

BOOK OF ABSTRACTS



*XIV International Scientific Agriculture Symposium
"Agrosym 2023"
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EFFECTS OF IRRIGATION RATE AND PLANTING DENSITY ON MAIZE YIELD AND WATER USE EFFICIENCY IN THE TEMPERATE CLIMATE OF SERBIA

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Abstract

Scarce water resources severely limit maize (*Zea mays* L.) cultivation in the temperate regions of northern Serbia. A two-year field experiment was conducted to investigate the effects of irrigation and planting density on yield and water use efficiency in temperate climate under sprinkler irrigation. The experiment included five irrigation treatments (full irrigated treatment – FIT; 80% FIT, 60% FIT, 40% FIT, and rainfed) and three planting densities (PD1: 54,900 plants ha⁻¹; PD2: 64,900 plants ha⁻¹; PD3: 75,200 plants ha⁻¹). There was increase in yield with the irrigation (1.05–80.00%) as compared to the rainfed crop. Results showed that decreasing irrigation rates resulted in a decrease in yield, crop water use efficiency (WUE), and irrigation water use efficiency (IWUE). Planting density had significant effects on yield, WUE, and IWUE which differed in both years. Increasing planting density gradually increased yield, WUE, and IWUE. For the pooled data, irrigation rate, planting density and their interaction was significant ($P < 0.05$). The highest two-year average yield, WUE, and IWUE were found for FIT-PD3 (14,612 kg ha⁻¹), rainfed-PD2 (2.764 kg m⁻³), and 60% FIT-PD3 (2.356 kg m⁻³), respectively. The results revealed that irrigation is necessary for maize cultivation because rainfall is insufficient to meet the crop water needs. In addition, if water becomes a limiting factor, 80% FIT-PD3 with average yield loss of 15% would be the best agronomic practices for growing maize with a sprinkler irrigation system in a temperate climate of Serbia.

Keywords: *Deficit irrigation, Sprinkler irrigation, Irrigation water use efficiency, Zea mays L.*