

Yield and chemical composition of soybean seed under different irrigation regimes in the Vojvodina region

BRANKA KREŠOVIĆ¹, BOSKO ANDRIJA GAJIC^{2,*}, ANGELINA TAPANAROVA²,
GORAN DUGALIĆ³

¹Maize Research Institute Zemun Polje, Belgrade, Serbia

²University of Belgrade, Faculty of Agriculture, Belgrade, Serbia

³University of Kragujevac, Faculty of Agronomy Čačak, Čačak

*Corresponding author: bonna@agrif.bg.ac.rs

ABSTRACT

Kresović B., Gajic B.A., Tapanarova A., Dugalić G. (2017): Yield and chemical composition of soybean seed under different irrigation regimes in the Vojvodina region. *Plant Soil Environ.*, 63: 34–39.

The goal of the present research is to determine an effective sprinkler irrigation strategy for soybean [*Glycine max* (L.) Merr.] in temperate climate conditions, in order to maximize yields and seed quality. A three-year field experiment with four different irrigation treatments was conducted on Calcic Chernozem in the Vojvodina region of Serbia. The irrigation regimes included: no irrigation; full irrigation (I_{100}); and two deficit irrigation treatments – 65% of I_{100} (I_{65}) and 40% of I_{100} . The irrigation treatments generally had a statistically significant effect on the increase of soybean yield and protein content. Irrigation did not have a significant effect on the oil content. In general, irrigation increased K, P, Mg, Mn, Cu, Zn and B concentrations and decreased Ca and Fe concentrations in soybean seed. The results show that irrigation with the largest amount of water (treatment I_{100}) provided no potential benefit in terms of soybean yield and chemical composition. Treatment I_{65} , which exhibited the most favourable watering conditions, is the best choice to maximize yield and ensure a good chemical composition of soybean under these agroecological conditions.

Keywords: water deficit; nutritional composition; micronutrient; macroelement; mineral content

In Vojvodina, like in other parts of Serbia, soybean is mostly rainfed. As such, soybean yields vary from year to year and are generally low in dry years. Soybean irrigation leads to yield increase and less variation among years in arid, semi-arid, humid and sub-humid regions (Al-Tawaha et al. 2007, Sincik et al. 2008). Irrigation also affects the chemical composition of soybean (Kumawat et al. 2000, Bennett et al. 2004) including protein, oil, sugar and minerals (Bellaloui et al. 2015). Soybean quality depends on the oil and protein content, as it is the main source of high-quality protein and oil (Grieshop and Fahey 2001). More food of

greater nutritional value, such as soy milk and tofu, is produced from soybeans with higher protein content (de Moraes et al. 2006). Users of these products prefer less oil and more protein (Kumar et al. 2006). Soybean is an important source of macro- and microminerals, such as P, K, Ca, Mn, Zn, Fe and B, which are indispensable in human food. A lack of these elements can lead to human malnutrition and health issues (Bouis 2003, Lu et al. 2008). As such, soybean quality improvement is extremely important for enhancing human and livestock nutrition (Bellaloui et al. 2010). According to available literature on the subject, the mineral

Supported by the Ministry of Education, Science and Technological Development of the Republic of Serbia, Projects No. III 43009 and TR 31037.

