

Effect of elevated CO₂ and temperature on crop growth and yield attributes of bell pepper (*Capsicum annuum* L.)

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ABSTRACT

Investigations were carried out during 2014 and 2015 to study the effect of elevated CO₂ and temperature on growth and yield contributing parameters of bell pepper (*Capsicum annuum* L.) under open top chamber (OTC) at research farm of Department of Environmental Science, Dr Y.S. Parmar UHF, Nauni, Solan, Himachal Pradesh with four treatments [T₁(eCO₂): OTC with elevated CO₂ 550±10 ppm; T₂(eT & eCO₂): elevated temperature by 1°C and elevated CO₂ 550±10 ppm; T₃(aT & aCO₂): ambient temperature and CO₂ and T₄: natural condition] and each treatment had two varieties (California Wonder and Solan Bharpur) of bell pepper which were replicated thrice. Results revealed that bell pepper recorded maximum plant height, leaf area, yield attributes under eCO₂ which were significantly higher than all other treatments. However, the harvest duration and days to first harvest was lowest under eCO₂. Higher fruit size as well as fruit weight was recorded with eCO₂ followed by eT and eCO₂, aT and aCO₂ and open natural condition. But maximum number of fruits and highest fruit yield was obtained with natural condition which was significantly superior over eCO₂ as well as over eT and eCO₂ because increase in temperature negated fruit set due to less pollen viability under eCO₂ and eT & eCO₂ as compared to open. In open natural conditions due to higher pollen viability and more fruit setting as compared to higher CO₂ and temperature conditions, it resulted more yield. Solan Bharpur recorded higher total fruit yield (800.2 g plant⁻¹) than California Wonder (399.1 g plant⁻¹). Elevated CO₂ has positive effect on plant growth and yield attributes in both cultivars of bell pepper. However, under interactive effect of elevated CO₂ and elevated temperature, rising temperature negated the positive effects of elevated CO₂ on crop production.

Key Words: Bell pepper, elevated CO₂, elevated temperature, open top chamber, vegetables