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## YIELD COMPONENTS AND YIELD OF F<sub>1</sub> TOMATO HYBRIDS

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**Abstract:** Examination of seven F<sub>1</sub> hybrids (J x 15; J x 45; J x Sp; Sp x J; Sp x J/1; Sp x 15; J/1 x 15) and one commercial hybrid Magnus is done for the number of fruits by plant, average fruit mass from all yields, and total yield. The hybrid J/1 x 15 had the largest number of fruits (22,7). The hybrids Sp x J and Sp x 15 had a larger average fruit mass (164,36 and 154,82 g. respectively) than the standard. Most hybrids had a higher total yield than the standard, while that of the hybrid J x Sp (79,6 t/ha) and Sp x J/1, J/1 x 15 (76,0 t/ha) was significantly higher. It was concluded that the examined hybrids were either on the level or better than the standard. Therefore, they will be included in future selection programs.

**Key words:** Number of fruits, fruit weight, total yield

M. GJEORGJIEVSKI, D. SPASOV, D. SPASOVA, MITE ILIEVSKI, B. ATANASOVA, Goce Delcev University, Faculty of Agriculture, „Krstе Misirkov“ b.b., 2000 Stip, R. of Makedonija. КОМПОНЕНТИ НА ПРОДУКТИВНОСТТА И ДОБИВ НА ХИБРИДНИ ДОМАТИ F<sub>1</sub>

**Резюме:** Направено е изпитване на седем F<sub>1</sub> хибрида (J x 15; J x 45; J x Sp; Sp x J; Sp x J/1; Sp x 15; J/1 x 15) и един търговски хибрид „Magnus“ по брой плодове на растение, средна маса на плода от целия добив и общ добив. Хибрида J/1 x 15 е имал най-голям брой плодове (22,7). Хибридите Sp x J и Sp x 15 са имали най-голяма средна маса на плода (164,36 и 154,82 g) в сравнение със стандарта. Повечето хибриди са имали по-висока обща продуктивност в сравнение със стандарта, а тази на хибридите J x Sp (79,6 t/ha) и Sp x J/1, J/1 x 15 (76,0 t/ha) е била достоверно по-висока.

Установено е че изпитваните хибриди са били или на нивото или по-добри от стандарта. По-тази причина те ще бъдат включени в бъдещи селекционни програми.

**Ключови думи:** рой плодове, тегло на плода, общ добив

In our country tomato production is achieved as early, middle early and late. Early and middle early production covers around 90% of the area of 6271 ha as there are maintained of that culture in our country, and only 10% belongs to the late production. That production distinguishes with that, which for seedling is used only F<sub>1</sub> hybrids, at which the heterosys is exhibited through increasing the average mass of the fruits (Raijadhav et al., 1986), early growth, resistance of diseases etc. But still, the main components of the tomato yield are the number of fruits by plant and the average fruit mass (Williams, 1959), between which there is positive correlation (Goldenberg, 1967, Zucenko 1973, Raijadhav 1986, Marinkovic 1990).

The aim of this examination is to establish the characteristics of some hybrids, which will be used

in other selection work, but it should be consider that standard sorts are with excellent taste, but the other production attributes are bad (they are not transportable, the fruits crack). Those bad characteristics and the appearance of more quality F<sub>1</sub> hybrids in the world made us to make program for improvement and selection of our own F<sub>1</sub> hybrids. The characteristics of those hybrids should be: high growth, different size of the fruits and with expressive resistance or tolerance to the most important diseases of tomatoes.

### MATERIAL AND METHODS

In this experiment examination of seven F<sub>1</sub> hybrids (J x 15; J x 45; J x Sp; Sp x J; Sp x J/1; Sp x 15; J/1 x 15) and one commercial hybrid Magnus is done. The hybrid seed is got by crossing done in year 2005 with

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the following lines:

J — is middle early line with Japanese background. The fruits are round, with expressive ribs around the petal, and the weight of the fruits is around 140 g.

J/1 — is early line, in determinant, with small fruits and the weight of the fruits is 60—90 g.

Sp — is with indeterminant growth, with green zone around the petal, the fruits are round with weight around 200—230 g.

15 — is with determinant growth, the fruits are with middle size with weight around 130 g.

45 — is half determinant line, with flat fruits, which when are mature have intensive red color.

The seedling is produced in half warm nurseries, with planting on 10.04.2006 and replanting on 23.05.2006. The experiment is set up by randomized block system in five repetitions on the field of Institute of Southern crops, Strumica. The received data are statistically done by the method Analyses of variance and tested with LSD test. Examinations are made on the number of fruits by plant, average mass of the fruits from all yields and the total yield.

## RESULTS AND DISCUSSION

**Number of fruits by plant.** The number of the fruits by plant is one of the main characteristic of which the yield depends. By the data of Zuzenko (1973), Damjanovic et. al (1981), the number of the made fruits by plant is characteristic of the sort. The sorts-lines with big fruits give less fruits in number and opposite, sorts that have smaller have more in number fruits by plant. Beside the genetically predisposition, for the number of the made fruits less but still have an influence the climate, agro technical measures and the manure. Zuzenko (1973) got positive genetically correlation between the yield, number of fruits by plant and the average mass of the fruit. The same results got also Castillo Munoz et al. (1986).

From the results that we got for the number of fruits by plant (Tabl. 1) it is easy to see that hybrids Sp x 15, J x 15 and Sp x J have the less number of fruits by plant, which was expected, because is it about a components with bigger fruits. More number of fruits gave only the hybrid J/1 x 15. Significantly more number of fruits by plant in correlation with the standard has the hybrids Sp x J/1, J x Sp and J x 45. Mentioned hybrids will be used in another selection work for making lines with more number of fruits by plant.

**Average fruit mass.** The mass of the fruits is very variable and it ranges from 1 g at sort Red currant to 900 g at sort Volovsko srce (Zuzenko, 1973). Used agro technical measures influences on size on the fruits, as well on regulation of the growth and development. There for growing one plant gives bigger fruits for 10—20% than growing two plants (Tamir, 1985). Increasing the density of the plants decreases the size of the fruits (Kansler, 1970). At more sorts the mass of the fruits increases with increased mineral manure

(Denis et al., 1979). Increasing the acidity of the soil decreases the mass of the fruits (Doss et al., 1977). Changing the ecological conditions, using the same agro technical measures, the mass of the fruits at more sorts varies insignificant, which means that genetically component has logarithmical and ecological arithmetical trend (Butler, 1978).

The average fruit mass is maintained from the fruit mass of all yields. Smallest fruit mass, in comparison with the standard have the hybrids: J/1 x 15, Sp x J/1, J x 45 (Tab. 2). Significantly bigger fruit mass in comparison with the standard have hybrids: Sp x J and Sp x 15, which was expected because it is about components with bigger fruits.

**Total yield.** The total yield fruits depends not only

**Table 1/Таблица 1**

Number of fruits on tomato plant

Hybrids	Repetitions					
	1	2	3	4	5	X
1	12,7	12,1	13,3	12,7	12,5	12,7
2	18,2	18,2	19,1	18,2	17,6	18,3
3	18,7	20,7	19,2	18,0	18,8	19,1
4	13,3	12,9	12,8	12,8	12,5	12,9
5	21,9	21,5	21,9	22,1	22,1	21,9
6	10,3	10,2	9,8	11,2	10,7	10,4
7	23,2	24,2	22,6	21,5	21,8	22,7
8	16,0	16,5	15,6	15,4	15,0	15,7
LSD	0,05%	0,83				
	0,01%	1,12				

**Table 2/Таблица 2**

Average weight of tomato fruits in g

Hybrids	Repetitions					
	1	2	3	4	5	X
1	123,0	132,0	118,1	124,5	122,0	123,92
2	108,7	105,9	107,4	113,9	111,6	109,50
3	124,3	120,2	122,5	122,9	118,8	121,74
4	154,1	172,2	173,0	160,1	162,4	164,36
5	102,5	102,5	95,0	104,3	102,2	101,30
6	157,7	152,6	166,9	148,1	148,8	154,82
7	97,3	86,9	100,9	106,2	99,6	98,18
8	129,0	128,3	136,8	130,4	131,1	131,12
LSD	0,05%	7,41				
	0,01%	36,05				

**Table 3/Таблица 3**

Total yield of tomato fruits in t/ha

Hybrids	Repetitions					
	1	2	3	4	5	X
1	53,6	54,8	54,0	54,4	52,4	53,8
2	68,0	66,1	70,0	71,0	67,4	68,9
3	79,6	85,1	80,7	76,0	76,7	79,6
4	70,4	76,0	76,1	70,7	70,0	72,7
5	77,0	75,4	71,3	79,0	77,6	76,0
6	55,8	53,4	56,3	56,7	54,9	55,4
7	77,4	72,0	78,1	78,3	74,4	76,0
8	70,6	72,6	73,3	69,1	67,4	70,6
LSD	0,05%	3,30				
	0,01%	4,44				

from the genetically factors but also from the environment (Zuzenko, 1973). The yield of the tomatoes is in positive correlation with the number of fruits by plant and the mass of the fruits (Castillo et al., 1986, Rajadhav et al., 1986). From the results in Tab.3 it can be seen that the smallest yield by unite of surface have the hybrids: J x 15 and Sp x 15, while the hybrids J x 45 and Sp x J are on the standard level. Significantly higher yield than the standard have the hybrids: J x Sp, Sp x J/1 and J/1 x 15.

## CONCLUSIONS

From the results the following conclusions can be made:

Examined hybrids differ in the components of the yield which are fruit number by plant and the average mass of the fruits.

The great fruit number by plant in comparison with the standard has the hybrid J/1 x 15, while bigger average fruit mass in comparison with the standard have the hybrids: Sp x J and Sp x 15.

Significantly higher yield than the standard was found at the hybrids J x Sp and J/1 x 15.

The results that we got indicate that examined hybrids that are better or are as the standard will be used as start for other selection work at tomatoes.

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