Selection of sunflower hybrids for Banja Luka area in Bosnia and Herzegovina

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ABSTRACT

Banja Luka area in Bosnia and Hezegovina does not have a regular sunflower production, although this area has favorable climate and soil conditions for profitable sunflower production. Based on three-year results of sunflower NS-hybrids developed at Novi Sad Institute of field and Vegetable Crops evaluated in micro experiments in the area of Banja Luka, we can establish the following conclusions: the highest average yield in a three-year period was accomplished by hybrids NS-H-411 and HN-H-45; the highest oil content in a three-year period was accomplished by hybrids Banaćanin and Kraišnik; the highest oil yield was accomplished by hybrids NS-H-411 and NS-H-45. In Banja Luka area of Bosnia and Herzegovina it is possible to achieve profitable production of sunflower on wider sowing areas, which could supply necessary quantity of oil as well as protein for livestock feeding.

Key words: Bosnia and Herzegovina – NS hybrids – oil content – oil yield – seed yield.

INTRODUCTION

Thanks to long-term selection work of Novi Sad Institute of Field and Vegetable Crops, today we have a great selection of high-yield sunflower hybrids for production in our agro-ecological conditions in Bosnia and Herzegovina. Our objective is to select high-yielding sunflower hybrids well adapted to agro-ecological areas in Bosnia and Herzegovina through long-term evaluation.

MATERIALS AND METHODS

We performed field evaluations in the period of 2004-2006 on a soil with acid reaction (pH=4.1) and low organic matter content (2.1%) at an altitude of 154 m. We evaluated 11 hybrids in 2004, 15 hybrids in 2005, and 13 hybrids in 2006. Evaluations were performed using randomized block design with four replications. The area of the plot was 14 m^2, with a distance between rows of 70 cm and a distance of plants in the row of 35 cm. Cultural practices were the standard for sunflower commercial production.

Climate parameters (Table 1) showed that the trials were conducted under optimal climate conditions. Average monthly temperatures in the three years included in the study were similar to long-term average temperatures (Table 1a). Precipitation during the vegetation period was greater than the long-term average (Table 1b).

Table 1. Meterological Parameters.

a) Average monthly temperatures (°C).

Year	Month					
	April	May	June	July	August	September
2004	11.9	14.8	19.6	21.6	21.4	16.0
2005	11.8	16.3	19.4	22.0	19.4	17.0
2006	12.4	16.0	20.0	22.9	19.5	17.4
Average:	12.0	15.7	19.7	22.2	20.1	16.8
Long-term average:	10.9	16.1	19.3	21.4	21.1	16.7

b) Precipitation (mm).

Year	Month					
	April	May	June	July	August	September
2004	166.4	86.1	104.3	129.6	45.0	46.3
2005	80.5	79.2	135.6	129.7	124.9	79.7
2006	151.6	95.0	126.7	80.00	220.0	47.4
Average:	132.8	86.8	122.2	113.1	129.9	57.8
Long-term average:	80.3	95.0	113.7	87.1	71.6	90.6

RESULTS AND DISCUSSION

Long-term evaluation of NS-hybrids showed the great potential of sunflower production in Banja Luka area in Bosnia and Herzegovina. The high seed oil yield achieved demonstrated that it is possible to perform profitable production of sunflower in Bosnia and Herzergovina, which confirms previous results of Kondić (2004; 2005), Crnobarac et al. (2007), and Miklić et al. (2007).

The results showed that the hybrids with the highest yield potential were NS-H-411, NS-H-45, NS-H-43 and Somborac. Seed yield of these hybrids was between 3,775-4,402 kg/ha (Table 2). Oil content was found between 32.9% (Labud) and 46.81% (Baća). The hybrids with the highest seed oil content were Baća, Somborac, Banaćanin, and Kraišnik (Table 3). Oil yield ranged from 1,251 kg/ha (Labud) to 1,866 kg/ha (NS-H-411) (Table 3). The highest oil yield was recorded in the hybrids NS-H-111, NS-H-45, Kraišnik, NS-H-43, and Baćanin (Table 3).

Table 2. Seed yield of sunflower hybrids evaluated in Banja Luka area of Bosnia and Herzegovina.

Hybrid	Grain yield with 11% humidity (kg/ha)			Average
	2004	2005	2006	
NS-H-111	4,070	4,455	4,700	4,408
NS-H-45	4,190	4-312	3,700	4,401
Krajišnik	3,700	3,350	4,440	3,830
Bačvanin	3,290	3,895	3,760	3,658
Banaćanin	3,370	3,160	4,540	3,690
Velja	3,150	2,665	3,960	3,258
Perun	3,540	3,405	4,020	3,655
Olivko	3,100	3,200	3,510	3,270
Pobednik	4,050	3,510	2,970	3,510
Labud	3,660	3,945	-	3,802
NS-H-43	3,800	3,770	-	3,785
Šumadinac	-	3,300	3,200	3,250
Baća	-	3,230	3,110	3,170
Somborac	-	3,750	3,800	3,775
Sremac	-	3,605	3,400	3,502
Average:	3,656	3,570	3,778	
LSD 5%	553	391	244	
1%	735	519	326	

Table 3. Oil content (%) and oil yield (kg/ha) of sunflower hybrids evaluated in Banja Luka area of Bosnia and Herzegovina.

Hybrid	Oil content (%)			Average	
	2004	2005	2006	Oil content %	Oil yield kg/ha
NS-H-111	42.19	45.96	38.86	42.34	1,866
NS-H-45	40.57	46.33	39.72	42.21	1,858
Krajišnik	43.13	49.77	43.20	45.37	1,738
Bačvanin	45.05	45.23	40.46	43.58	1,590
Banaćanin	42.78	50.83	44.07	45.89	1,693
Velja	45.74	45.84	41.06	44.21	1,440
Perun	38.71	49.84	41.06	43.20	1,579
Olivko	40.57	45.44	45.04	43.68	1,428
Pobednik	38.86	49.44	45.89	44.73	1,570
Labud	36.13	29.70	-	32.91	1,251
NS-H-43	41.97	48.23	-	45.10	1,707
Šumadinac	-	46.60	41.81	44.20	1-436
Baća	-	49.11	44.51	46.81	1,484
Somborac	-	48.26	43.65	45.95	1,735
Sremac	-	45.61	42.20	43.90	1,537

The three-year evaluation of NS-hybrids of sunflower in the area of Banja Luka in Bosnia and Herzegovina led us to the following conclusions:

1. Climate and soil conditions are satisfactory for sunflower production in Bosnia and Herzegovina.
2. All examined hybrids gave average yield larger than 3 t/ha.
3. It is possible to increase yield potential by further evaluation of hybrids and through adoption of modern production techniques.

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