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Professional paper

EVALUATION OF MORPHOBIOLOGICAL AND PRODUCTIVE INDICATORS OF MAIZE HYBRIDS (*ZEA MAYS SP. L*) IN TOSHKËZ, LUSHNJE

Valmir SALIJI[3], Denada DËRVISHI[1], Amarildo CAULI[1], Moltine PREBIBAJ[1], Nikollaq BARDHI[1], Zejnedije ADEMI[2]

*1*Faculty of Agriculture and Environment, Agricultural University of Tirana, Albania.*
2 Faculty of Agriculture and Biotechnology, Department of Manufacturing Plant, University of Tetova, NMK.*
3 Department of Plant Biotechnology, University "Ss. Cyril and Methodius" NMK.*
**Corresponding Author: e-mail: zejnedije.ademi@unite.edu.mk*

Abstract

Maize hybrids are adapted according to the areas in accordance with their biological characteristics and meeting the climatic and soil requirements, as well as the cultivation technology that is constantly improving. In the area of Lushnje, there are very good conditions for the cultivation of maize, especially hybrids with a long growing season and high production capacity. In conditions where Albania does not produce its own seed but imports it from different countries, it is very important to evaluate and study hybrids with the aim of determining the most suitable hybrid for different areas. The study of maize hybrids imported from three main sources that dominate the area sown with maize in Albania, and mainly in the coastal lowlands, remains a continuous work that is repeated almost every year.
The hybrids included in this study: 5685, 5182, and 6092 from DKS, Bulgaria, Contigos, Intelligence, Kalxon, Kulmos, and Kabriles from KËS, Germany, 707, 666 and 553 B from ZP (Zemun Polje, Serbia). The experiment was set up according to the randomized block scheme 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, variant, yield, import, demand, climate and soil**.**

1. Introduction

Corn cultivation in Albania is historic and it continues to be one of the main crops. Evaluation of morphologic and productive indicators of hybrids is one of the fields of scientific research for maize. Through this study, it is intended to determine the most suitable hybrids according to the main ecological areas of Albania.

2. Object and method of scientific work.

The object of the work was the study of the stability of some maize hybrids, for some morphological indicators of the plant, of the cob, 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 Toshkëz, Lushnje Municipality. 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. Scientific work materials: As basic material in this scientific research, a series of foreign hybrids were used and synthesized by the Shkodër Maize Institute, specifically:

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

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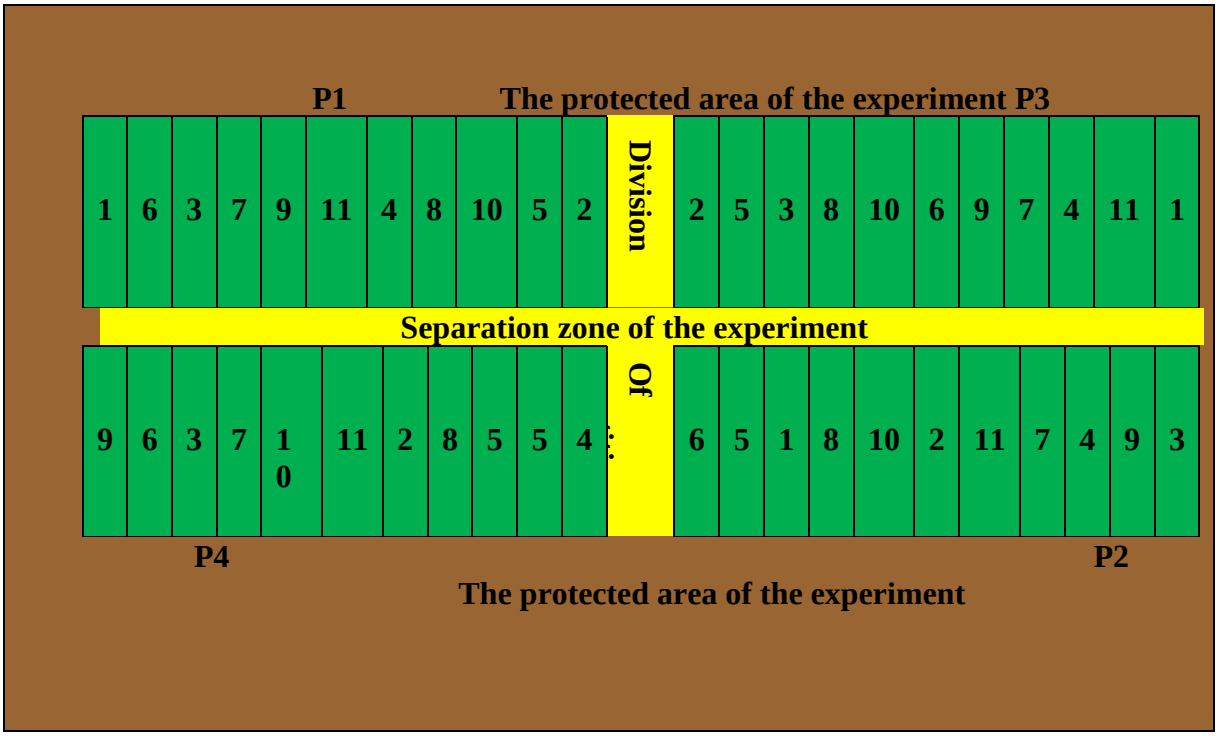
2.2 The place, time, and method of the study: The study was carried out in Toshkëz of the Municipality, Lushnje on the soil of the owner **Trifon ARAPI** in 2023. The soil where the experiment was set up was of light subclay composition with a deep sole**. The pre-plant was wheat.**

Experiments were set up based on randomized block designs in four replications. The area of a variant 2.1x5 = 10.5 m2



Scheme 1 Random block (randomized).

2.3. The 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

II.A. 1. Biometric indicators in plants:

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

II.B. 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

II.C. 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

3. Results and their discussion

In the results and their discussion, the experimental part of the microthesis is treated. In the beginning, 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 realized by each hybrid, which is also the basic indicator of the work.

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.

Interpretation of phenological indicators of maize hybrids planted in test in the Municipality of Lushnje, Toshkëz for the year 2023

Phenological stages include the qualitative changes that the plant undergoes in its morphology and physiology during growth and development. In terms of 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 also said, 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. These phases are associated with profound biochemical and physiological changes and after the grain is bound, the translocation of assimilates begins 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 the knowledge of the full germination-ripening period also serves us for a rational regionalization of this plant.

I. Morphological indicators

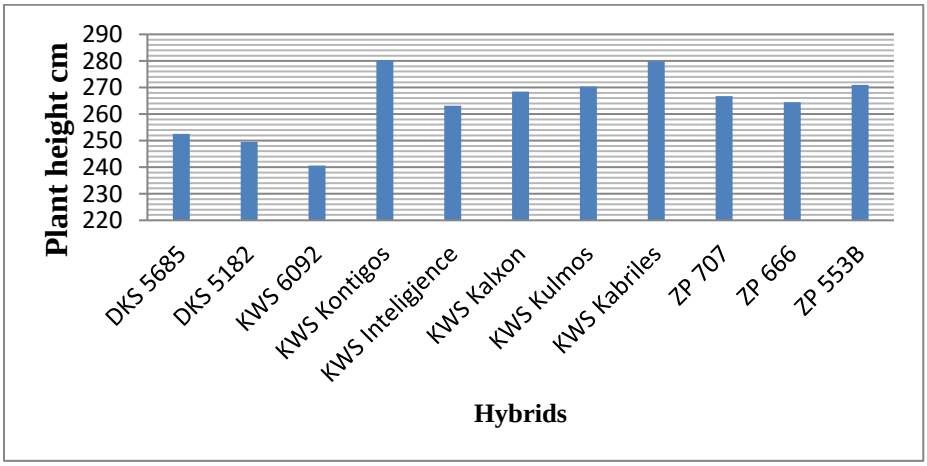


Chart 1 Plant height (cm)

The hybrids included in this study are of different origins: Germany, Bulgaria, and Serbia (ZP). As can be seen from the graph, it turns out that the height of the plant is different. The hybrids

of KWS Germany and ZP Serbia have the greatest height. Hybrids have differences in terms of plant height. The Kontigos and Kabriles hybrids, both of KWS, have the greatest height.

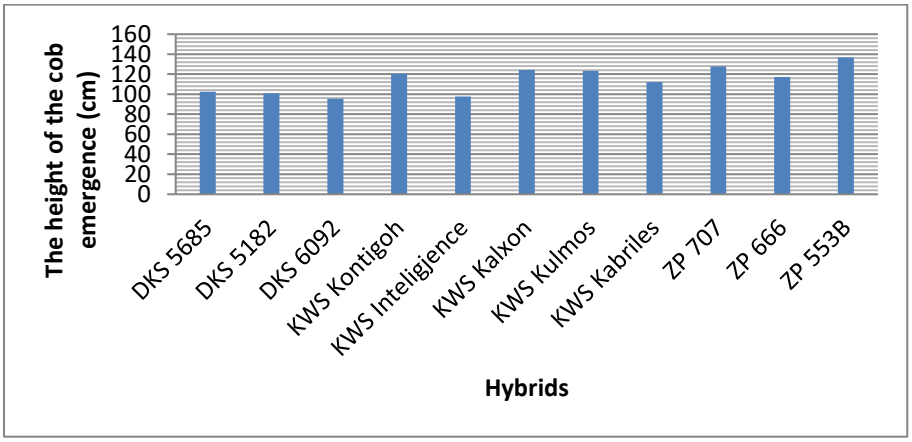


Chart 2 The height of the cob emergence (cm)

The height of the cob emergence shows small differences. The corn grows higher, above 100 cm in the hybrids ZP538, ZP707, Kalxon and Kulmos and lower, i.e. below 100 cm, in the hybrids DKS6092 and KWS Inteligente.

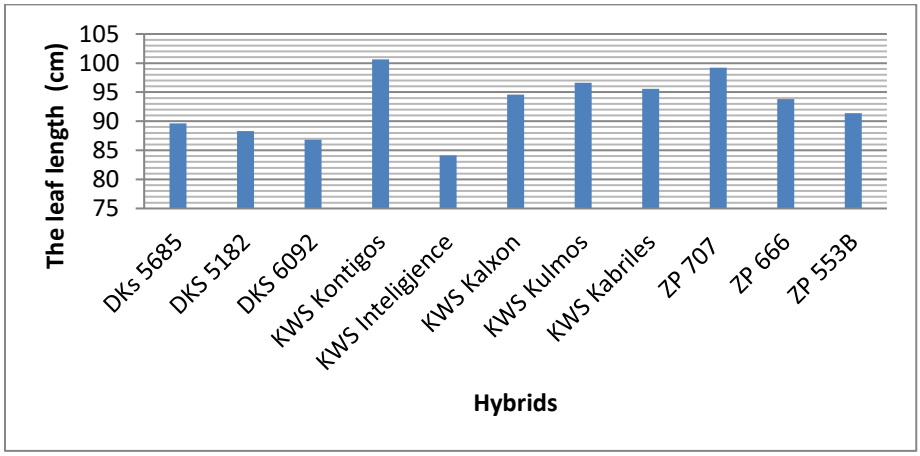


Chart 3 Leaf length (cm)

The length of the leaf shows significant differences between the groups of hybrids according to their origins. KWS Kontigos and ZP 707 hybrids have longer leaves and DKS6092 and KWS Inteligente hybrids have shorter leaves, while ZP hybrids have more complete stability.

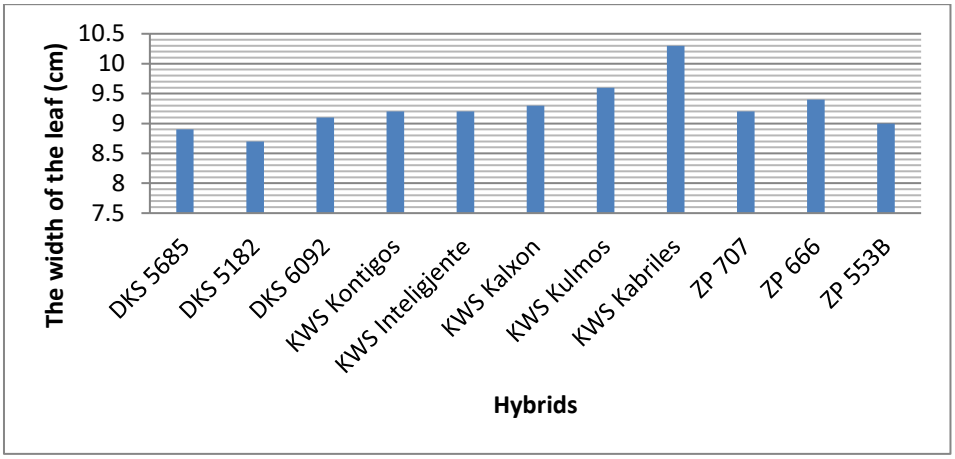


Chart 4 Leaf width (cm)

Leaf width represents an indicator with little variation between hybrids except for the hybrid KVS Kabriles and Kulmos which have wider and narrower angled leaves.

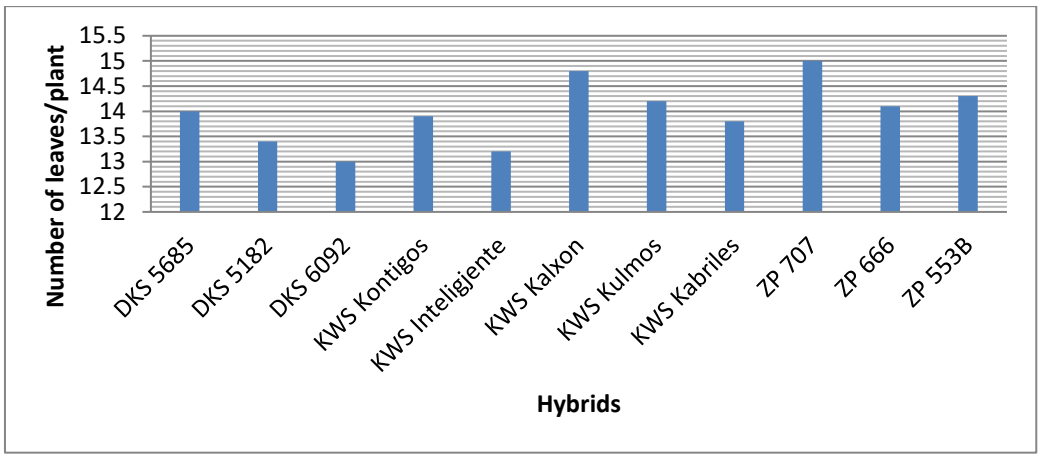


Chart 5 Number of leaves per plant

The number of leaves per plant is different between groups of hybrids and within the same group. Specifically, Hybrids KWS Kalxon and ZP 707 have a higher number of leaves and DKS 5182, DKS6092, and KWS Inteligente have a lower number of leaves.

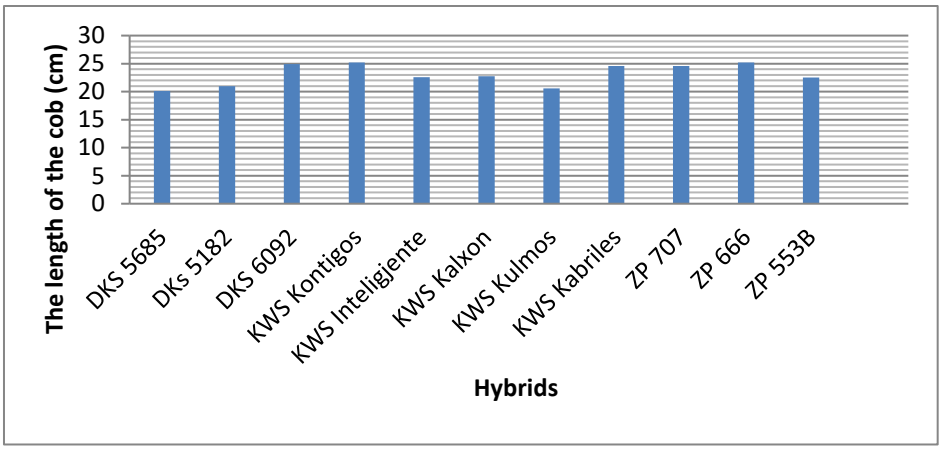


Chart 6 The length of the cob (cm)

The length of the cob is an important indicator of achieving high yields. It does not represent major changes. The hybrids with the longest vegetative period have the highest values, specifically: DKS6092. KWS Kontigos, KWS Kabriles, ZP707, and ZP666, and the lowest values are DKS5685 and DKS 5182.

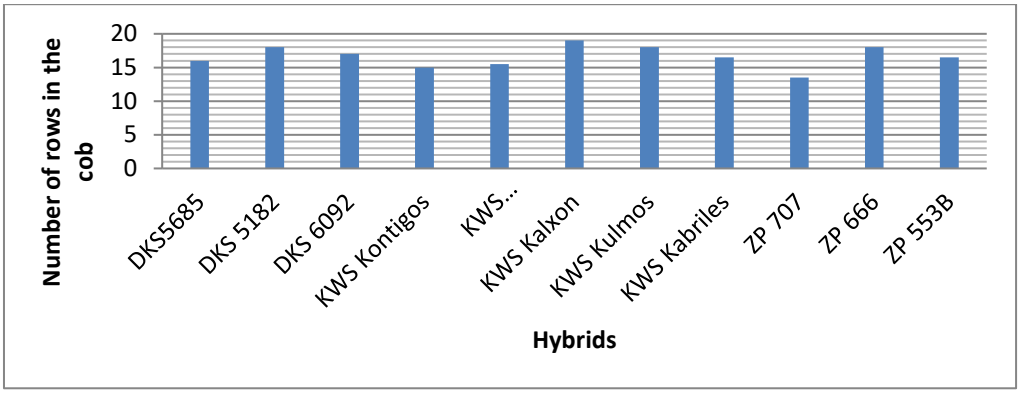


Chart 7 Number of rows in the cob

The number of rows is approximate within the group of hybrids, with values of 16-18 rows in DKS and KWS hybrids, while ZP hybrids go down to 14 rows.

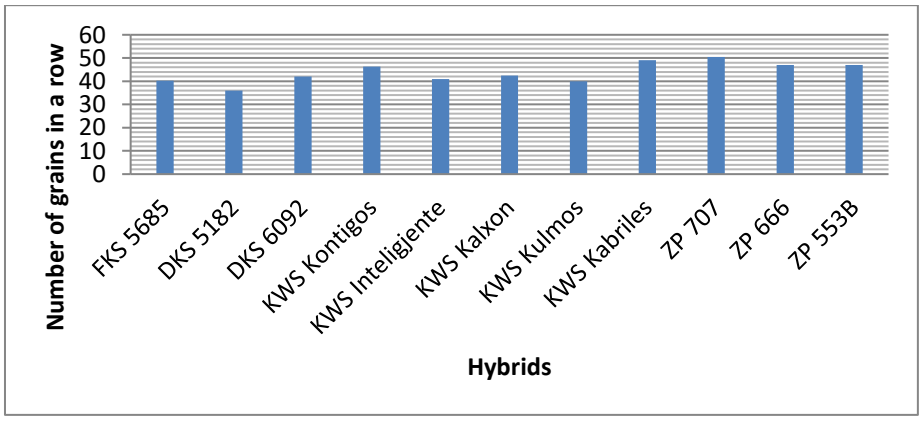


Chart 8 Number of grains in a row

The number of grains in a row is a genetically predetermined indicator. Failure to achieve the correct number of grains in a row clearly indicates a lack of quality service to maize hybrids. The hybrids: KWS Kabriles, ZP707, ZP666, and ZP 538N have the highest number of grains and the hybrids: DKS 5685 and DKS 5182 have the lowest number of grains.

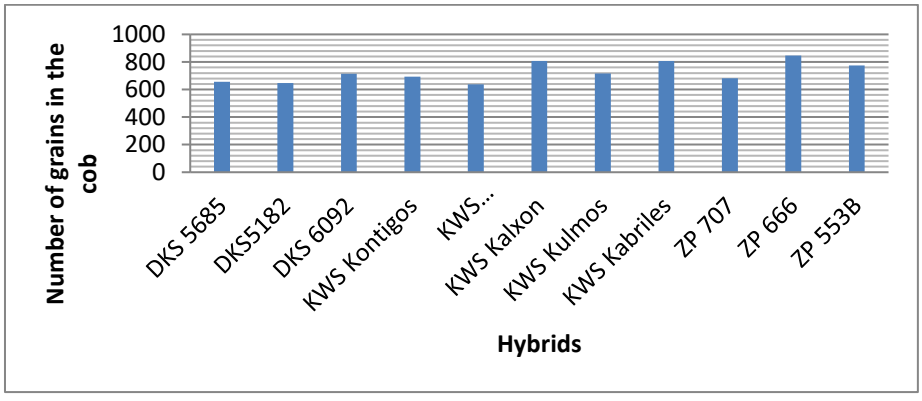


Chart 9 Number of grains in the cob

Even the number of grains in the cob is genetically predetermined, but the changes come from adaptation to climatic conditions and cultivation technology.

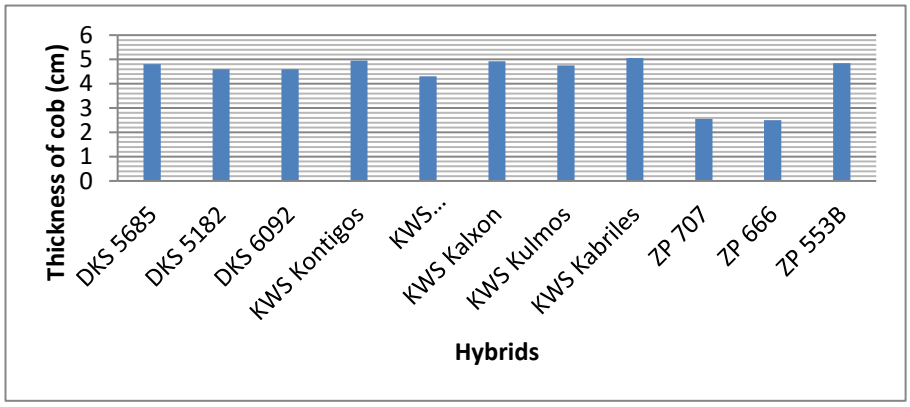


Chart 10 Thickness of the cob (cm)

The thickness of the cob is almost the same, only with a difference in the hybrids: ZP707 and ZP666, which have a smaller thickness.

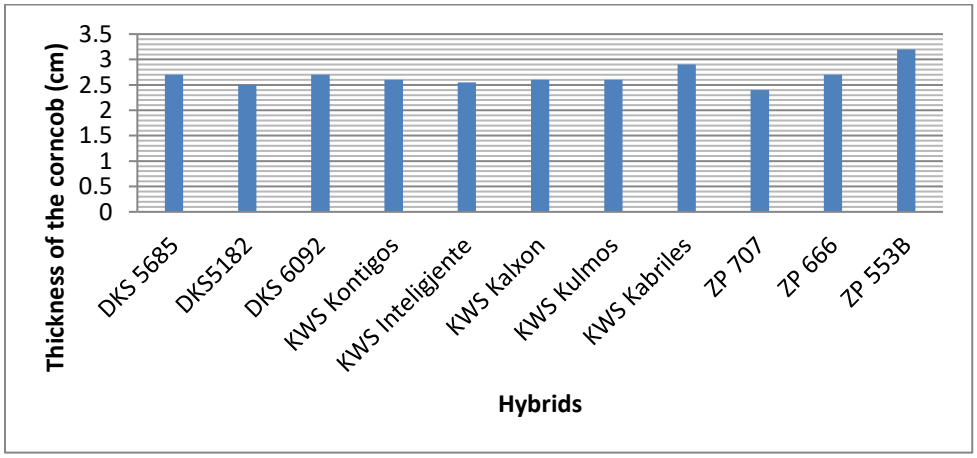


Chart 11 Thickness of the corncob (cm)

The cob thickness is almost equal in nine hybrids and is higher in two hybrids: KWS Kabriles and ZP 553B.

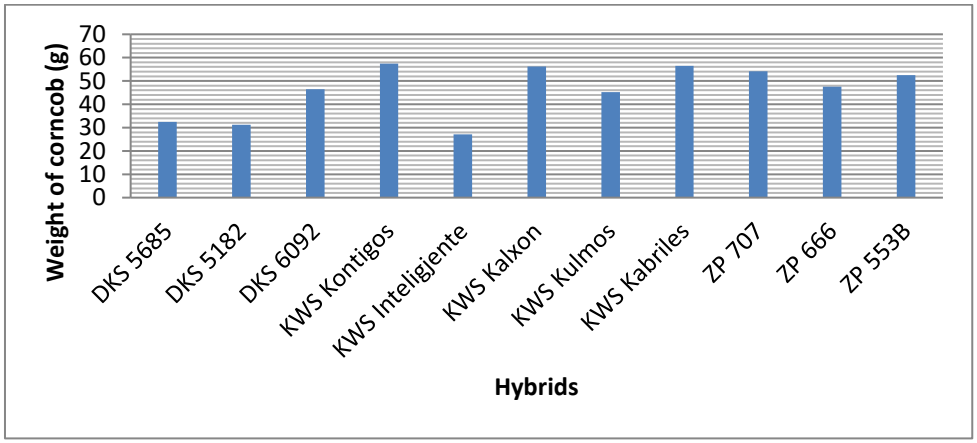


Chart 12 Weight of corncob (g)

The weight of corncob is quite different both within hybrid groups and between hybrid groups. The hybrids: KWS Kontigos, KWS Kalxon, KWS Kabriles, ZP707, and ZP553B have the highest values, and DKS5685, DKS5182, and KWS Inteligente have the lowest values**.**

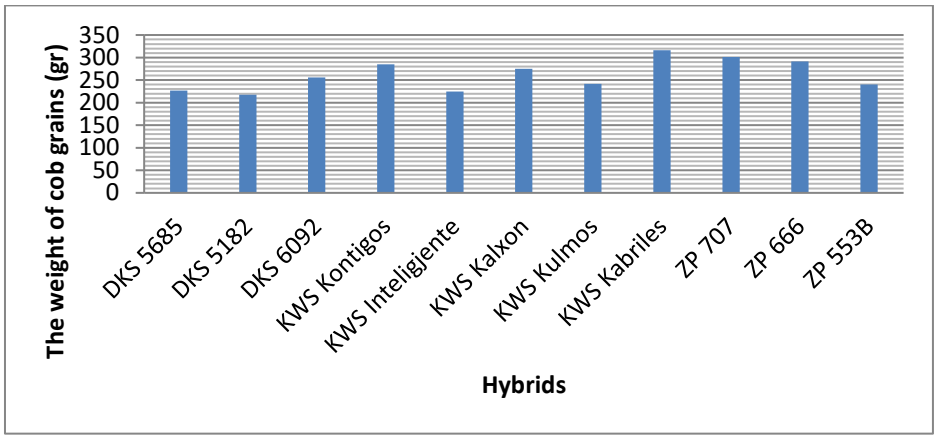


Chart 13 The weight of cob grains (gr)

The weight of grains in the cob is also a genetically predetermined indicator. The differentiation is made by the quality of the cultivation technology. Differences are presented between the group of hybrids KWS Cabrile, ZP707, ZP666, KWS Kontigos, and KWS Kalxon.

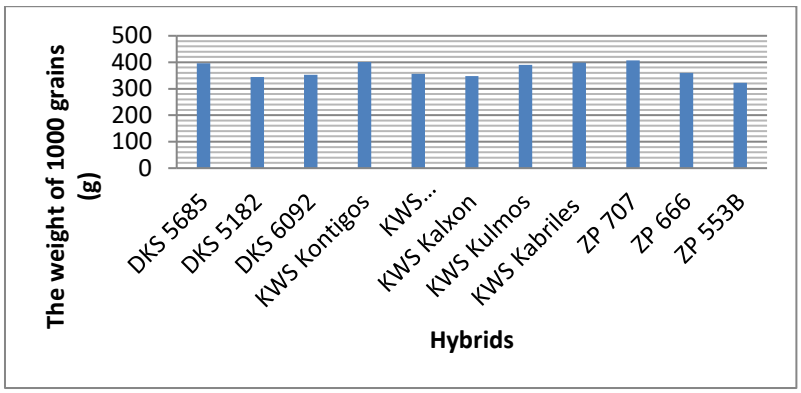


Chart 14 The weight of 1000 grains (g)

The weight of 1000 grains is done accurately because it represents a very important indicator to achieve high yields. The hybrids DKS5685, KWS Kontigos, KWS Kulmos, KWS Kabriles and ZP 707 have the highest values of the weight of 1000 grains.

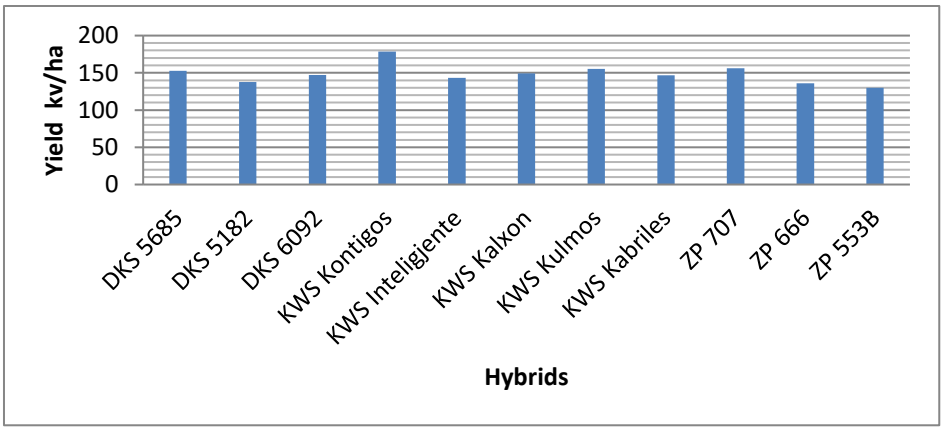


Chart 15 The yield (kv/ha)

Yield is the most important and final analytical indicator. Hybrids present differences between them for this indicator. The highest yield was given by the KWS Kontigos hybrid, followed by the DKS 5685, KWS Kulmos, and ZP 707 hybrids.

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 hybrids included in this study are of different origins: Germany, Bulgaria, and Serbia (ZP). As can be seen from the graph, the height of the plant is different. The hybrids of KWS Germany and ZP Serbia have the greatest height. Hybrids have differences in terms of plant height. Contigo and Cabrile hybrids, both of KWS, have the greatest height.
2. The height of the cob emergence does not show large changes. The cob appears at a height above 100 cm in the ZP538, ZP707, Kalxon and Kulmos hybrids, as well as at a height below 100 cm in the DKS6092 and KWS Inteligente hybrids.
3. The length of the leaf shows significant differences between the group of hybrids according to their origins. KWS Kontigos and ZP 707 hybrids have longer leaves and DKS6092 and KWS Inteligente hybrids have lower leaves, while ZP hybrids have a more complete stability.
4. Leaf width represents an indicator with little variation between hybrids except for the hybrid KVS Kabriles and Kulmos which have wider and narrower angled leaves.
5. The number of leaves per plant is different between groups of hybrids and within the same group. Specifically, Hybrids KWS Kalxon and ZP 707 have a higher number of leaves and DKS 5182, DKS6092, and KWS Inteligente have a lower number of leaves
6. The length of the cob is an important indicator to realize high yields. It does not represent major changes. The hybrids with a longer vegetative period have the highest values, specifically: DKS6092. KWS Kontigos, KWS Kabriles, ZP707, and ZP666, and the lowest values are DKS5685 and DKS 5182.
7. The number of rows is approximate within the hybrid group with values of 16-18 rows that DKS and KWS hybrids have, while ZP hybrids go down to 14 rows.
8. The number of grains in a row is a genetically predetermined indicator. Failure to achieve the right number of grains in a row indicates the lack of quality service to maize hybrids. The hybrids have the highest number of grains: KWS Kabriles, ZP707, ZP666 and ZP553B and lower hybrids: DKS5685 and DKS5182.
9. Even the number of grains in the cob is genetically predetermined, but changes come from adaptation to climatic conditions and cultivation technology.
11. The thickness of the cob is almost the same, only with a difference in the hybrids: ZP707 and ZP666, which have a smaller thickness.
12. Corncob thickness is almost equal in nine hybrids and is higher in two hybrids: KWS Kabriles and ZP553B.
13. Corncob weight is quite different both within hybrid groups and between hybrid groups. The hybrids: KWS Kontigos, KWS Kalxon, KWS Kabriles, ZP707, and ZP553B have the highest values, and DKS 5685, DKS 5182, and KWS Inteligente have the lowest value.
14. Grain cob weight is also a default predictor of genetics. The differentiation is made by the quality of the cultivation technology. It represents variation between groups of hybrids and within the same group. The hybrids: KWS Kabriles, ZP707, ZP666, KWS Kontigos, and KWS Kalxon have the highest values of the weight of cob grains.

15. The weight of 1000 grains is done accurately because it represents a very important indicator to achieve high yields. The hybrids DKS5685, KWS Kontigos, KWS Kulmos, KWS Kabriles and ZP 707 have the highest values of the weight of 1000 grains.
16. Yield is the most important and final analytical indicator. Hybrids present differences between them. The highest yield was given by the KWS Kontigos hybrid, followed by the DKS 5685, KWS Kulmos and ZP707 hybrids.

4. B. Recommendations

From the general assessment of all the indicators and especially of the yield, we advise to plant the hybrids in wide production: KWS Kontigos, DKS 5685, KWS Kulmos and ZP 707, which have given higher yield.

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