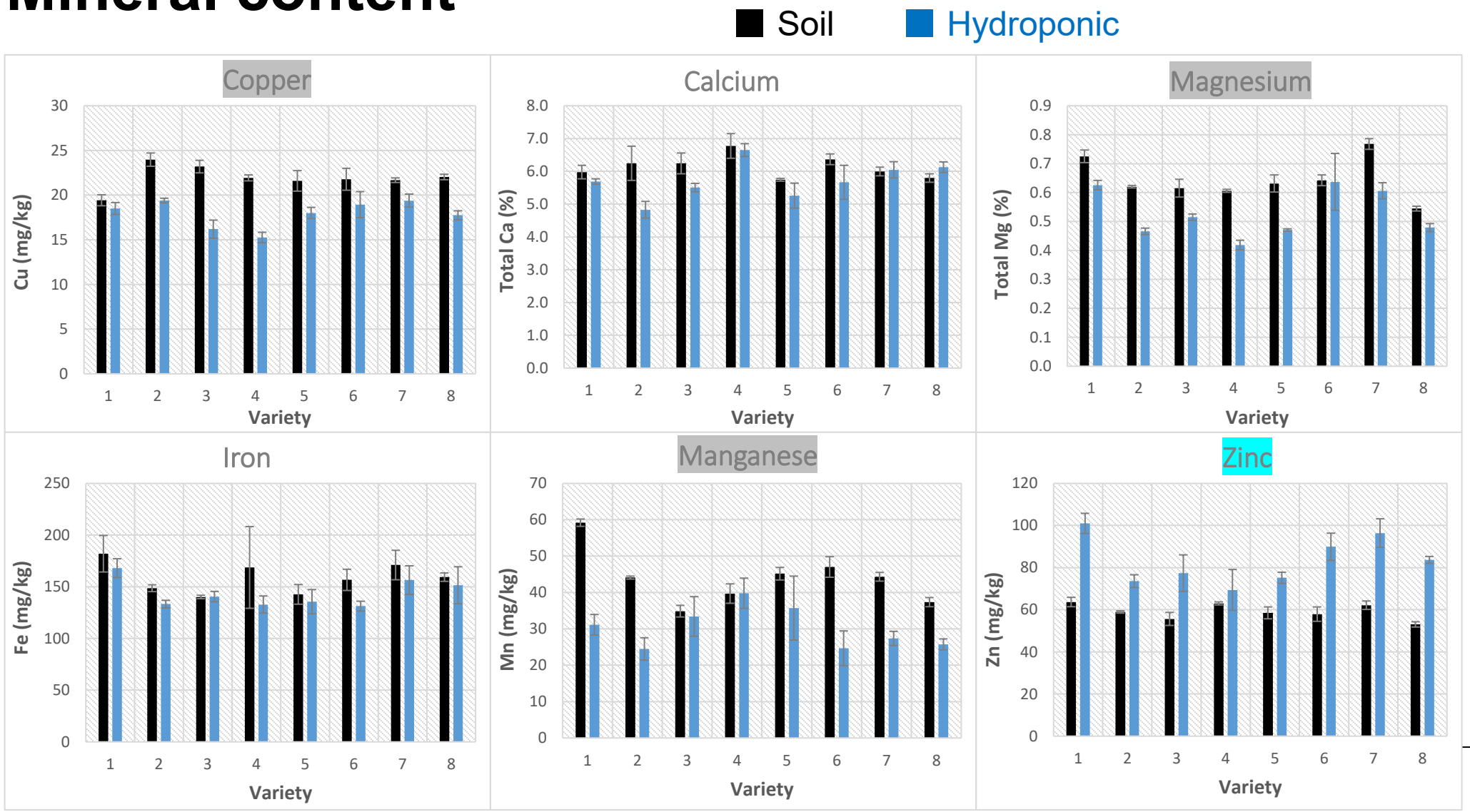
Results
Mineral content



Results
Mineral content



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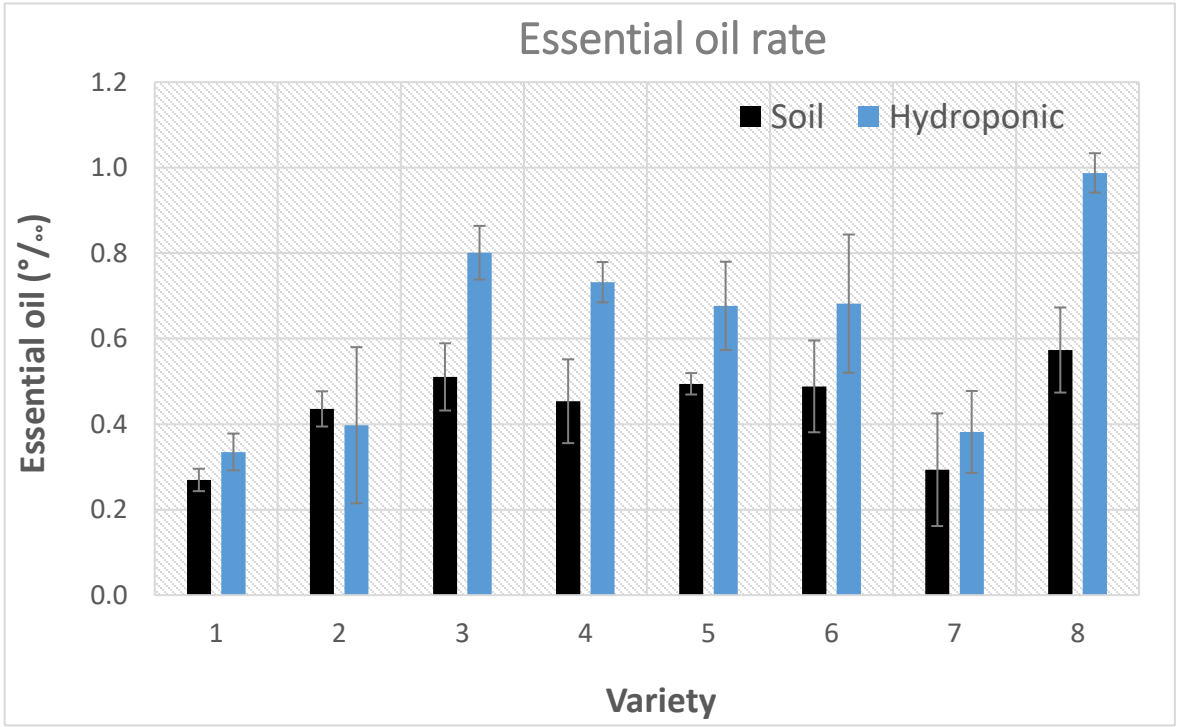
Results
Essential oil



→ Higher essential oil content in hydroponic

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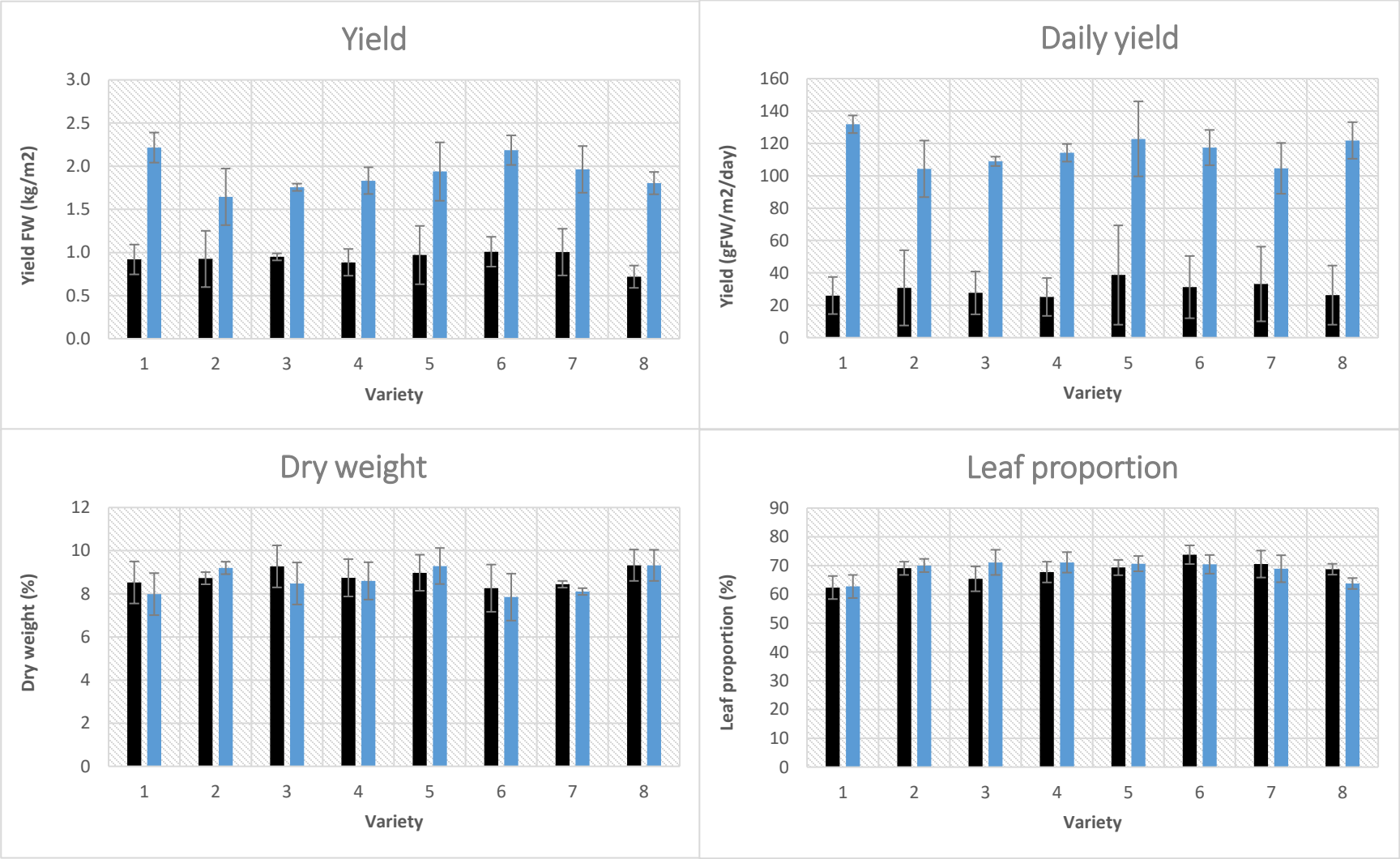
Results
Yield comparison



Growth duration

- Soil → 82 days
- Hydroponic → 34 days

Conclusion

	Hydroponic	Soil
Yield	++	
Growth duration	++	
Transpiration		+
Stomatal conductance		+
Chlorophyll	+	
Nutrient content	-	-
Macro	+	
Micro	+	+
Essential oil	+	

Perpectives

- Further comparison will be performed
  - Density
  - Light
  - Temperature

    → preliminary results suggest that decreasing temperature leads to an increase in yield of around 65% depending on variety
















Thank you for your attention

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