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COMPARATIVE TESTING OF ELITE № 6374 AND *VAN* SWEET CHERRY CULTIVAR DURING THE PERIOD OF FULL FRUITING

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Abstract

The studies were conducted during the period 2014-2015 in a sweet cherry plantation in the Institute of Agriculture – Kyustendil, including introduced cultivars and selected elites. The object of research was sweet cherry elite № 6374 (Germersdorf x Stella), compared with the standard *Van* cultivar. The trees were grafted on prunus mahaleb seedling rootstock planted in the spring of 2002, grown without irrigation and formed a freely-growing crown.

Pruning was done after planting and then the trees were left to freely express their growth and reproductive characteristic. Sanitary pruning was applied when necessary. It was found that the standard *Van* variety and elite № 6374 did not differ significantly in vigour. Elite № 6374 performed higher productivity, larger fruits and a relatively better resistance to fruit cracking.

Keywords: sweet cherry, cultivars, growth, fruiting, fruit quality.

INTRODUCTION

One of the most important priorities in the sweet cherry, as with other fruit species, is continuous improvement in the assortment. In many countries with developed cherry production, this activity attaches great importance.

In Bulgaria in the recent years have been created many new cultivars, hybrids and elites which in biological and economic properties outperform common in the practice cultivars (Georgiev et al., 2001; Zhivondov and Gercheva, 2005).

At the Institute of Agriculture - Kyustendil is created eleven sweet cherry cultivars of which three were approved in 2015 - Dima, Alekston and Vasinika (Christov and Krumov, 2014).

Besides these cultivars here are grown over eleven hundred hybrid plants of which are selected fifty-eight elite (Christov, 2001).

Parallel with the work on the sweet cherry selection in our country takes place and an intensive introduction of new foreign cultivars.

After testing the most valuable of them and cost-effective for the production are available for distribution in the practice (Lichev et al., 2004). Work in this field continues.

The aim was to test the new elite № 6374 and compare it with the standard cultivar Van during the period of full fruiting in the constantly changing weather conditions in a typical for cultivation area, which is Kyustendil.

MATERIALS AND METHODS

The studies were conducted in the period 2014-2015 in a collectible cherry plantation of the Institute of Agriculture-Kyustendil, which includes the introduced cultivars and selected local elites. Indicators for monitoring and research were consistent with approved methodology (Nedev et al., 1979).

The object of the study was the sweet cherry elite № 6374 (Stella x Germersdorf), compared with standard cultivar Van. The total area of an experimental plantation is 5 da.

Trees were grafted on Mahaleb seedling rootstock, planted in the spring of 2002 and were grown without irrigation. They were formed in a freely growing crown with 40-45 cm height of the stem from the place of grafting.

Pruning was done after planting, and then the trees were left to express freely their growth and reproductive characteristics. Over the years the cultivation was applied only sanitary pruning.

RESULTS AND DISCUSSION

Growth characteristics of the trees are shown in Table 1.

Table 1. Growth characteristics of elite № 6374 and cultivar Van at the end of the 13 vegetation (2015)

Variants	Trunk cross sectional area, cm^2	Crown height, m	Crown wigth, m	Crown volume, m^3
Elite № 6374	230,00	4,27	3,65	13,27
Van	284,00	3,67	3,85	12,63
GD 5%	135,00	1,84	0,50	10,40
.. 1%	311,50	4,24	1,15	24,00
0,1%	991,60	13,50	3,65	76,39

The thickness of the stem and crown width of the elite № 6374 were with lower values compared to the control, while in the other indicators the results were better for Van, but the differences in all cases were minor.

A higher percentage of fruit set was recorded in the elite in 2015 (Table 2).

There were no significant differences between the two variants as regards the yield per tree and on 1 cm^2 of TCSA (Table 2).

Table 2. Reproductive characteristics of elite № 6374 and Van sweet cherry cultivar during 2014-2015

Variants	Fruit set, %		Yield			
			Kg/tree			Kg/cm^2 of TCSA
	2014	2015	2014	2015	Общо/ Total	Общо за 2014 и 2015 г./ Total for 2014-2015
Elite № 6374	43,40	53,70	25,20	35,20	60,40	0,26
Van	46,00	43,00	32,70	31,70	64,40	0,23
GD 5%	6,50	1,90	33,10	7,80	36,40	0,24
.. 1%	14,90	4,40	76,30	17,90	84,00	0,54
0,1%	47,50	13,90	242,90	57,00	267,30	1,73

The fruits of elite № 6374 were larger in both years of the study (Table 3).

The average fruit weight of the elite and cultivar Van over the years varied greatly.

In 2014 the fruit of both variants were larger, due to the weaker load of fruit (Table 3), combined with higher rainfall (Table 4).

In 2015 the fruits of the elite and the variety Van were very small, as a result of three interrelated reasons - greater load, short duration of the period from late flowering to ripening and adverse weather conditions during this period, resulting in less rainfall, higher air temperatures (Table 4).

Table 3. Average fruit mass and fruit load

Variants	Average fruit mass, g		Number of fruit per 1cm^2 of TCSA	
	2014	2015	2014	2015
Elite № 6374	10,70	3,90	142,70	508,50
Van	7,90	3,30	222,90	528,10
GD 5% .. 1% 0,1%	0,70 1,60 5,30	0,10 0,30 1,10	227,80 525,40 1672,70	128,70 296,80 944,90

Table 4. Meteorological conditions and duration of the period from the end of flowering to fruit ripening

Variants	Duration, days		Rainfall, mm		Mean maximum air temperature, °C		Daily average air temperature, °C	
	2014	2015	2014	2015	2014	2015	2014	2015
Elite № 6374	62	55	161,5	81,9	21,34	25,88	14,42	17,70
Van	68	59	253,3	87,6	20,37	24,57	12,51	16,31

The fruit of elite № 6374 had a greater length of the handle compared to Van (Table. 5), and it was defined as average long. In regard to fruit flesh, the trend in both years was not unidirectional. This allows us to continue our research on this indicator. In 2014, when elite № 6374 cracked were only single fruit, while Van cracking reached 34% (Table 5).

The reported difference between the two variants tested is very large and has the benefit of elite № 6374. But we are not fully convinced in this regard because of the following facts:

1. The total amount of rainfall from flowering to ripening of fruits in 2014 at the elite was 161, 5 mm, while in the standard-253, 3 mm (Table 4).

2. The amount of rainfall for 10 day period immediately prior to harvest of the fruit at the elite was 78, 2 mm for 5 precipitation days and for the variety Van it was 85 mm, accumulated for 7 days (Fig. 1).

Table 5. Other features of the fruits

Variants	Length of fruit handle, cm		Fruit firmness, g/cm^2		Fruits cracking, %
	2014	2015	2014	2015	2014
Elite№ 6374	4,30	4,40	906,00	790,00	1,00
Van	2,90	2,60	880,00	1176,00	34,00
GD 5% 1% 0,1%	0,50 1,20 3,80	0,40 1,00 3,20	72,10 166,20 529,10	200,90 463,40 1475,40	

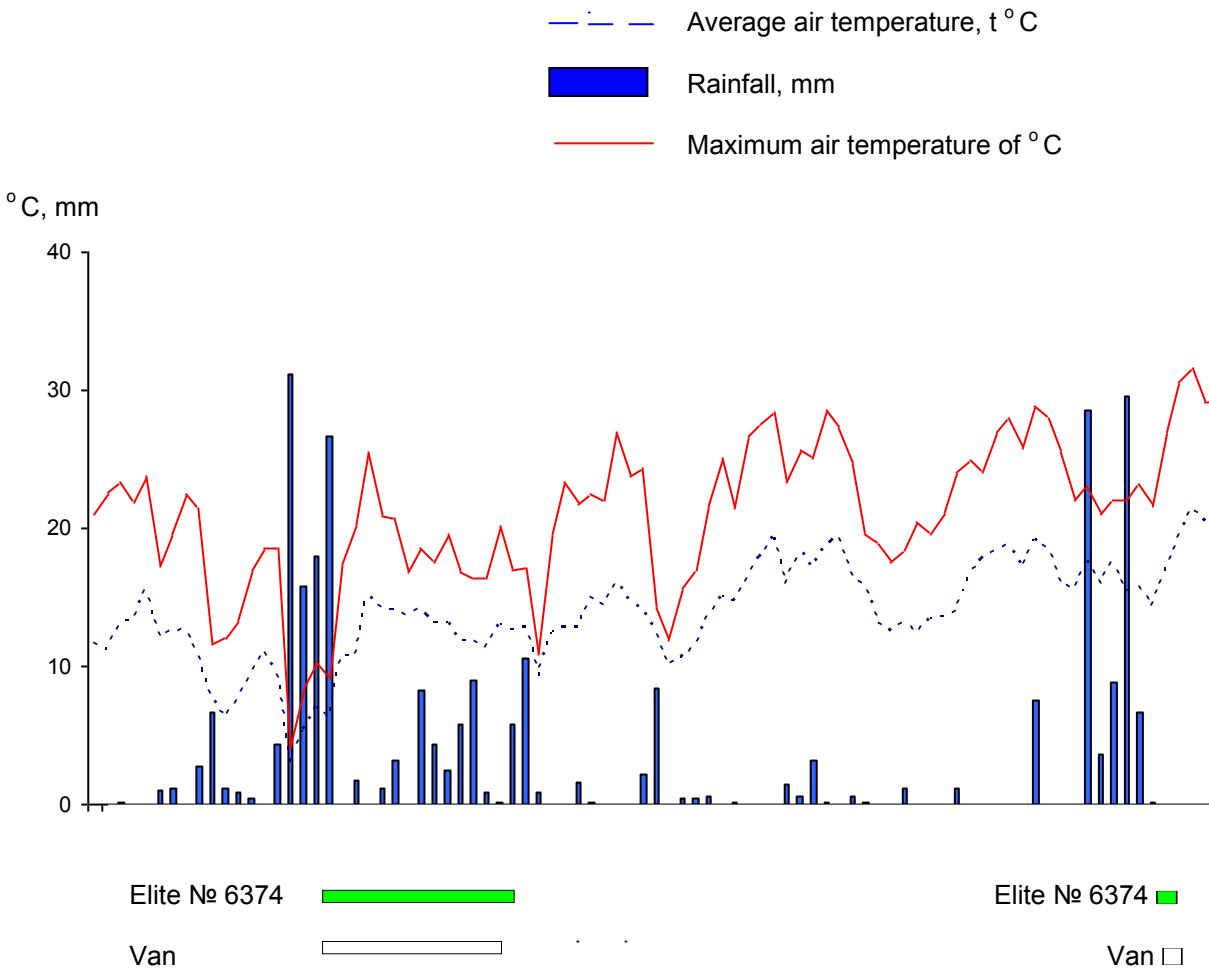

Fig. 1. *Terms of flowering and ripening of the fruits of elite № 6374 and Van sweet cherry cultivar and meteorological conditions during the period from April to June 2014*

Given these arguments and also found by other authors that cracking of cherry fruit depends mainly on rainfall during the on-growing and ripening of the fruit (Granger, 2005; Popatanasova et al., 2005; Popatanasova and Sotirov, 2005; Greco et al., 2008; Vercammen et al., 2008) and from the amount of rainfall during the 10 day period preceding the harvest (Lichev et al., 2009), we think that it is possible elite № 6374 to show some resistance to cracking, but it is not.

CONCLUSIONS

1. Elite № 6374 and cultivar Van do not differ significantly in the tree growth.

2. Elite № 6374 has a higher percentage of fruit set, larger fruit and relatively better resistance to cracking of the fruit, compared to the standard cultivar Van.

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