

Discrimination between citrus genotypes

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Discrimination between citrus genotypes

Summary

Isozyme analysis was used to distinguish between genotypes and explore relationships within the genus *Citrus*. Two experimental studies were conducted, the first concerned with the identification of zygotic (sexual) from nucellar (asexual) seedlings of five polyembryonic citrus rootstocks resulting from open pollination, and the second with identification of mandarin types and investigation of the relationships amongst them.

Eight isozyme systems of six enzymes were utilized in the first study. 2.1 % of the seedlings were determined to be zygotic in rough lemon, 2.6 % in trifoliata orange, and 0.8 % in each of sweet orange and Troyer citrange, but none in Cleopatra mandarin. There was no correlation between isozyme genotype and any morphological character of the seedlings. The zygotic seedlings detected isozymically were not always located at the micropylar end of the seed as has been suggested previously nor were they characterized by weak growth, or as the single seedling produced by a seed.

Nineteen isozyme systems of sixteen enzymes were employed in the second study to discriminate between mandarin cultivars, hybrids and selections. Variability was observed at 12 loci, and all but three mandarin types could be differentiated from one another. Two of those which could not be differentiated are probably identical genotypes. The reported parentage was confirmed for seven cultivars, and disproved for five, with the rest undetermined. Relatedness within the tangelo and the tangor groups was high, probably reflecting their recent origin. Relatedness within the common mandarin group was low reflecting their multiple origins and long period in cultivation. Exceptions were Algerian and Beauty of Glen Retreat which differed from each other at only one locus. Relatedness between groups was generally low, with the least relatedness between the tangelos and the other groups, probably due to the grapefruit parent of the former. The Ellendale cultivars formed a particularly cohesive group, but contained two genotypes differing in isozyme

pattern, but both marketed as Ellendale. Five of the Ellendale type cultivars probably arose by self-pollination or by mutation of Ellendale.

This study has shown that isozyme techniques can be used successfully not only to discriminate between zygotic and nucellar seedlings, but also to investigate the parentage and relatedness of the cultivars. It has also shown that increasing the number of isozyme systems employed increases the probability of discriminating genotypes.

DECLARATION

I hereby declare that the work presented in this thesis has been carried out by myself and does not incorporate any material previously submitted for another degree in any University. To the best of my knowledge and belief, it does not contain any material previously written or published by another person, except where due reference is made in the text.

Sumeru Ashari

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