UDC 633.63.631.52

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COMPARATIVE ASSESSMENT OF PARENT COMPONENT WORLD SUGAR HYBRIDS OF SUGAR BEET FOR FEEDBACK ON A REGULATED ENVIRONMENTAL FACTORS

On the basis of Eberhard & Russell assesses environmental stability and plasticity simple sterile hybrids of sugar beet as a parent components on the basis of sugar content in media with different combinations of backgrounds fertilization (normal and high) and feeding area (normal and extended). Highlight the best plastic and stable parent components with positive genotypic effect of sugar to create highly adaptive World sugar beet hybrids for consumer purposes and for the production of bioethanol.

Keywords: *sugar content, hybrid, flexibility, stability, selection agricultural background.*

Introduction. Sugar beets - great economic culture that has full use, the main of which - sugar for consumption purposes and as a valuable source of raw materials for bioethanol production [1,2]. Therefore, the problem formulation and study the genetic control of major agronomic traits and their manifestation at the level of phenotype is relevant and important to the selection process of this culture.

Modern hybrids of sugar beet insufficiently balanced by adaptive capacity , leading to sharp fluctuations agronomic traits including sugar content [3]. Such fluctuations caused by both soil and climatic zone beet and controlled growing conditions varying from a combination of various elements of technology (fertilizers, feeding area , the material costs of intensification , etc.). Therefore, the negative

impact of unfavorable abiotic factors can be significantly reduced high adaptive potential of modern hybrids [4]. . This suggests the need for a component hybridization with genetically determined property adequately respond to favorable agricultural background .

The parent component Cup hybrids of sugar beet can be represented in the form of World Cup homozygous lines and a simple sterile hybrids UGS) obtained by crossing lines with unrelated WC fixing sterility (type O). According to S.Boroyevycha , hybrid models have a special status relative to adaptability and plasticity as homozygous materials should be grown in favorable conditions, and materials that are characterized by specific heterozygosis' have better physiological homeostasis, ie with high adaptability and stability performance elements in different agro-ecological conditions of cultivation [5]. That is why in modern breeding sugar beets along with the creation of World homozygous parent lines using components and homogeneous , but with some heterozygosis', UGS sugar beet [6].

The aim of our study was to evaluate the adaptability and stability parameters for UGS breeding backgrounds with different mix of fertilizer and feeding area and find flexible and stable for the sugar content of the parent components to create highly adaptive Cup hybrids of sugar beet.

Materials and methods research. Simple sterile hybrids (SSH) was obtained from crossing the 5 FM lines-unique 5 not related fixers sterility - About types (20 hybrids), but in the analyzed 12 of the best of them, which in the ranking with a collection of sugar took 12 the first ranks (from largest to smallest values). Adjustable factors (environment) were: normal background fertilizers - standard size power supply (SSPS), the normal background - extended nutrition area (NBENA), the increased background fertilizers - plain area (IBFPA) and the increased background - extended nutrition area (IBENA). They served backgrounds to study in 2011-2012 yield UGS (Verhnyachka DSS 2011-2012) in multivariate experiment [7,8], the Adaptability of the world Cup hybrids were determined by the coefficient of regression Eberhard & Russell, characterizes the tendency of changes in the rate of

yield depending on the changes of ecological conditions (in our experiment - breeding agricultural background) [9].

Results and discussion. Analysis of the data field studies showed that SSH based on sugar content had a different response to an environment that is characterized by a specific reaction to certain breeding background (Table).

Table 1

Sugar content of simple sterile hybrids depending on the breeding agricultural background, Verhnyatska experimental breeding station, 2011-2012

Breeding agro backgrounds	Simple sterile hybrids												Average	Difference
	MS1/Or2	MS 1/Or4	MS 1/Or5	MS 2/Or1	MS 3/Or1	MS 3 /Or2	MS 3/Or4	MS 3/Or5	MS 4/Or5	MS 5/Or1	MS 5/Or2	MS 5/Or4		
SSPS	16,5	16,6	16,5	17,3	17,3	16,5	17,3	17,8	17,5	17,3	16,4	16,9	17,0	-0,1
NBENA	17,8	17,2	18,1	17,2	17,8	16,3	16,9	17,2	17,2	16,7	17,7	16,2	17,2	0,1
IBFPA	17,7	17,7	17,2	17,8	16,5	16,6	16,6	17,6	16,5	17,7	17,3	16,8	17,2	0,1
IBENA	18,2	16,8	17,5	17,4	17,8	17,9	15,3	16,4	16,6	18,1	17,6	16,6	17,2	0,1
Average on a hybrid combinations	17,6	17,1	17,3	17,4	17,4	16,8	16,5	17,3	17,0	17,5	17,3	16,6	17,1	
Standard deviation	0,7	0,5	0,7	0,3	0,6	0,7	0,9	0,6	0,5	0,6	0.6	0,3		
Max - maximum yield	18,2	17,7	18,1	17,8	17,8	17,9	17,3	17,8	17,5	18,1	17,7	16,9		
Min - minimum yield	16,5	16,6	16,5	17,2	16,5	16,3	15,3	16,4	16,5	16,7	16,4	16,2		
R - swing to yield	1,7	1,1	1,6	0,6	0,3	1,6	2,0	1,4	1,0	1,4	1,3	0,7		
Error of the mean of arithmetic	0,4	0,2	0,3	0,1	1,3	0,4	0,4	0,3	0,2	0,3	0,3	0,2		
VF,% - coefficient of variation	4,2	2,8	3,8	1,5	3,5	4,3	5,2	3,6	2,8	3,4	3,4	1,9		
Hom	4,2	6,0	4,5	11,6	4,9	3,9	3,2	4,8	6,0	5,1	5,0	8,9		
As - factor of stability agronomic	95,8	97,2	96,2	98,5	96,5	95,7	94,8	96,4	97,2	96,6	96,6	98,1		

The 12 studied hybrids at an average assessment on various agricultural background significantly different from the average sugar content of the experiment (17.1 %). It depended not only on the genotype , but also on the response of each of the hybrids to replace agricultural background. The best hybrids were MS1/OT2

(17.6 %) and MS5/OT1 (17.5 %). Thus, based on line 5 World Cup was analyzed three hybrids with different O types, their average score on the sugar content was different - from high (MS5/OT2 - 17.5 %) and lowest in the experiment (MS5/OT4 - 16.6%) . In OT2 three hybrid combinations with MS lines 1 , 3 and 5 also had contrasting indicators sugar - sugar content was highest in hybrid MS1/OT2 (17.6 %), the lowest - in MS3/OT2 (16.7 %). Oscillations of sugar each SSH according to different selection agricultural background shows the coefficient of variation, which ranged from 1.5 to 5.2% of the variation of the absolute value of 0.3 to 1.7%. Agronomic rate stability was high for all hybrid combinations , totaling 94.8 ... 98.5%, and the rate Hom, which shows the relative level of homeostasis varied depending on genotype within 3.2 ... 11.6. Thus, a different response to changing agricultural background SSH is a consequence of both genotype and genotype / environment interactions. Drahavtsev V.A . Attaching great importance to the latest in ecological genetics of quantitative traits, wrote that the level of plant productivity is not determined by genes of quantitative traits, and the interaction genotype / environment [10].

For parameter estimation stability analysis was carried deviation of the average variance for each of the hybrid combinations (Fig. 1).

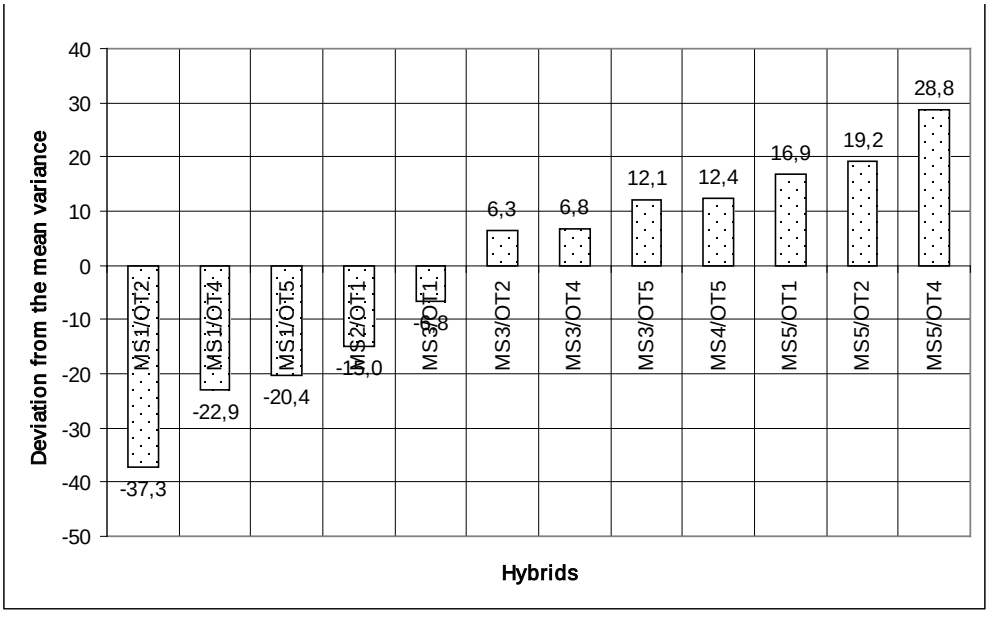

Figure 1. Deviations from the average variance of simple sugar sterile hybrids of sugar beet, 2011-2012 years.

Determined that a significant deviation from the sign " minus" from the mean variance showed 5 hybrids , two hybrids, based on line 5 World Cup (MS5/OT2 and MS5/OT3) slightly declined to zero , the remaining hybrids recorded significant deviation variance with the sign " plus". This shows mixed reaction motherboard components for sugar content in terms of stability in different environmental conditions.

It is known that the breeding value are examples in which appears a positive genotypic effect based.

An analysis of the hybrids had the highest MS1/OT2 (0.42%) and hybrid MS5/OT1 (0.32%), but they differed in response to breeding agricultural background: one of them had the highest degree of plasticity (7,42) other - characterized by poor response to changing environmental conditions (degree of plasticity 0.68) (Fig. 2).

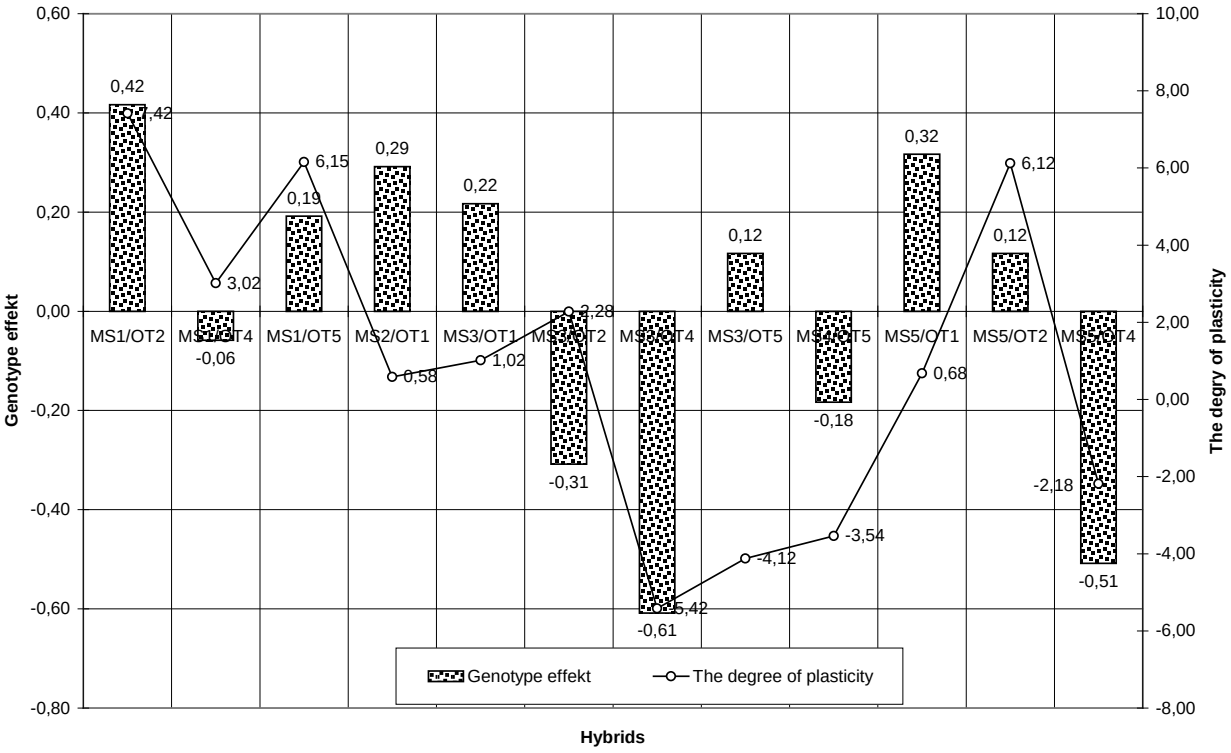

Fig.2. Genotypic effect and the degree of plasticity for SSH sugar content of sugar beet, 2011-2012 years.

Hybrids and MS2/OT1 MS3/OT5 in which genotypic effect was respectively 0.29 and 0.12 ...% sugar content can provide a stable environment for degraded

because they have advantages for conventional technologies in an extensive background. Simple sterile hybrids MS1/OT5 and MS5/OT2 with low but positive genotypic effect (respectively 0.19 and 0.12) showed a favorable response to environmental conditions, ie, were highly plastic. They require a high level of intensive farming and related background. K hybrid MS3/OT1 (genotypic effect 0.22) with the value of the degree of plasticity close to unity (1.02) there is full compliance with changing sugar agricultural background change.

Conclusions. Learning simple sterile hybrids as maternal components in selection media with different combinations of abiotic factors will make it possible to create plasticity adaptively hybrids of sugar beet, which manifest as the basis of sugar content potential. On the basis of Eberhard & Russell allocated Sweets combination with high positive genotypic effect that differentiated the parameters of adaptability: plasticity - SSH MS1/OT2, MS1/OT5 and MS5/OT2) stable - MS2/OT1 and MS3/OT5 and adequate to fluctuations agricultural background hybrid MS3/OT1. For their participation could create the final World Cup hybrids of sugar beet in specific ranges of agro-ecological conditions suitable for high fees how sugar and for bio fuel production.

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Анотація

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Порівняльна оцінка цукристості материнських компонентів ЧС гібридів цукрових буряків за відгуком на регульовані фактори середовища

На основі методу Еберхарда і Рассела надана оцінка екологічної стабільності і пластичності простих стерильних гібридів цукрових буряків як материнських компонентів за ознакою цукристості у середовищах з різним поєднанням фонів удобрення (звичайний і підвищений) і площі живлення(звичайна і розширена). Виділено кращі пластичні і стабільні

материнські компоненти з позитивним генотиповим ефектом цукристості для створення високо адаптивних ЧС гібридів цукрових буряків на споживчі цілі і для виробництва біоетанолу.

Ключові слова: *цукристість, гібрид, пластичність, стабільність, селекційний агрофон*

Аннотация

Корнеева М.А., Эрмантраут Э.Р., Ненька М.М.

Сравнительная оценка сахаристости материнских компонентов МС гибридов сахарной свеклы по отзывам на регулируемые факторы среды

На основе метода Эберхарда-Рассела дана оценка экологической стабильности и пластичности простых стерильных гибридов сахарной свеклы как материнских компонентов по признаку сахаристости в средах с различным сочетанием фонов удобрений (обыкновенный и повышенный) и площади питания (обыкновенная и расширенная). Выделены лучшие пластичные и стабильные материнские компоненты с положительным генотипическим эффектом сахаристости для создания высокопродуктивных МС гибридов сахарной свеклы на потребительские цели и для производства биоэтанола.

Ключевые слова: *сахаристость, гибрид, пластичность, стабильность, селекционный агрофон*