Title Association of fruit traits and aril browning in pomegranate (*Punica granatum* L.)

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Citation Euphytica, 174, Number 1, 137-141, 2010

Keywords Aril colour; Internal breakdown of arils; Physiological disorder; Skin colour; Statistical model; TSS

Abstract

Pomegranate cultivation is one of the most attractive farming enterprises in the Indian arid tropics. However, the quality of the fruit is often severely affected by a physiological disorder called 'aril browning' in which a part or all the arils show discolouration (browning) and such fruits are unfit for consumption. This has become a serious concern to consumers, growers and researchers in the recent times. In order to understand the genotypic variation for aril browning and its association with other fruit traits, 158 progenies obtained by selfing two pomegranate multiple hybrids viz., {('Ganesh' × 'Kabul') × 'Yercaud'} × {('Ganesh' × 'Gulsha Rose Pink')-F_2} and {('Yercaud' × 'Jyothi') × ('Ganesh' × 'Gulsha Rose Pink')-F_2} × {('Ganesh' × 'Kabul') × 'Yercaud'} were studied. Because of heterozygous nature of the crop and diverse genetic base of parents, a wide array of recombinants were produced which were scored for aril browning, fruit skin colour, aril colour, total soluble solids (TSS) and seed mellowness. Results of Spearman's correlation analysis revealed that aril browning is inversely related with aril colour ($r = -0.41$). A statistical model constructed to study the reasons for the observed variation in aril browning showed that about 82.9% of it was accounted collectively by skin colour, aril colour, TSS and seed mellowness. Further, a refined model represented by Y (aril browning severity) = 0.78 − 0.52 X_1 (aril colour) + 0.23 X_2 (TSS) was found to contribute to 73.5% of the observed variability in aril browning with least error in prediction. Analysis of data further showed that every unit increase in intensity of aril colour amounted to decrease in severity of aril browning by 0.52 units. However, for every unit increase in TSS there was an increase of 0.23 units in severity of aril browning. Thus, with the increase in intensity of aril colour there was a reduction in severity of aril browning while with raise in TSS, aril browning incidence was higher, an association often not favourable in selection of desirable genotypes. The results of the present study suggested that while developing varieties free from aril browning it is important to strike a balance between aril colour and TSS level.

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