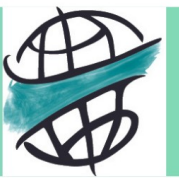


Investigation on leaf temperature and water use of Tatsoi cultivation under light and water stress



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Introduction

Each plant has a different response to stress. One way to determine a plant's response to stress is by observing changes in leaf temperature. Water stress is known to cause changes in leaf temperature and chlorophyll (Shahenshah & Isoda, 2010). Pakcoy plants leaf temperature is reported to decrease with increasing air humidity (Han et al., 2019).

The mystery?

- How leaf temperature change on Tatsoi plant during light and water stress?
- How light and water stress impact Tatsoi plant water use?

Results

- Stomatal conductance (g_{sw}) has a positive correlation with net photosynthesis (A_n) and transpiration (Tr) rate.

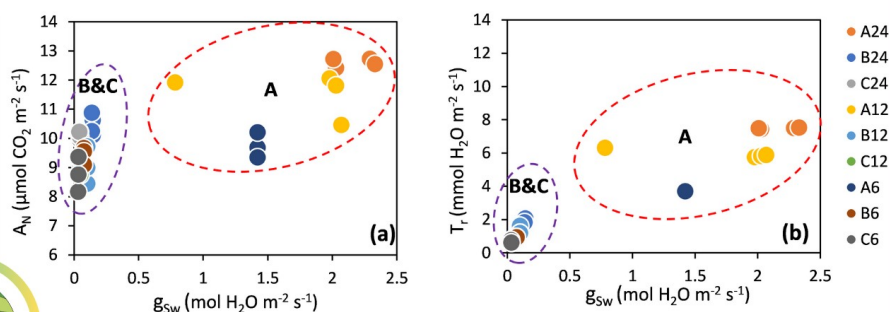


Figure 1. g_{sw} relation with A_n and Tr

- Tatsoi response to stress by reducing water uptake (low $dH \sim WR$), leads to higher leaf temperature (low $T_c - T_a$) than the non-stressed plant.
- The low WUE occurred due to low fresh weight since Tatsoi plant in the B & C treatment has a low photosynthesis rate, results in reduced plant growth rate and yield.

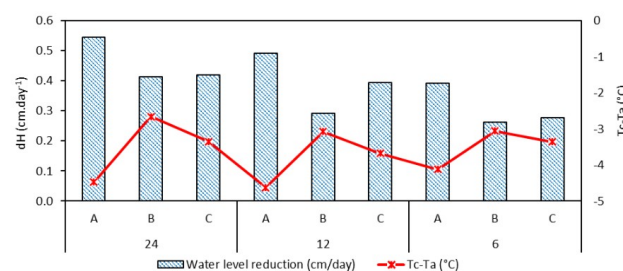


Figure 2. Average dH and $T_c - T_a$

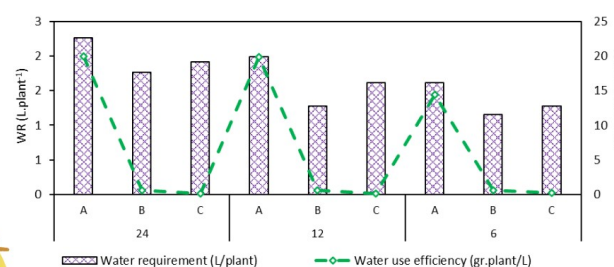
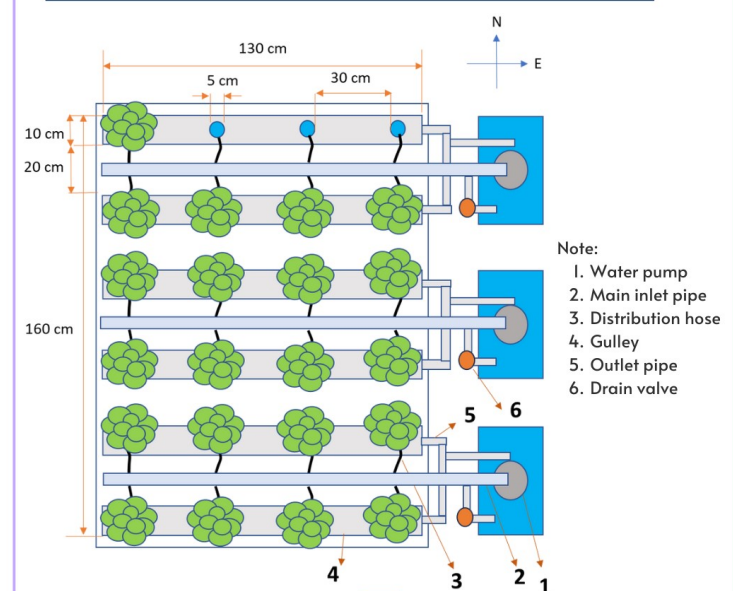


Figure 3. WR and WUE

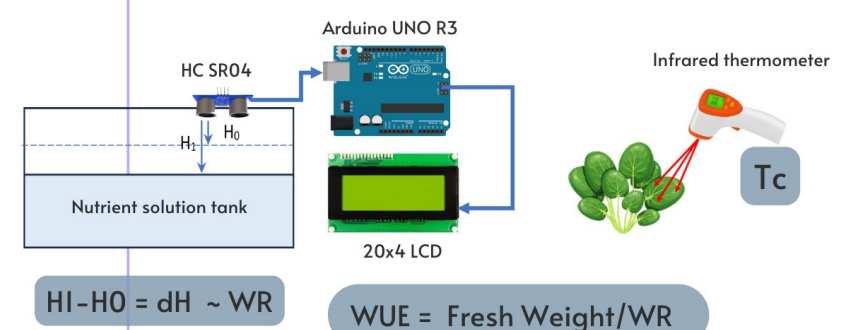
Methods

The treatments (3x3)

- Shading : 0% shade (A), 90% shade (B), 99% shade (C).
- Watering durations: 24, 12, 6 hours.



A24, B24, C24, A12, B12, C12, A6, B6, C6



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Main finding

The research underscores the importance of optimizing light and water conditions in NFT hydroponic systems inside a greenhouse, to maintain Tatsoi plant health and sustainable production, especially in tropical climates.

Conclusion

- Tatsoi leaf temperature change is influenced by transpirational cooling which highly related to light and water deficiency.
- Light and water stress significantly decrease water use efficiency (>90%) due to lower photosynthetic rate, results in decreasing fresh plant weight.