

CROPPING BEHAVIOR OF SOME SUGAR BEET VARIETIES IN TRANSYLVANIAN PLAIN CONDITIONS

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Abstract. The researches done on an experimental field in Turda aimed to follow the cropping behavior of 37 sugar beet varieties: Abondamx, Amulet, Belini, Berlioz, Cavallo, Danube, Eduarda, Fighter, Gallant Ro, Gallant Cz, Grinta, Hi 1354, Ilias, Ingrida, Jadranka, Jasmina, Logan, Marino, Matti, Mesange, Monsum, Natura, Octopus, Papillon, Proteus, Rivolta, Steffka, Sy Probus, Sy Robustus, Tatry, Vangelis, Vendetta, Victor, Vienetta, Wapiti, Zeppelin și Macumba. The most productive varieties proved to be Natura, Papillon and Vienetta, with a sugar percentage of more than 18%.

Keywords: variety, yield, sugar percentage.

INTRODUCTION

Global warming and the climate changes it determines is one of the greatest threats for agriculture and a significant problem from an environmental point of view, with negative consequences residing also on the economy. The yields of agricultural crops may be affected by climate instability. Sugar beet is an economically important crop, being the only plant that provides raw material for sugar production in the continental temperate climate, especially in the European countries. According to the Romanian Sugar Beet Growers Federation (FCSZR), in 2015, the sugar beet contracted surface was of 23,877 ha, while the cropped surface was of 23,581 ha. Thus, it was observed a reduction of this surface with 18.6% when compared with 2014. The mean sugar beet yield per ha recorded for Romania in 2014 was of 54.15 t/ha, and the mean sugar content per country was of 16.32%. A study on cropping behavior of some sugar beet varieties within the Transylvanian Plain is extremely opportune for the croppers of this area which would then be able to choose the most productive sugar beet varieties and with the highest sugar content.

MATERIALS AND METHODS

A mono-factorial experiment with 3 repetitions was set in Turda, in 2014 in order to follow the cropping behavior of some sugar beet varieties within the Transylvanian Plain. The total experimental surface was of 194.4 m and 37 sugar beet varieties were followed: Abondamx, Amulet, Belini, Berlioz, Cavallo, Danube, Eduarda, Fighter, Gallant Ro, Gallant Cz, Grinta, Hi 1354, Ilias, Ingrida, Jadranka, Jasmina, Logan, Marino, Matti, Mesange, Monsum, Natura, Octopus, Papillon, Proteus, Rivolta, Steffka, Sy Probus, Sy Robustus, Tatry, Vangelis, Vendetta, Victor, Vienetta, Wapiti, Zeppelin and Macumba. The field experiment was done after the classical technology. The ploughing was done during autumn, on the 25th of November. The seedbed was prepared during the spring of 2014, on the 22th of March, with a tractor aggregated with a rotary harrow. After preparing the seedbed, the seeding was done on the 23th April 2014 at a depth of 2 cm, the distance between rows being of 45 cm and the the distance between plants on the row of 18 cm. Each experimental variant was yielded on the 25th of October. The results were reported at hectare surface.

Calculations and results interpretation were done after consecrated statistical methods like variance analysis. For differences significance, the t test was used, with limit differences calculations for the significance thresholds of 5, 1 and 0,1%. The Duncan multiple comparison test was also used, using each variant as witness for the all of the others (ANOVA program).

RESULTS AND DISCUSSIONS

In the pedological-climatic environment of the Transylvanian Plain, the 37 sugar beet varieties had a different behavior with regards to roots yield. In comparison with the mean yield, the Rivolta variety had negatively distinct significant differences of the root yield, and the Octopus variety had negatively significant differences.

Table 1

Sugar beet yield of the 37 experimental varieties

Variety	Yield (t ha ⁻¹)	Percentage	Dif. Signif.	Duncan Test
Average	61,32	100	Ctr.	-
Abondamax	61,71	101	0,40 ⁻	cdefg
Amulet Cz	61,09	100	-0,23 ⁻	bcdefg
Belini	65,27	107	3,96 ⁻	defg
Berlioz	55,54	91	-5,78 ⁻	Abc
Cavallo	64,91	106	3,59 ⁻	defg
Danube	61,49	100	0,17 ⁻	cdefg
Eduarda KWS	65,24	106	3,92 ⁻	defg
Fighter	61,54	100	0,23 ⁻	cdefg
Gallant Cz	65,70	107	4,38 ⁻	efg
Gallant Ro	63,76	104	2,44 ⁻	cdefg
Grinta	67,28	110	5,97 ⁻	g
Hi 1354	59,60	97	-1,71 ⁻	abcdefg
Ilias	55,57	91	-5,75 ⁻	Abc
Ingrida KWS	56,86	93	-4,45 ⁻	Abcd
Jadranka KWS	56,75	93	-4,57 ⁻	Abcd
Jasmina KWS Ro	59,65	97	-1,66 ⁻	abcdefg
Logan	65,74	107	4,42 ⁻	efg
Macumba	66,14	108	4,82 ⁻	fg
Marino	66,31	108	5,00 ⁻	fg
Matti	57,08	93	-4,23 ⁻	abcde
Mesange	62,06	101	0,75 ⁻	cdefg
Monsun	65,05	106	3,73 ⁻	defg
Natura Cz	68,32	111	7,01 ⁻	g
Octopus	52,51	86	-8,81 ⁰	Ab
Papillon	67,46	110	6,15 ⁻	g
Proteus	57,21	93	-4,10 ⁻	abcde
Rivolta	51,33	84	-9,99 ⁰⁰	A
Steffka Kws	60,10	98	-1,22 ⁻	bcdefg
Sy Probus	64,55	105	3,24 ⁻	Defg
SY Robustus Ro	63,06	103	1,74 ⁻	cdefg
Tatry Ro	60,06	98	-1,25 ⁻	bcdefg
Vangelis	60,58	99	-0,74 ⁻	bcdefg
Vendetta Kws	56,89	93	-4,42 ⁻	Abcd
Victor Ro	61,12	100	-0,19 ⁻	bcdefg
Vienetta Kws	66,51	109	5,19 ⁻	fg
Wapiti	57,93	95	-3,39 ⁻	abcdef
Zeppelin	56,65	82	-4,66 ⁻	Abcd
LSD (p 5%)			7,11	7,13-8,89
LSD (p 1%)			9,46	
LSD (p 0,1)			12,25	

The sugar beet varieties Abondamax, Belini, Cavallo, Fighter, Gallant, Grinta, Logan, Macumba, Marino, Mesange, Monsun, Natura, Papillon, Sy Probus, SY Robustus and Vienetta had small yield gains when compared with the mean yield, but these gains are not statistically assured (table 1). The sugar content of the experimental varieties ranges between 15.36% (Proteus) and 18.61% (Steffka). Ingrida, Mesange, Rivolta, Steffka and Vangelis varieties had higher sugar contents (over 5% higher) when compared with the mean per varieties (table 2).

Table 2

Sugar content of the 37 experimental varieties

Variety	Sugar content (%)	Percentage	Dif. Signif.	Duncan Test
Average	17,42	100	Ctr.	-
Abondamax	17,50	101	0,08 ⁻	Ab
Amulet Cz	17,72	102	0,30 ⁻	Ab
Belini	16,50	95	-0,91 ⁻	ab
Berlioz	17,84	102	0,42 ⁻	ab
Cavallo	16,95	97	-0,47 ⁻	ab
Danube	17,91	103	0,49 ⁻	b
Eduarda KWS	16,90	97	-0,52 ⁻	ab
Fighter	17,46	101	0,04 ⁻	ab
Gallant Cz	17,65	101	0,23 ⁻	ab
Gallant Ro	16,90	97	-0,52 ⁻	ab
Grinta	17,73	102	0,32 ⁻	ab
Hi 1354	16,71	96	-0,71 ⁻	ab
Ilias	17,34	99	-0,08 ⁻	ab
Ingrida KWS	18,26	105	0,84 ⁻	b
Jadranka KWS	16,89	97	-0,52 ⁻	ab
Jasmina KWS Ro	16,38	94,1	-1,03 ⁻	ab
Logan	17,15	99	-0,27 ⁻	ab
Macumba	16,80	96	-0,62 ⁻	ab
Marino	17,73	102	0,31 ⁻	ab
Matti	16,56	95	-0,86 ⁻	ab
Mesange	18,50	106	1,08 ⁻	b
Monsun	17,58	101	0,16 ⁻	ab
Natura Cz	18,04	104	0,62 ⁻	b
Octopus	16,18	93	-1,24 ⁻	ab
Papillon	17,99	103	0,57 ⁻	b
Proteus	15,36	88	-2,05 ⁰	a
Rivolta	18,57	107	1,15 ⁻	b
Steffka KWS	18,61	107	1,19 ⁻	b
Sy Probus	16,80	96	-0,62 ⁻	ab
SY Robustus Ro	17,45	101	0,03 ⁻	ab
Tatry Ro	18,02	104	0,60 ⁻	b
Vangelis	18,30	105	0,88 ⁻	b
Vendetta KWS	17,76	102	0,34 ⁻	ab
Victor Ro	17,66	101	0,24 ⁻	ab
Vienetta KWS	18,14	104	0,72 ⁻	b
Wapiti	17,20	99	-0,21 ⁻	ab
Zeppelin	17,40	99	-0,02 ⁻	ab
LSD (p 5%)			1,99	1,99-2,51
LSD (p 1%)			2,63	
LSD (p 0,1)			3,39	

CONCLUSIONS

These researches showed the Natura variety to be the most productive of the 37 varieties followed under the conditions of the Transylvanian Plain, with a yield of 68.32t/ha.

All varieties proved to be fit to the environmental conditions of the Transylvanian Plain providing yields of more than 51t/ha. With the classical sugar beet cropping technology, the experimental varieties produced a sugar content of more than 16%. Ingrida, Natura, Rivolta, Steffka, Tetry, Vangelis and Vienetta sugar beet varieties proved to be the richest in sugar content (over 18%).

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