

PLANTING DATE EFFECTS ON OIL YIELD IN SUNFLOWER (*Helianthus annuus* L.)

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Abstract

Oil yield per unit area is the ultimate target in growing high-oil sunflower genotypes. The research was carried out to determine planting dates effects on oil yield, using three sunflower hybrids (Miro, Rimi, Pobednik), eight planting dates and two vegetation periods. The experiment was RCB design with four replications. Oil yield, as a product of grain yield and oil concentration was expressed in kg/ha. Oil yield was predominantly influenced by the year of growing (91.5%). The influence of planting date on yield amounted 4.3 %. All sources of variation were highly significant, except hybrid and interaction hybrid x year. In average hybrid Rimi had highest mean value for oil yield. Oil yield was higher in 2004 than in 2005.

Introduction

Sunflower (*Helianthus annuus* L) is currently cultivated for its seeds and this crop is the world's fourth largest oil-seed crop (de Rodriguez et al., 2002). In Serbia sunflower is the main oilcrop. For successful production of edible oil, hybrids are needed which are capable of providing high grain production, i.e., high production of oil per unit area. Oil yield per unit area is the ultimate target in growing high-oil sunflower genotypes. Oil yield is affected by other plant characters, between them the most important are plant number per unit area, number of grains per plant, hectoliter mass, 100-grain mass, husk content, oil content in grain and grain yield (Joksimovic et al., 1999).

The aim of this study was to evaluate the effect of planting date on oil yield in sunflower.

Material and methods

In order to investigate the influence of planting date on oil yield in sunflower three hybrids were chosen: Miro, Rimi and Pobednik. They were grown during two vegetation periods (2004, 2005) at the experimental field of the Institute of Field and Vegetable Crops, Oil Department, Novi Sad. The hybrids were sown at eight different planting dates (in 10-days interval from 20 March to 1 June). The experiment was RCB design with four replications. Oil yield, as a product of grain yield and oil concentration was expressed in kg/ha.

Data were processed by means of STATISTICA 7.0.

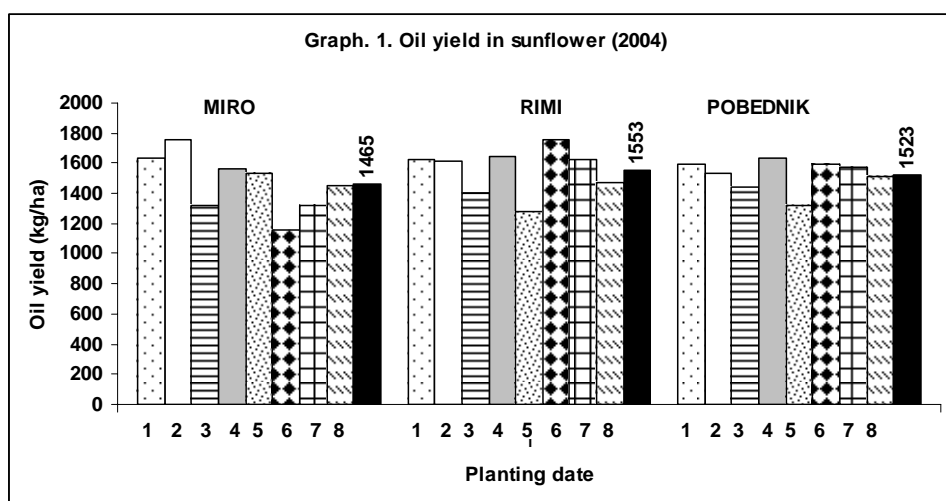
Results and discussion

Highly significant differences were found for all sources of variation, except for hybrids and interaction hybrid x year (Tab. 1).

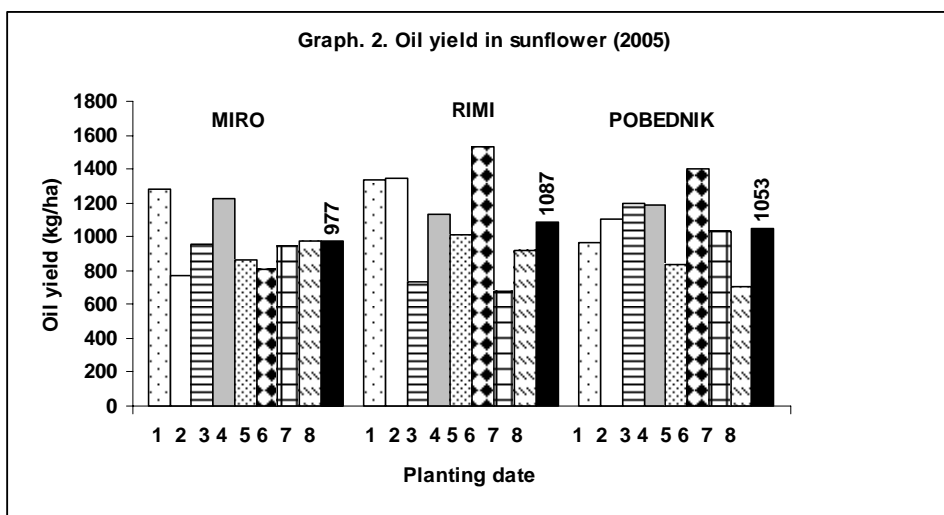
Table. 1. ANOVA for oil yield in sunflower (2004, 2005)

Source of variation	Df	MS		F_e
		Value	%	
Hybrid (H)	2	83133	0.69	2.83 ^{NS}
Planting date (P)	7	505089	4.27	17.21 ^{**}
Year (Y)	1	10823010	91.54	368.71 ^{**}
H x P	14	101322	0.86	3.45 ^{**}
H x Y	2	45229	0.38	1.54 ^{**}
P x Y	7	176953	1.50	6.03 ^{**}
H x P x Y	14	59413	0.50	2.02 ^{**}
E	144	29353		

Oil yield was predominantly influenced by the year of growing (91.5%). The influence of planting date on yield amounted 4.3 % (Tab. 1). Our results are in agreement with the findings of de la Vega and Hall (2000). They reported that planting date was the main source of variation for oil yield. In their experiment oil yield varied from 817 kg/ha (sowing in December) to 2300 kg/ha (sowing in October) in average for two years in the conditions of Argentina. Ekin et al. (2005) found that, in average over years, oil yield ranged from 0.66 t/ha to 1.58 t/ha in Van region, Turkey. It was shown that oil yield was affected by cultivars and years. In three years trial, using hybrids Dukat, Velja and Krajisnik, Balalic et al. (2006) reported that the contribution of year to oil yield was 76 %, and of planting date 3.9 %.

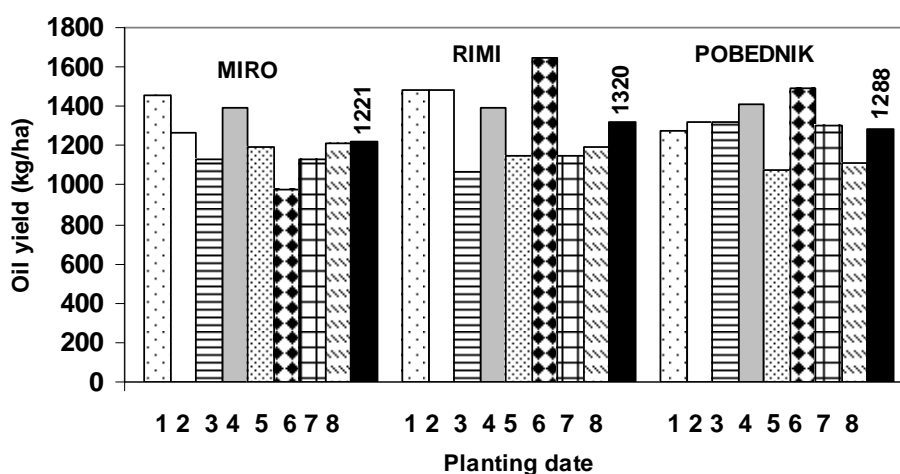


In the first year of the experiment (2004) oil yield was higher than in 2005 in all hybrids and in average for all planting dates (Graph. 1, 2). It is due to inconvenient climatic conditions in 2005. The best oil yielding hybrid in both years was hybrid Rimi (Graph. 3).



Taking into account average oil yield for two years it can be seen that Rimi and Pobednik maximum values reached at sixth planting date (30 April), and Miro, the hybrid with lowest oil yield, the highest mean value showed in first (20 March) and fourth (10 April) planting date (Graph. 3).

Graph. 3. Oil yield in sunflower (2004, 2005)



Crnobarac et al. (1996) found that there was significant influence of planting date on oil yield during two year experiment (1994, 1995). The maximum oil yield was reached at III, IV and V planting date (10 April, 20 April and 1 May). After that oil yield decreased, being lowest at last planting date (1 June).

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