

Exploring Some Regional Maize Hybrids under Agro-Ecological Conditions of Kosovo

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Abstract

Ten maize hybrids F₁ generation from the region were tested, during the growing season of 2012, in agro-climatic condition of Kosovo. The investigation has been performed in micro trials set up at the two most important agro production sites of Kosovo, Peja and Pestova, in which trials has been investigated the yield, crude, protein, content and other relevant traits of. The perspective maize hybrids. The obtained result showed that there are statistically significant differences among the maize hybrids compared with standard check, with regard to the grain yield, crude, protein contents and other traits. Such statistically significant differences have been observed between localities as well.

KEYWORDS: micro trials, maize hybrids, grain yield, crude protein content

INTRODUCTION

Maize (*Zea mays* L.) is one of the most important field crop that is regularly cultivated each year in Kosovo with an area 75000-85000 ha with some oscillation. Grain yield per surface unit is one of the most important traits that influence directly for rent ability and economic production. The average grain yield of maize in the last years the main agro- production localities of Kosovo is very low ranging from 4.5-5.5 t/ha. For an economic and sustainable production of maize there is necessary to have high yield hybrids, optimal agro-climatic conditions, modern agriculture mechanization and application of proper plant protection measures the yield is very complex trait that depends by genotype of maize and environment conditions, as well (Andric *et al.*, 2006; Brkic *et al.*, 2006). During the cropping season of 2012 the micro trials were established in two most important agro-production localities of Kosovo to investigate the performance of ten maize hybrids from the region with the aim of their introduction into the national list of varieties Kosovo.

MATERIAL AND METHODS

During cropping season of 2009 there were evaluated ten maize hybrids originated from the region (DKC 6574, DKC 5143, DKC 6677, ZPSC 505, ARIUS, ALINNEA, OS 515, OS 430, NS 444) while as standard check was used hybrid NS 640 which is among the most used hybrids in Kosovo. The evaluation was conducted at two different localities of Kosovo known for different agro climatic and pedologic characteristics (Peja - Research Station of Kosovo Institute of Agriculture and Pestova - private agriculture company). The experimental design was a complete randomized block design in three replications. Each hybrid was sown in plots 10 m long and 0.7 m wide with 1m space distant each other. Previous crop in trials set up in Peja was winter wheat, while in Pestovo was potato. The sowing was done manually within optimal time (third decade of April) in both of localities, with the sowing distance of 25cm within a row according to the FAO group of maturity. Each experimental plot received the following amount of fertilizer: 350 kg/ha (NPK 10:30:20), as a basal application, 150 kg/ha (Urea) and 50 kg/ha (KAN) respectively, split in two top

dressing application, furrow irrigation was applied twice (at first and third decade of June 2012) in both of respective localities evaluation has been performed in the field (plant height, the height of the first cob within the plant and cobs number/plant), and in the laboratory conditions (grain yield, crude protein content), according to the ISTA regulations (International Seed Association, 1996). The obtained data were statistically processed using MSTAT-C program (Crop and soil sciences Dept., Michigan St. Univ., USA), ANOVA was computed as well as a LSD test for the level of significance of 1 and 5%

RESULTS AND DISCUSSION

Biometric investigation of phenological parameters was done during the whole cropping season for all hybrids in experimental plots while the results are presented in Table 1.

Table 1. Phenological traits of maize hybrids at two localities in Kosovo, 2012

Nr.	Hybrid	Locality	Plant height (cm)	Height of the first cob in plant (cm)	No. of cobs per plant
1.	DK C6574	Peja	226.6	96.6	1.15
		Pestova	225.5	96.0	1.15
2.	DKC5143	Peja	246.6	110.0	1.10
		Pestova	245.5	108.0	1.10
3.	DKC 6677	Peja	243.0	103.3	1.15
		Pestova	245.0	103.5	1.15
4.	ZPS C505	Peja	253.3	106.6	1.60
		Pestova	254.0	106.5	1.60
5.	ARIUS	Peja	253.3	106.6	1.15
		Pestova	250.0	105.0	1.15
6.	ALINNEA	Peja	251.5	110.0	1.15
		Pestova	254.0	110.5	1.15
7.	OS 515	Peja	263.3	113.3	1.25
		Pestova	262.0	111.0	1.25
8.	OS 430	Peja	250.0	103.3	1.15
		Pestova	253.5	103.5	1.15
9.	NS 444	Peja	258.3	110.0	1.15
		Pestova	260.0	110.5	1.15
10.	NS 640	Peja	266.6	113.3	1.30
		Pestova	260.5	110.0	1.30

With regard to the plant height all of maize hybrid little differs from the standard check (NS 640), with the lowest value recorded to the hybrid DKC 6574 (225.5 cm) and the highest to the hybrid OS 515 (263.5 cm). The height of the first cob in the plant was different as well for all of maize hybrids under evaluation, compared to standard check. Most of the hybrids were higher than NS 640, with the lowest one recorded to hybrid DKC 6574 (96.6 cm) and the highest one to hybrid OS 515 (113.5 cm). As for the number of the cobs per plant, which is considered among the most important yield components (Musa *et al.*, 2003), the studied hybrids were highly variable with respect to this characteristic, from 1.10 cobs/plant (DKC 5143) to 1.60 (ZPSC 505), whereas for standard check the number of combs per plant was 1.30.

Table 2. Grain Yield kg/plot of maize hybrids at two localities in Kosovo, 2012

Nr.	Hybrid (A)	Locality (B)	Year (C) 2012	Average (A)
1.	DK C6574	Peja	18.96	18.23
		Pestova	17.50	
		Average (A x C)	18.23	
2.	DKC 5143	Peja	19.26	18.36
		Pestova	17.46	
		Average (A x C)	18.36	
3.	DKC 6677	Peja	18.83	17.98
		Pestova	17.13	
		Average (A x C)	17.98	
4.	ZPSC 505	Peja	19.23	18.18
		Pestova	17.13	
		Average (A x C)	18.18	
5.	ARIUS	Peja	18.13	17.53
		Pestova	16.93	
		Average (A x C)	17.53	
6.	ALINNEA	Peja	17.70	17.05
		Pestova	16.40	
		Average (A x C)	17.05	
7.	OS 515	Peja	19.40	19.51
		Pestova	19.63	
		Average (A x C)	19.51	
8.	OS 430	Peja	18.66	19.18
		Pestova	19.70	
		Average (A x C)	19.18	
9.	NS 444	Peja	17.26	17.85
		Pestova	18.50	
		Average (A x C)	17.85	
10.	NS 640	Peja	18.90	17.85
		Pestova	16.80	
		Average (A x C)	17.85	
Average (B x C)		B1	18.63	Average (B)
		B2	17.72	18.1783
Factor		A	B	AB
LSD	1 %	0.9403	1.3841	1.3546
	5 %	0.6864	1.0149	0.9919

According to ANOVA (Table 2) there were statistical differences of different level of significance with regard to grain yield with respect to the hybrids, localities and interactions of factors (hybrids x localities).

Table 3. Crude protein content (%), of maize hybrids at two localities in Kosova, 2012

Nr.	Hybrid (A)	Locality (B)	Year (C) 2012	Average (A)
1.	DK C6574	Peja	11.4	11.1
		Pestova	10.9	
		Average (A x C)	11.1	
2.	DKC 5143	Peja	10.5	10.9
		Pestova	11.4	
		Average (A x C)	10.9	
3.	DKC 6677	Peja	13.1	12.5
		Pestova	11.9	
		Average (A x C)	12.5	
4.	ZPSC 505	Peja	10.0	9.9
		Pestova	9.7	
		Average (A x C)	9.9	
5.	ARIUS	Peja	9.6	9.9
		Pestova	10.2	
		Average (A x C)	9.9	
6.	ALINNEA	Peja	12.3	12.4
		Pestova	12.5	
		Average (A x C)	12.4	
7.	OS 515	Peja	13.8	13.7
		Pestova	13.6	
		Average (A x C)	13.7	
8.	OS 430	Peja	12.8	12.5
		Pestova	12.3	
		Average (A x C)	12.5	
9.	NS 444	Peja	12.1	12.0
		Pestova	11.9	
		Average (A x C)	12.0	
10.	NS 640	Peja	11.8	11.5
		Pestova	11.3	
		Average (A x C)	11.5	
Average (B x C)		B1	11.7	Average (B)
		B2	11.6	11.6
Factor		A	B	AB
LSD	1 %	0.9403	1.3841	1.3546
	5 %	0.6864	1.0149	0.9919

Comparing to standard check NS 640 the lower grain yield was realized with hybrids Alinnea (17.05) and Arius (17.53) whereas the other gave higher grain yield with the highest being to hybrid OS 515 (19.51 kg/plot). Statistically highly significant differences were shown with respect to the hybrids sown in different localities, the highest grain yield obtained with hybrids sown in Peja (18.63 kg/plot). These differences to some extent were anticipated, taking into account different climatic and pedologic conditions that were more favorable for maize cultivation in Peja. According to ANOVA (Table 2) there were statistical differences of different level of

significance with regard to the interaction of factors, hybrid x locality. Crude protein content in the gain of maize hybrids varied and standard check (Table 3). According to ANOVA it was shown that there are statistically significant differences of different level of significance between hybrids and standard check with the highest content of crude protein to hybrid OS 515 (13.7%) and the lowest one to hybrids ZPSC 505 and Arius (9.9 %). Statistically significant differences were shown as well between hybrids sown in different localities. The highest percent of crude protein content was obtained with hybrids sown in Peja (11.7%) compared with those sown Pestovo (11.6%). Statistically significant different were shown as well concerning the interactions of factors, hybrids locality (Table 3).

CONCLUSIONS

The results obtained after only one growing season, we can give partial indication of hybrids performances that has been undoubtedly influenced by climatic conditions recorded during the year of 2012. The results have shown that there were statistically significant differences among investigated hybrids compared to standard check grain yield and crude protein content. Comparing to standard check NS 640 the lower grain yield was realized with hybrids Alinnea (17.05) and Arius (17.23), whereas the higher grain yield was recorded to hybrids OS 515 (19.51 kg/plot). Statistically highly significant differences were shown with respect to the hybrids sown in Peja (18.63 kg/plot). The highest content of crude protein was recorded to hybrids OS 713 (137%) and the lowest one for hybrids ZPCS 505 and Arius (9.9%), whereas the highest percent of crude protein content was obtained with hybrids sown in Peja (11.7%) compared with those sown in Pestovo (11.6%). Finally most of evaluated maize hybrids showed very high level of adaptability in agro-climatic condition of Kosovo those most of the evaluated hybrids will be proposed for their introduction into national variety list of Kosovo.

References

- Andric L., Plavsic, Cuplic T., Simic B. (2006). Makropokusi OS - hibrida kukuruza u 2005 godini u Republici Hrvatskoj. Zbornik Radova. 41. Hrvatski & Medunarodni Znansvendi :
- Brkic I., Zduniš Z., Sade B., Safiyet Kan. (2006). Rezultati preliminarnih istraživanja OS hibrida kukuruza u Turskoj. Zbornik Radova. 41. Hrvatski & Međunarodni Znansveni Simpozij Agronoma, 171-172.
- Wei Li. (2009). Morphological analysis of tassels replace upper ear1 in maize. 51 annual maize genetics conference, 12 -15 March, St. Charles, Illionis, USA.
- Musa, F, Kelmendi, B, Berisha, D., Cacaj, I., Bekqeli, R. (2009). Svojstva hrvatskih hibrida kukuruza agro ekoloskim uvjetime Kosova, 44. Hrvatski 4. Medunarodi simpozij agronoma 2009, Genetics, Plant Breeding and Seed Production: pp. 355-359.
- Musa, F., Carli, C., Jashanica, V., Kelmendi, B., Ramadani, S. (2003). Value for Cultivation and Use of some wheat cultivars Agro ecological Condition of Dukagjini Area. Kërkime, Akademia e Shkencave dhe Arteve të Kosovës. Prishtinë: pp. 89-97.