

## **Differential effect of nitrogen forms on physiological parameters and micronutrient concentration in maize (*Zea mays* L.)**

### **ABSTRACT**

Nitrogen is an essential macro nutrient for the plant growth. Plants can absorb nitrogen in cationic ( $\text{NH}_4^+$ ) and anionic ( $\text{NO}_3^-$ ) forms that can influence the physiological parameters, absorption of micronutrients and can cause the nutritional imbalance in plants. This study investigated the effects of urea, ammonium nitrate, ammonium sulphate and calcium nitrate on growth, physiological parameters and absorption of micronutrients by maize. Nitrogen forms significantly affected shoot and root dry weights, leaf stomatal conductance, transpiration rate, photosynthetic rate and concentrations of zinc, manganese and copper in maize shoots and roots. Urea fed plants had maximum shoot dry weight (56.76 g pot<sup>-1</sup>) and root dry weight (5.50 g pot<sup>-1</sup>) while nitrate fed plants had minimum shoot (51.74 g pot<sup>-1</sup>) and root dry weights (4.42 g pot<sup>-1</sup>). Ammonium fed plants had significantly ( $P < 0.05$ ) higher stomatal conductance (0.21 mmol m<sup>-2</sup>s<sup>-1</sup>), transpiration rate (5.58 mmol m<sup>-2</sup>s<sup>-1</sup>) and photosynthetic rate (20.95 mg CO<sub>2</sub> m<sup>-2</sup>s<sup>-1</sup>) compared to the plants fed with other forms of nitrogen. Ammonium fed plants had significantly ( $P < 0.05$ ) higher concentrations of zinc (53.79 mg kg<sup>-1</sup>), manganese (51.72 mg kg<sup>-1</sup>) and copper (7.19 mg kg<sup>-1</sup>) in shoots and similar trend was observed in roots. It was concluded that urea fed plants produced maximum shoot and root dry matter and ammonium fed plants contained maximum concentration of micronutrients in shoots and roots.

**Keyword:** Ammonium; Maize; Micronutrient; Nitrate; Stomatal conductance; Transpiration rate