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Autotetraploid 'Meiwa' Kumquat

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Abstract

The origin of the autotetraploid form of 'Meiwa' kumquat, *Fortunella crassifolia* Swing. is recorded. Some of the more prominent morphological changes in the phenotype that occurred as a result of autotetraploidy are described. Autotetraploid 'Meiwa' was developed for use as a tetraploid parent in crosses with diploid cultivars of *Citrus* to produce seedling triploid selections with superior traits. The morphological changes in the phenotype that occurred when the diploid Fortunella 'Meiwa' was converted to the tetraploid condition were analogous to the corresponding changes that occurred when diploid *Citrus* cultivars were converted to the tetraploid condition.

Introduction

Tetraploid forms of *Citrus* have been of interest to citrus breeders because of their potential usefulness as parents in producing triploid selections with superior traits from genetic combinations of diploids and tetraploids. Some cultivars of kumquat in the genus *Fortunella*, a close relative of *Citrus*, have a number of desirable traits that may be of value in citrus variety improvement. Tetraploid forms of *Fortunella* may also have a similar potential

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usefulness in producing triploid selections. The origin of the autotetraploid form of 'Meiwa' kumquat, is recorded here. Some of the more prominent morphological changes in the phenotype that occurred as a result of autotetraploidy in 'Meiwa' kumquat are described.

Origin

Small plants of 'Meiwa' kumquat were propagated by budding on seedling rootstocks of trifoliate orange, *Poncirus trifoliata* (L.) Rafinesque, for use in inducing autotetraploidy by colchicine treatment. Autotetraploidy was accomplished by using the method developed by Barrett (1) to induce polyploid citrus cultivars by colchicine treatment of apical meristems. Buds were taken from tetraploid shoot growth following colchicine treatment and propagated on potted seedling rootstocks of trifoliate orange. The propagated tetraploid plants were grown in the glasshouse for observation and fruiting. Nucellar seedlings were also grown in pots in the glasshouse after tetraploid 'Meiwa' began fruiting.

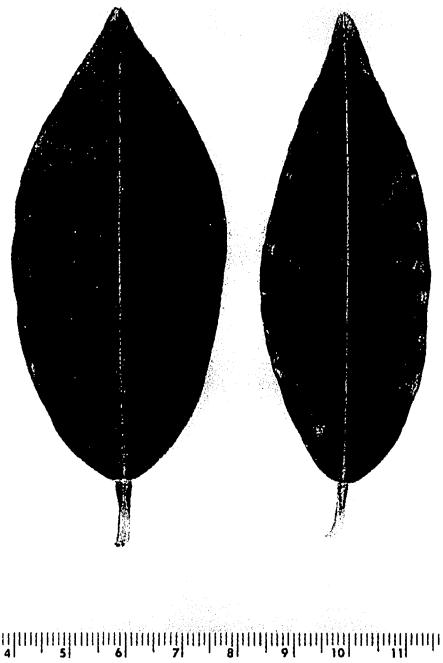

Figure 1. Leaf. Left-autotetraploid. Right-diploid. Scale-centimeters.

The original autotetraploid 'Meiwa' and propagations from it growing in pots in the glasshouse were all destroyed as a result of misapplied quarantine regulations during the Florida "citrus canker era." Prior to onset of the quarantine, one small potted nucellar tetraploid seedling of 'Meiwa' had been transferred to a glasshouse at the USDA's A. H. Whitmore Foundation Farm near Leesburg, Florida. This plant became the only surviving specimen. When quarantine restrictions were lifted, new plants were propagated on potted seedlings of trifoliate orange and grown in the glasshouse.

Description

The description of some of the morphological changes that occurred in tetraploid 'Meiwa' kumquat were made from glasshouse-grown potted plants. Comparisons with normal diploid 'Meiwa' kumquat, where mentioned, were made from similarly grown potted plants.

The foliage of tetraploid 'Meiwa' is dark green with a thick, leather-like leaf blade ~0.44 mm thick with a 2.31 length/width ratio. Foliage of normal, diploid 'Meiwa' in comparison is a lighter green with a thinner and narrower leaf blade ~0.34 mm thick with a 2.75 length/width ratio (Fig. 1).

Tetraploid 'Meiwa' flowers are large, more robust, with thicker and more rigid petals. Fig. 2 shows an unopened full size flower bud, an open flower bud, an emasculated flower bud and an individual petal typical of tetraploid and diploid 'Meiwa' kumquats. Under glasshouse growing conditions, potted plants of both tetraploid and diploid 'Meiwa' forms flower and fruit more than once per year.

Fruit of tetraploid 'Meiwa' weigh ~23.8 g with average diameters for

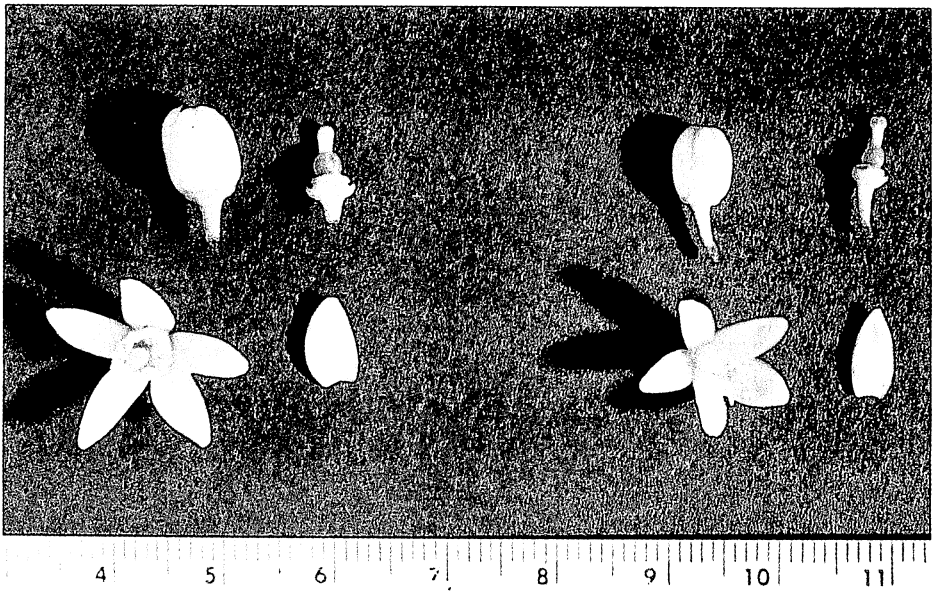

Figure 2. Flower. Left-autotetraploid. Right-diploid. Scale-centimeters.

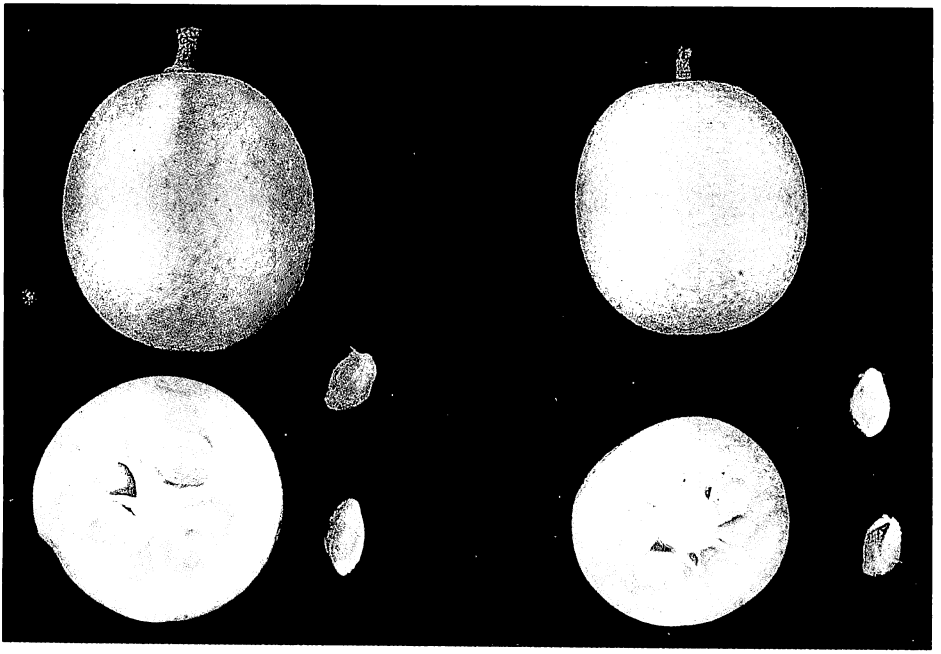

Figure 3. Fruit. Left-autotetraploid. Right-diploid. Scale-centimeters.

the long and short axes ~45 and 40 mm respectively. Comparable diploid 'Meiwa' weigh ~14.6 g with average diameters for the long and short axes ~40 and 36 mm respectively (Fig. 3). Seeds of the tetraploid have the general appearance of being broader and larger than diploid seeds. Seeds of the tetraploid are ~11 mm long by 6.5 mm wide and vary in number, 0-5, per fruit. Seeds of the diploid are ~10 mm long by 5.5 mm wide and vary 0-6 per fruit. Juice samples of tetraploid 'Meiwa' gave values ~14.0% total soluble solids and titratable acidity ~5.44%. Comparable juice samples of diploid 'Meiwa' gave values of ~12.6% total soluble solids and titratable acidity ~4.85%. Container-grown tetraploid plants of 'Meiwa' are attractive ornamentals that produce larger fruit than ordinary, diploid 'Meiwa.' The morphological changes in the phenotype that occurred when the diploid *Fortunella* 'Meiwa' was converted to the tetraploid condition were analogous to the corresponding changes that occurred when diploid *Citrus* cultivars were converted to the tetraploid condition.

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A Selection Study on Determining Important Characteristics of Almond Trees in Turkey

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Abstract

In this study, carried out in 1988, 450 almond trees (*Amygdalus communis* L.) were examined to select the important quality fruit types in natural almond population grown around the Apa Dam Lake in Cumra, Konya, Turkey, and of them 12 types were selected with regard to fruit characteristics. All selected types were seen to have the characteristics of late flowering. The average inshell fruit weights were between 3.37 g and 5.24 g. The kernel weights were 0.64 and 1.00 g and the ration kernel were 14.29% and 20.01%. All types had extremely hard shell almond characteristics.

Introduction

The homeland of the almond tree (*Amygdalus communis* L.) is the lower mountainous region of Middle Asia. Almond is an inshell fruit which is grown commercially in an area extending from Afghanistan and Iran to Southeast Asian of India and more plato countries and more particularly in Mediterranean countries, Middle East and California (9). Archeological excavations carried out in Southeast Anatolia, Turkey, discovered almond seeds from 7000 B.C. (14).

Almond trees growing in a vast region with different ecological conditions have formed a number of populations, variations and local types due to the influence of agricultural techniques of related countries. In addition to natural selection, some countries like Iran, Uzbekistan and Afghanistan have made conscious selection by farmers, thus, some almond types lasting cold hardness were found. On the other hand, some types expressing low chilling requirement for bloom have appeared on the coast of the Mediterranean region (11). Although development in almond production is very slow in its homeland region, very rapid

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