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A Marker For Seedlessness In Kinnow Mandarin

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Citrus is the major fruit of Pakistan grown on 197,000 hectares which is 30.48% of total fruit area. The production is 1862,000 tonnes which is 29.35% of the total fruit production of which 95.0% *Citrus* is produced only in Punjab with the leading cultivar Kinnow mandarin grafted on rough lemon rootstock.

However, the other scion varieties of mandarins, sweet oranges, sweet lime, lemon, sour/Kaghzi lime, grape fruit, pummelo, hybrid *Citrus* cultivars and various rootstocks are also grown in province Punjab. In 1999-2000, Pakistan exported kinnow worth 750 million rupees. Kinnow is juicy and has excellent flavour with the dominant drawback of more seeds which may be 34 as maximum including fully developed seeds and aborted ovules. Kinnow mandarin cultivar is no more a clone, but highly variable because of lack of quality control over proper scion bud wood selection and root stock uniformity by its various nursery producers.

In an extensive survey of market fruits and *Citrus* orchards in Faisalabad, it was observed that Kinnow with a ring on fruit apex has reduced number of seeds (Fig. 1). The marker for seedlessness is selection of available natural mutation as a ridged structural ring at the apex of fruit. The ring is complete or as broken ring or appear as scars of a ring. The trees bearing fruits with apical ring are not frequent in orchards and the fruits have 5-20% probability of carrying less than 4 seeds. However on the same branches, the fruits without ring were also having 5% probability of less than 4 seeds per fruit. The probability of less number of seeds varies from tree to tree and from branch to branch. Also there is variation in number and size of aborted ovules.

The selected bud wood carrying fruits with less than 4 seeds were grafted on rough lemon trees in Ayub Agricultural Research Institute Faisalabad. Nucellar embryony of these fruits is being exploited at Nuclear Institute for Agriculture and Biology, Faisalabad. The micrografts of shoot apex of germinating embryos are grafted on decapitated rough lemon seedlings for obtaining somatic plants of individual cell lines having a desirable character of less than 4 seeds per fruit in a broad genetic base of Kinnow mandarin.

The selection of fruit apical ring as a marker for reduced number of seeds from natural variability in Kinnow population is a break through in Kinnow mandarin breeding for seedless character. It is being reported for the first time in Pakistan.

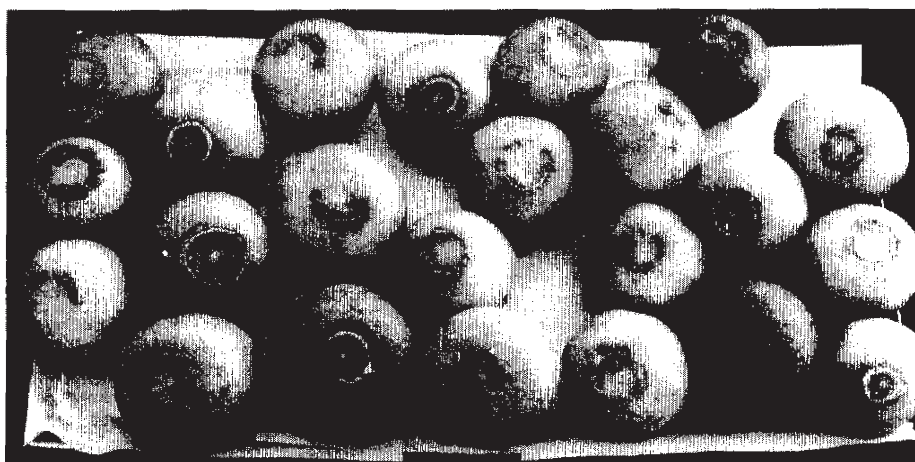


Fig. 1: Fruit apex ring is a marker for seedlessness in kinnow mandarin