

SELECTION OF MONOGRAIN HIGH SUGARY POLLINATORS-FORTIFIERS OF SUGAR BEET STERILITY

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This article deals with the results of selection of high sugary forms of sterility fortifiers in saturated crossing generations with high sugary donors. 7 better numbers are chosen which are included in selective process for creation maternal component of hybrids.

With implementation in production highproductive MS hybrids on sterile basis, the work of researchers must be directed on increasing not only the yield of roots but on the sugar content in hybrids and their parental components. Increase of beets' sugariness only on 0,1% essentially enlarges the yield of sugar from them [1].

Hybrid's phenotype by sugariness and by other polygene qualities forms on the basis of genotype influence of parental forms and modified environment conditions [2]. One of the problem in sugar beet selection, which will be actual for a long time, is excretion and fixing of high-sugary in initial materials generation because it is greatly modified by enviromental conditions [3].

In the collection of monograin materials which are studied on the station, there are materials with high potential of sugariness. It is testified by the results of selection of sugariness donors in the previous testing and marks of these materials especially maternal hybrids form by the combinative ability. But during the last years in hybrids combinations (F_1) received by crossing different by the origin MS lines with polygrain pollinators, was marked that in phenotype manifestation of sugar content the main part was paratype or environmental variability. Genotype differences between research materials were shown only in some hybrid's combinations [4]. That's why there is question of improving source materials by sugar content using effective way of crossing – saturation by sugariness donors. With this goal the research was laid, in which pollinators were studied, candidates on sterility fixers.

The purpose of our work is to improve the ways of creating high sugary forms of monograin sugar beets for receiving MS hybrids on their basis.

Methodology of the investigation. In the process of selective work, saturational interbreeding of monograin linear materials of sugar beets were held by the high sugary donors. The productivity of obtained materials was studied and on their bases were created hybrid's combinations, were chosen better high sugary forms.

All selective works were held according to well-known methodics. For fixing in posterity high sugar content in roots of hybrid forms of monograin linear pollinators-fortifiers of sterility, saturational interbreeding by high sugary donors under the conditions of free repollination on the space-isolated plots and in group isolators.

As initial material of research served pollinators, from population branches of monograin materials VP 29 and VO 8524, picked up in the result of individually–family selection on the plots of hybridization candidates of sterility fixers and their MS analogies. Donors in saturational interbreeding acted as recorders by sugar content, picked up by the results of previous testing in 2009. From branch of selections VP 29 was defined the number under tribal indication VO⁸¹¹/_{H.08} and from branch VO 8524 – VO¹⁰⁹⁶/_{H.08}. Every selective number in crossings was presented by more than 50 roots. Correlation of crossing components was 1:1.

Previous testing of monograin pollinators-fortifiers of sterility was made by randomized single row plots, with area of 4,5 m². The sugar content was indicated by the cold digesting method on “Venema” line. Evaluation by the sugar content was held by the 20-roots tests in three-time repetition. Were compared hybrid forms to group standard on the research, to initial materials and especially to initial form of every selective number.

Materials were tested in 2 series (36 numbers in every series) which included 16 initial and 50 hybrid forms. 66 individual selective numbers were studied. In the content of group standard, three better hybrids were included which were taken from the Institute of bioenergetic cultures and sugar beets. Statistic analysis of research results was held by the analysis of variance method by B.O. Dospekhov.

The results of researches. Characteristic of initial materials included in saturational interbreeding is shown in table 1. Changes of qualities “crop capacity” and “sugariness” was oscillated greatly. By “crop capacity” it amounted 38,9...58,4 t/ha, by “sugariness” 15,4...17,2% and was depended on the genotype of pollinators.

1. Characteristic of initial materials, VBSS, 2011

№	The origin of material		Crop capacity, t/ha	Mass of 1 root, g	The amount of sugar, %
	tribal name	branch			
1	VO⁸¹¹/_{H.08}	VP 29	38,9	565	17,23
2	VO ⁷⁸² / _{H.08}	-//-	51,1	479	16,22
3	VO ⁷⁸⁴ / _{H.08}	-//-	45,3	536	16,64
4	VO ⁷⁸⁸ / _{H.08}	-//-	35,8	644	16,21
5	VO ⁷⁷⁰ / _{H.08}	-//-	50,4	582	16,25
6	VO ⁷³⁹ / _{H.08}	-//-	42,9	452	15,99
7	VO ⁷⁹⁷ / _{H.08}	-//-	50,7	570	15,63
8	VO ⁷⁷⁵ / _{H.08}	-//-	41,1	486	15,67
9	VO ¹³⁰⁶ / _{H.08}	VO 8524	58,4	598	15,56
10	VO ¹³⁴⁰ / _{H.08}	-//-	56,7	554	15,50
11	BO ¹³⁴⁷ / _{H.08}	-//-	51,8	630	15,36
12	BO ¹³⁶⁰ / _{H.08}	-//-	46,7	583	15,38
13	BO¹⁰⁹⁶/_{H.08}	-//-	46,7	457	16,80

For selection of highsugary forms, in previous testing of monograin materials were studied initial forms of pollinators–candidates in O types and created on their basis hybrids from saturational crossings.

In table 2 better pollinators and their initial forms are shown, which were indicated by the sugar content comparing to group standard in previous varietal-testing 2012.

2. The evaluation of productivity of better pollinators – components of saturational crossings, VBSS, 2012

№	Variant	Origin	The indexes of productivity			
			absolute		% to standard	
			yield, t/ha	Sugar content, %	yield	Sugar content
1	1022	10710/1 BO 8524 tester	53,9	16,95	117	100
	1023	7703/2,6 BO 8524	35,6	15,80	77	93
3	1004	10706 × 10710/1 BO 8524	41,1	17,20	89	101
4	1005	10706/1 × 10710/1 BO 8524	52,2	17,70	113	104
5	1058	7505/1-4,5 BП 29 tester	42,2	17,40	92	102
6	1055	7799/3 BП 29	52,2	18,10	113	106
7	1027	10774 × 7505/1-4,5 BП 29	54,4	18,40	118	108
8	1043	10778/2 × 7505/1-4,5 BП 29	30,4	18,15	66	107
9	1057	7502/1,5 BП 29	43,3	18,05	94	106
10	1047	10780 × 7505/1-4,5 BП 29	22,2	18,20	48	107
11	1048	10780/1 × 7505/1-4,5 BП 29	31,1	18,50	68	109
12	1053	7487/2,7 BП 29	45,1	16,60	98	97
13	1051	10781/1 × 7505/1-4,5 BП 29	46,0	17,80	100	105
<i>HIP₀₅</i>			<i>13,8</i>	<i>1,3</i>	<i>33,0</i>	<i>7,7</i>
Absolute indicators of group standard			46,0 t/ha	17,03%		

Analysis of productivity of initial materials showed that by the crop capacity they were on the level of group standard (77–113% to standard, Hip₀₅=33), and by the sugar content (93–106% to standard, Hip₀₅=7,7).

The yield of hybrid forms 3S is lower than their initial forms. By this quality the pollinator 1047 was lower by research and amounted 22,2 t/ha and others didn't differ. Absolute indicators by sugariness, comparing to standard on 1-10% were higher than initial forms. The sugar content in roots in two pollinators (1027, 1048) were higher than standard and amounted 108, 109 to it (Hip₀₅=7,7). Deserves

attention the pollinator 1027 in which high sugar content was indicated together with high crop capacity of roots (54,4 t/h) (table 2).

Comparing sugariness in initial materials of pollinators and created on their basis hybrids materials as a result of saturational crossings showed that majority of numbers on 0,2–2,58% were higher than initial forms by sugar content. The best are shown in table 3.

3. Better pollinators by sugar content in roots, previous testing, VBSS, 2012

№	Sowing	Origin of material	Sugar content		Oscillation from amount initial forms	Oscillation from group standard on research
			absolute indexes, %	± to initial forms		
1	1004	3C BO 1306/ _{H08} VO8524 (1364)	17,20	+1,40	+0,01	+0,16
2	1005	3C BO 660/ _{H11} VO 8524 (1364)	17,70	+1,90	+0,51	+0,66
3	1027	3C BO 784/ _{H08} VII 29 (1357)	18,40	+0,30	+1,21	+1,36
4	1043	3C BO 877/ _{H11} VII 29 (1363)	18,15	+0,75	+0,99	+1,11
5	1047	3C BO 797/ _{H08} VII 29 (1361)	18,20	+0,15	+1,01	+1,16
6	1048	3C BO 882/ _{H11} VII 29 (1361)	18,50	+0,45	+1,31	+1,46
7	1051	3C BO 878/ _{H11} VII 29 (1353)	17,80	+1,20	+0,61	+0,76
HIP ₀₅			1,3			
Absolute indicators of group standard			17,03			
Amount of initial form		BO 8524	15,82	+1,63	+0,26	+0,42
		BII 29	17,73	+0,48	+1,02	+1,18
Amount of initials on research			17,19		+0,81	+0,97

Better pollinators by the sugar content were recognized selections from branch VO 8524, numbers 1004 and 1005 which exceeded their initial forms accordingly on 1,4; 1,9%. Selections from branch VP 29 1027 and 1048 were higher than group standard. Only one pollinator 1048 exceeded the standard and amount of initial forms by the sugar content in roots. Oscillation of hybrid materials to initial forms amounted + 0,15...1,63% and to group standard +0,16...+1,46% (table 3).

Conclusions.

1. It was established that introduction in selective process of saturated crossings gave the possibility to improve initial monograin materials by the quality “sugariness”.

2. It was indicated 7 highsugary forms, two of them exceeded group standard.
3. Hybridization of selective materials by donors of sugariness promoted increase of sugar content in roots of monograin pollinators on +0,15...+1,63% comparing to initial forms.
4. By the sugar content in roots, monograin pollinators exceeded group standard on +0,16...+1,16%.

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Вакуленко П.И. Отбор односеменных высокосахаристых опылителей-закрепителей стерильности сахарной свеклы

В статье изложены результаты отборов высокосахаристых форм закрепителей стерильности в потомствах насыщающих скрещиваний с донорами высокой сахаристости.

Установлено, что введение в селекционный процесс насыщающих скрещиваний, дает возможность улучшить исходные однонасемянные материалы за признаком „сахаристость”. Гибридизация селекционных материалов донорами сахаристости содействовала повышению содержания сахара в корнеплодах односеменных опылителей на +0,15...+1,63%, по сравнению к исходным формам. По содержанию сахара в корнеплодах однонасемянные опылители на +0,16...+1,46% превышали групповой стандарт. Выделены 7 лучших номеров, которые введены в селекционный процесс для создания материнского компонента гибридов.

Ключевые слова: *гибрид, гибридизация, закрепители стерильности, ЧС аналог, сахаристость, насыщающее скрещивание.*

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Selection of monograin high-sugar pollinators-fixers of sugar beet sterility

This article deals with the results of selection of high-sugar forms sterility fixers in saturated crossing of generations with high-sugar donors.

It is determined that introduction in selective process of saturated crossings gives the possibility to improve initial monograin materials by the “sugary” quality. Hybridization of selective materials by the sugary donors helped to increase sugar content in roots of monograin pollinators to +0,15...+1,63 comparing to initial forms. By sugar content in roots, monograin pollinators increased group standard to +0,16, +1,46%. Allocated the best 7 numbers which are included in the selection process to create maternal component of hybrids.

Key words: *hybrid, hybridization, sterility fixers, Ms analog, sugary, saturational crossing.*