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VARIABILITY OF YIELD ELEMENTS IN F2-F3 PLANTS OBTAINED AS A RESULT OF PAIR HYBRIDS OF SOY

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ABSTRACT

The article presents the results of the number of pods per plant and the weight of seeds per plant in F2-F3 plants obtained on the basis of varieties introduced from Korea. The highest results in terms of the number of pods per plant were among the introduced variety samples in the variety sample SN30(-969), F2-F3 SN27(-266) x SN30(-969) and F2SN28(-268) x SN30(-969) combinations, one plant it was highlighted that among the parent forms, the seed weight in the plant was obtained in the SN7(-014) cultivar sample, and in the F2KO18 x SN30(-969) combinations.

Keywords: soybean, F2-F3 plants, yield elements, variability, heredity, introduction, seed weight per plant, number of pods per plant, quality harvest, environmentally friendly breeding material, new variety

СОЯНИНГ ЖУФТ ДУРАГАЙЛАШ НАТИЖАСИДА ОЛИНГАН F2-F3 ЎСИМЛИКЛАРДА ҲОСИЛДОРЛИК ЭЛЕМЕНТЛАРИНИНГ ЎЗГАРУВЧАНЛИГИ

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АННОТАЦИЯ

Мақолада Кореядан интродукция қилинган нав намуналар ва улар асосида олинган F2-F3 ўсимликларда бир ўсимликдаги дуккаклар сони ҳамда бир туп ўсимликдаги уруғ оғирлиги бўйича натижалар келтирилган. Бир ўсимликдаги дуккаклар сони бўйича юқори натижалар интродукция қилинган нав намуналар орасида СН30(-969) нав намунасида, F2-F3 СН27(-266) х СН30(-969) ва F2СН28(-268) х СН30(-969) комбинацияларида, бир туп ўсимликдаги уруғ оғирлиги ота-оналик шакллар орасида СН7(-014) нав намунасида, F2КО18 х СН30(-969) комбинацияларида юқори кўрсаткичлар олинганлиги ёритилган.

Калит сўзлар: соя, F2-F3 ўсимликлар, ҳосилдорлик элементлар, ўзгарувчанлик, ирсийланиш, интродукция, бир туп ўсимликдаги уруғ оғирлиги бир ўсимликдаги дуккаклар сони, сифатли ҳосил, экологик тоза селекцион ашё, янги нав

INTRODUCTION

According to the data of 2022 in the world, 357 million tons of grain will be grown in 93 countries where soybeans are grown, of which Brazil (126.0 million tons), the USA (124 million tons), Argentina (38.0 million tons) are among the countries that grow the most soybeans. tons), China (15 million tons), India (14 million tons), Paraguay (11 million tons), Canada (7.3 million tons), Ukraine (4.5 million tons), Russia (4 1 million tons), Bolivia (2.9 million tons), South Africa (1.5 million tons), Uruguay (1.3 million tons), Italy (1.2 million tons), a total of 327 million tons. Soybean export is 156 million tons worldwide, of which USA, Brazil, and Argentina are the leading countries. One of the important problems in soybean breeding is the creation and wide use of high-yielding, high-protein and high-oil, early- and mid-ripening varieties in production. Due to global climate change, population growth, and reduction of irrigated areas, effective use of agricultural areas, planting as main and repeated crops and obtaining high and quality crops are urgent tasks.

The purpose of the research was to create drought-resistant, high protein and oil content, non-fatty, suitable for mechanization, productive, ecologically clean breeding materials and a new variety using samples of the introduced variety of soybean.

Samples of Korean selection introduced as research objects - SN27(-266), SN28(-268), SN3(-008), SN7(-014), SN11(-018), SN30(-969), US-25 (-622), US-14(-382), US-44 (-641), US-80 (-699), US-82(-701), K09(339), KO20, KO3(-214), KO21(RR-1), KO18 and their hybrids, families, lines obtained by crossing them; Varieties belonging to Krasnodar selection - Avanta, Arleta, Sparta, Selekta 201, Selekta 302, Uzbekskaya 2 varieties belonging to Uzbekistan selection were used.

RESEARCH METHODS

The field phenological observations of the obtained data are of the former UzPITI "Methods of Conducting Field Experiments" [20; 146-b], statistical analyzes B.A. Dospekhov [21; 351-b] style and implemented in Ms Excel dactupi acoci. G. Beil and R. Atkins [161; 35-37-b] formulas, classification into clusters were calculated and analyzed in Rstudio computer program.

LITERATURE REVIEW

Today in the republic, special attention is paid to testing new varieties of legumes, including soybeans, and adapting them to specific soil and climate conditions, growing and storing high-yielding, high-quality, ecologically clean grain products, and developing agrotechnologies for increasing soil fertility [10; 21 b]. Bellaloui N. and others [11; 31 b], Betzelberger A. M. and others [12; 1569-1581 b], Kholmurodova G.R. and others [13; 96 p. 14; 115 pp.]. Soybean seeds contain a large amount of oil (17...25 %) and protein (35...55 %), and are the first among the most important agricultural crops. Analyzes of morphological characteristics of introduced soybean varieties, their description, biometric indicators, chemical composition of soybean grains and a number of valuable economic characteristics were carried out and scientific results

were obtained [1; pp. 35-39, 2; pp. 46-50, 3; pp. 26-30, 4; pp. 31-36, 5; pp. 45-49, 6; pp. 50-55, 7; pp. 21-24, 8; 1-7 p., 9; 1-10 p.]

RESEARCH RESULTS

As in row crops, the heredity, variability and formation of productivity elements are of great importance in soybean. Because productivity is considered one of the main polygenic traits, crops are mainly grown for their productivity.

The task of the breeder is to increase the productivity of the variety. Therefore, individual selection aimed at productivity in heterogeneous populations should be carried out according to indicators with strong genetic transmission ability and low (low) possibility of modification variation from generation to generation.

These indicators are: plant height, length of joint intervals, number of joints in the main (head) stem, number of seeds in a pod, weight of 1000 seeds and yield index.

For selection, it is necessary to form the initial forms, select and create new varieties in uniform growing conditions. In hybridization, a highly differentiated indicator in one of the parent forms should be supplemented by an average development of this indicator in the other.

Evaluation of the selection material should be carried out according to the set of signs, because the maximum manifestation of one indicator usually coincides with the minimum manifestation of the other.

Selection based on productivity should be carried out together depending on the location of the lower pods at an optimal height (15-17 cm) and resistance to rotting. This in turn greatly reduced crop spillage during harvesting.

According to the data in Table 1, the results of the analysis showed that the number of pods per plant among the samples of the introduced variety was the highest in SN30(-969), which was 128.4 pieces. Relatively high results were also observed in samples of SN7(-014), SN28(-268) and US-44 (-641) varieties, which were 117.3, 114.4, and 105, respectively.

The highest result of the trait from F2 plants obtained by pair hybridization was 133.3 units and was shown in combination F2SN11(-018) x SN30(-969). F2SN27(-266) x SN30(-969) and F2SN28(-268) x SN30(-969) combinations also showed relatively high results, with results equal to 129.4 units and 121.8 units. In these combinations, h2=7.07 and h2=0.76, respectively, it was noted that the heritability of the number of pods per plant was positive, while in other combinations it was negative.

According to the data of Table 1, the number of pods per plant in samples of the introduced variety from South Korea ranged from 73.9 (US-25(-622)) to 128.8 (SN30(-969)) units. So, it was shown that among the samples of the introduced variety, SN30(-969) had the highest character index. Among them, relatively high results are SN7(-14), SN28(-268) and US-

It was observed in 44 (-641) variety samples and amounted to 117.7 units, 114.7 units and 105.5 units, respectively.

In F3 plants, the number of pods per plant was from 74.3 (F3US-25(-622) x SN30(-969)) to 133.6 (F3SN11(-018) x SN30(-969)) units. Relatively high results for the character were observed in combinations F3SN28(-268) x SN30(-969), F3KO20 x SN30(-969), F3US-44 (-641) x SN30(-969) and F3KO18 x SN30(-969) and corresponding were 120.4 units, 114.8 units, 111.6 units and 110.7 units, respectively. The highest level of heritability was observed in the combination

SN27(-266) x SN30(-969) h2=7.53, relatively high heritability was observed in the combination SN28(-268) x SN30(-969) and was h2=2.09.

1-table Variation in the number of pods per plant in F2-F3 soybean plants

№	Parental forms	The number of pods per plant, pcs				The number of pods per plant, pcs			
		M±m	σ	V, %	h^2	M±m	σ	V, %	h^2
1	2	3	4	5	6	7	8	9	10
1	CH27(-266)	107,8±1,78	3,56	3,30		108,2±1,18	2,36	2,18	
2	CH28(-268)	114,4±1,43	2,86	2,50		114,7±1,20	2,41	2,10	
3	CH3(-008)	80,1±1,48	2,96	3,69		80,8±1,13	2,27	2,81	
4	CH7(-014)	117,3±1,25	2,51	2,14		117,7±1,22	2,45	2,08	
5	CH11(-018)	88,0±1,39	2,78	3,16		88,4±1,16	2,32	2,63	
6	CH30(-969)	128,4±1,39	2,79	2,17		128,8±1,39	2,79	2,16	
7	US-25(-622)	73,6±1,45	2,91	3,95		73,9±1,12	2,25	3,04	
8	US-14(-382)	83,1±1,43	2,87	3,45		83,4±1,15	2,30	2,76	
9	US-44 (-641)	105,0±1,62	3,25	3,10		105,5±1,16	2,33	2,21	
10	US-80 (-699)	95,6±1,55	3,11	3,25		95,9±1,17	2,35	2,45	
11	US-82 (-701)	82,5±1,55	3,10	3,76		82,8±1,14	2,28	2,76	
12	K 09 (339)	63,8±1,50	3,01	4,72		64,1±1,03	2,06	3,21	
13	KO20	76,7±1,48	2,97	3,87		76,9±1,12	2,24	2,91	
14	KO3(-214)	77,0±1,79	3,59	4,66		77,2±1,13	2,26	2,93	
15	KO21(RR-1)	63,9±1,18	2,36	3,70		64,2±1,03	2,07	3,22	
16	KO18	75,4±1,11	2,23	2,95		75,7±1,11	2,22	2,94	
Hybrid combinations		F_2 plants				F_3 plants			
17	CH27(-266) x CH30(-969)	129,4±1,88	3,77	2,91	7,07	129,8±1,79	3,59	2,77	7,53
18	CH28(-268) x CH30(-969)	121,8±1,56	3,13	2,57	0,76	120,4±1,68	3,36	2,79	2,09
19	CH3(-008) x CH30(-969)	89,4±1,53	3,07	3,43	-1,25	89,7±1,42	2,84	3,16	-1,15
20	CH7(-014) x CH30(-969)	98,9±1,58	3,17	3,20	-1,76	99,3±1,45	2,91	2,93	-2,32
21	CH11(-018) x CH30(-969)	133,3±1,76	3,52	2,64	-2,57	133,6±1,82	3,65	2,73	-1,63
22	US-25(-622) x CH30(-969)	73,9±1,58	3,17	4,28	-5,30	74,3±1,32	2,64	3,56	-5,23
23	US-14(-382) x CH30(-969)	84,9±1,77	3,55	4,18	-4,12	85,3±1,39	2,78	3,26	-4,84
24	US-44 (-641) x CH30(-969)	111,2±1,65	3,30	2,96	-6,48	111,6±1,58	3,17	2,84	-5,66
25	US-80 (-699) x CH30(-969)	97,5±1,82	3,65	3,74	-7,54	97,9±1,44	2,88	2,94	-7,44
26	US-82 (-701) x CH30(-969)	78,9±1,69	3,38	4,28	-6,99	79,3±1,37	2,75	3,46	-6,67
27	K 09 (339) x CH30(-969)	89,9±1,85	3,70	4,11	-5,79	90,3±1,44	2,89	3,19	-5,95
28	KO20 x CH30(-969)	114,5±1,79	3,58	3,13	-7,86	114,8±1,60	3,20	2,79	-7,47
29	KO3 (-214) x CH30(-969)	80,6±1,77	3,54	4,39	-8,35	80,9±1,35	2,71	3,35	-7,44
30	KO21(RR-1) x CH30(-969)	83,4±1,75	3,50	4,20	-4,9	83,7±1,37	2,75	3,29	-5,65
31	KO18 x CH30(-969)	110,4±1,71	3,43	3,10	-6,09	110,7±1,57	3,14	2,84	-6,48

Negative heritability was noted in the remaining combinations. It should be noted that SN30(-969) variety sample and F3SN27(-266) x SN30(-969) and F3SN28(-268) x SN30(-969) hybrid combinations in terms of the number of pods per plant it was noted that it is superior in terms of sign.

The next main yield factor was seed weight per plant, which ranged from 12.4 g (SN3(-008) to 44.5 g (SN7(-014)) in parental forms (Table 6.25). indicators were recorded in combinations of SN28(-268) (35 g) and SN30(-969) (30 g).

The results of the analysis of the variation of seed weight per plant in F2 plants showed that the samples of the variety introduced from South Korea showed values ranging from 12.4 g (SN3(-008)) to 44.5 g (SN7(-014)) (Fig. 2 table). compared to SN28(-268), US-80 (-699), SN30(-969), US-14(-382), SN11(-018), US-82 (-701) and KO3(-214) high results are noted, respectively It was 35 g, 27.5 g, 25.3 g, 25.2 g, 25.2 g and 24.8 g.

In F2 plants, seed weight per plant ranged from 16.7 g (F2SN3(-008) x SN30(-969)) to 29.1 g (F2KO18 x SN30(-969)). Seed weight per plant ranged from 23.1 (F2US-80 (-699) x SN30(-969), F2SN27(-266) x SN30(-969)) to 28.1 g F2US-44 (-641) x F2US-44 (-641) x SN30(-969)) in most combinations. It was shown to be up to SN30(-969). The highest level of heritability is h2 =0.41 in the hybrid combination F2 US-80 (-699) x SN30(-969), in the hybrid combination F2KO18 x SN30(-969), h2 =0.21 F2SN27(-266) x SN30(-969) hybrid combination h2 =0.20 was observed.

It was noted that the seed weight per plant was 12.7 g (SN3(-008) to 44.7 g (SN7(-014)) in parental forms, and the indicator was above 21 g mostly in samples of this variety (5.27- table). The variation of seed weight per plant in F3 plants was from 17.2 g to 28.5 g. In these hybrid combinations, it was shown that the values for the character were mostly between 20.3 g and 27.5 g.

Therefore, positive results were observed in the combination of F3 US-44 (-641) x SN30(-969) and F3SN11(-018) x SN30(-969) from the variety sample SN7(-014) in terms of seed weight per plant. In the soybean plant, the location of the lower pods is considered one of the main productivity components, and the location of the lower pods at an acceptable height, i.e. up to 12-16 cm, explains the suitability of mechanization and wastage during harvesting, which ultimately creates the basis for an abundant harvest.

Therefore, a high number of seeds per plant is observed in the SN30(-969) variety introduced from South Korea and in the F3 SN11(-018) x SN30(-969) hybrid combination, and it is appropriate to use them in genetic selection studies.

2-table Variation of seed weight per plant in soybean F2-F3 plants

№	Parental forms	seed weight per plant, grams				seed weight per plant, grams			
		M±m	σ	V, %	h^2	M±m	σ	V, %	h^2
1	2	3	4	5	6	7	8	9	10
1	CH27(-266)	14,3±0,28	0,56	3,97		14,7±0,34	0,69	4,68	
2	CH28(-268)	35±0,39	0,79	2,27		35,1±0,45	0,91	2,60	
3	CH3(-008)	12,4±0,23	0,47	3,84		12,7±0,29	0,59	4,68	
4	CH7(-014)	44,5±0,50	1,01	2,28		44,7±0,58	1,16	2,60	
5	CH11(-018)	25,2±0,49	0,98	3,90		25,4±0,44	0,88	3,49	
6	CH30(-969)	30,1±0,41	0,82	2,75		30,2±0,42	0,85	2,83	
7	US-25(-622)	21,0±0,33	0,66	3,16		21,4±0,36	0,72	3,37	
8	US-14(-382)	25,3±0,43	0,86	3,40		25,5±0,44	0,89	3,51	
9	US-44 (-641)	19,9±0,37	0,75	3,79		20,3±0,43	0,87	4,29	
10	US-80 (-699)	27,5±0,45	0,91	3,31		27,8±0,45	0,91	3,30	
11	US-82 (-701)	25,2±0,48	0,96	3,82		25,5±0,43	0,87	3,43	
12	K 09 (339)	21,8±0,44	0,89	4,10		22,1±0,41	0,82	3,74	
13	KO20	21,9±0,49	0,99	4,54		22,3±0,42	0,84	3,76	
14	KO3(-214)	24,8±0,32	0,64	2,58		25,1±0,43	0,87	3,48	
15	KO21(RR-1)	19,5±0,32	0,65	3,36		19,8±0,36	0,73	3,69	
16	KO18	21,6±0,42	0,85	3,94		21,9±0,39	0,78	3,57	
Hybrid combinations		F_2 plants				F_3 plants			
17	CH27(-266) x CH30(-969)	23,1±0,49	0,99	4,27	0,20	23,5±0,40	0,80	3,41	-0,02
18	CH28(-268) x CH30(-969)	24,9±0,30	0,60	2,40	-0,19	25,3±0,44	0,88	3,49	-0,07
19	CH3(-008) x CH30(-969)	16,7±0,39	0,78	4,67	0,14	17,2±0,31	0,62	3,60	-0,01
20	CH7(-014) x CH30(-969)	17,4±0,39	0,78	4,53	-0,05	17,8±0,33	0,67	3,7	0,15
21	CH11(-018) x CH30(-969)	27,0±0,44	0,88	3,28	-0,12	27,5±0,45	0,91	3,32	-0,06
22	US-25(-622) x CH30(-969)	24,6±0,35	0,70	2,87	-0,10	24,9±0,42	0,84	3,40	-0,01
23	US-14(-382) x CH30(-969)	24,7±0,40	0,80	3,25	-0,06	25,3±0,43	0,86	3,43	-0,02
24	US-44 (-641) x CH30(-969)	28,1±0,37	0,74	2,63	-0,03	28,5±0,46	0,92	3,22	0,09
25	US-80 (-699) x CH30(-969)	23,1±0,57	1,14	4,94	0,41	23,5±0,43	0,86	3,65	0,06
26	US-82 (-701) x CH30(-969)	24,9±0,37	0,75	3,02	-0,02	25,3±0,44	0,88	3,50	0,11
27	K 09 (339) x CH30(-969)	19,7±0,45	0,90	4,55	-0,02	20,3±0,41	0,83	4,12	-0,05
28	KO20 x CH30(-969)	17,4±0,42	0,84	4,82	-0,11	18,1±0,39	0,79	4,39	-0,11
29	KO3 (-214) x CH30(-969)	23,6±0,37	0,74	3,15	0,01	23,9±0,41	0,83	3,49	0,02
30	KO21(RR-1) x CH30(-969)	24,6±0,43	0,87	3,54	0,15	25,2±0,43	0,87	3,45	0,13
31	KO18 x CH30(-969)	29,1±0,49	0,98	3,36	0,21	29,1±0,46	0,93	3,19	0,17

CONCLUSIONS

1. Among the samples of the introduced variety, the highest results for the number of pods per plant were 128.4-128.8 pieces in the SN30(-969) variety sample. The highest result of the trait from F2 plants obtained by pair hybridization was 133.3 units and was shown in combination F2SN11(-018) x SN30(-969). F2SN27(-266) x SN30(-969) and F2SN28(-268) x SN30(-969) combinations also showed relatively high results, with results equal to 129.4 units and 121.8 units. F3SN27(-266) x SN30(-969) and F3SN28(-268) x SN30(-969) showed superior results. Among F2 and F3 plants according to the trait, positive heritability was noted only in SN27(-266) x SN30(-969) and SN28(-268) x SN30(-969) combinations (h2 =7.07 and h2 =0.76, respectively ; h2 =7.53 and h2 =2.09).

2. The seed weight per plant was 44.7 g among parental forms SN7(-014). According to the sign, it was noted that the indicator was higher than 21 g in samples of this variety. Among the F2 plants, the highest result was observed in the F2KO18 x SN30(-969) combination, 29.1 g, and 29.3 g in the F3 KO18 x SN30(-969) combination. So, over the years, a sign-wise advantage was noted in this combination. Seed weight per plant among F2 plants SN27(-266) x SN30(-969) (h2 =0.20), KO3 (-214) x SN30(-969) (h2 =0.01), KO21(RR- 1) x SN30(-969) (h2 =0.15) and KO18 x SN30(-969) (h2 =0.21), F3 plants SN7(-014) x SN30(-969) (h2 =0.15), KO3 (-214) x SN30(-969) (h2 =0.02), KO21(RR-1) x SN30(-969) (h2 =0.13) and KO18 x SN30(-969) (h2 =0.02) positive heritability was observed.

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