TRANSMISSION OF THE DOUBLE KERNEL TRAIT TO HYBRID DESCENDANTS OF ALMONDS

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Abstract

The Texas cultivar, used as maternal genitor, transmits the trait of double kernels to its hybrid generations. The most successful combinations, in which 80% of the hybrids do not have double kernels, are Primorski x Tétényi bőtermő and Texas x Saucaret.

Key words: genitor, hybrid, double kernels.

INTRODUCTION

Double kernels, which are considered a flaw of almond fruit, are passed on differently from the genitors that have this trait (Grasselly Ch., 1972; Şcheau V., 1998), partly due to low temperatures during flowering.

MATERIAL AND METHODS

In 2003, crossings were performed, having the Texas and Primorski cultivars as maternal parents.

The hybrid seed was tiered during a cold patch, in November, and it was planted in pots in March 2004. In June, the hybrids were planted in the field at 5/1 m.

During the first three years, traditional maintenance treatments were performed, and from 2008 to 2010 the percentage of double kernels was determined on samples of 50 pieces of fruit based on hybrid combinations and genitors.

RESULTS AND DISCUSSION

Table 1 presents double kernel figures of almond genotypes and hybrids. The standard deviation for the Texas series of crossings shows values ranging from 0.22 for Texas x H1/9 – 1fa and 2.80 for Texas x Preanâi. The coefficients of variability of 13.9 for Texas x Nikitski 62, 10.5 for and Texas x H1/9 – 1fa, 15.3 for Texas x Mari de stepă, classify the hybrids as variable within medium limits, whereas values of 23.2 for Texas x pollen mixture, 24.8 Texas x Preanâi, 21.8 Texas x Tétényi bőtermő and 20.1 Texas x Saucaret catalog them as very variable within admissible limits.

Table 1

Double kernels in almond genotypes and hybrids
(average values for 3 years)

Nr. Crt.	Combination	No. of analyzed hybrids (items)	Genitors' average (%)	Hybrids' average (%)	Standard deviation (s)	Coefficient of variability (s^2)	Hybrid limits	Hybrids without double kernels (%)
1	Texas x Amestec polen (Tétényi Bötermö + H 1/ 9-1 fa)	43	3.07	3.53	0.82	23.2	0.0-53.6	79.07
2	Texas x Nikitski 62	10	5.35	3.03	0.42	13.9	0.0-17.4	70.00
3	Texas x H 1 / 9-1 fa	27	4.60	2.10	0.22	10.5	0.0-8.0	70.37
4	Texas x Mari de stepă	31	4.10	4.18	0.64	15.3	0.0-24.3	67.74
5	Texas x Preanâi	11	11.95	11.27	2.80	24.8	0.0-52.9	36.36
6	Texas x Tétényi Bötermö	3	3.85	12.50	2.72	21.80	0.0-37.5	66.66
7	Texas x Saucaret	5	3.95	8.03	1.62	2.01	0.0-39.7	80.00
8	Primorski x Texas	9	4.95	8.68	2.13	24.5	0.0-50.0	44.44
9	Primorski x Saucaret	6	4.20	7.12	0.92	12.9	0.0-14.2	33.33
10	Primorski x Mari de stepă	19	1.35	2.70	0.32	11.9	0.0-13.8	63.16
11	Primorski x Tétényi Bötermö	35	1.10	0.91	0.11	12.1	0.0-12.3	80.00
12	Media	199	4.13	5.82	-	-	-	-

The standard deviation for the series of crossings with Primorski varies from 0.11 for Primorski x Tétényi bőtermő to 2.13 for Primorski x Texas.

For three of the combinations, Primorski x Saucaret, Primorski x Mari de stepă and Primorski x Tétényi bőtermő, the hybrids are variable within medium limits, and for Primorski x Texas, they are very variable within admissible limits.

Table 2 presents some comparative results regarding double kernels in almond genotypes and hybrids.

Compared to the average of the combinations, that is 4.13%, the genitors' averages are statistically ensured as distinctly significantly positive for Primorski x Texas, very significant for Texas x Nikitski 62 and Texas x Preanâi and very significant negative for Texas x pollen mixture, Primorski x Saucaret, Primorski x Mari de stepă and Primorski x Tétényi bőtermő.

Table 2

Comparative results regarding double kernels in almond genotypes and hybrids
(average values for 3 years)

Nr. crt.	Hybrid combination	$\overline{X}$ genitors		±d (grades)	Signifi cance	$\overline{X}$ hybrids		±d (grades)	Signifi cance
		grades	%			grades	%		
1	Texas x Amestec polen (Tétényi Bötermö + H 1/ 9-1 fa)	3.07	74.3	-1.06	ooo	3.53	60.7	-2.29	ooo
2	Texas x Nikitski 62	5.35	129.5	+1.22	xxx	3.03	52.1	-2.78	ooo
3	Texas x H 1 / 9-1 fa	4.60	111.4	+0.47	-	2.10	36.1	-3.72	ooo
4	Texas x Mari de stepă	4.10	99.3	-0.03	-	4.18	71.8	-1.64	ooo
5	Texas x Preanâi	11.95	289.3	+7.82	xxx	11.27	201.4	+5.90	xxx
6	Texas x Tétényi Bötermö	3.85	93.2	-0.28	-	12.50	214.8	+6.68	xxx
7	Texas x Saucaret	3.95	95.6	-0.18	-	8.03	138.0	+2.21	xxx
8	Primorski x Texas	4.95	119.9	+0.82	xx	8.68	149.10	+2.86	xxx
9	Primorski x Saucaret	1.20	29.10	-2.93	ooo	7.12	122.3	+1.30	xx
10	Primorski x Mari de stepă	1.35	32.70	-2.78	ooo	2.70	46.4	-3.12	ooo
11	Primorski x Tétényi Bötermö	1.10	26.6	-3.03	ooo	0.91	15.5	-4.91	ooo
12	Media	4.13	100.0	-	-	5.82	100.0	-	-
				DL 5%=0.33 DL 1%=0.47 DL 0.1%=0.67				DL 5%=0.42 DL 1%=0.59 DL 0.1%=0.84	

Compared to the hybrids' average, which is 5.82%, the averages of hybrids are statistically ensured as positive, distinctly significant for Primorski x Saucaret and very significant for Texas x Preanâi, Texas x Primorski x Tétényi bőtermő, Texas x Saucaret and Primorski x Texas, and very significantly negative for all the other crossings.

There are correlations between the hybrids' and genitors' averages, but statistically ensured as significantly positive, only when the number of hybrids is not taken into consideration.

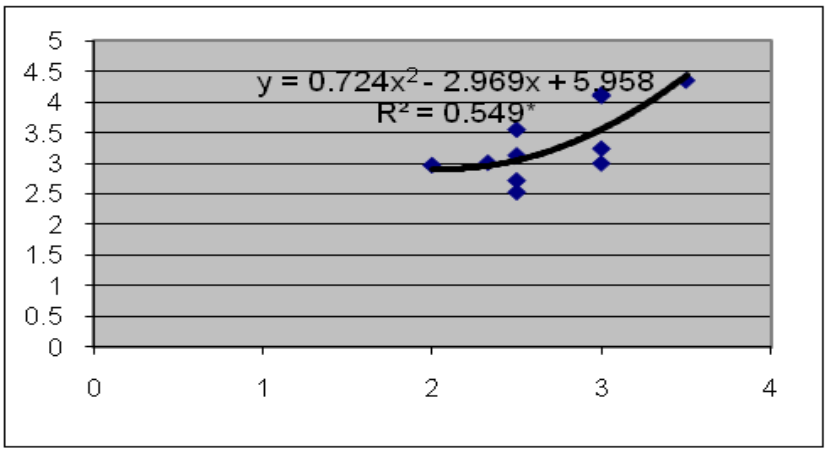

Fig. 1 Correlation between average of hybrids x average of genitors regardless of the number of hybrids (x and y).

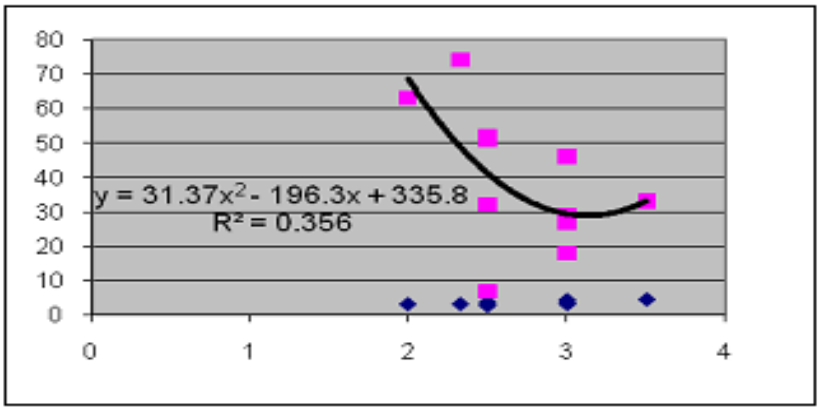

Fig. 2 Correlation between average of hybrids x average of genitors considering the number of hybrids (x, y and z).

CONCLUSIONS

Generally, the Texas cultivar used as maternal parent leads to descendants that have double kernels.

The most successful combinations, in which 80% of the hybrids do not have double kernels, are Primorski x Tétényi bőtermő and Texas x Saucaret.

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