

Influence of Soil Moisture Levels and Cytokinin Application on the Photosynthesis of Mung Bean (*Vigna radiata* L.) Variety 'Harsha'

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Mung bean (*Vigna radiata* L.) is a vital legume crop that is widely grown for its nutritional value as well as for its ability to fix atmospheric nitrogen to enrich the soil. However, soil moisture stress is a major limitation which reduces the yield of Mung bean, and the application of cytokinin is known to mitigate stress in plants. The focus of this study was to analyse the photosynthetic response of the mung bean variety 'Harsha' to different soil moisture levels and the application of cytokinin (kinetin). The experiment was conducted as a completely randomized design (CRD) with 2 factors; two levels of moisture (80% field capacity and 40% field capacity), and two cytokinin levels (0 and 150 mg/L kinetin) under greenhouse conditions. Kinetin was foliar sprayed for five times in weekly intervals after flowering. The rate of photosynthesis and stomatal conductance were measured once after flower initiation. Flower and fruit setting were measured daily basis. Data was analysed using Statistical Analysis Software (SAS). According to the results, the cytokinin application did not significantly affect photosynthetic rate and stomatal conductance. The photosynthetic rate of plants grown under high soil moisture was $10.1 \mu\text{mol CO}_2 \text{ m}^{-2} \text{ s}^{-1} \text{ plant}^{-1}$, whereas those under low moisture conditions showed nearly a 50% reduction, showing the significant impact of water availability on photosynthetic efficiency. A similar trend was observed in stomatal conductance, which dropped from $0.08 \text{ mol H}_2\text{O m}^{-2} \text{ s}^{-1} \text{ plant}^{-1}$ in well-watered plants to just 0.02 under moisture-limited conditions. The interaction effect did not significantly affect the rate of photosynthesis ($p > 0.05$). Kinetin application resulted in 3 days earlier flowering compared to control plants. Interestingly, a higher number of flowers were observed in plants treated with cytokinin under high soil moisture conditions. The interaction effect significantly affected the flowering and pod setting ($p < 0.05$).

Keywords: Cytokinin, Mung bean, Photosynthesis, Soil moisture