transpiration, and integrated evaluation (TOPSIS) showed that comprehensive growth was positively correlated with yield, implying that fruit weight models must incorporate coupled water-nutrient-$CO_2$ effects rather than treating each driver independently.

Intelligent irrigation-fertigation systems and IoT platforms offer promising tools to regulate environmental drivers in real time and indirectly stabilize fruit weight. In greenhouse watermelon, an intelligent drip-fertigation system used soil-moisture sensors and IoT-based controllers to adjust irrigation limits and nutrient supply by growth stage, reducing water, N, $P_2O_5$ and $K_2O$ inputs by 33%-72% without compromising yield or fruit quality. Dry matter accumulation and nutrient uptake followed logistic curves, and improving root traits under intelligent fertigation enhanced water and nutrient acquisition, suggesting that such systems could be coupled with fruit weight models to optimize source-sink balance during the fruit expansion phase. More integrated smart-farming architectures are also emerging for melon and watermelon. An IoT system combining soil moisture, temperature, humidity, and light sensors with CNN-based image analysis automatically regulated watering while predicting fruit weight with accuracies above 99%, and achieved very high reliability of nutrient, pH, and moisture sensors. Broader reviews of AI-IoT in precision agriculture emphasize that fusing remote sensing, high-throughput phenotyping, and machine-learning analytics enables site-specific irrigation and fertilization, automated crop monitoring, and yield forecasting, but also note challenges in data integration, scalability, and real-time decision support that must be addressed before such systems can be widely deployed for watermelon fruit weight regulation.

## Acknowledgments
Thanks to the reviewers for providing detailed comments and guidance on the manuscript of this study. The reviewers' keen insights into the issues and attention to detail have greatly benefited the authors.

## 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
Anees M., Zhu H., Umer M., Gong C., Yuan P., Lu X., He N., Kaseb M., Yang D., Zhao Y., and Liu W., 2023, Identification of an Aux/IAA regulator for flesh firmness using combined GWAS and bulked segregant RNA-Seq analysis in watermelon, Horticultural Plant Journal, 10(2): 463-476.
https://doi.org/10.1016/j.hpj.2023.05.018

Bai T., Wang T., Zhang N., Chen Y., and Mercatoris B., 2020, Growth simulation and yield prediction for perennial jujube fruit tree by integrating age into the WOFOST model, Journal of Integrative Agriculture, 19(8): 2022-2034.
https://doi.org/10.1016/S2095-3119(19)62753-X

Barros A., Silva R., Neto A., Vellame L., Santos M., and De Oliveira Aguiar Netto A., 2024, Thermal, hydric, and physiological effects on watermelon due to wetted area variation, Revista Ceres, 71(1): 1-10.
https://doi.org/10.1590/0034-737X2024710002

Bora D., Neog M., and Dutta S., 2024, Assessment of morpho-biochemical traits in watermelon (*Citrullus lanatus*) cultivars across staggered sowing intervals under the agro-climatic conditions of Assam, India, Journal of Scientific Research and Reports, 30(10): 480-490.
https://doi.org/10.9734/jsrr/2024/v30i102480

Chamchum W., Glahan S., Kramchote S., Maniwara P., and Suwor P., 2023, Growth and yield of watermelon (*Citrullus lanatus*) in plastic house in response to white LED supplementary lighting, AGRIVITA Journal of Agricultural Science, 45(2): 363-372.
https://doi.org/10.17503/agrivita.v45i2.3967

Chung S., Yun K., and Kim S., 2025, An integrative process-based model of fruit growth as a function of carbon and water fluxes modulated by endogenous abscisic acid in blueberry fruit, Quantitative Plant Biology, 6: e11.
https://doi.org/10.1017/qpb.2025.10011

Correa E., Malla S., Crosby K., and Avila C., 2020, Evaluation of genotypes and association of traits in watermelon across two southern Texas locations, Horticulturae, 6(4): 67.
https://doi.org/10.3390/horticulturae6040067

Dahake L., Sonkamble A., Patil S., and Meshram L., 2020, Influence of spacing on yield, quality and economics of watermelon, International Journal of Chemical Studies, 8(6): 1223-1225.
https://doi.org/10.22271/chemi.2020.v8.i6ab.11052

Deka B., Handique K., Borthakur P., Kotoky U., Saikia A., Kalita P., Gogoi B., Goswami S., Hazarika B., and Hazarika J., 2024, Effect of crop geometry, fruit thinning and nutrient management on growth parameters of watermelon (*Citrullus lanatus* Thumb.), International Journal of Advanced Biochemistry Research, 8(1): 294-299.
https://doi.org/10.33545/26174693.2024.v8.i1sb.294