

TRANSMISSION OF SEED MELLOWNESS IN INTERCULTIVAR CROSSES OF POMEGRANATE (*Punica granatum* L.)

A.R. KARALE¹, U.T. DESAI²

Department of Horticulture,
M.P.K.V., Rahuri

ABSTRACT

Variability with respect to seed mellowness in pomegranate was studied in the hybrid seedlings resulting from intercultivar crosses comprising 17 parents. The proportion of very soft to soft seeded hybrids ranged from 4.88 per cent to 44.86 per cent. The soft seeded female parent G-137 had the highest rate of transmission of seed mellowness. It has been suggested that parents are heterozygous for seed mellowness and there are modifying factors affecting seed mellowness, probably an interaction between parents which modify seed mellowness expression.

KEY WORDS: Pomegranate, Seed mellowness, Intercultivar, Cross-hybrids

Seed softness is the foremost important quality character in pomegranate. The hybridization to evolve soft seeded varieties/cultivars has been carried out in this crop both in temperate (Rozev, 1972) and tropical conditions (Anonymous, 1979). The present study was therefore taken up to find out the occurrence of soft seeded hybrids in intercultivar crosses of this crop.

MATERIALS AND METHODS

The parental material for investigation comprised of four female parents and 13 male parents selected on the basis of *per se* performance were crossed using Line X Tester model in 1989. Of the females, Ganesh and G-137 had soft seeds while Muscat series selections P-23 and P-26 had semi hard seeds. All the testers viz., No.5, No.31, No.61, No. 142, No. 177, No. 219, No. 242, No. 303, No. 377, No. 379, No. 382, No.408 and No. 462 had soft seeds. The resulted 718 F₁ hybrids along with their parents were planted in the main field at a distance of 90 x 90 cm, in the year 1991. All the parental cultivars and hybrid seedlings received uniform cultural practices throughout the period of their evaluation. The data were recorded during 1993 and 1994. The mellowness of seed was estimated by using the Tablet Hardness Tester, manufactured by M/s. Indian Equipment Company, Mumbai. For this purpose, seeds were oven dried at 70°C for 24 hrs to remove moisture. Then the hardness of 25 seeds was tested and based on mean values, mellowness was recorded. It was expressed as strength in kg/

cm² required to crush the individual seed. Five categories as follows were made :

Hardness value (kg/cm ²)	Mellowness of seed
<1.20	Very soft
1.21 - 175	Soft
1.76 - 2.25	Semi-hard
2.26 - 2.75	Hard
>2.75	Very hard

RESULTS AND DISCUSSION

The data regarding seed mellowness of the different hybrids (crosses) and their proportion in each type is presented in Table 1. The proportion of very soft to soft types ranged from 4.88 per cent to 44.86 per cent. The soft seeded female parent G-137 had the highest rate of transmission of seed mellowness. This was followed by Ganesh and P-26 which gave 43.68 and 41.35 per cent soft seeded hybrids respectively. The female parent P-23 had the lowest rate of transmission which gave 4.88 to 36.58 per cent very soft to soft seeded hybrids.

From these it would appear that the progeny of each crosses showed a continuous variation for seed mellowness with transgressive segregation and different parental combinations have different transmission rates for seed mellowness. The fact that proportion of soft seeded hybrids tended to increase in the crosses with every increase in the size of the population. The

Table 1. Classification of pomegranate hybrids for seed mellowness

Cross	Number and proportion of hybrids with seed mellowness				
	Very soft	Soft	Semi-hard	Hard	Very hard
Ganesh x All testers	38 (13.72)	121 (43.68)	59 (21.30)	32 (11.55)	27 (9.75)
G-137 x All testers	16 (8.65)	83 (44.86)	39 (21.08)	20 (10.82)	27 (14.59)
P-23 x All testers	6 (4.88)	45 (36.58)	36 (29.27)	16 (13.00)	20 (16.27)
P-26 x All testers	11 (8.27)	55 (41.35)	35 (26.32)	13 (9.77)	19 (14.29)
Total (9.86)	71 (42.34)	304 (23.54)	169 (11.28)	81 (12.95)	93

Figures in parenthesis indicate percentage of hybrids

maximum almost touching the theoretical ratio of 50% i.e. 9.86 per cent having only 71 hybrids to 42.34 per cent having 304 hybrids is suggestive of the heterozygosity of the female parents for seed mellowness. The variable proportion of very soft to soft seeded hybrids fail to suggest any simple gene action for seed mellowness in pomegranate. Similar findings have been reported by Sharma and Uppal (1978) while studying the segregation pattern of seedlessness in intercultivar crosses of grapes. Weinberger and Harman (1964) reported that the seeded female parents varied greatly in the transmission of seedlessness depending upon the particular pollen parent used. It was suggested that seedlessness may be a recessive character. According to Olmo (1969) seedlessness in grapes may be affected by the presence of modifier genes in the female parent and their number determines the number of stenospermocarpic seedlings in the progeny. Stout (1939) who obtained a 1:1 ration between seeded and seedless progeny, suggested a basic single allele relationship in which the seeded parent is homozygous recessive and seedlessness is heterozygous.

It appears from the present results that different parents have different transmission rates

for soft seededness. The wide variation in the degree of development of the very soft to soft seeds in hybrids indicates that there are various modifying factors affecting seed mellowness and probably there is an interaction between parents which modify seed mellowness expression.

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