

For eastern China and especially for Zhejiang-related production, more local greenhouse work is needed. The Haining study gives a strong starting point, but it does not answer every question about irrigation frequency under the humid, quality-oriented, protected systems common in the region. Future trials should compare daily versus pulsed scheduling, link irrigation rhythm with fruit cracking and flavor, and test whether sensor-based models developed in one Delta greenhouse can be transferred to another. That would make irrigation recommendations not only more scientific, but more regionally useful (Chang et al., 2019; Yue et al., 2023).

8.4 Conclusions

Irrigation frequency is one of the most practical and biologically meaningful levers in melon production. It shapes vegetative growth through its effects on root-zone stability, leaf expansion, and photosynthesis. It shapes fruit development by protecting or constraining fruit set and enlargement. And it shapes fruit quality by influencing sugar concentration, acidity, firmness, nutritional compounds, and cracking during maturation. The strongest overall pattern in the literature is not that frequent irrigation is always better or that deficit is always better. Rather, melon performs best when irrigation frequency changes with developmental stage.

Stable and adequate watering is most important from flowering through early fruit growth. This is the phase where poor scheduling most clearly reduces yield. Later, once fruit size is largely formed, a carefully controlled reduction in frequency or intensity can improve sweetness, nutritional density, and market quality, and may also reduce cracking. Greenhouse systems, soilless culture, and high-value protected production make this stage-specific logic even more important because the root zone is smaller and fruit quality premiums are higher.

Viewed this way, irrigation frequency is not simply a timing parameter. It is a developmental strategy. Good melon irrigation should therefore be dynamic, stage-specific, and increasingly data-informed. For growers and researchers alike, the practical goal is no longer just to apply enough water. It is to deliver water with the right rhythm, at the right stage, for the right fruit outcome.

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Conflict of Interest Disclosure

The author affirms that this research was conducted without any commercial or financial relationships that could be construed as a potential conflict of interest.

References

- Bustan A., Cohen S., De Malach Y., Zimmerman P., Golan R., Sagi M., and Pasternak D., 2005, Effects of timing and duration of brackish irrigation water on fruit yield and quality of late summer melons, *Agricultural Water Management*, 74(2): 123-134.
<https://doi.org/10.1016/j.agwat.2004.11.009>
- Cabello M.J., Castellanos M.T., Romojaro F., Martínez-Madrid C., and Ribas F., 2009, Yield and quality of melon grown under different irrigation and nitrogen rates, *Agricultural Water Management*, 96(5): 866-874.
<https://doi.org/10.1016/j.agwat.2008.11.006>
- Chang L., Yin Y., Xiang J., Liu Q., Li D., and Huang D., 2019, A phenotype-based approach for the substrate water status forecast of greenhouse netted muskmelon, *Sensors*, 19(12): 2673.
<https://doi.org/10.3390/s19122673>
- Cheng H., Kong W., Tang T., Ren K., Zhang K., Wei H., and Lin T., 2022, Identification of key gene networks controlling soluble sugar and organic acid metabolism during oriental melon fruit development by integrated analysis of metabolic and transcriptomic analyses, *Frontiers in Plant Science*, 13: 830517.
<https://doi.org/10.3389/fpls.2022.830517>
- di Santo H., and Barrios-Masias F., 2026, Implementation of deficit irrigation to improve crop water productivity in cantaloupe melons, *The Journal of Agricultural Science*, 164: e29.
<https://doi.org/10.1017/S0021859626100665>
- Ercan M., Çoklar H., Akbulut M., Yavuz D., Seymen M., and Yavuz N., 2023, Effect of irrigation regime on chemical, physico-chemical, and functional properties of melon fruits and seeds, *Gesunde Pflanzen*, 75(6): 2835-2845.
<https://doi.org/10.1007/s10343-023-00900-w>