

**THE EVALUATION OF MORPHOLOGICAL, BIOLOGICAL AND PRODUCTIVE
OF THE MAIZE HYBRIDS**

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Abstract

The maize is the most prevalent crop in the world. It is considered a green mine, because for a short time, 100-135 days, it gives a dry mass production (grain and green mass), that can't be completed by any other plant. It has high and diverse values of use. Studies in maize plants are numerous, and they continue for different aspects: genetics, breeding, improving of technological parameters and its processing. Study of hybrids and their suitability in an area and micro-area constitutes a permanent field of study to increase the maize production and improving its quality. Based on this principle, a study of ten maize hybrids in western coastal plains of Albania, and specifically in Toshkëz-Lushnja is undertaken.

For the hybrids under study (from Italy, Serbia, Albania) production indicators (, number of rows, number of grains in row and ear, production per plant and grain yield) were evaluated. Yield and yield components were evaluated in ten maize hybrids originated from Italy, Serbia and Albania.

Keywords: Maize, hybrid, morphology, yield components, yield.

Introduction

The maize is the most prevalent crop in the world. It is considered a green mine, because for a short time, 100-135 days, it gives a dry mass production (grain and green mass), that can't be completed by any other plant. It has high and diverse values of use. Studies in maize plants are numerous, and they continue for different aspects: genetics, breeding, improving of technological parameters and its processing. Study of hybrids and their suitability in an area and micro-area constitutes a permanent field of study to increase the maize production and improving its quality. Based on this principle, a study of ten maize hybrids in western coastal plains of Albania, and specifically in Toshkëz-Lushnja is undertaken.

Study of the suitability of hybrids is one of the possibilities of increasing the yield of maize in different ecological zones. In Albania the hybrids from different countries of the World and Europe are been planted. For determining the appropriate hybrids, especially for the coastal plain west of Albania (Myzeqe) is set up field study of ten hybrids with different vegetation length, mainly late. For all hybrids are made measurements for indicators of the ear, the grain and the grain yield. In the end, the final conclusions are drawn, which have defined hybrids with higher performance and more appropriate for this area.

Material and methods

The scope of work was to evaluate the biological and the production indicators of some maize hybrids in terms of Western Plain of Albania. As a basic material in this research has been used a eight foreign hybrids and two hybrids synthesized by the ex-Institute of maize and rice in Shkodra, namely:

Experimental Institute of wheat and maize, Bergamo (Italy):

H 605, H 606, H 702.

The Maize Research Institute Zemun Polje (Serbia): ZP 606, ZP 666, ZP 684, ZP 718B, ZP 735.

Ex-Institute of Maize and Rice Shkodra (Albania): R- 683, R-685.

The study was conducted in the village- Toshkez (Lushnja district), in the land of Artan Sota (land owner), in 2011. The land where the experiment was set up is of sub-clay composition with deep subsoil. The pre-crop was wheat.

The soil characteristics are: pH 7.55, humus 2.7%, 0.18% nitrogen, phosphorus 17.7 ppm, 12.5 ppm potassium, calcium 9.07 ppm. The experiment was set up according to the randomized block scheme, with four repetition and ten variants. The elemental plot of each variant was 18 m².

The biometric indicators of ear and production indicators are measured:

A 1. The biometric indicators of spikes ear

The row number in a spike ear

The grain number in a row per row

The grain number in a spike number of grain in ear /per ear

The ear thickness

The cob thickness

The cob weight

A 2. The biometric indicators of production

The weight of ear grains

. 1000 grain weight

The yield /ha.

There are predetermined 20 plants in 4 replications, in which are made biometric measurements

Results and discussion

Analysis of data for indicators of the ear occupies an important place, Table 1. Ear indicators are important elements of production, therefore are been treated carefully. According to the methodology, the attention was focused on the ear dimensions: thickness, number of rows, number of grains in a row, the number of grains in the ear, the , thickness of cob, thickness of ear. From the data it can be seen that hybrids are characterized by a proven variation. From examination of the data is resulted that, with smaller numbers of rows in the spike is presented hybrid ZP 684 with 14.2 rows, with the largest number is presented R 685 hybrid, with

18.9rows. The number of row and the number of grains per row are two of the key elements of the production of maize, so referred as a selection and evaluation object. The number of grains per row varies from 38.3 for hybrids ZP735 to 45.3 in hybrids H605, average 40.87.

Table 1. The parameters of ear

No.	Hybrids	Origin	Number of grains per row	Number of grains per ear	Thickness of ear(cm)	Thickness of cob (cm)	
1	R-683	ALB	43.2	741.1	5.1	3.0	
2	R-685	ALB	40.1	708.7	5.3	3.1	
3	H 605	ITA	45.3	704.6	5.2	3.1	
4	H 702	ITA	39.6	628.8	5.1	3.1	
5	ZP 684	SRB	39.9	566.2	4.8	2.9	
6	ZP 735	SRB	38.3	617.1	5.2	3.1	
7	H 606	ITA	40.3	685.2	5.1	3.0	
8	ZP 718B	SRB	41.1	664.5	5.0	2.9	
9	ZP 606	SRB	41,3	599,3	5.0	2,9	
10	ZP 666	ITA	39.7	677,6	4,9	2,8	
Average			40,87	659,31	5,07	2,99	

The number of grains per ear generally ranges from 600 to 700 grains. per ear in The smallest number of grains per ear has hybrid ZP 684,566.2 grains, and the largest number has hybrid R 685,741,1 grains, averaged 659,31.. The thickness of the ear is a valuable indicator, too. The ear thickness for studied hybrids varies from 4.8 cm for hybrid ZP 684, to 5.3 for hybrid R685. Average thickness of ear for all hybrids is 5,07 cm.

. The minor differences for cob thickness in analysed hybrids (form 2,8 cm in hybrid ZP666 to 3.1 cm in hybrids R685, H605, H702 and ZP735) indicate that no proven differences.

With interest is the study of biometric indicators of grain, Table 2. In this respect were studied two indicators, the weight of grains per ear and weight of 1000 grains. From the data we can observe that there is significant variance among hybrids. Specifically, the weight of grains per ear ranges from 214.5 g for hybrid ZP 684, up to 248, 8 g at hybrid ZP 666. The average weight of grains per ear for tested hybrids is 245.7 g (DMV 0:05 = 18.75 and 0:01 = 22:47).

The weight of 1000 grains is an important indicator as it has to do with the size of grains, which is related to the production. From the data we observe that hybrids represent a wide variation between them. Specifically, this indicator varies from 297 g at hybrid R-683, in 387 g in hybrid.ZP 735 The average weight of 1000 grains for studied hybrids is 356 g.

Table 2. The data of grain, cob weight and their ratio

Nr.	Hybrids	Origin	Weight of 1000 grains (g)	Weight of grains per ear(g)	Weight of cob (g)	Grain/cob ratio
1	R-683	ALB	297	224,0	43,1	84:16
2	R-685	ALB	327	230.4	44.1	84:16
3	H 605	ITA	357	259.8	55.1	82.5:17.5
4	H 702	ITA	348	231.2	61	79:21
5	ZP684	SRB	370	214.5	47.6	82:18
6	ZP 735	SRB	387	233.2	48.4	83:17
7	H 606	ITA	342	244.3	44.8	84.5:15.5
8	ZP 718B	SRB	378	242.6	54	81.8:18.2
9	ZP 606	SRB	380	238,7	45,1	84:16
10	ZP 666	SRB	378	248,8	40,3	86:14
Average			356,4	236,75	48,35	83:17

It is known that the ear is consisted of grains and the cob where the grains are been placed. At the overall weight of ear is intended that cob weight to be as small as possible. Usually, the ratio grain/cob is expressed in percentage. The cob weight ranges from 43.1 g at hybrid R 683, to 61 g at hybrid H 702. The average weight of cob to the studied hybrids is 48,35 g.

Ratio grain/cob represents small differences, where the best value was at ZP 666 hybrid (86:14); the value has diminished at ZP 718 B hybrid (81,8 : 18,2).

It is understood that in a comparative study of hybrid performance, the main indicator and the most important is, undoubtedly, yield. Hybrids represent various differences in performance. In this case, hybrids are grouped by production capacity starting from the highest to the one with the lowest.



Figure 1. Yields data (t/ha) P. 0.05=10.4 q/ha P. 0.01= 13.54 q/ha

Hybrids represent a significant variance for yield, Fig.1. Specifically, it varies from 127 875 t/ha to ZP 718B hybrid, to 150.1 q / ha to PR31A34 hybrid. It appears from the analysis of variance tables, in which significant variations through hybrids are been observed, where f -factual is greater than f -critical.

Conclusions

For all biometric indicators of ear and grain there are differences between hybrids, which materialized to achieve production for each hybrid. Referring to the performance indicators, hybrids can divide into three groups:

The first group hybrids: H 606,ZP 735, R 685, H 605, which provide the highest performance for both levels of security.

The second group: ZP 606 and H 702, which provide the highest performance for one security level (0, 01).

The third group: R- 683, ZP 684, ZP 718 B, ZP 666 that don't have good results.

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