



Effect of Irrigation and Nitrogen Management on Performance of Winter Sunflower (*Helianthus annuus* L.)

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Abstract: Irrigation scheduling and nitrogen fertilization has a great influence on sunflower (*Helianthus annuus* L.) growth and yield. A field study was conducted to monitor the effects of irrigation regimes, nitrogen application rates and methods in a sandy loam soil. The treatments during first year included four irrigations schedules in main plots viz. i) irrigation water amount minus rain amount to cumulative pan evaporation ratio (IW/CPE) of 0.6 throughout the crop growth period ($I_{0.6}$), ii) IW/CPE of 0.9 throughout ($I_{0.9}$), iii) IW/CPE of 1.2 throughout ($I_{1.2}$) and iv) irrigation was withheld until 50% anthesis and thereafter applied at IW/CPE of 1.2 ($I_{1.2F}$). Nitrogen was applied @ 30 (N_{30}), 60 (N_{60}) and 90 (N_{90}) kg ha⁻¹ as the sub plot treatments at the time of sowing. The treatments during the second year were similar to those during first year except that treatment $I_{0.6}$ was modified to $I_{0.6/1.2}$ due to very low rains during early crop season. Irrigation was applied on the basis of IW/CPE of 0.6 till flowering and subsequently on the basis of IW/CPE ratio of 1.2 ($I_{0.6/1.2}$). In addition, the nitrogen during second year was applied before PSI and at the time of sowing (AS) as per the treatments. The experiment was laid out in factorial randomized block design with three replications. The plant parameters (like plant height, stem girth etc.) were significantly affected by irrigation, applied nitrogen and method of N application. The advantage of PSI for increasing grain yield was highest when irrigation was limited or withheld during vegetative stage i.e. 50% anthesis stage.

Key Words: Sunflower, Irrigation Regime, Nitrogen Rates, Growth Parameters, Yield Components