THE PRELIMINARY RESULTS REGARDING THE BEHAVIOR OF SOME CURRANT CULTIVARS ON THE SANDY SOILS FROM THE SOUTH OF OLTENIA

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ABSTRACT

The currant is an rustic species, with a high biological potential, able of yielding 5-8 tons / ha. It grows wildly in mountainous areas of Europe (Alps, Carpathians), Asia and North America. The currant is one of the most widespread shrubs in cultivation in our country. The production results were better for the black currant compared to the red currant. In the study period, from all studied red currant cultivars, the Detvan cultivar was highligth with 2.9 t/ha yield. For the black currant cultivars the yield was much higher versus to the red currants yield, being between 3.0 t/ha to Poli 51 cultivar and 4.6 t / ha to Tisel cultivar.

INTRODUCTION

The currant is a wild species in the mountains of Europe (Alps, Carpathians), Asia and North America. with a high biological potentially. This is one of the most important cultures for the countries of North Europa.

The currant in particular with black fruit, as well as with red fruits, are the constituent of a lot numbers of food stuffs, as a pomological product the fruits have a multitude of uses and a very complex biochemical composition. Over the years, was a considerable interest in red and black currants due to their beneficial effect on health (Brennan R. and Graham J. 2009, Mladin P., et al., 2009, Pluta S. et al., 2008). For this reason, numerous breeding activities for the currant species have been developed, especially in the northern countries of Europe. In Romania, such programs have been undertaken since 1968, the initial program was led by Paulina Mladin and currently continued by Titirica Irina (Titirica I., 2018). One of the products of the Romanian breeding program is the *Poli 51* variety evaluated in this study. Blackcurrants (*Ribes nigrum*) and redcurrants (*Ribes rubrum*) are highly valued for their nutritional and therapeutic value of the fruits (Gopalan et al. 2012) and also for the nutraceutical effect of buds and different parts of plants consumed as tea and as different pharmaceutical extracts. The buds of currant plants are valuable for the cosmetics industry, for the perfume industry due to the content in volatile oils. Thus, in the areas unfavourable to the cultivation of this species for fruits, the capitalization of the area can be made, in ecological cultures destined for the vegetal production for the pharmaceutical and cosmetic industry can be established. The purpose of this study is to evaluate the behaviour of six currant cultivars, in the pedoclimatic conditions from Southern Romania, to promote the most valuable cultivars in the commercial culture for this area.

MATERIAL AND METHOD

The study was conducted in the period 2020-2021, in an experimental plot established in 2019, on a sandy soil characterized by a low content of: humus (0.09%), CaCO3 (01-03%), nitrogen content (0.027%) and assimilable potassium (14-22 ppm). Two blackcurrant cultivars: Tisel, Tiben, Ruben, Poli 51 and 4 redcurrant cultivars: Detvan, Random, Janker van Tets, Juniferwere studied. The plants were planted at a distance of

3x1 m raised beds covered with polypropylene mulch fabric (Agrotextile). Drip irrigation was provided under the mulch. In order, to evaluate the suitability of these cultivars for the pedoclimatic conditions of sandy soils from the Romanian Southern area, the following biometrical determinations were made:dynamics of fruiting shoots growth (cm), average fruit weight (g), fruit diameter (mm), fruit height (mm), total soluble solids (%), glucose (%) vitamin C (%) titrable acidity (%) reported as malic acid, yield fruits (t/ha).The results obtained were statistically analysed using the analysis of variance.

RESULTS AND DISCUSSIONS

The vegetative biometrics characteristics to the studied currant cultivars.

The dynamics of shoots growth.

The Table 1 show that, the shoots of all red currant cultivars have exceeded the length of 32 cm. The lowest value was reported for the Detvan and Junifer cultivars (32.6 cm), and for the Jonkheer van Tets cultivar had recorded the highest value of 39.2 cm. Among the blackcurrant cultivars, the lowest value of vegetative growth was reported in Tiben and Tisel cultivars (26.3 cm and respectively 28.6 cm) , and the Poli 51 cultivar registered the highest value of the length of shoots (47 cm)(table 1).

Table 1

The dynamics of shoots growth in the studied period(cm)

The cultivar	The months						
	20-IV.	*20-V.*	*20-VI.*	*20-VII.*	*20-VIII.*	*20-IX.*	*5-X.*
Detvan	*6,6*	*8,5*	*14,6*	*22,9*	*29,0*	*31,4*	*32,7*
Rondom	*10,1*	*15,4*	*21,5*	*26,1*	*32,3*	*35,9*	*37,7*
Jonkheer van Tets	*10,0*	*15,3*	*23,7*	*27,7*	*34,0*	*37,3*	*39,2*
Junifer	*10,4*	*15,3*	*21,5*	*25,5*	*27,7*	*30,9*	*32,6*
Tisel	6,6	9,2	13,8	18,7	26,2	28,0	28,6
Tiben	6,1	8,6	12,6	17,1	23,1	25,3	26,3
Ruben	7,8	10,1	15,4	22,5	26,3	28,9	30,0
Poli 51	10,0	15,3	22,7	34,0	43,1	45,7	47,0

The fruits biometrics characteristics to the studied currant cultivars.

The average weight of a fruit, in terms of this characteristic, the Detvan cultivar reached the highest value (0.94 g/fruit), followed by the Jonkheer van Tets cultivar with a a value of 0.84 g /fruit, and the Junifer cultivar with a average weight of fruits in the studied period by 0.64 g/fruit.Regarding the average fruit weight of the blackcurrant varieties, from Table 2, shows that the Ruben variety reached the highest value of 1.44 g / fruit, followed by the Tisel variety with a value of 1.22 grams, and the Tiben variety had an average fruit weight of 0.86 grams. The Romanian cultivar Poli 51 recorded an average fruit weight by 1.16g / fruit with a difference of 0.28g from the Ruben cultivar(Table 2).

The diameter fruits,the values show in table 2 varied between 8.92 mm (Junifer cultivar) and 11.44 mm (Detvan cultivar) to the red currant cultivars.

The diameter of the fruits of the blackcurrant varieties varied between 11.48 mm (Tiben cultivar) and 13.48 mm (Ruben cultivar).

The height fruits,in the studied period varied between 10.67 mm (Tiben cultivar) and 12.99 mm (Ruben cultivar) for the studied blackcurrant varieties and between 8.37-10.91 mm for the redcurrant varieties. (Table 2)

The fruits chemical characteristics to the studied currant cultivars.

Blackcurrant varieties have a high soluble dry matter content compared to redcurrants (Kampuss K., et al., 2004 and Nour V. et all., 2011) reported a soluble dry matter content of approximately 14.5 -15.5% for blackcurrant varieties. In our study, the Tisel variety with a 16% soluble dry matter content is highlighted.

Of the red currant varieties studied, the highest amount of soluble dry matter was found in the Jonkeer van Tets cultivar (10.9%).

The total dry matter content was between 21.83-26.2% for blackcurrant varieties and 14.37-16.06 for redcurrant varieties (Table 3).Blackcurrant fruits are considered among the richest in vitamin C (100-200 %), thrice more high than in oranges. In addition, vitamin C in currant fruits is very stable, both in thermal shock and oxidation, due to the complex of organic substances that inhibit oxidative processes (Laguale V., 2007).

The content of vitamin C in fruit had varied between 80.21-89.20 (%) to the red currrant cultivar, the lowest values being registered at the currant the red currant varieties and at the black currant the registered values varied between 110-164.56 (%) (Table 3).

Table 2

The fruits biometrics characteristics

The cultivar	Average fruit weight (g)	Fruit diameter (mm)	Fruit height (mm)
Detvan	0,94	11,44	10,91
Rondom	0,43	9,26	8,79
Jonkheer van Tets	0,84	10,06	10,85
Junifer	0,64	8,92	8,37
Tisel	1,22	12,45	12,26
Tiben	0,86	11,48	10,67
Ruben	1,44	13,48	12,99
Poli 51	1,16	12,78	12,11

Table 3

The fruits chemical characteristics to the studied currant cultivars

The cultivar	Soluble solids (%)	Vitamin C (mg)	Glucose (%)	Titrable acidity (%)	Total soluble solids (%)
Detvan	10,3	85,36	8,9	2,56	16,06
Rondom	9,5	87,60	8,2	2,43	14,37
Jonkheer Van Tets	10,9	80,21	8,8	2,36	15,36
Junifer	9,8	89,2	8,9	2,30	15,00
Tiben	12,2	110,08	10,5	1,28	26,2
Ruben	9,9	138,16	8,52	1,92	23,15
Tisel	16,0	164,56	7,85	1,28	21,83
Poli 51	13	146,96	11,2	1,22	23

The fruit yield.The fruit yield is determined by genetic factors especially the degree of self-fertility and also by environmental factors, and for the stage of plant growth (Webb R., 1978).The plants being in the second year after planting, did not reach the maximum

production potential. The average yield t/ha was between 0.268 kg for the Rondom cultivar and 0.333 kg for the Detvan cultivar.

Table 4

The fruit yield in 2020 year

The cultivar	Average Yield (t/ha)	Relative production	Difference (t/ha)	Significance
Detvan	0.333	Control (100)	(Control)	
Rondom	0.268	80,48	-0.065	ooo
Jonkheer van Tets	0.318	95,49	-0.015	-
Junifer	0.250	75,07	-0.083	ooo
Tisel	0.909	Control(100)	(Control)	
Tiben	1.445	158,96	0.536	-
Ruben	1.330	146,31	0.421	-
Poli 51	1.954	214,96	1.045	**
	LSD 5% = 22,77	LSD 1% = 34,49	LSD 0,1% = 55,40	

The yield reported per hectare were between 0.250t/ha for Junifer cultivar and 0.333t/ha for Detvan cultivar. Also, a production of over 0.300 t/ha was recorded for the Jonkheer van Tets cultivar (Table 4).

Table 5

The fruit yield in 2021 year

The cultivar	The average yield (t/ha)	Relative production (%)	Diference (t/ha)	Significance
Detvan	2.981	138.0	+0.6	**
Rondom	1.431	66.6	-0.9	-
Jonkheer van Tets	2.321	130.0	0.0	-
Junifer	2.621	88.0	-0.3	-
Average (red current cultivars)	2.300	100	Control	
LSD	5%=0.38	1%=0.71	0.1%=1.6	
Tisel	4.621	101.6	+0.07	-
Tiben	4.422	97.1	- 0.13	-
Ruben	4.432	97.3	-0.12	-
Poli 51	4.732	103.97	+0.18	-
Average (black current cultivars)	4.551	100	Control	
LSD	5%=0.20	1%=0.35	0.1%=0.8	

The fruit yield per hectare (calculated at planting distances of 3m /1m) for the studied black currant cultivars were between 0.909 t/ ha (for the Tisel cultivar) and 1.954 t/ha(for the Poli 51 cultivar) in the second year after planting (Table 4).

In the third year after planting, the registered fruit yield highlith the Detvan cultivar by significantly differences versus to the other red currant studied, but for the blackcurrant studied cultivars the differences ensured from a statistical point of view were not recorded (table 5).The Poli 51 cultivar registered the highest production compared to all the other black currant studied varieties.

CONCLUSIONS

The shoots of all red currant cultivars have exceeded the length of 32 cm. The lowest value was reported for the Detvan cultivar, and to the blackcurrant cultivars, the lowest value of vegetative growth was reported in Tiben and Tisel cultivars, the Poli 51 cultivar registered the highest value of the length of shoots (47 cm).

The total dry matter content was between 21.83-26.2% for blackcurrant varieties and 14.37-16.06 for redcurrant varieties.

The Poli 51 cultivar registered the highest yield compared to all the other black currant studied varieties.

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