



## STUDY OF PLANT DENSITY IN MAIZE PRODUCTION IN 2021

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**Abstract:** *The main goal of these study was to examining the effect of plant density of maize hybrids on yield and income. The Pioneer0164, KWS Don Juan, and KWS Kashmir hybrids reached their maximum yield and the highest income at a plant density of 65,000 plants/ha. On the other hand the KWS Kollegas hybrid resulted the highest yield (7866 kg/ha) at a plant density of 80,000 plants/ha, and consequently, the highest income as well.*

### • Introduction

The plant density, a component of the maize production technology, which has been widely studied, but is still not exploited sufficiently in farm practice. It has a great influence on the success of maize production, especially when weather conditions are unpredictable (Könczöl, 2018).

### Material and method

The experiment was set up in Óbecse (Serbia) used by in a split-plot design with four replications and four plant densities (65,000, 70,000, 75,000, 80,000 plants/ha) in 2021. The studied hybrids were: KWS Kashmir (FAO 400), KWS Kollegas (FAO 480), KWS Don Juan (FAO 440) and Pioneer 0164 (FAO 430). The soil was calcareous chernozem. Its nitrogen and phosphorus content was very good, and potassium content was good.

2021 was moderately dry year. The amount of rain was lower by 98.6 mm than the average in the vegetation period of maize.

The statistical tests were performed using one-factor analysis of variance, based on the method of Sváb (1986). Result data were processed and statistically evaluated using the software Microsoft Excel 2016 and IBM SPSS Statistics Version 29.0.0.0.

### • Results and discussions

The Pioneer 0164, KWS DonJuan, and KWS Kashmir hybrids responded to an increase in plant density with a decrease in yield. However, these results were not statistically significant.

In contrast, the KWS Kollegas hybrid yielded the lowest (6688 kg ha<sup>-1</sup>) at a plant density of 70,000 plants ha<sup>-1</sup>, while achieving its maximum yield (7866 kg ha<sup>-1</sup>) at a plant density of 80,000 plants ha<sup>-1</sup>. The latter result was statistically significant. (Table 1.)

Table 1. The effect of plant density on the yield of maize hybrids

Hybrid	Yield (kg ha <sup>-1</sup> )			
	65,000 plants ha <sup>-1</sup>	70,000 plants ha <sup>-1</sup>	75,000 plants ha <sup>-1</sup>	80,000 plants ha <sup>-1</sup>
Pioneer 0164	7248 <sup>Ab</sup>	6910 <sup>Aab</sup>	6649 <sup>ABab</sup>	6327 <sup>Aa</sup>
KWS Kollegas	7228 <sup>Aa</sup>	6688 <sup>Aa</sup>	7026 <sup>AB</sup>	7866 <sup>Ba</sup>
KWS Don Juan	7239 <sup>Aa</sup>	6804 <sup>Aa</sup>	6488 <sup>Aa</sup>	6533 <sup>Aa</sup>
KWS Kashmir	7740 <sup>Aa</sup>	7622 <sup>Aa</sup>	7468 <sup>Ba</sup>	7418 <sup>ABa</sup>

For each hybrid (rows), values marked with different lowercase letters and for each plant density (columns), values marked with different uppercase letters significantly differ at the p<0.05 significance level

### • Conclusions

Determining the optimal plant density requires knowledge of the ecological, agronomic requirements, and biological characteristics of the specific maize hybrid. It has been determined that for most of the maize hybrids included in the study, cultivation with lower plant densities was more economical.

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