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Original scientific paper

THE STUDY OF MAIZE HYBRIDS (*ZEA MAYS SPECIES* L.) IN DIMAL MUNICIPALITY, BERAT

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Abstract

Maize is one of the most important crops in world agriculture and has a very important place in the planted area. It is cultivated for various purposes: Bread, Livestock (silage), the beer industry, the oil industry, and for bioenergy. More than five hundred different food items, dishes and drinks are produced from the maize plant. The production of hybrid seed has greatly influenced the increase in the yield of maize, both for grain and forage mass. For the conditions of Albania, the study of maize hybrids is very important, since the hybrid seed is imported and not produced in the country. The experiment involved eleven hybrids imported by the companies: *ARLI International* and *Huqi*, which respectively import from *Zemun Polje* and from *Dekalb* and *KWS*. Eleven hybrids were included in the study, namely: 477, 6263, 388, 735, 606, 555, 5601, 707, 666,553 B from *Zemun Polje* and Kulmos from *KWS*, Germany. The experiment was set up according to a randomized block design with eleven variants and four replications. Ten plants were determined for each replicate and variant on which biometric measurements and production indicators were made. The data was subjected to mathematical data processing to determine the best hybrid, which is adapted to the conditions of the area and gives the highest yield.

Keywords: Maize, hybrid, plant height, leaf, cob, rows, grain and yield.

1. Introduction

The maize plant is one of the most important plants in the world and is used for human and livestock food. In recent years, it is also being used for the production of bioenergy. The study of hybrids is always current to determine the best hybrid for an ecological zone of each country.

2. Object and method of scientific work

The object of the work was the study of the stability of some hybrids of maize, for some morphological indicators of the plant, of the ear, and of the yield kv/ha. These have been studied on the basis of the manifestation of these important features in the conditions of the field of Berat. The basic materials that have been in this trial raised in this area have been systematized and subjected to mathematical analysis related to the agronomic stability determination model.

2.1. Materials of scientific work: As basic material in this scientific research, a series of foreign hybrids were used and synthesized by the former Shkodra Maize Institute, specifically:

1. **"Arli" International sh.p.k. Zemun Polje Maize Institute (Serbia)**
2. **Huqi sh.p.k.**

2.2 Place, time and method of conducting the study: The study was conducted in DIMAL Municipality, Berat in 2023. The soil where the experiment was set up was of light subclay composition with a deep sole. Pre-plant was wheat.

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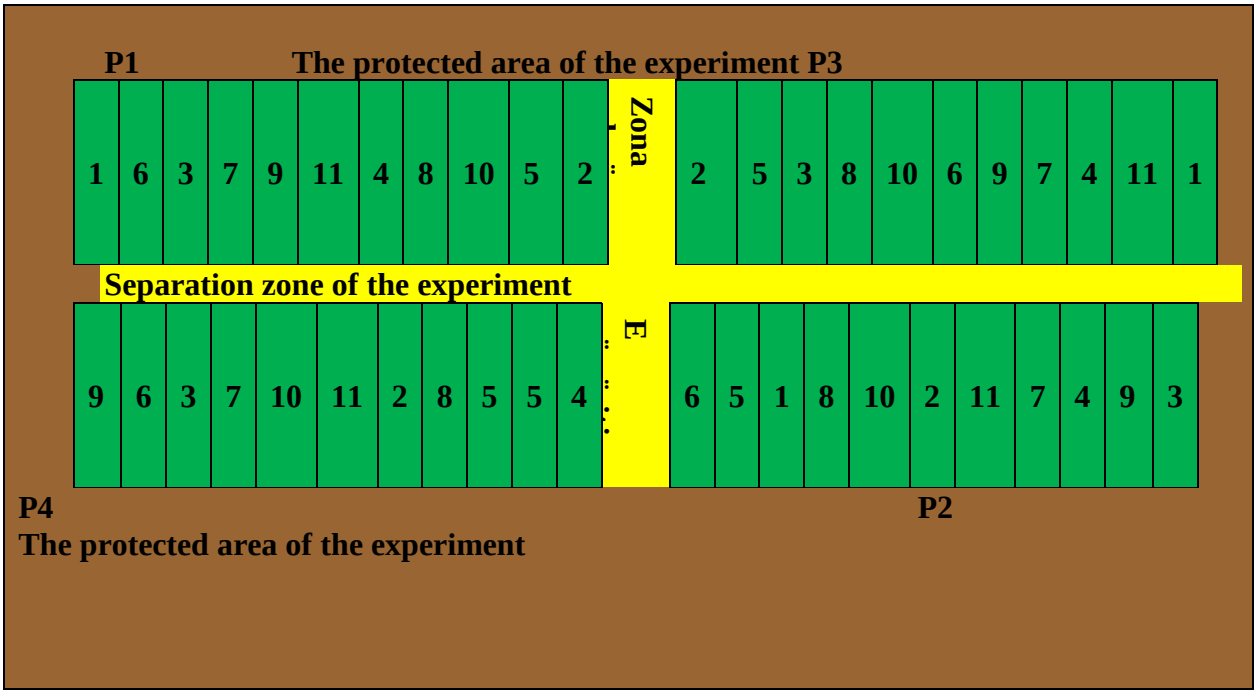
The experiment was set up based on randomized block designs with four replications. The area of a variant 2.1x5 = 10.5 m^2



Scheme 1. Random block (randomized).

2.3. Programmed phenological, morphological and production indicators.

I. Phenological indicators

1. Germination - male flowering (days),
2. Germination - female flowering (days),
3. Germination-full maturity (days).

II. Biometric indicators in plants, cobs and grains

1. Biometric indicators in plants,
2. Plant height in cm,
3. The height of the first cob emerging from the soil,
4. Number of leaves
5. Leaf length in cm,
6. Leaf width in cm,

III. Biometric indicators on the cob

1. Cob length in cm,
2. The number of rows in the cob,
3. The number of grains in a row,
4. The number of grains in the cob, the thickness of the cob,
5. The thickness of the corncob, in cm,
6. Weight of corncob in gr

IV. Biometric indicators in grain

1. Weight of cob grains in gr,
2. Weight of 1000 grains
3. *Yield kv/ha*

The data were extracted on the basis of measurements on 20 plants in two repetitions from which the average was calculated where the relevant analyzes were performed. The data were subjected to statistical analysis:

Indicators of analysis of variance, minimum verified difference.

3. Results and their discussion.

In the results and their discussion, the experimental part of the data of the experiment is treated. At first the discussion focuses on the phenological indicators and then continues with the biometric indicators on the plant, ear and grain and closes with the interpretation of the yield. The soil in which the experiment was set up was analyzed and the indicators are: water pH 6.95, saline pH 6.7, K.E. 0.100, Humus 2.2 %, Nitrogen 0.14 %, Phosphorus ppm 11.6, Potassium ppm 13.27, CaCO3 1.64 %, sand 36.6 %, silt 31.3 % and clay 32.1 %. They are suitable soils for potato cultivation.

3.1. Interpretation of the phenological indicators of maize hybrids put to the test in the Municipality of DIMAL, Berat for the year 2023 Phenological stages include the qualitative changes that the plant undergoes in its morphology and physiology during growth and development. With regard to these indicators, in this study, attention was focused on the periods of full germination-male flowering, full germination-female flowering and full germination-full ripening, or as it is said otherwise, the vegetative period. The selection of these stages is not random, but is related to the fact that these are fundamental in the development of the maize plant. The phase from flowering to full ripening is the generative phase, the reproductive phase, which is decisive in the formation of the productive part of the plant, the cobs and the grains. These phases are accompanied by deep biochemical, physiological and chemical changes and after the binding of the grain begins the translocation of assimilates in the reserve organs of the plant which are the grains. We are interested in the vegetative phase within the biology of the plant being as short as possible, while the vegetative phase is longer because the plant accumulates for grain production. On the other hand, it must be said that knowing the period of germination and full ripening also serves us for a rational regionalization of this plant.
Between the hybrids there are not too big differences in the duration of the plant's development phases, which ranges from 120 days to 140 days.
Even in the transition of the phenophases, the same difference appears, that is, there are small changes excluding the hybrids ZP735 and ZP 707, which are also for the production of silage.

3.3. Interpretation of biometric indicators of maize hybrids

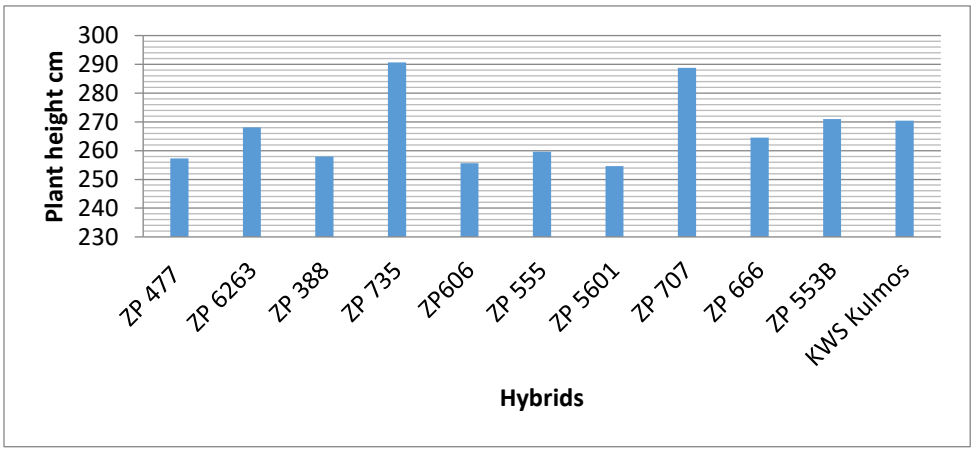


Chart 1 Plant height in cm

The hybrids included in the study have different plant heights. The hybrids with the highest height are ZP735 and ZP707. The height of the plant varies according to the vegetative period.

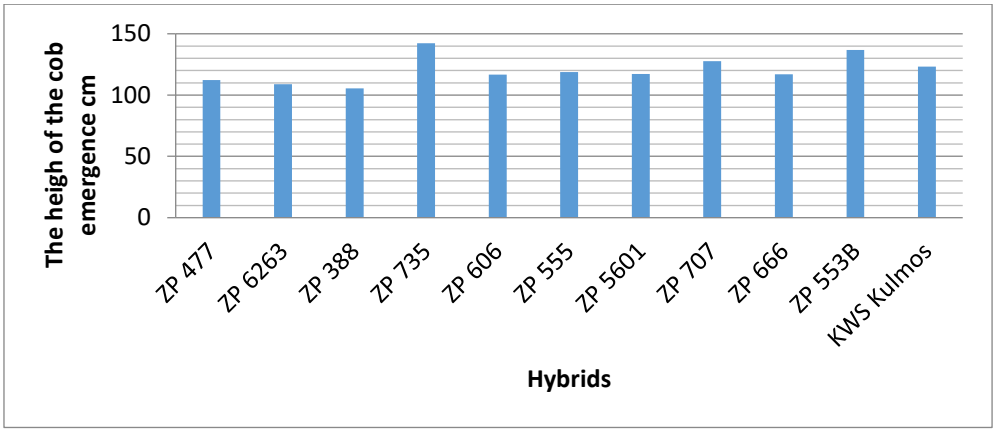


Chart 2 The height of the cob emergence in cm

The height of the cob emergence has less variation than the height of the plant. In general, the cob appears at a height of over 100 cm. Hybrids with a longer vegetative period emerge the cobs at the greatest height, and specifically, ZP735 and ZP707 emerge the cob higher than others.

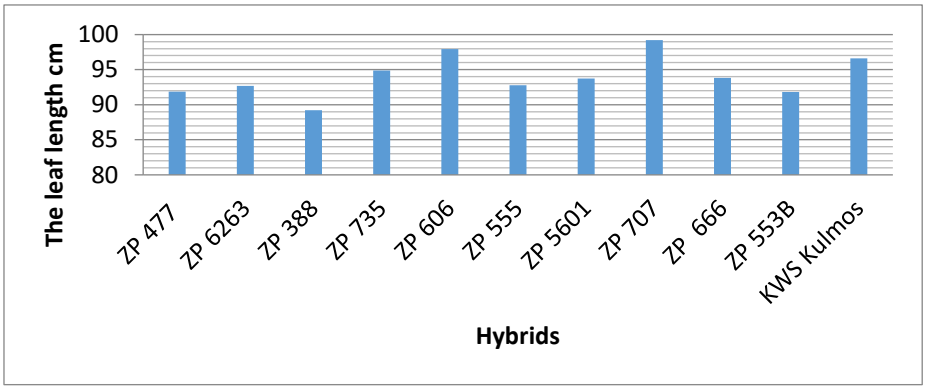


Chart 3 Leaf length in cm

The leaves have higher variability and are generally longer in hybrids that have a longer vegetative period. Hybrids ZP735, ZP707, and Kulmos have longer leaves.

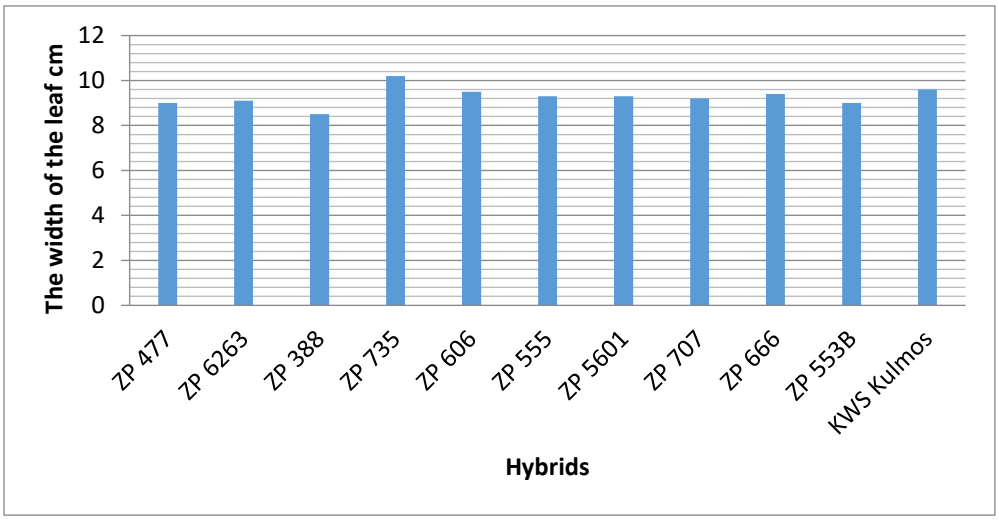


Chart 4 Leaf width in cm

The width of the leaf does not have big differences and they have approximate values. Again, it is the hybrid with the longest vegetative period that have the widest leaves.

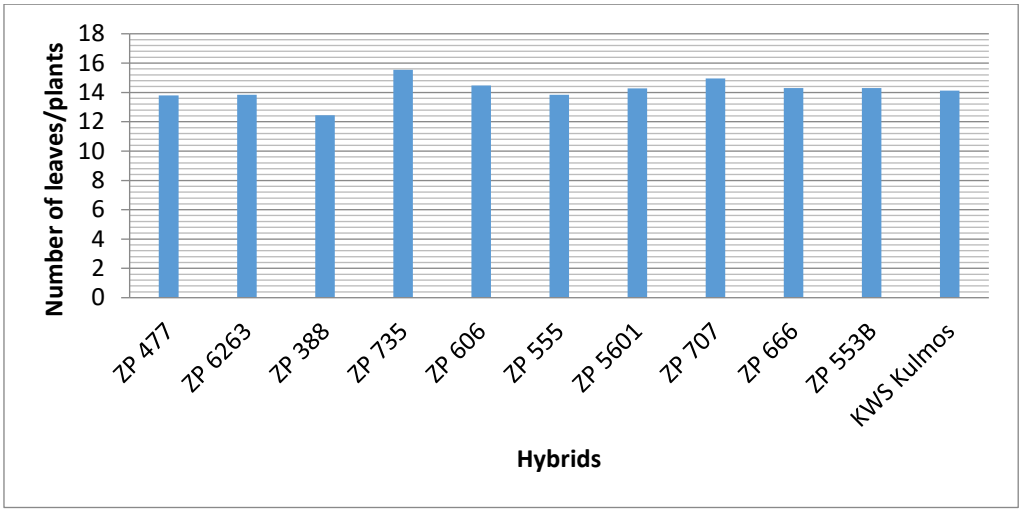


Chart 5 Number of leaves per plant

The number of leaves per plant does not have high variability. But also in this indicator, the same regulation is presented, hybrids with a longer vegetation period also have a higher number of leaves.

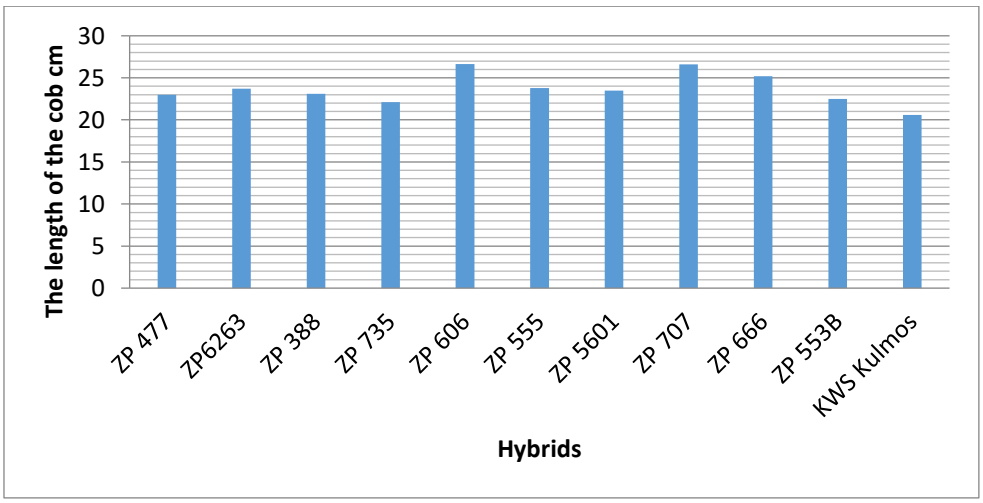


Chart 6 The length of the cob (cm)

The cob length is the indicator that has the most value and is the most studied. The regularity is concrete, hybrids with a longer vegetative period have longer cobs and higher yields. The number of rows on the cob is a fixed indicator for each hybrid. There are no major differences between the hybrids. Only Kulmos and ZP 666 have eighteen lines each, while the others have sixteen and fourteen lines.

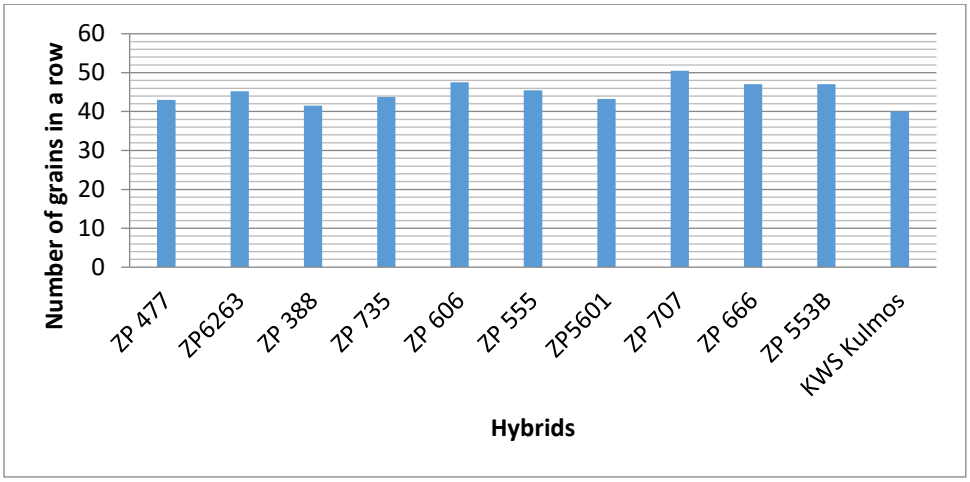


Chart 7 Number of grains in a row

The number of grains in a row is higher in ZP606, ZP707, ZP666, and ZP553B. This indicator is determined by genetics but also by cultivation technology. In the present case, where the technology has been the same, it appears as a genetic feature.

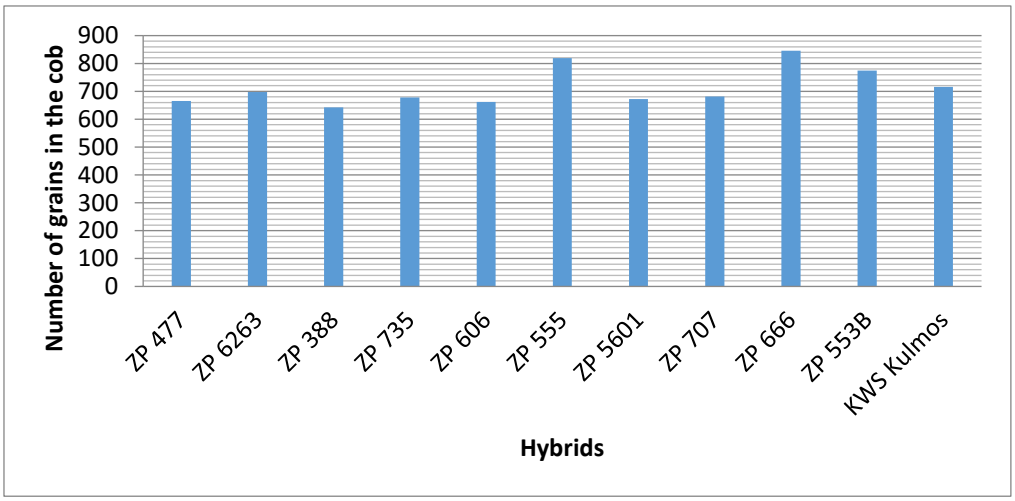


Chart 8 Number of grains on the cob

The number of grains on the cob is the most valued indicator because it is related to the yield. The hybrids that have the highest number of grains in the cob are the hybrids: ZP555, ZP666 and Kulmos.

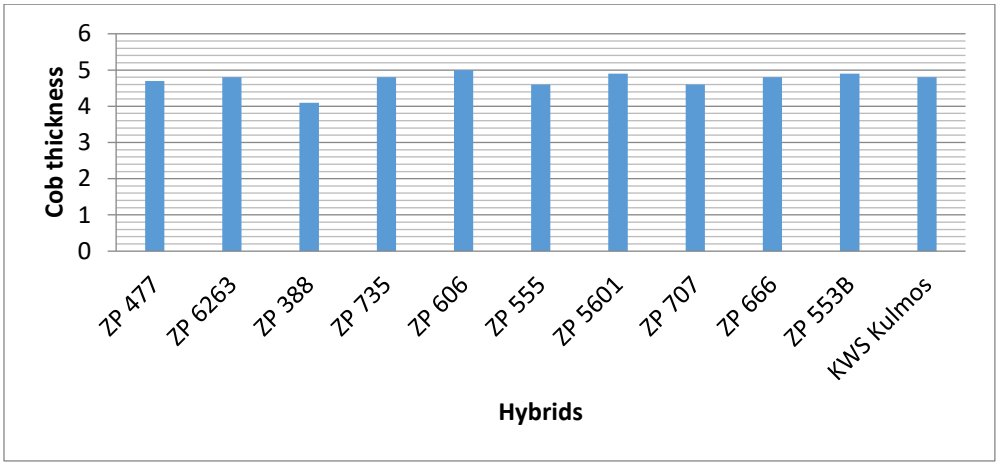


Chart 9 Cob thickness

Cob thickness is an indicator that presents less variability. It practically ranges from four to five cm. The hybrids: ZP606 and ZP553B have the thickest cobs, while the hybrid ZP 388 has the lowest.

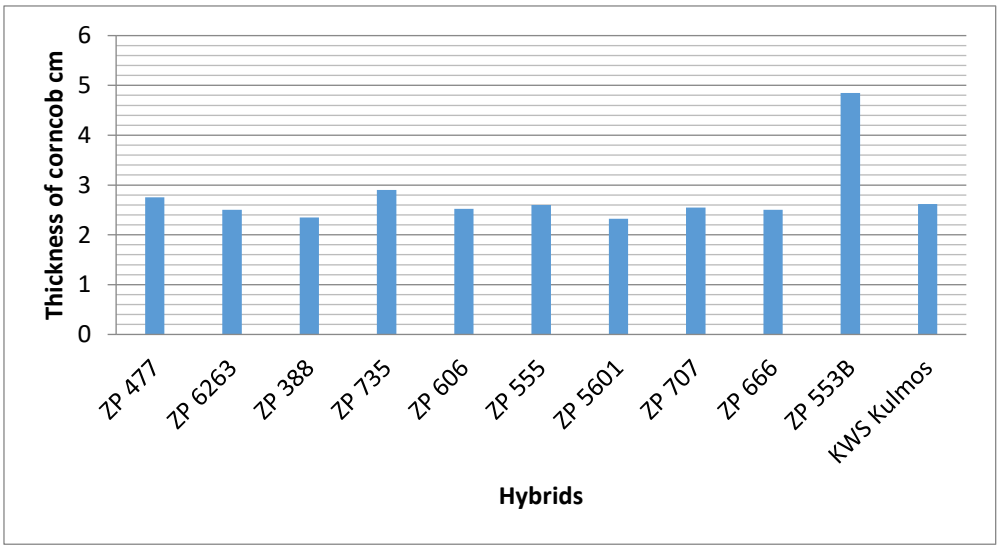


Chart 10 The thickness of the corncob (cm)

The thickness of the corncob is an indicator that affects the drying of the grain. Hybrids with smaller cob thickness are often preferred. In this specific case, the thickest corncob has ZP 553B.

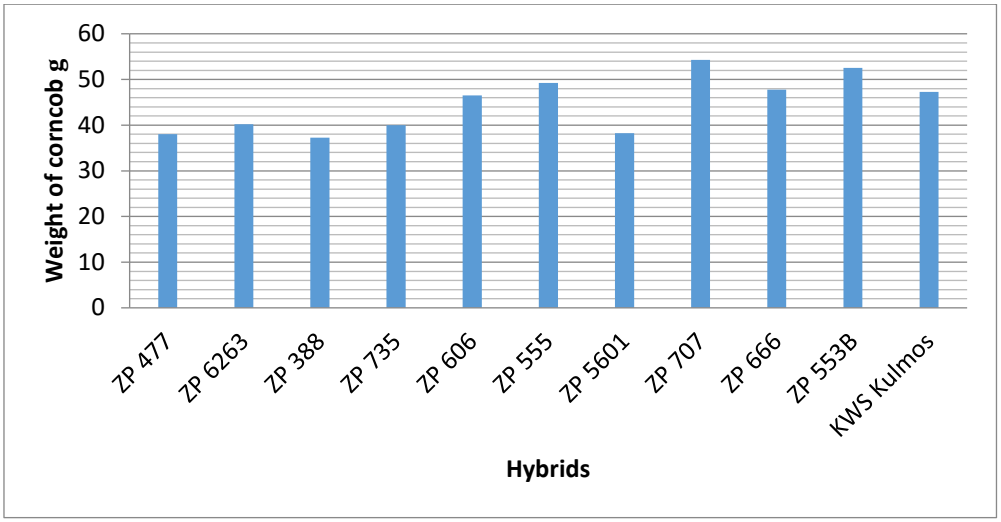


Chart 11 The weight of the corncob in g

The corncob weight varies between hybrids. The hybrids that have the largest corncob weight are: ZP735, ZP707, and ZP553B and the hybrids: ZP477, ZP6263, ZP388, and ZP5601 have the lowest.

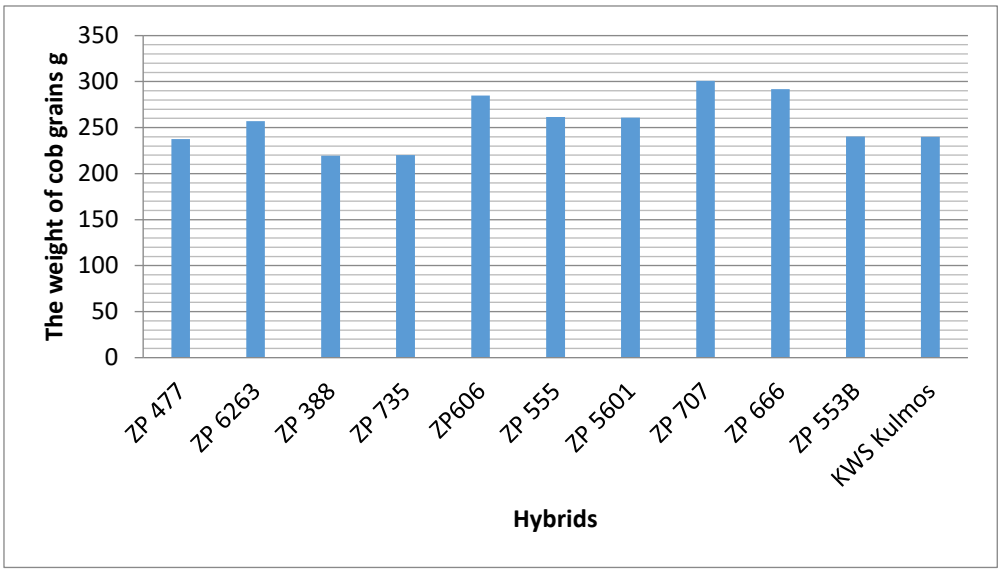


Chart 12 Weight of cob grains (gr)

The cob weight is different among hybrids, and hybrids ZP606, ZP707, and ZP666 have the heaviest weight. The weight of 1000 grains is the indicator that is most appreciated by all and that is studied in the promotion of hybrids. It greatly affects the yield of hybrids. The hybrids: ZP606, ZP5601, and ZP707 have the highest weight of 1000 grains, and the hybrids: ZP735, P388 and Kulmos have the lowest weight.

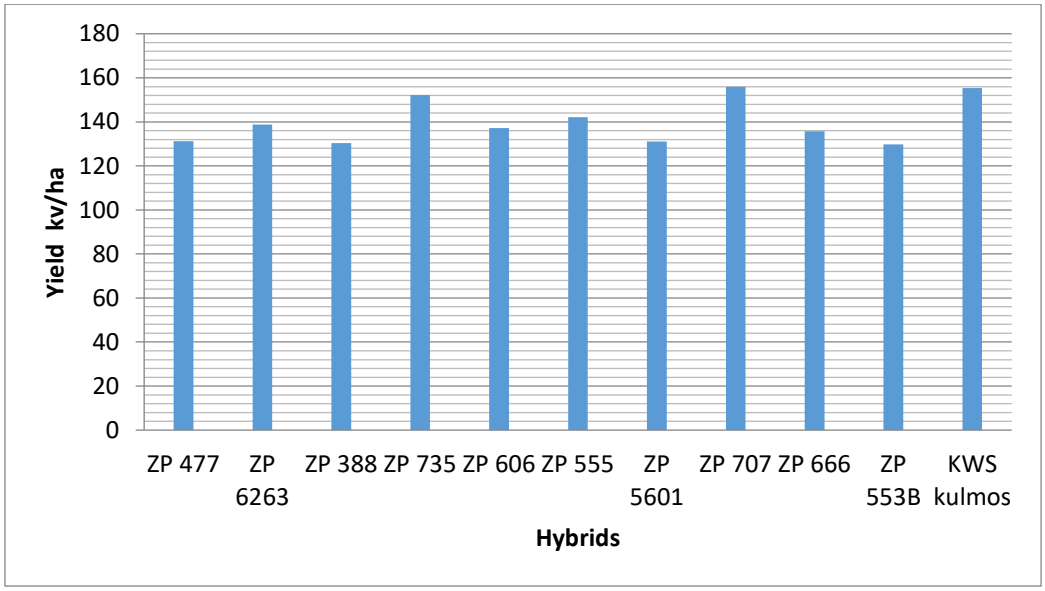


Chart 13 The yield (kv/ha)

The yield of the hybrids is different and three hybrids have the highest yield: ZP735, ZP707, Kulmos and the following hybrids have the lowest yield: ZP553B, ZP388 and ZP5601.

4. Conclusions and recommendations

The study of some mentioned hybrids of different maize firms in the conditions of Lushnja leads us to the following conclusions and recommendations:

4. A. Conclusions

1. The cob length is the indicator that has the most value and is the most studied. The law is concrete, hybrids with a longer vegetative period have longer ears and more yield
2. The number of grains in a row is higher in ZP606, ZP707, ZP666 and ZP553B. he indicator is determined from the genetic side but also from the cultivation technology. In the specific case, where technology has been the same appears as a genetic feature.
3. The number of grains in the cob is the most valued indicator because it is related to the yield.

The hybrids that have the highest number of grains in the cob are the hybrids: ZP555, ZP666

and Kulmos.

4. Cob thickness is an indicator that presents less variability. It practically ranges from 4-5 cm.

The hybrids have the thickest cobs: ZP606 and ZP553B, while the hybrid ZP 388 has the lowest value.

5. The thickness of the corncob is an indicator that affects the drying of the grain. They are often preferred hybrids with smaller corncob thickness. In this case, ZP 553B has the thickest corncob.
6. The corncob weight varies between hybrids. The hybrids that have the largest corncob weight are: ZP735, ZP707 and ZP553B and the hybrids that have the lowest weight are: ZP477, ZP6263, ZP388 and ZP5601
7. The weight of grains on the cob is different among hybrids and the hybrids: ZP606, ZP707, and ZP666 have the largest weight.

8. The weight of 1000 grains is the indicator that you appreciate the most of all and that is studied in the promotion of hybrids. It greatly affects the yield of the hybrid. The hybrids: ZP606, ZP5601, and ZP707 have the highest weight of 1000 grains and the hybrids: ZP735, ZP388 and Kulmos have the lowest weight.
9. The yield of the hybrids is different and three hybrids have the highest yield: ZP735, ZP707 and Kulmos. The hybrids ZP553B, ZP388, and ZP5601 have the lowest yield.

4. B. Recommendations

From the general evaluation and especially the yield, we advise planting in wide production the hybrids: ZP553B, ZP388, and ZP5601 which have given higher yield

References

[1]. Fitoteknia , 1984, Grup autore, UB Tiranë.
[2]. Hajkola K, 2000, Rezultate të provave të krahasimit të hibrideve të misrit me pjekje të vonë. B.SH.B. 4, 47-52.
[3]. Hallauer A R, Russell W A, Lamkey K R, 1988. Corn breeding. In "Corn and corn improvement".
[4]. Laçej H ,Dionisi Gj 1986 Metodologjia e përdorur dhe rezultatet e arritura në krijimin e linjave të misrit në vendin tonë. BSHB,Nr 1,Tiranë
[5]. Laçej. H. 1980- Rezultate të punës gjenetiko seleksionuese me misrin në vendin tonë, BSHB, Nr 4 ,Tiranë.
[6]. Osja A, Deva A,2000, Misri në Shqipëri, arritje dhe perspektiva. Tiranë.
[7]. Përmeti M, Xhepa S, Salillari A.1987, Linjat baze të përmiresimit gjenetik të bimës së misrit. Tiranë.
[8]. Russell W.A, S.A Eberhart 1975, Hybrid performance of selected maize lines from reciprocal selection and test cross selection programs, Crop sci. 15, 1-4.
[9]. Salillari A 1990 Studime në fushen gjenetike dhe përmiresimit të misrit.Disertacion për graden shkencore "Doktor i Shkencave". UB,Tiranë.