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Título artículo: Functional response of garlic to optimized regulated deficit irrigation (ORDI) across crop stages and years: Is physiological performance impaired at the most sensitive stages to water deficit?
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RESUMEN: Garlic is widely cultivated around the globe. Particularly in semi-arid regions, where limited water reservoirs are getting more valuable due to climate change and increasing demand. In this context, implementation of irrigation management techniques such as the optimized regulated deficit irrigation (ORDI) are beginning to be explored. ORDI distributes the total available water, based on the needs at each growing stage (in the case of garlic: establishment = Ky(i'), crop development = Ky(i''), bulbification = Ky(ii) and ripening = Ky(iii)). To evaluate and improve deficit irrigation strategies, leaf functional traits such as stomatal conductance (gs); net CO2 assimilation rate (An) and the ratio of An and gs, known as the intrinsic water use efficiency (WUEi) can be reliable indicators of the functional response of the plant and its acclimation to deficit irrigation. In this study, five irrigation treatments were analyzed during 2016 and 2017: one without water limitation (FullIG), and the other four with different irrigation water supplies, corresponding to 100 %, 90%, 80% and 70% of net irrigation needs of purple garlic for intermediate weather conditions of a typical meteorological year (TMY). In 2015, the same treatments except T100 were analyzed. Thus, FullIG and T100 were the same treatment up to the amount of water assigned to T100 was depleted. In the case of T90, T80 and T70, the allocation of the amount of available irrigation water was optimized by using ORDI. Garlic displayed acclimation to water deficits imposed by ORDI. ORDI allowed the recovery of optimal physiological performance of garlic after water stressed and increased irrigation supply at the most drought sensitive stages. However, other environmental factors besides water deficit, affected biomass increment and finally bulb yield throughout the studied years. Overall, this study confirmed that ORDI optimized irrigation water supply throughout the crop cycle, minimizing yield losses in the most water limited treatments and supported the use of selected functional traits as early proxies of crop yield to assist and improve irrigation management of garlic in areas with restricted water availability.

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