

EXAMINATION ON GENETIC POTENTIAL OF TRAIT YIELD OF GREEN MASS FOR PREPARING SILAGE ON MAIZE HYBRIDS FROM FAO GROUPS 400 AND 600 CULTIVATED IN THE BITOLA PART OF PELAGONIJA

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ABSTRACT

It is examined genetic potential of trait yield of green mass for preparing silage on six genotypes of maize hybrids, made in Institute for field crops and horticulture Novi Sad, Serbia (FAO 600-NSSK 640, NSSK-6010 и FAO 400 - NSSK 4015), Agricultural Institute in Osiek (FAO 600-OSSK 617 и FAO 400 – OSSK 499) and Bc Institute for selection and production of plants in Zagreb, R. Croatia (FAO 400 – Bc 418) and possibilities for breeding in the Bitola part of Pelagonija, in production year 2010 and 2011.

From the six examined genotypes of maize hybrids, the genetic potential of trait yield of green mass, mostly come to expression at hybrid NSSK-6010, with an average yield of 55.3 tons/ha, and at least come to expression at hybrid NSSK-4015, with average yield of 37.50 tons/ha.

The genetic potential of the trait yield of green mass, on genotype hybrid maize Bc 418 (St), with an average yield of green mass from 39.50 tons/ha, compared with hybrids from their own group FAO 400, gave lower average yield of green mass from hybrid OSSK 499 of 1.9% or 0.75 tones/ha and higher average yield of green mass from hybrid NSSK-4015 of 5.06 % or 2.00 tones/ha.

Out of the six examined genotypes of hybrid maize cultivated in conditions with irrigation, in Bitola part on Pelagonija, is achieved quite high yield of green mass and it can be bred with success in Bitola part on Pelagonija.

Key words: maize, genotype, yield, green mass.

1. Introduction

For achieving high and stable grain yield at maize, despite the application of standard agrotechnic for the Pelagonian region, one of the most important preconditions is the selection of appropriate genotype – maize hybrid, that most of all will respond to the agotechnical conditions offered by the region in order to come to expression the genetic potential of trait yield of green mass of hybrids.

Our examinations were focused to determine the genetic potential of trait yield of green mass on six genotypes of hybrid maize, which belong to the group of middle early FAO 400 and late FAO 600 corn hybrids intended for feeding of livestock.

2. Material and method for work

Examinations were conducted in the production 2009/2010 and 2010/2011 year, in the locality in village Egri, on the surfaces of individual farmers. Planting material is obtained from the Institute for field crops and horticulture Novi Sad, Serbia, Agricultural Institute in Osiek and BC Institute for selection and production of plants in Zagreb, R. Croatia. They are middle early and late genotypes of hybrid maize. Examinations are set by the method of random block system in 5 repetitions, with size of the studied parcels of 10 m². The results are compared with the standard, and the standard deviations are given in % and t/ha. Based on measurements, carried out after the harvest of each repetition of the studied genotypes of hybrid maize was conducted visual assessment of the trait yield of green mass. After harvesting, is performed determination of moisture in the grain, and the yield in kg/ha with 14% moisture. During the vegetation are conducted standard agricultural practices such as: on locality in village Egri - soil type aluvium, preculture sunflower in both years of testing, reverberating of plant remainings (15-20 cm) 29.07.2010 and 11

year, fertilization (100 kg/ha N, 90 kg/ha P and 60 kg/ha K) 30.07.2010 and 01.08.2011 year, deep plowing (30-40 cm), 03.08.2010 and 04.08.2011 year, plating, cultivation and sowing, 20.04.2010 and 22.04.2011 year, feed (80κ kg/ha N) 20.05.2010 and 21.05.2011 year, protection from weeds after sowing for (tight plate trofi 2 l/ha), 28.10.2009/10 and 29.10.2010/11, irrigation in year 2010 (1-15.06 (25 l/m²), 2-12.07(25 l/m²), 3-25.07.(30 l/m²), 4-05.08. (30 l/m²), 5-15.08. (30 l/m²), 6-25.08. (30 l/m²) = 170 mm²) and irrigation in year 2011 (1-05.06 (25 l/m²), 2-25.06(30 l/m²), 3-04.07.(30 l/m²), 4-14.07.(30 l/m²), 5-25.07.(40 l/m²), 6-06.08.(40 l/m²), 7-17.07.(40 l/m²), 8-27.08. (40 l/m²) = 275 mm²), and vintage on 29.09.2010 and 30.09.2011 year.

2.1. Soil and climatic conditions

a). Soil conditions

According to Mr. Filipovski (1971), soil conditions in Bitola part of Pelagonija are heterogeneous, i.e. represented are various soil types and subtypes. In the locality where tests are performed in the village Egri, soil type is alluvial, without carbonate and with weak acidic reaction (pH in KCl 6, 30 and H₂O 6, 85), which is a suitable environment for the development of maize. Nutritious substances were analyzed according to the AL method (Bogdanovic, 1966), the soil is well supplied with humus (2.60) and provided with secondary nutrients (P₂O) 13, 90 and (K₂O) 19, 50 by the method of Tjuran and Konanova.

б). Climatic conditions

In Table 1 are given data on the temperature conditions in Bitola part of Pelagonia, of which can be seen that they give opportunity to successfully grow the green mass-silage, early and late maize hybrid genotypes of whose period of vegetation is above 150 days from sprouting to technological maturity.

Tab.1 Climatic conditions

Months	Year 2010		Year 2011	
	Rainfalls in mm	Average monthly air temperature °C	Rainfalls in mm	Average monthly air temperature °C
IV	55,2	12,0	14,8	10,9
V	82,4	16,9	82,7	14,6
VI	43,2	20,2	31,9	19,9
VII	26,6	22,5	9,6	23,7
VIII	00,0	24,2	13,7	23,0
IX	46,3	17,7	44,0	20,3
Total	253,7		196,7	

The total amount of rainfalls during the vegetation of maize is much smaller than the needs of culture.

During the examination was 253.7 mm in the first (2010) year, while 196.7 mm in the second (2011) year. Compared to two years of testing they are larger in the first (2010) year of examination for 57 mm. Disposition of rainfalls per month is not most favorable. So in July and August when maize has the greatest need of water they amount up to 26.6 mm in July and 00,0 mm in August, in the first year 2010, while in the second year of testing 2011 they amount up to 9.6 mm in July and 13, 7 mm in August,. Because of this situation we can conclude that the total amount is not satisfactory, while the schedule during the vegetation is not most favorable. Therefore, needs irrigation during June, July and August.

3.Results and discussion

To achieve high and stable genetic potential of yield of green mass silage during the vegetation of maize, the required amount of water varies depending on conditions. According Kjosevski B. (1966), in Skopje field is required 4,184 m³/ha, while in the Polog 4, 774 m³/ha, in the terms of R. Macedonia. From the data in Table 1 may be concluded that the total amount of rainfalls

does not meet the water needs of maize for normal development and achievement of stable and high yield of green mass for silage. During the vegetation of culture, water deficit is complemented with irrigation in accordance with the needs of culture. In the first year 2010, the deficit of water was complemented with 6 irrigations: 1-15.06 (25 l/m²), 2-12.07(25 l/m²), and 3-25.07. (30 l/m²), 4-05.08. (30 l/m²), 5-15.08. (30 l/m²), 6-25.08. (30 l/m²) = 170 mm². Whereby provide the required amount of water (253, 7 mm rainfall + 170 mm with irrigation = total 423, 7 mm/m²). And in the second year 2011, the deficit of water was complemented with 8 irrigations: 1-05.06 (25 l/m²), 2-25.06(30 l/m²), and 3-04.07. (30 l/m²), 4-14.07.(30 l/m²), 5-25.07.(40 l/m²), 6-06.08.(40 l/m²), 7-17.07.(40 l/m²), 8-27.08. (40 l/m²) = 275 mm². Whereby provide the required amount of water (196, 7 mm rainfall + 275 mm with irrigation = total 471, 7 mm/m²).

Tab.2 Examination of genetic potential of the trait yield of green mass of six genotypes of hybrid maize, on the locality in village Egri

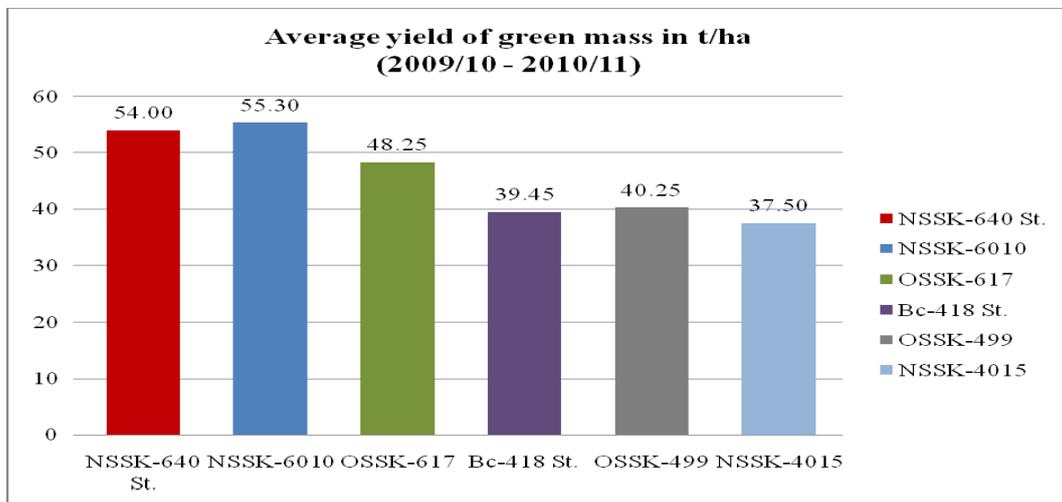
Num.	Genotype	2010/11	2010	2011	2010/2011	Index %
		Average number of plants m ²	Average yield of green mass in t/ha	Average yield of green mass in t/ha	Average yield of green mass in t/ha	
1	NSSK-640 St.	60 000	55,00	53,00	54,00	100,00
2	NSSK-6010	59 800	56,20	54,40	55,30	102,41
3	OSSK-617	60 000	49,00	47,50	48,25	89,35
4	Bc-418 St.	66 000	40,40	38,50	39,45	100,00
5	OSSK-499	65 850	41,00	39,50	40,25	102,03
6	NSSK-4015	65 950	37,00	38,00	37,50	95,06

In Table 2 are given data for the examination of genetic potential of the trait yield of green mass of six genotypes of hybrid maize, of which can be seen that almost all achieve very good yields of green mass for production of silage.

From the examined genotypes of hybrid maize from the group FAO 600, the genetic potential of the trait yield of green mass, mostly come to expression at hybrid NSSK-6010, with an average yield of 55,30 tons/ha, which compared with hybrid NSSK-640 St (54,00 tons/ha) gave higher yield for 2,41% or 1,30 tons/ha, than the hybrid NSSK-640 St come to expression, with an average yield of 54,00 tons/ha, which compared with hybrid OSSK-617 (48, 25 tons/ha) gave higher yield for 10,65 % or 5,75 tons/ha,

From the examined genotypes of hybrid maize from the group FAO 400, the genetic potential of the trait yield of green mass, mostly come to expression at hybrid OSSK-499, with an average yield of 40,25 tons/ha, which compared with hybrid Bc-418 St (39,45 tons/ha) gave higher yield for 2,03% or 0,80 tons/ha, than the hybrid Bc-418 St come to expression, with an average yield of 39,45 tons/ha, which compared with hybrid NSSK-4015 (37, 50 tons/ha) gave higher yield for 4,94 % or 1,95 tons/ha.

Chart 1



In Chart 1, are represented the data from Table 2, for the genetic potential of trait yield of green mass of the examined genotypes of hybrid maize. From the chart it is obvious that out of the six examined genotypes of hybrid maize, the highest yield was achieved from group FAO 600, at the hybrid NSSK-6010, with an average yield of 55,30 tons/ha, while from the group FAO 400, at the hybrid OSSK-499, with an average yield of 40,25 tons/ha.

Out of the three examined genotypes of hybrid maize, cultivated in conditions with irrigation, in Bitola part on Pelagonija, is achieved high yield of green mass for production of silage and it can successfully be grown in Bitola part on Pelagonija.

4. Conclusion

Based on two year examinations (2009/2010 and 2010/2011) in Bitola part of Pelagonija the genetic potential of the trait yield of green mass for production of silage of the genotypes of hybrid maize, which belong to the group of FAO 600 (NSSK 640, NSSK-6010 и OSSK 617) and FAO 400 (Bc 418, OSSK 499 и NSSK 4015), can be drawn the following conclusions:

1. From the examined genotypes of hybrid maize from the group FAO 600, the genetic potential of the trait yield of green mass, mostly come to expression at hybrid NSSK-6010, with an average yield of 55,30 tons/ha, which compared with hybrid NSSK-640 St (54,00 tons/ha) gave higher yield for 2,41% or 1,30 tons/ha, than the hybrid NSSK-640 St come to expression, with an average yield of 54,00 tons/ha, which compared with hybrid OSSK-617 (48,25 tons/ha) gave higher yield for 10,65 % or 5,75 tons/ha,
2. From the examined genotypes of hybrid maize from the group FAO 400, the genetic potential of the trait yield of green mass, mostly come to expression at hybrid OSSK-499, with an average yield of 40,25 tons/ha, which compared with hybrid Bc-418 St (39,45 tons/ha) gave higher yield for 2,03% or 0,80 tons/ha, than the hybrid Bc-418 St come to expression, with an average yield of 39,45 tons/ha, which compared with hybrid NSSK-4015 (37,50 tons/ha) gave higher yield for 4,94 % or 1,95 tons/ha.
3. Out of the three examined genotypes of hybrid maize, cultivated in conditions with irrigation, in Bitola part on Pelagonija, is achieved high yield of green mass for production of silage and it can be breed with success in Bitola part on Pelagonija.

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