TRANSMISSION OF "THE WEIGHT OF 50KERNELS" TRAIT TO HYBRID DESCENDANTS OF ALMONDS

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Abstract

Hybrids showing values of 'the weight of 50 kernels' higher than those of their genitors can be found especially in the Texas x Pollen mixture combination with 38.70%, Texas x Mari de stepă with 42.22%, Texas x Tétényi bőtermő with 50% and Primorski x Tétényi bőtermő with 26.92%. Consequently, the F1 hybrid generation, having heterozygous genitors, shows percentages of segregation that are conditioned by the interaction of the genotypes involved, determining the emergence of a number of hybrids from each combination that can be successfully used in the genetic enhancement process.

Key words: hybrid, weight of 50 kernels, genotype.

INTRODUCTION

At the outset, more than 147 cultivars and hybrids were taken into consideration in order to establish and select the best genitors employed in the enhancement processes. (Şcheau V.,1998),(Branişte N. et al.,2006), (Şcheau V. et al.,2006),(Şcheau V.,1990),(Roman R. et al.,1999),(Şcheau V. et al.,1997),(Şcheau V. et al.),(Şcheau V. et al., 1996),(Şcheau V. et al., 1994),(Şcheau V.,1989).

After obtaining the hybrids and planting them at 4/1 m and 5/1 m, the field and hybrids were maintained normally for three years. Beginning with the 4th year since they were planted, two of the hybrid lots, having 1,274 and 647 individuals, were surveyed regarding 10 traits in order to establish the manner in which these traits are inherited by the hybrid descendants (Gîtea M. et al.,2010),(Gîtea M. et al.,2010),(Şcheau V. et al.,2010,(Şcheau Al. et al.,2010),(Gîtea M. et al.,2004),(Şcheau V. et al.,2002),(Şcheau V. et al., 2002),(Şcheau V. et al, 2002),(Şcheau V. et al., 2001),(Şcheau V. et al., 2001),(Şcheau V., 2001),(Şcheau V., 2001),(Şcheau V. et al., 2000),.

MATERIAL AND METHOD

The hybrids were obtained in 2004 at SCDP Oradea and the research was carried out in the year 4 and 7 from planting. The material for the study consists of 333 almond hybrids; the manner in which they transmit to descendants "the weight of 50 kernels" trait was monitored. The Texas and Primorski cultivars were used as maternal genitors in the crossings.

The data was statistically processed, the standard deviation and the coefficient of variability also being calculated, using the method of variance analysis.

RESULTS AND DISSCUSIONS

Table 1 presents "the weight of 50 kernels" trait in almond genotypes and hybrids for the two series of crossings.

Regarding the Texas series of crossings, the number of hybrids varies from 4 for Texas x Tétényi bőtermő to 62 for Texas x Pollen mixture, whereas in the case of the Primorski series, from 17 for Primorski x Saucaret to 52 for Primorski x Tétényi bőtermő. Only one combination, Primorski x Tétényi bőtermő, revealed a hybrids average of 55.63 g, thus higher than the average of genitors, which was 52.5 g.

The standard deviation for the Texas series of crossings ranges from 8.3 for Texas x Tétényi bőtermő to 14.2 for Texas x Pollen Mixture, whereas for the Primorski series the values range from 7.6 for Primorski x Texas to 13.6 for Primorski x Tétényi bőtermő.

When it comes to the Texas series, the Texas x Tétényi bőtermő, Texas x Nikitski 62, Texas x Saucaret and Texas x H1/9-1fa crossings have coefficients of variability between 14.9, 17.0, 17.9 and 19.7, which classify them as variable within medium limits, while Texas x Mari de stepă, Texas x Preanâi and Texas x Pollen mixture, with 20.1, 24.7 and 28.4, fall into the category of variable within admissible limits.

Regarding the Primorski series of crossings, except for the Primorski x Texas combination, which had a coefficient of variability of 16.3, that is to say variable within medium limits, all the other crossings have values between 20.6 and 26.3, which means extremely variable individuals, within admissible limits.

In the case of the Texas series, the hybrids with a higher "weight of 50 kernels" value than their genitors can be found particularly in the Texas x Pollen mixture with 38.7%, Texas x Mari de stepă with 42.22%, Texas x Tétényi bőtermő with 50%, as for the Primorski series, the Primorski x Mari de stepă with 25% and Primorski x Tétényi bőtermő with 26.92% must be mentioned.

Table 1

The weight of 50 kernels in almond genotypes and hybrids (average values for 3 years)

Nr. Crt.	Hybrid crossing	No. of analyzed hybrids (items)	Genitors' average (g)	Hybrids' average (g)	Standard deviation (s)	Coefficient of variability (s%)	Hybrid limits (g)	Hybrids with higher values than genitors (%)
1	Texas x Amestec Polen	62	53.24	50.08	14.2	28.4	17.3 – 82.0	38.70
2	Texas x Nikitski 62	19	64.31	47.49	8.1	17.0	32.6 – 61.9	0.00
3	Texas x H1/9-1fa	43	52.61	43.56	8.6	19.7	30.4 – 72.3	4.65
4	Texas x Mari de Stepa	45	59.60	55.30	11.1	20.1	28.6 – 73.7	42.22
5	Texas x Preanai	24	59.13	52.47	13.0	24.7	25.0 – 81.5	25.00
6	Texas x Tetenyi Botermo	4	52.5	55.63	8.3	14.9	50.0 – 66.7	50.00
7	Texas x Saucaret	12	64.52	61.43	11.0	17.9	45.0 – 84.7	14.00
8	Primorski x Texas	23	56.15	46.53	7.6	16.3	35.5 – 62.6	17.39
9	Primorski x Saucaret	17	70.17	52.91	12.4	23.4	24.0 – 75.0	5.88
10	Primorski x Mari de Stepa	32	65.25	57.21	11.8	20.6	27.5 – 75.0	25.00
11	Primorski x Tetenyi Botermo	52	58.16	51.56	13.6	26.3	32.5 – 94.0	26.92
	Average (Mt.)	-	59.60	52.20	-	-	-	-

Table 2 presents the comparative results regarding "the weight of 50 kernels" in almond genotypes and hybrids.

Taking into account the averages of genitors, in the case of the Texas series of crossings, Texas x H1/9-1fa and Texas x Tétényi bőtermő are statistically negative and significant, whereas in the Primorski series, the Primorski x Saucaret is positive, distinctly significant.

Considering the averages of the genitors in the Texas series of crossings, the Texas x H1/9-1fa combination is negative and Texas x Saucaret is statistically positive and distinctly significant.

Table 2

Comparative results regarding the weight of 50 kernels in almond genotypes and hybrids (average values for 3 years)

Nr. Crt.	Hybrid combination	X genitors		±d (%)	Significance	X hybrids		±d (%)	Significance
		g	%			g	%		
1	Texas x Amestec Polen	53.24	89.3	-6.36	-	50.08	95.5	-2.12	-
2	Texas x Nikitski 62	64.31	107.9	+4.71	-	47.49	91.0	-4.73	-
3	Texas x H1/9-1fa	52.61	88.3	-6.99	o	43.56	83.4	-8.64	oo
4	Texas x Mari de Stepa	59.60	100.0	0.00	-	55.30	105.9	+3.10	-
5	Texas x Preanai	59.13	99.2	-0.47	-	52.47	100.5	+0.27	-
6	Texas x Tetenyi Botermo	52.5	88.1	-7.10	o	55.63	106.6	+3.43	-
7	Texas x Saucaret	64.52	108.3	+4.91	-	61.43	117.7	+9.23	xx
8	Primorski x Texas	56.15	94.2	-0.45	-	46.53	89.1	-5.67	-
9	Primorski x Saucaret	70.17	117.7	+10.57	xx	52.91	101.4	+0.71	-
10	Primorski x Mari de Stepa	65.25	109.5	+5.65	-	57.21	109.6	+5.01	-
11	Primorski x Tetenyi Botermo	58.16	97.6	-1.44	-	51.56	98.8	-0.64	-
12	Average (Mt.)	59.6	100.0	0.00	-	52.20	100.0	0.00	-
				LSD $_{5\%}$ = 6.54				LSD $_{5\%}$ = 5.73	
				LSD $_{1\%}$ = 8.60				LSD $_{1\%}$ = 7.54	
				LSD $_{0,1\%}$ = 11.02				LSD $_{0.1\%}$ = 9.66	

Figure 1 presents the polynomial correlation between the average of genitors x the average of hybrids regarding "the weight of 50 kernels", without taking into account the number of hybrids, with a coefficient r^2=0.2088***, which is statistically very significant.

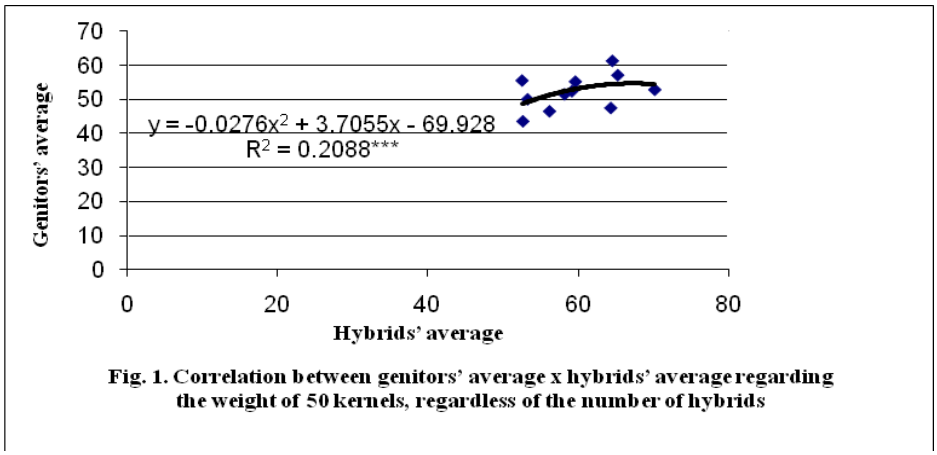

Fig. 1. Correlation between genitors' average x hybrids' average regarding the weight of 50 kernels, regardless of the number of hybrids

Figure 2 presents the polynomial correlation between the average of genitors x the average of hybrids regarding "the weight of 50 kernels", taking into account the number of hybrids, with a coefficient $r^2=0.1567^{xx}$, which is statistically ensured as distinctly significant.

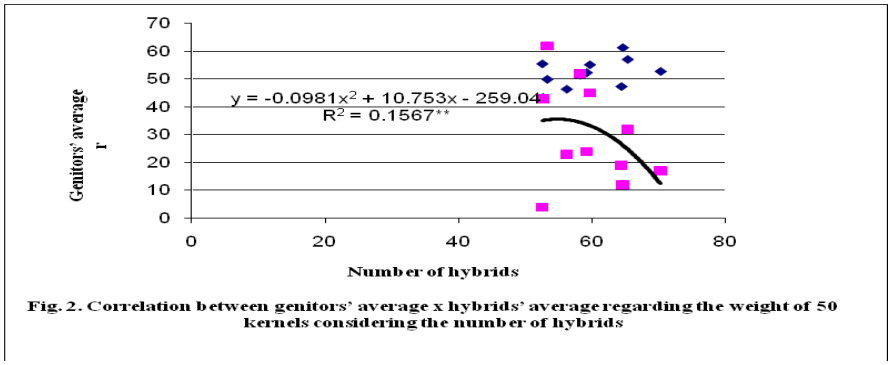

Fig. 2. Correlation between genitors' average x hybrids' average regarding the weight of 50 kernels considering the number of hybrids

CONCLUSIONS

Out of the 11 hybrid combinations, the average of the hybrids was higher than the average of genitors only in the Texas x Tétényi bőtermő combination, specifically 55.63 g compared to 52.5 g.

Hybrids having "the weight of 50 kernels" values higher than their genitors can be found in the Texas x Pollen Mixture combination with 38.7%, Texas x Mari de stepă with 42.22%, Texas x Tétényi bőtermő with 50% and Primorski x Tétényi bőtermő with 26.92%, creating percentages of segregation and generating hybrids which can be used in the enhancement process.

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