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STUDIES ON CROP BEHAVIOUR AND PRODUCTIONS OBTAINED IN SUMMER CROP FOR WHITE CABBAGE HYBRIDS

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Abstract

Since cabbage is a product frequently used in feeding the population, we tried that through the research made to find hybrids that correspond regarding the yields obtained but also from qualitative point of view, according to the market requirements. The purpose was to analyze the behaviour of some hybrids recommended by different producers in terms of climate and soil conditions found in Dâmboviţa county and in climatic conditions of 2014, following the results we can make recommendations that can be put into practice and that can satisfy the producers both from the point of view of the production potential and from the point of view of inputs needed for its maximization. The behaviour of five hybrids was studied, suitable for field crop: Cheers, Taurus, NIZ 17-1197, NIZ 17-1043, Mighty Boy. Very significant increases compared to the control were achieved by NIZ hybrids range. Unsalable leaf production reached the highest value in Taurus hybrid, 408.8 g, with the average production over 85.52 g and 93.8 g, over control production, these values mean increases of over 25%. From the economic point of view, the crop is a profitable one, the expense is lower than the revenue. Therefore, after analyzing the behavior of the hybrids used in experience on the existing soil in Dambovița county region, we can say that all studied hybrids showed good results. The highest productions and the highest production increases, for summer crop, were obtained by Taurus NIZ 17-1197 and 17-1043 NIZ hybrids.

Key words**:** *hybrids, production potential, white cabbage*

INTRODUCTION

White cabbage is a crop White cabbage is an important crop in the global vegetable economy. White cabbage (*Brassica oleracea* L., Alef. var. *capitata* f. *alba* D.C. *Brassicaceae* family) is one of the most important species in the assortment of the vegetable plants in our country, as it is demonstrated by the large grown area that represents about 20-27% of the total surface cultivated with vegetables [5].

White cabbage is grown for bulbs that are widely used in the culinary art, being used raw or pickled, with or without meat, dehydrated or frozen in different ways, in an assortment of dishes much appreciated by the consumers [6]. It also constitutes an important raw material in food can industry and especially in fortified juice, usually mixed with carrot juice [8]. Is a little perishable product during transport, temporary storage and use [2]. With a high resistance to low temperatures, its fresh consume r can be more prolonged in winter (4-5 months) by cold store (cold storage) or in the field (in improvised shelters) in quantities necessary for consume, from November to March [3].

Also, the harvest is done over a long period of the year, ensuring income from spring to autumn [1]. Similar to the trends existing in the world, the diversification of the new assortment of grown vegetables grown will occur in our country too [5].

The main purpose of the greengrocers is to obtain quality crops [4]. In order to ensure high yields of cabbage it is needed to study and improve the agricultural technology adapted to the specific climate conditions [7].

MATERIALS AND METHODS

The purpose of the analysis of five hybrids of summer cabbage was to monitor their

behavior in certain climatic conditions and to make a comparative analysis of the productions obtained in order to evaluate and then to recommend the best option in terms of capacity production and quality. It was also studied the influence of the technological links such as density and fertilization on stimulating the production yield for each of the five hybrids studied.

Testing and analyzing the behavior of the hybrids was carried out during year 2014.

In order to establish experimental crops, a varied assortment of cabbage hybrids were analyzed of different origin, as following: CHEERS F1 producer Takii (Japan); MIGHTY BOY F1 producer Mikado Kyowa (Japan);); TAURUS F1, NIZ 17-1197 F1, NIZ 17-1043 F1 producer Nickerson-Zwaan (Holland).

Cheers F1 is a hybrid of white cabbage, it is easy to grow with strong tolerance to temperature variations, and resistant to Fuzarium. Well resistant to stress conditions and it is tolerant to high temperatures. It reaches maturity after 75-80 days and it weighs 2.5-3.5 kg. The bulb shape is round.

Taurus F1 (NIZ 17-1167 F1) is a very tolerant hybrid to pests and diseases, vigorous, large size, very good for the filed crop, very good quality. It reaches maturity 100 days after planting, it produces round bulbs, 2.5-3.5 even 6.0 kg weight, blue-green color. It is very good for fresh consumption and processing. The recommended density, 25,000-35,000 pl/ha. Very resistant to Xanthomonas and Fusarium. It tastes sweet, appreciated for fresh consumption, the bulb is well protected to the transport of external leaves. It is a hybrid that adapts in different geographical areas and it is highly appreciated by growers.

NiZ 17-1197 F1 is a hybrid of white cabbage, tolerant to Fusarium and resistant to diseases. It reaches maturity in 80-90 days after planting.

NIZ 17-1043 F1 is a hybrid of white cabbage that reaches maturity at 90 days after planting. The bulbs reach a weight of 1.5-2.5 kg. It is a hybrid recommended for fresh consumption starting with March until July.

Mighty boy F1. It is an early hybrid with vegetation period of 50-55 days after planting and fruit weight of 1.3-1.6 kg. The fruit is compact, uniform, resistant to cracking, light green and round shape. The plant is adapted to difficult climatic conditions.

Recommended for crops in greenhouses or in the field.

Climatic conditions in which the research was made.

Soil. Crevedia area is characterized by typical reddish-brown soils, clay, false gleize, softness, luvic.

Climate. The average annual precipitation recorded is 547 mm. The rainfall recorded in the year of experience were 499.5 mm which shows a deficit of rainfall compared to the average annual rainfall of 47.5 mm.

The ground was prepared since autumn, by executing the shredding of vegetal remains resulting from the previous crop, work done with a disc harrow.

The basic fertilization was carried out with manure in an amount of 30 t/ha while applying doses of 250 kg/ha of superphosphate and 150 kg/ha potassium salt. All were incorporated under plow. In spring fertilizers with nitrogen were applied, herbicide work was done with Dual Gold product in dose of 1.2 l/ha, incorporated into the soil. The land was crushed and leveled. For making determinations, 5 plants were taken for analysis, randomly of each studied hybrid, making then their average. As a control, in order to compare the results, Cheers F1 hybrid was selected. Like previous plant was green onion. Seedling production was made in warm seedbeds. The seeding was made on 20th March, no more transplanters, the amount of seed used was about 400 g/ha.

Planting in the field was done on 27th April. The seedling was not hardened but it was left open, as temperatures allowed this.

As a planting scheme, it was planted at 60 cm between rows and 40 cm between plants in the row, resulting a density of 42,000 pl/ha.

RESULTS AND DISCUSSIONS

For the calculation, evaluation and analysis of the productions obtained, plants harvested from a surface of 1000 m^2 were weighted and

then transformed into production on hectare (Table 1.).

Table 1. Influence of hybrids on total obtained yield

CRT.NO.	HYBRID	YIELD T/HA	DIFFERENCE COMPARED TO AVERAGE T/HA	%	DIFFERENCE COMPARED TO CONTROL	%
1	TAURUS F1	53.2	10.2	+23.7	+11.5***	+27.6
2	CHEERS F1 MT	41.7	-1.3	-3.0	MT	MT
3	MIGHTY BOY F1	34.1	-8.9	-20.7	-7.6000	-18.2
4	NIZ 17-1197 F1	43.8	0.8	+1.9	+2.1*	+5.0
5	NIZ 17-1043 F1	42.5	-0.5	-1.2	+0,8	+1.9
	AVERAGE	43.0	MT	MT		

Dl 5%=1.98 t/ha Dl 1%=2.89 t/ha Dl 0.1%=4.33 t/ha

From the data resulted from Table 1 we can notice the productive superiority of Taurus hybrid, 53.2 t/ha compared to the productions achieved by the other hybrids (lowest 34.1 t / ha), which is a very significant production increase. Harvesting growth recorded in Taurus hybrid compared to the average of hybrids production, 43.0 t/ha was 10.2 t/ha, which is an addition of 23.7% and 11.5 t/ha as compared to the control, namely an additional of 27.6%. The lowest production was recorded in hybrid Mighty Boy, 34.1 t/ha so a minus crop of about 20%, a very significant negative growth. The other hybrids in the study were recorded with values close to the harvest, over 40 t/ha. NIZ hybrid 17-1197 was scored with a significant production increase, 2.1 t/ha and hybrid NIZ 17-1043 recorded insignificant increases of crop compared to control (Figure 1.)

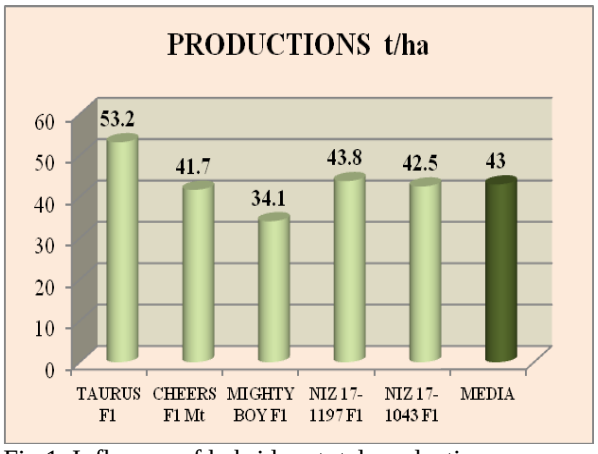

Fig.1. Influence of hybrid on total production

Among the hybrids grown for summer crop, F1 Taurus hybrid had the highest value of the plant weight, 2,436.0 g. In terms of the participation share in the formation of total production, of the bulb, the highest value was recorded in NIZ hybrid 17-1043, 84%, and the lowest in F1 Cheers hybrid, 75.9%.

Table 2. Influence of hybrid on participation share of the production components to its formation

CRT NO.	HYBRID	G. PLANT G	G. BULB. G	%	G. ROOT. G	%	G. STEM G	%	G. UNSALABLE LEAVES G	%
1	TAURUS F1	2,436.0	1,901.0	78.0	71.4	2.9	54.8	2.3	408.8	16.8
2	CHEERS F1 MT	1,553.0	1,179.2	75.9	38.4	2.5	20.4	1.3	315.0	20.3
3	MIGHTY BOY	1,802.8	1,398.4	77.6	32.4	1.7	48.2	2.7	323.8	18.0
4	NIZ 17-1197 F1	2,158.8	1,736.0	80.4	36.2	1.7	68.0	3.1	318.6	14.8
5	NIZ 17-1043 F1	1,975.6	1,658.6	84.0	23.4	1.1	43.4	2.2	250.2	12.7
	AVERAGE	1,985.24	1,574.64		40.36		46.96		323.28	

The participation share of the roots recorded a maximum in Taurus hybrid, 2.9% and a minimum in hybrid NIZ 17-1043, 1.1%. At the stem the lowest percentage was that of Cheers hybrid, 1.3% and in terms of the percentage of unsalable leaves, the lowest value was recorded in hybrid NIZ 17-1043, 12.7%. Looking at things in terms of participation share increase of the bulbs and reducing the participation share of the other components, the low values recorded at the root, stem and unsalable leaves are positive aspects (Table 2.)

According to the data written in Table 3, Mighty Boy hybrid recorded a distinct significant plus of production compared to the control, 219.2 g, lower than the other hybrids studied, which achieved very significant production increases.

The lowest value being achieved in Mighty Boy hybrid and the highest one in Taurus hybrid (Figure 2).

Compared with the control, all grown hybrids recorded production increases, ranging between 18.6 to 61.2% of their value. The lowest value being achieved in Mighty Boy hybrid and the highest one in Taurus hybrid.

Table 3.Influence of hybrid on salable production (bulb weight)

NR. CRT.	HYBRID	BULB WEIGHT. G	DIFFERENCE COMPARED TO AVERAGE -G	%	DIFFERENCE COMPARED TO CONTROL- G	%
1	TAURUS F1	1,901.0	+326.4	+20.7	+721.8^{XXX}	+61.2
2	CHEERS F1 MT	1,179.2	-395.44	-25.1	MT	MT
3	MIGHTY BOY F1	1,398.4	-176.24	-11.2	+219.2^{XX}	+18.6
4	NIZ 17-1197 F1	1,736.0	161.36	+10.2	+556.8^{XXX}	+47.2
5	NIZ 17-1043 F1	1,658.6	83.96	+5.3	+479.4^{XXX}	+40.6
	AVERAGE	1,574.64				

Dl 5%=112.705 g; Dl 1%= 163.934 g; Dl 0.1%= 245.902 g

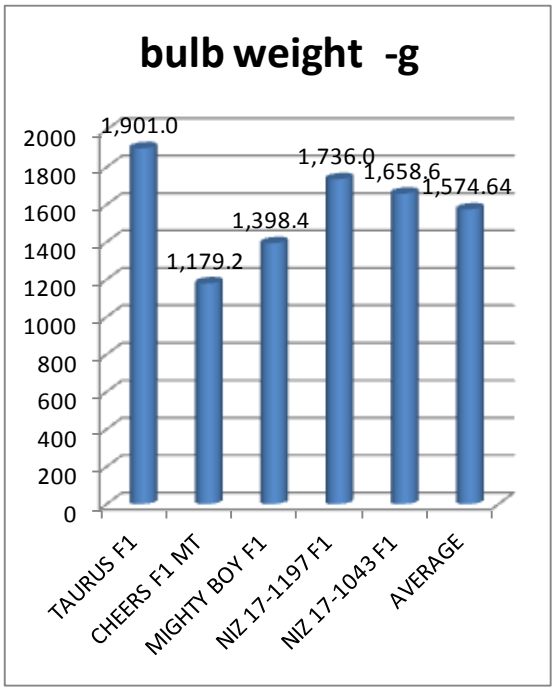

Fig. 2. Influence of hybrid on bulb weight

CONCLUSIONS

Among the hybrids used for establishing summer cabbage crop, the most productive hybrid proved to be Taurus hybrid with 53.2 t/ha, with an extra harvest compared to average of 10.2 t/ha and compared to the control of 11.5 t/ha, which means an increase of 27.6%. The lowest production was obtained in Mighty Boy hybrid, 34.1 t/ha and a minus compared to the control, of 7.6 t/ha (18.2%). Cheers hybrids,, NIZ 17-1043 and 17-1197 NIZ had relatively similar productions, all over 40 t/ha.

When making the production, all hybrids in the study had a participation share of the bulb of more than 75%, the highest level in hybrid NIZ 17-1043, 84%. The weight of the roots ranged from 1.1% to 2.9% hybrid NIZ 17-1043 and Taurus hybrid. The weight of the unsalable leaves reached a maximum in Cheers hybrid, 20.3% and a minimum in hybrid NIZ 17-1043, 12.7%. It can be concluded that hybrid NIZ 17-1043 has a balanced weight of the elements, the highest, as it is wanted, being the bulb.

The highest salable production was achieved by Taurus hybrid, 1901 g, which means an extra weight compared to the average of 326.4 g (20.7%) and 61.2% above control. The lowest production was recorded in Cheers hybrid, 1179.2 g, namely 25.1% less than the average. Very significant increases compared to the control were achieved by NIZ hybrids range.

Unsalable leaf production reached the highest value in Taurus hybrid, 408.8 g, with the average production over 85.52 g and 93.8 g, over control production, these values mean increases of over 25%. The lowest value was recorded in hybrid NIZ 17-1043, 250.2 g, with over 20% less than the average values

and control. Productions located around 300 g obtained the other hybrids, Cheers, Mighty Boy and NIZ 17-1197.

The percentage of participation of bulbs in the formation of the crop increased to hybrids in summer crops, which means higher production.

The most productive hybrid in summer crop in the climatic conditions of the area in 2014 was Taurus, 53.2 t/ha.

From the point of view of the balance of the participation share of the plant components in the formation of the production, the highest ranked was NIZ 17-1043 and 17-1197 NIZ. From the point of view of tamping degree, all studied hybrids were included in extra class.

From the economic point of view, the crop is a profitable one, the expense is lower than the revenue.

Therefore, after analyzing the behavior of the hybrids used in experience on the existing soil in Dâmboviţa county region, we can say that all studied hybrids showed good results. The highest productions and the highest production increases, for summer crop, were obtained by Taurus NIZ 17-1197 and 17-1043 NIZ hybrids.

The most recommended hybrids in terms of the lowest unsalable production, therefore lower losses, are hybrids NIZ and Taurus, for summer crop.

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