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Performance of Maize Hybrids under Drought Stress Conditions Affected by Potassium Application in a Subtropical Semi-Arid Climate

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Abstract

Maize is used as staple food for more than 1.2 billion people in Latin America, Africa and rainfed areas of Asia. All parts of the maize plant (stem, leaves, grains) are being used for food and non-food products and have an important role in world food security both in temperate and tropical climates. In current scenario of climate change, drought is a major abiotic stress effecting production of food and feed crops including maize. Potassium is considered as drought mitigating plant nutrient, therefore, this field study was conducted to assess the impact of varying levels of potassium application on the productivity of maize grown under well irrigated and imposed drought stress conditions. The experiment was laid out in a randomized complete block design in a factorial arrangement of treatments with three replications. The experimental treatments consisted of three potassium levels viz. control (no potassium application) and a potassium application of 50 kg ha^{-1} or 75 kg ha^{-1}, and eight maize hybrids viz. 30T60, 30Y87, 30P50, 6714, 7720, Garanon, 6789 and Gorrila. The results revealed a significant impact of potassium application on the physio-morphological and yield traits with a significant interaction of potassium application rate and maize hybrid. Under well irrigated, maximum grain yield observed was 6 t ha^{-1} (potassium application at 75 kg ha^{-1}) while under drought stress, the maximum grain yield obtained was 4.8 t ha^{-1} (potassium application at 75 kg ha^{-1}). Potassium application improved the yield, both under irrigated and drought stress conditions but the effect was more visible under the later one. Concluding the results, selection of maize hybrid with optimal potassium application can improve maize yield and ensure food security under water limited area.

Keywords: Maize, potassium fertiliser, water stress, yield traits

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