

TRANSMISSION OF FRUIT WEIGHT TO HYBRID DESCENDANTS OF ALMONDS

Gîtea Manuel*, Șcheau Viorel, Șcheau Alexandru

**University of Oradea, Faculty of Environmental Protection, 26 Gen. Magheru St., 410048 Oradea;*

Abstract

The study was conducted on 352 hybrids belonging to 11 combinations. An exceptional breed for the transmission of fruit weight to descendants is Mari de stepă

Key words: genotypes, hybrids, fruit weight

INTRODUCTION

Most breeds that exist in the assortments of important almond cultivating countries have a weight of the fruit ranging between 2.5 – 3.5 and 4g (Garcia J.E., Godini A., 1997).

Given that productivity is a “refractory” trait in the transmission to the first hybrid generation, more significant productions can be obtained through the increase in the weight of the fruit, which is a much more variable trait in hybrid offspring (Yadrov A.A. 1997, Șcheau V., 2007).

Even in countries with long traditions in cultivating almonds (Felipe A.J. 1976, Grassely Ch. 1980), the productivity of the breeds is the main subject for improvement.

MATERIAL AND METHODS

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

In the spring of 2004, the hybrids were planted in plastic flower pots, and then, in June, in the field at 5/1 m. During the first three years, normal culture treatments were performed, whereas during the following three years, systematic studies were conducted in order to establish fruit weight for the 352 hybrids.

The number of hybrids per combination varied from 5 for the Texas x Tétényi bőtermő combination to 62 for the Texas x pollen mixture and Primorski x Tétényi bőtermő combinations.

RESULTS AND DISCUSSION

Table 1 presents fruit weight of almond genotypes and hybrids. For five of the hybrid combinations, Texas x pollen mixture, Texas x Nikitski 62, Texas x Preanăi, Texas x Tétényi bőtermő and Texas x Saucaret, the coefficients of variability have values ranging from 10.1 to 17.0, thus being variable within medium limits, while for the other six combinations, the hybrids are very variable within admissible limits.

Table 1

Fruit weight in almond genotypes and hybrids(average values for 3 years)

No	Combination	No. of analyzed hybrids	Average of genitors (g)	Average of hybrids (g)	Standard deviation (s)	Coefficient of variability (s%)	Hybrid limits (g)	Hybrids with greater weights than their genitors
1.	Texas x Polen mixture (Tétény Bötermö + H 1/ 9-1 fa)	62	2.40	2,15	0.44	15.9	1.27-4.44	29.03
2.	Texas x Nikitski 62	19	2.80	2.37	0.47	17.0	1.33-4.38	10.53
3.	Texas x H 1 / 9-1 fa	44	2.45	2.60	0.61	22.1	1.35-4.93	45.45
4.	Texas x Mari de stepă	46	4.25	3.84	0.79	28.6	2.46-5.80	54.35
5.	Texas x Preanăi	26	2.60	2.06	0.32	11.6	1.42-3.23	7.69
6.	Texas x Tétényi Bötermö	5	2.40	2.40	0.28	10.1	1.93-3.70	60.00
7.	Texas x Saucaret	13	3.35	2.49	0.36	13.0	1.74-4.00	30.77
8.	Primorski x Texas	21	3.25	2.75	0.72	26.1	1.47-5.56	28.57
9.	Primorski x Saucaret	19	4.10	3.02	0.59	21.4	1.40-4.69	2.631
10.	Primorski x Mari de stepă	35	5.00	3.77	0.74	26.8	1.90-5.17	5.71
11.	Primorski x Tétényi Bötermö	62	3.15	2.88	0.58	21.0	1.20-4.63	33.87

Table 2 presents the comparative results regarding the fruit weight of almond genotypes and hybrids.

Concerning the series of crossings with the Texas cultivar, there was only one instance of increase, Texas x Mari de stepă with a 39.1% growth in the average of hybrids, being statistically ensured as very significant.

The series of crossings with the Primorski cultivar revealed that only the Primorski x Mari de stepă combination had a 36.6% increase, the average of hybrids being statistically ensured as very significant.

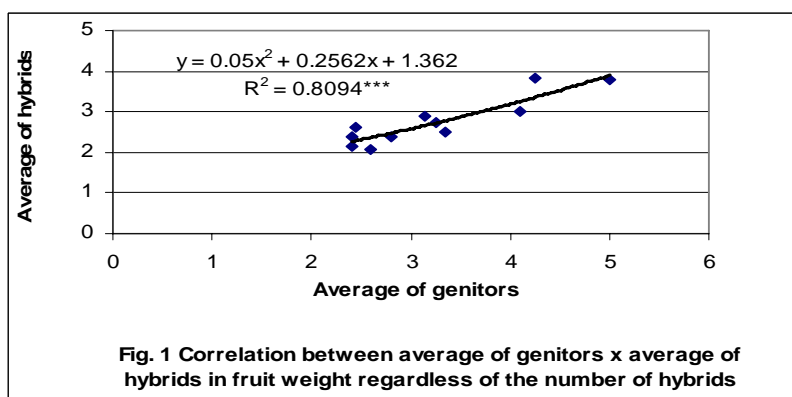
Figures 1 and 2 present the correlations between the averages of genitors x the average of hybrids, regardless or considering the number of hybrids.

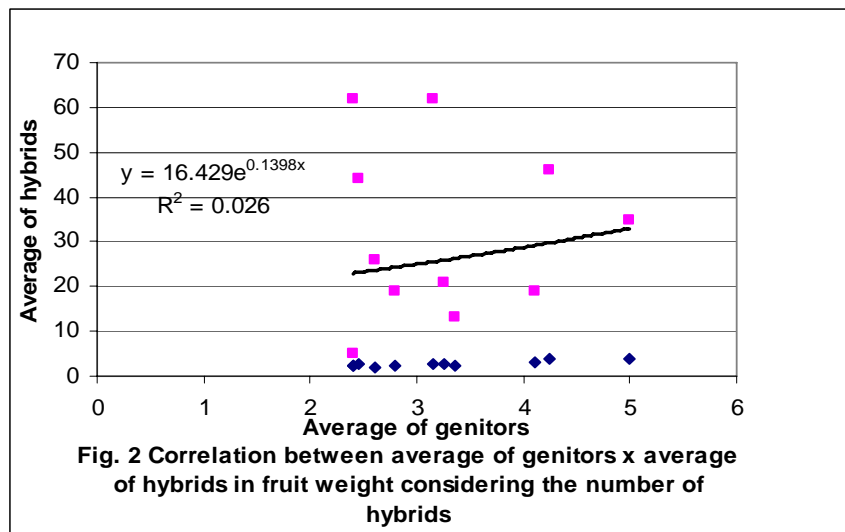
The correlation between the average of genitors x the average of hybrids (fig. 1) has a coefficient ($r^2=0.809^{***}$) which is statistically ensured as very significant; this means that the genitors' productivity is thoroughly transmitted to hybrid descendants.

Table 2

Comparative results regarding fruit weight in almond genotypes and hybrids
(average values for 3 years)

Nr	Combination	\bar{X} genitors		$\pm d$	s	\bar{X} hybrids		$\pm d$	s
		grades	%			grades	%		
1.	Texas x Polen mixture (Tétény Bötermő + H 1/9-1 fa)	2.4	73.8	-0.85	000	2.15	77.9	-0.61	00
2.	Texas x Nikitski 62	2.8	86.2	-0.45	0	2.37	85.9	-0.39	0
3.	Texas x H 1/9-1 fa	2.45	75.4	-0.80	000	2.60	94.2	-0.16	-
4.	Texas x Mari de stepă	4.25	130.8	+1.0	***	3.84	139.10	+1.08	***
5.	Texas x Preanăi	2.6	80.0	-0.65	00	2.06	74.6	-0.70	000
6.	Texas x Tétényi Bötermő	2.4	73.8	-0.85	000	2.40	87.0	-0.36	0
7.	Texas x Saucaret	3.35	103.1	+0.10	-	2.49	90.2	-0.27	-
8.	Primorski x Texas	3.25	100.0	-	-	2.75	99.6	-0.01	-
9.	Primorski x Saucaret	4.10	126.2	+0.85	***	3.02	109.4	+0.26	-
10.	Primorski x Mari de stepă	5.00	153.8	+1.75	***	3.77	136.6	+1.01	***
11.	Primorski x Tétényi Bötermő	3.15	96.9	-0.10	-	2.88	104.3	+0.12	-
12.	\bar{X} genitori - x \bar{X} hibridi	3.25	100.0	-	-	2.76	100.0	-	-

LSD $_{5\%}$ = 0.39LSD $_{1\%}$ = 0.55LSD $_{0.1\%}$ = 0.79LSD $_{5\%}$ = 0.33LSD $_{1\%}$ = 0.47LSD $_{0.1\%}$ = 0.67



CONCLUSIONS

The weight of a fruit, if it is significant enough, can influence production in proportion of 20-30%.

The Romanian Mari de stepă cultivar is an ideal genitor for the transmission of this trait, while the combinations Texas x Mari de stepă and Primorski x Mari de stepă produce the most hybrids with fruit weights over 5g.

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