RESEARCH ARTICLE **(Open Access)**

Results of testing for some known maize hybrids and our new combinations in terms of productivity ha in Lushnje

ARTAN SOTA[1], NAZMI HASANAJ[2], TRIFON ARAPI[3], FETAH ELEZI[4]

[1]Department of Plant Science and Technology, Agricultural University of Tirana, Tirana, Albania
[2]SeedCompany, Istog, Kosovo
[3]AgroARFA, Lushnje, Albania
[4] Center for Genetic Resource, Agricultural University of Tirana, Tirana, Albania

Abstract

In Toshkëz district of Lushnja, the group of genetic improvement of AgroARFA crops, maintain a scientific activity with the maize culture, in testing some of the best hybrid versions circulating in the country with high results in the production of maize. Their origin is mainly from Italy and new hybrid combinations of our company. The purpose is not only to determine the best foreigner hybrids, but also to be tested in parallel with the levels of our new hybrid combinations. For those who give high scores to suit our conditions, they are recommended to be used. In this statement we give results of hybrids and new hybrid combinations carried out in 2014-2015. From all the work out it is shown that hybrid combinations between lines synthesized in our country represent a significant variation of performances yield which is related to their genetic consistency.Nine lines are well combined with intersections (tester) lines:AS12; AS19 and AS20. Hybrid combinations with high expectations such as AS18xAS20, AS17xAS19 and AS12xAS18 enter the state testing network. From foreign hybrids with higher levels of performance we would distinguish hybrids: DKC 6815 and SNH 8605.

Key words: *hybrid combinations,testing, cross tester, variation*

1. Introduction

The principal way for growing the production, apart from applying correctly all technological steps, is the usage of qualities and high productive values hybrids, adaptable for the conditions of a special area. We have to mention that introduction hybrids through the lines lead us to a higher yield of this plant. Actually in market there are different types of hybrids created by different companies. It is necessary that before producing extensively the hybrids, should be tried if they adopt in the places where are recommended to spread. In this framework, in Toshkez, Lushnja, were carried every year different test with the best hybrids in order to study their behavior in the conditions of Myzeqeja. Apart the best types of hybrids such as Pioner, Dekalb companies, and new hybrid combinations, which are created by the ARFA Company. From the studies, it results that the corn hybrids with high capacity belong to the Pioner and Dekalb companies. Their productive capacity in the conditions of Myzeqe is 170-180 kv/ha. While the productive capacity of our best hybrids combinations created by the crossing lines of ARFA is in the borders of 150-167 kv/ha. In the conditions when the price of the seeds of the best hybrids is high, which is not affordable by our farmers, the hybrids produced here are an alternative for the fact that the cost of producing the seeds is almost 50% lower compared to

*Corresponding author: Fetah Elezi ; E-mail:elezi_fetah@yahoo.com

2. Material and Methods

The selection of foreign hybrids that will be involved in our experimental schemes, is done every year referring to the foreign data studies, especially to the special magazines, but also from exchanging contacts and information with the specialist that are dealing with this activity. For new hybrid combinations we are based in our control evidences, where in the test are only included that combinations with high yield or equal to the yield of best foreign hybrids, like Pioner, Dekalb, SNH etc. In table 1, are given the nominations of foreign hybrids that are used as tester.

Table 1: The foreign hybrids used as tester in 2015

Hybrid	Company
P 1114	PIONER
P 1114	PIONER
DKC 6815	DEKALB
SNH 3618	SNH
SNH 4743	SNH
SNH 8605	SNH

The used test scheme is with full randomization according to the cases with 3 or 4 replications. The test is done conform a respective technologically advanced card, where is included fertilization, planting time, irrigation and other cultural services. In tests are kept phenological notes, rating for their behavior towards different factors, such as high temperatures, diseases etc. biometric measures (ear, plant and seeds) and is defined the kv/ha yield of each hybrid. The dates are tested through adequate statistics of variance analysis for main indicators. In this reference we will show the results of kv/ha yield of the combinations of hybrids in this two last years, because that's the main indicator for valuing definitively the hybrid.

3. The results of the discussion

In table 2 are the results of the of the best hybrids combinations in report with the foreign test hybrids (which have high yield result in the test of previous years). In this test the hybrid combinations are listed beginning from the mother plant of each hybrid formula, in total 67 combinations. For each 10 combinations there's the adequate label. As a father plant we have used three tester lines, which have high results in the previous tests, known for high combination capacity with other lines. The tester lines are: AS12, AS19 and AS20.

Tab.2: The yield in kv/ha of hybrid combinations and the foreign hybrids in the field trial in Lushnja,2015

Nr	The nomination of the hybrid combination	Yield kv/ha	Nr	The nomination of the hybrid combination	Yield Kv/ha
1	AS1Brr1 x AS20	148.89	34	(32F73 x AS8)BC2 x AS12	111.975
2	AS1Brr1 x AS19	126.14	35	(32F73 x AS10)BC2 x AS20	102.02
3	AS1Brr1 x AS12	138.22	36	(32F73 x AS10)BC2 x AS19	106.925
4	AS3Brr1 x AS20	134.51	37	(32F73 x AS10)BC2 x AS12	109.03
5	AS3Brr1 x AS19	102.89	38	(32F73 x AS13)BC2/1 x AS20	123.995
6	AS8Brr1 x AS12	98.85	39	(32F73 x AS13)BC2/1 x AS19	137.87

7	AS9Brr1 x AS12	90.72	40	(32F73 x AS13)BC2/1 x AS12	110.68
8	AS11Brr1 x AS20	119.03	41	(AS11 x AS14 x AS11) x AS20	69.725
9	AS11Brr1 x AS19	112.46	42	(AS11 x AS14 x AS11) x AS19	119.375
10	AS11/2D11 x AS20	105.25	43	(AS11 x AS14 x AS11) x AS12	124.26
11	AS11/2D11 x AS19	116.875	44	(AS11 x AS14)BC2 x AS20	102.37
	DKC 6815	167.85		Sn8605	155.49
12	AS11/4D16 x AS20	98.795	45	(AS11 x AS14)BC2 x AS19	111
13	AS11/4D16 x AS219	117.62	46	(AS11 x AS14)BC2 x AS12	126.115
14	AS17 x AS20	144.755	47	32F73/6 I3 x AS20	114.145
15	AS17 x AS19	127.035	48	32F73/6 I3 x AS19	118.58
16	AS17 x AS12	118.945	49	32F73/6 I3 x AS12	127.48
17	AS18 x AS20	169.12	50	9613/1 I3 x AS20	134.055
18	AS18 x AS19	135.645	51	9613/1 I3 x AS19	136.18
19	AS18 x AS12	149.51	52	9613/1 I3 x AS12	132.91
20	(9613 x AS13)BC2/1 x AS20	124.075	53	(AS13 x HKSH)/1 I2 x AS20	86.03
21	jo-(9613 x AS13)BC2/1 x AS19	100	54	(AS13 x HKSH)/1 I2 x AS19	117.83
22	(9613 x AS13)BC2/1 x AS12	121.86	55	(AS13 x HKSH)/1 I2 x AS12	122.605
	P1921	139.99		SNH4743	138.26
23	(9613 x AS9)BC2/2 x AS20	115.2	56	GDM437/3 I3 x AS20	108.35
24	jo-(9613 x AS9)BC2/2 x AS19	100	57	GDM437/3 I3 x AS19	118.465
25	(9613 x AS9)BC2/2 x AS12	125.01	58	GDM437/3 I3 x AS12	121.635
26	(9613 x AS10)BC2/3 x AS20	112.07	59	6815/4 I3 x AS20	100.965
27	(9613 x AS10)BC2/3 x AS19	114.215	60	9615/1 I3 x AS19	89.78
28	(9613 x AS10)BC2/3 x AS12	111.865	61	9615/1 I3 x AS12	105.255
29	(32F73 x AS7)BC2/1 x AS20	120.855	62	(6815 x AS3)/1 I2 x AS20	130.805
30	(32F73 x AS7)BC2/1 x AS19	118.835	63	(6815 x AS3)/1 I2 x AS19	128.285
31	(32F73 x AS7)BC2/1 x AS12	115.295	64	(6815 x AS3)/1 I2 x AS12	135.725
32	(32F73 x AS8)BC2 x AS20	96.7	65	9613/4 I3 x AS20	119.48
33	(32F73 x AS8)BC2 x AS19	115.675	66	9613/4 I3 x AS19	105.735
	Sn3618	133.025	67	9613/4 I3 x AS12	82.17
The average yield of the hybrid combinations		119.5	Theaverage yield of the foreign hybrid		147.5
The average yield of the best hybrid combinations		150.029			

From the data of the tab.2, it results that the yield of hybrid combinations varies from 69,72 kv/ha in the hybrid combination formed from the crossing line (AS11x.AS14xAS11) with AS20 line, in 169,12 kv/ha in hybrid combination AS18xAS20.The yield of tester varies from 138.26 kv/ha at SNH4743 hybrid to 167,5 at DKC 6815 hybrid. The average yield of hybrid combinations is 119.5 kv/ha, while the yield of the testers is 147,5kv/ha.

The results of this test give us data not only in the production of each hybrid combination, but also for the values of their lines. The lines AS1, AS12, AS18, AS20, 9613/I, I3, 6815 x AS3 etc., are the type of lines which in combination with other line gives high yield hybrids for which will be shown a special attention. In tables 3 and 4 will show a confront between best combination hybrids with the tester hybrids.

Tab.3 The average yieldkv/ha of new hybrid Combination in in Lushnja 2015

Nr.	The hybrid combination	kv/ha yield
1	AS1Brr1 x AS20	148.89
2	AS17 x AS20	144.755
3	AS18 x AS20	169.12
4	AS18 x AS12	149.51
5	(32F73 x AS13)BC2/1 x AS19	137.87
	The average yield	150.029

According to hybrid combinations with the higher yield is the hybrid formed from the crossing line AS18
with AS20 in 169,12kv/ha. This combination is almost close according to the kv/ha yield with the foreign hybrids which will be subject of a study for the purpose to be established a hybrid formula: stability of the production potential of the breed lines, the combination of the fertilization period of parenting components and the spreading area.

Tab.4: The average yield in kv/ha of hybrids, in field trial in Lushnja 2015.

Nr.	Hybrid	Yield in kv/ha
1	DKC 6815	167.85
2	P 1114	139.99
3	SNH 3618	133.025
4	SNH 8605	155.49
5	SNH 4743	138.26
6	DKC 6815	150.115
	Average yield	147.455

Some of hybrid combinations have been tested in 2014. It is necessary the confrontation of data between the kv/ha yield of the hybrid combination in 2015 and
2014.

Tab.5: The yield in kv/ha of best combinations hybrids in crossing lines in field trial in Lushnja 2015

Nr	Hybrid	2014	Nr	Hybrid	2014
66	Tester SNH 8605	192.4	33	AS12 x AS17	154.3
73	Tester DKC 6815	184.8	74	Tester SNH 1614	152
68	Tester P1114	173.9	27	AS11 x AS17	152
69	Tester SNH 3618	178.3	29	AS11 x AS19	152
70	Tester SNH 8606	167.4	25	AS11 x AS12	149
54	AS17 x AS19	169.5	30	AS11 x AS20	147.8
67	Tester SNH 2618	156.5	49	AS14 x AS20	144.5
34	AS12 x AS18	156.5	62	AS19 x AS11	141.3
55	AS18 x AS2	150.3	63	AS19 x AS13	139.1
71	Tester SNH 3616	155.4	72	Tester ZP 344 (H. SERB)	123.9

In the tab.5, we can notice that some of hybrid combinations are equal or almost equal to the hybrid proper testers. Concretely the AS17xAS19 combination has 169,5 kv/ha yield, meantime the SNH 8606 hybrid has 167,4 kv/ha, the AS12 x AS17 combination has 154 kv/ha, value equal to the SNH 3616 hybrid; the combination AS11 x AS17 and AS11 x AS19 (with base AS11), are at the same level with the SNH 1614 tester. At the same time if we refer to the average of the best foreign hybrids we have identified that the AS17xAS19 hybrid combination is at the same level with these hybrids.

5. Conclusions

1. The hybrid combinations between new lines has an obvious variation according to the yield in kv/ha which is related to their genetic structure.

2. The lines AS1Brr1, AS12, AS17, AS18, 9613/1 I3, 6815 x AS3I4, 9613/1 I4, 6815 x AS3I4 and 32F73 x AS13)BC2/1 are well combined in crossing with these other tester lines: AS12; AS19 and AS20.

3.These hybrid combinations AS18 x AS20, AS17xAS19 and AS12xAS18 have high yield and are fund of the company.

4. From the foreign hybrids with high yield are DKC 6815 DKC 6815 and SNH 8605 hybrids. It should be given a priority to this hybrid to be widely used by farmers.

6. References

Journal citation

1.Aliu S. The study of GCA and SCA for some maize inbred lines in agro ecological conditions of Kosovo.CropScience S.r.l. 2006. 222.2014.

2. Aliu S., Fetahu Sh., Salillari A. "**General and specific combining ability studies for plant height (PH) in some maize inbred lines in agroekological conditions in Kosovo**". National centers of Agricultural sciences institute of Plant genetic resourses "K.Malkov" Plovdiv, Bulgaria.13-14, June 2007

3. Copolino F., Salamini F. **Breeding activity of the maize station of Bergamo**: **Synthetic gene pools and inbreds released in the period (1975-1989)**, Maydica 36, 1991. 87-106.

4. Duvick D.N., Smith J.S.C., Cooper M.. **Changes in performance, parentage, and genetic diversity of successful corn hybrids**. Maydica. 1930–2000, 2004. 65–97.

5.Duvick D.N. **The contribution of breding to yield advances in maize (*Zea mays*)**. In D.L. Sparks (ed) Advanes in Agronomy. Vol.86 Elseiver Academic Prees Boston. 2005.90-110.

6. Elezi F., Hasani N,, Ibraliu A., Plaku F., Salillari A. "**Study results on the heterosis effect of some inbreed maize lines in the Istog conditions**" BSHN (UT) special. 2011.

7. Hallauer AR.. **Improvements in yield of maize hybrids.** The Universal Decimal Classification (UDC)63. 1990.193–198.

8. Sprague GF, Dudley JW.. **Corn and Corn Improvement**(3 ed.). Madison, Wisconsin, USA. 1988.

Dissertation or thesis citation

9. Salillari A.**Studime në fushën gjenetike dhe përmirësimit të misrit**. Disertacion.UB,Tiranë. 1990.

Published proccedings citation

10. Salillari A, Gjeta M, Mehmeti I, Hajkola K. **Maize, genetics, breeding and seed production**. Institute of Maize and Rice, Tirana. 2005. 112–114.

11. Smith, CW, Betran, J, Runge, ECA (eds), Corn: **Origin, History, Technology and Production**. John Wiley & Sons Inc., Hoboken, NJ, USA.2004.

12.Unità di Ricerca per la Maiscoltura: **Programmi di Breeding.** ARC-MAC, 2013.