INVESTIGATIONS ON INSERTION HEIGHT AND TILLING LENGTH IN AN ASSORTMENT OF SWEET CORN HYBRIDS

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Abstract.

The demand for sweet corn is increasing from year to year both worldwide and in our country. On the other hand, this crop can represent a source of income for farmers who own small areas of land. In addition, thanks to the relatively short period of vegetation, it can be cultivated in areas where the de-springing occurs earlier, so that the crop can benefit from the moisture accumulated in the soil from the cold season and the precipitations from the spring, avoiding periods of atmospheric drought and in the soil, increasingly common in recent years starting in July and August.

The research focused on the behavior of an assortment of 11 sweet corn hybrids sold on the market in our country, from different precocity groups, in terms of cob insertion height and cob length, in the pedoclimatic conditions of the Ramna area, Caraș Severin county. The area where the research was carried out is characterized by an early spring, the minimum germination temperature of 10 0C, occurring in the first days of April.

With reference to the cob insertion height, hybrid 2- Spirit F1 and hybrid 5- Starshine F1- class I, with cob insertion at a height of approximately 50 cm, are inferior to the other hybrids taken in the studio, and hybrid 9-Driver F1, with the insertion value of the 60 cm cob - class A, is clearly superior to all the hybrids studied. The highest cob length value – about 24 cm, was obtained at a10 [Accentuate F1] and a9 [Driver F1] – class A, which differs significantly from other hybrids. The lowest value of about 18 cm was obtained at a8 [Landmark F1] and a4 [Tyson F1] – class E, a value that differs significantly from the other hybrids.

Keywords*:sweet corn, production, climatic conditions, mineral fertilization*

INTRODUCTION

Sweet corn is a crop that in recent years has come to the attention of farmers in our country, and at present we can talk about a market, admittedly small (both sweet corn farmers and consumers), but the areas that are cultivated are constantly growing. The European funding opportunities available to farmers since the country's accession to the European Union also contributed to the development of this culture in Romania.

MATERIALS AND METHODS

For the study of agronomic characteristics according to maturity group and the relationship between cob insertion, cob length, cob weight, vegetation period, sweet corn production and analysis of the main components of the experienced variables, the biological material was represented by an assortment consisting of 11 hybrids of sweet corn sold on the market in our country, from maturity groups and different characteristics, whose brief description we present below.

- *Spirit F1,it is an extra-early hybrid, vegetation period of 65 days, vigorous plants, medium height, 20 cm cobs, with 14-16 rows of yellow berries and very good taste. It lends itself to propagation by seedlings and is consumed fresh or processed.*

- *legend f1,it is harvested afterat 73-75days after germination, it shows special qualities. Plant height of 175 cm, cylindrical cobs, average weight 300 grams, length 18-20 cm, suitable for fresh consumption as well as preservation.*
- *Tyson F1, eIt is a super sweet hybrid, medium early, very good taste, vegetation period 75-80 days. The plants have very good vigor, medium height, the grains are intense yellow in color and have a high storage capacity.*
- *Starshine F1,eit is an early hybrid, vegetation period 70 days, vigorous plants, 20 cm cobs and 14-16 rows, yellow berries and good quality and taste.*
- *SF201F1, is an early hybrid of 84 days, super sweet, with a very good taste, suitable for early as well as late sowing, cylindrical cobs, with16-18 rows of grains, length of 18-19 cm your weight of310 - 350 g.*
- *Jubilee F1, hybrid with a large waist, about 2 m, the insertion point of the cob is about 90 cm, 23 cm cobs, with 18 rows of grains, it consume fresh and processed.*
- *Landmark F1, very sweet early hybrid, with a vegetation period of 73 days, with very good germination in cold soil, plants of 195 cm, cylindrical cobs and 21 cm, having 12-14 rows of grains. It is consumed fresh or processed.*
- *Driver F1, is a super-sweet type hybrid, vegetation period of 78-80 days, with plants that can reach 2-2.2 meters high, cobs of 24-25 centimeters, with 18-20 rows of grains. It is consumed fresh and processed.*
- *Accentuate F1, is a new hybrid with a vegetation period of 78-80 days, plant height of 180 cm, cob length of 22-24 cm, with 18 rows of grains. It is recommended for consumption both fresh and processed.*
- *Sweet Thing is a new generation hybrid, early (70-73 days), the cob has 20 rows of grains, the length is 20 cm, the plants are 160-170 cm (robust plants). It can be consumed fresh as well as processed.*

The experiment was set up according to the Latin rectangle method, and the observations were made at the waxy milk physiological maturity, at 10 plants/repetition, respectively 30 plants/experimental hybrid.

RESULTS AND DISCUSSIONS

The results regarding the cob insertion height obtained in the first experimental year are presented in table 1 and figure 1. from the obtained data it appears that the cob insertion height had values between 50.18 cm for the Spirit F1 hybrid and 60.13 cm to the Driver F1 hybrid.

Versus control – field average of 53.99 cm, hybrid only Jubilee F1, the insertion height value recorded close values (53.95 cm).It should be noted that the hybrids: 2[Spirit F1], 3[.Legend F1], 4[Tyson F1], 5[Starshine F1] and 6[SF201 F1] had cob insertion values below the experience average, between 0.92 and 4.00 cm. In the case of hybrids:1[Summer],8[Landmark F1],9[F1 Driver],10[Accentuated F1]and11[Sweet Thing], cob insertion height valuesthey exceeded the average of the field with increments between 0.83 - 6.14 cm.

Table 1

Cob insertion height results

A Factor-hybrid	/Cob insert		Difference [cm]	Significance
	cm	**%**		
1. Summer	54.85	101.59	0.86	***
2. Spirit F1	50.18	92.93	-3.82	000
3.Legend F1	53.08	98.30	-0.92	000
4. Tyson F1	51.97	96.25	-2.03	000
5. Starshine F1	49.99	92.59	-4.00	000
6. SF201 F1	51.04	94.53	-2.95	000
7. Jubilee F1	53.95	99.92	-0.04	n.s
8. Landmark F1	54.82	101.54	0.83	***
9. F1 driver	60.13	111.37	6.14	***
10. Accentuate F1	58.10	107.60	4.10	***
11. Sweet Thing	55.82	103.37	1.82	***
Field average	53.99	100.0	Mt	

DL 5% = 0.33 cm; DL 1% = 0.45 cm; DL 0.1% = 0.60 cm;

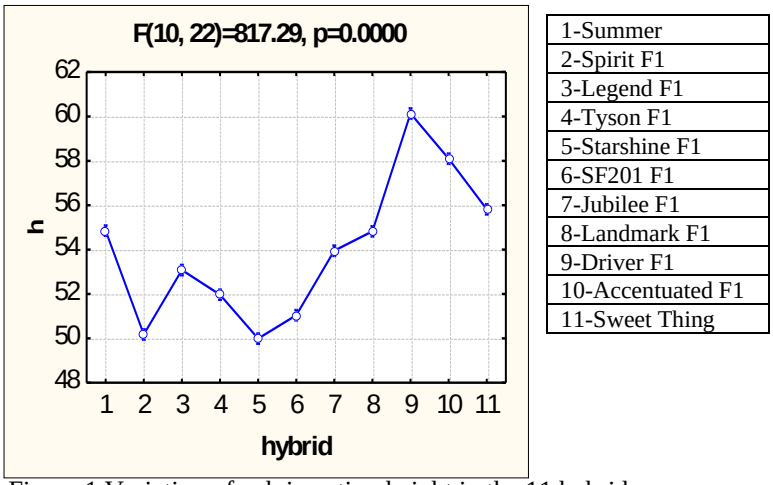

Figure 1 Variation of cob insertion height in the 11 hybrids

For cob insertion, values between 58-60 cm are obtained for hybrids: 10 [Accentuate F1] and 9 [Driver F1]. The superiority of these hybrids over the other hybrids is highly significant [p<0.001]

The lowest values of approximately 50 cm are obtained with hybrid 2 [Spirit F1], respectively hybrid 5 [Starshine F1].

In conclusion, the highest value of 60 cm is obtained in hybrid 9 [Driver F1] - semi-early hybrid, and the lowest of approximately 50 cm in hybrid 2 [Spirit F1] - extra-early hybrid and hybrid 5 [Starshine F1], hybrid early.

DUNCAN TEST for DL5% = 0.33 cm - factor A[hybrid]

Original data	Sister data
Mean 1 = 54.85 D	Mean 9 = 60.13 A
Mean 2 = 50.18 I	Mean 10 = 58.10 B
Mean 3 = 53.08 F	Mean 11 = 55.82 C
Mean 4 = 51.97 G	Mean 1 = 54.85 D
Mean 5 = 49.99 I	Mean 8 = 54.82 D
Mean 6 = 51.04 H	Mean 7 = 53.95 E
Mean 7 = 53.95 E	Mean 3 = 53.08 F
Mean 8 = 54.82 D	Mean 4 = 51.97 G
Mean 9 = 60.13 A	Mean 6 = 51.04 H
Mean 10 = 58.10 B	Mean 2 = 50.18 I
Mean 11 = 55.82 C	Mean 5 = 49.99 I

Mean 1-Summer
Mean 2-Spirit F1
Mean 3-Legend F1
Mean 4-Tyson F1
Mean 5-Starshine F1
Mean 6-SF201 F1
Mean 7-Jubilee F1
Mean 8-Landmark F1
Mean 9-Driver F1
Mean 10-Accentuated F1
Mean 11-Sweet Thing

Following the 55 comparisons [C112], classes A – I were obtained.

The highest value of cob insertion – 60.13 cm, was obtained at**a9[Driver F1]**– class A, which differs significantly from other hybrids.

The lowest value, 50 cm, was obtained at a5[Starshine F1] and a2[Spirit F1] – class I, a value that differs significantly from the other hybrids. In the two hybrids Starshine F1 and Spirit F1, the cob insertion value is similar [homogeneous value], the two hybrids are not significantly different from each other.

Note that:

- **a1**[Estival] – extra-early and a8 [Landmark F1]- semi-early, are part of the same homogeneity class - class D. We can say that hybrid 1[Estival] and hybrid 8[Landmark F1], do not differ significantly from each other, i.e. at the two hybrids obtain a homogeneous cob insertion value.
- **a2**[Spirit F1]] – extra-early and a5 [Starshine F1]] – early, belong to the same homogeneity class - class I. We can say that the Spirit F1 hybrid and the Starshine F1 hybrid do not differ significantly from each other, i.e. in the two hybrids, a homogeneous cob insertion value is obtained.

The results regarding the cob length obtained in the first experimental year for an assortment of 11 hybrids with different vegetation periods are presented in table 2 and figure 2.

Compared to the control - the average of the experience, the 11 hybrids registered with very significant increases, except the hybrid3 [Legend F1] whose increase was distinctly significant.

It should be noted that hybrids:

- 1 - 8 [Summer,Spirit F1, Legend F1, Tyson F1, Starshine F1, SF201 F1, Jubilee F1, Landmark F1]they had cob length values below the average of the experience, the difference compared to the average of the experience is negative;
- 9[F1 Driver],10[Accentuated F1]and11[Sweet Thing] they were higher than the average of the experience, they exceeded the average of the field with increases between 1.52 - 3.54 cm, or in other words: the two hybrids have increases with 17.24% and 7.38% higher than the average of the field.

Table 2

Results regarding the length of the cob

A Factor [hybrid]	Cob length		Difference [cm]	Significance
	cm	**%**		
a1. summery	19.92	96.88	-0.64	000
a2. Spirit F1	19.04	92.62	-1.52	000
a3. Legend F1	20.00	97.29	-0.56	00
a4. Tyson F1	17.80	86.56	-2.76	000
a5. Starshine F1	19.94	97.00	-0.62	000
a6. SF201 F1	19.03	92.53	-1.54	000
a7. F1 Jubilees	22.17	107.81	1.60	000
a8. Landmark F1	18.03	87.69	-2.53	000
a9. F1 driver	24.06	117.01	3.50	***
a10. Accented F1	24.11	117.24	3.54	***
a11. Sweet Thing	22.08	107.38	1.52	***
Field average	20.56	100.0	Mt	

DL 5% = 0.334 cm DL 1% = 0.455 cm DL 0.1% = 0.611 cm

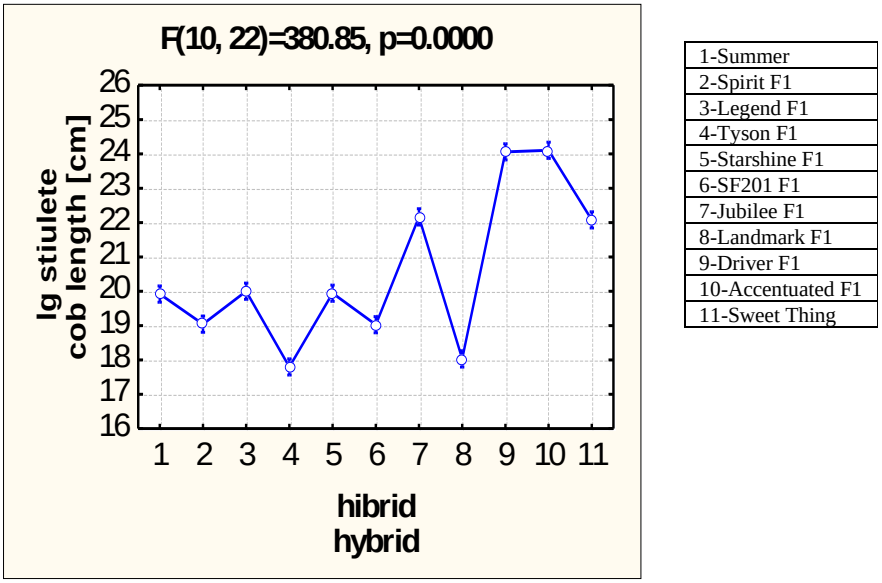

Figure 2 Cob length variation in the 11 hybrids

Following the above values it is observed that the hybrid 9-Driver F1 and 10-Accentuate F1 – semi-early hybrids have the highest values compared to the other hybrids, and the hybrid 4-Tyson F1 and 8-Landmark F have the lowest values.

In conclusion, the 4-Tyson F1-early hybrid and the 8-Landmark F-semi-early hybrid, with a cob length of approximately 18 cm, are inferior to the other hybrids studied, and the values recorded for the 9-Driver F1 and 10-Accentuate F1 hybrid - the semi-early hybrids, approximately 24 cm, are clearly superior to all the hybrids studied.

DUNCAN TEST for DL5% = 0.334 cm - factor A[hybrid]

Original data	Sister data
Mean 1 = 19.92 C	Mean 10 = 24.11 A
Mean 2 = 19.04 D	Mean 9 = 24.06 A
Mean 3 = 20.00 C	Mean 7 = 22.17 B
Mean 4 = 17.80 E	Mean 11 = 22.08 B
Mean 5 = 19.94 C	Mean 3 = 20.00 C
Mean 6 = 19.03 D	Mean 5 = 19.94 C
Mean 7 = 22.17 B	Mean 1 = 19.92 C
Mean 8 = 18.03 E	Mean 2 = 19.04 D
Mean 9 = 24.06 A	Mean 6 = 19.03 D
Mean 10 = 24.11 A	Mean 8 = 18.03 E
Mean 11 = 22.08 B	Mean 4 = 17.80 E

Mean 1-Summer
Mean 2-Spirit F1
Mean 3-Legend F1
Mean 4-Tyson F1
Mean 5-Starshine F1
Mean 6-SF201 F1
Mean 7-Jubilee F1
Mean 8-Landmark F1
Mean 9-Driver F1
Mean 10-Accentuated F1
Mean 11-Sweet Thing

After the 55 comparisons [C112] the classes A – E were obtained.

The highest value of the length of the cob – approximately 24 cm, was obtained at**a10[**Accentuate F1] and a9 [Driver F1]– Class A, which is significantly different from other hybrids.

The lowest value of approximately 18 cm was obtained at a8 [Landmark F1] and a4 [Tyson F1] – class E, a value that differs significantly from the other hybrids.

Note that:

- **a7**[Jubilee F1] and a11 [Sweet Thing], belong to the same homogeneity class - class B. We can say that the hybrid 7[Jubilee F1] and the hybrid 11[Sweet Thing], do not differ significantly from each other, that is, in the two hybrids obtain a homogeneous cob length value, but they differ significantly from the other hybrids;
- **a3**[Legend F1], a5 [Starshine F1] and a1 [Estival], belong to the same homogeneity class - class C. So we can say that hybrid 3 [Legend F1], hybrid 5 [Starshine F1] and hybrid 1 [Estival] , they do not differ significantly from each other, i.e. the three hybrids obtain a homogeneous cob length value, but they differ significantly from the other hybrids;
- **a2**[Spirit F1] and a6 [SF201 F1], are part of the same homogeneity class - class D. We can say that the hybrid 2[Spirit F1] and the hybrid 6[SF201 F1], do not differ significantly from each other, i.e. in the two hybrids, a homogeneous cob length value is obtained, but they differ significantly from the other hybrids.

CONCLUSIONS

With reference to the cob insertion height, hybrid 2- Spirit F1 and hybrid 5- Starshine F1- class I, with cob insertion at a height of approximately 50 cm, are inferior to the other hybrids taken in the studio, and the hybrid 9-Driver F1, with the insertion value of the 60 cm cob - class A, is clearly superior to all the hybrids studied.

The highest cob length value – about 24 cm, was obtained at a10 [Accentuate F1] and a9 [Driver F1] – class A, which differs significantly from other hybrids.

The lowest value of approximately 18 cm was obtained at a8 [Landmark F1] and a4 [Tyson F1] – class E, a value that differs significantly from the other hybrids.

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