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Influence of abiotic stressors on growth, physiology, productivity and quality of horticultural crops and its mitigation strategies

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E nvironmental stresses, such as drought, salinity, cold, wind velocity, humidity and heat cause adverse effects on the growth of plants and the productivity and quality of crops. Abiotic stress is the primary cause of crop loss worldwide, reducing average yields for most major crop plants by >50%. Abiotic stressors affect the water relations of a plant on the cellular as well as whole plant level causing specific as well as unspecific reactions. This leads to a series of morphological, physiological, biochemical and molecular changes that adversely affect plant growth and productivity. The most important criterion of adaptation in a natural ecosystem is survival in space and time. In addition, climate change has created additional environmental variables which may influence pre and postharvest stress susceptibility of fruits and vegetables. The focus of effort should probably be on use of breeding or directed breeding and selection approach is that there must be stressors applied in reproducible ways to allow the breeder to identify expression of stress resistance since that characteristic is adaptive, rather than constitutive, in nature. The knowledge of timing of phonological events and their variability can help to get more stable crop yields and quality. Both an early crop cultivar and an earlier sowing may be reducing the irrigation requirements and water amount. The increased water use efficiency caused by increasing CO₂ will compensate only partially for the negative effects of increasing water limitation. Farming practices like 'conservation tillage and zero-tillage', optimum land use' practices are helping in mitigating abiotic stressors and lead to decomposition of organic materials and more carbon stored in the soil.

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