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ORIGIN OF DIFFERENT PLOIDY LEVELS OF PROGENY FROM DIPLOID X TETRAPLOID SOMATIC HYBRID CROSSES IN CITRUS

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World production of Citrus fruit is on a continuous growth, representing the first fruit crop in international trade. The main evolution during the last decades was the growth of request on small Citrus fruits (clementines and mandarins). Many breeding programs get started all over the world due to the evolution of consumer and market preferences.

One of the consumer turn-off is the excessive seed number. One of the ways chosen, to resolve this problem is the creation of sterile triploids cultivars, which have a great commercial potential because of their seedlessness.

A way for triploid creation is sexual cross between diploids and tetraploids. However the scarcity of natural tetraploid gene pool was a restriction for using this method. Citrus somatic hybridisation via protoplast fusion allowed the creation of tetraploid somatic hybrids that can be used as parents to generate triploids cultivars. Several crosses using diploids (female) and tetraploid somatic hybrids (male) were realised by CIRAD:

- Fortune mandarin (*C. reticulata* Blanco) x (Willow leaf mandarin SRA 133 (*C. deliciosa* Ten.) (WLM) + Star ruby Pomelo (*C. paradisi*) Tetraploid somatic hybrid),
- Eureka lemon SRA 4 (*Citrus limon* (L) Burm) x (Pumelo Star Ruby (*C. paradisi* Macfad) and Corsican citron (*C. medica* L.) tetraploid somatic hybrid)
- Eureka lemon SRA 4 (*Citrus limon* (L) Burm) x (Mexican lime (*C. aurantifolia*) + Shamouti orange (*C. sinensis* L.) tetraploid somatic hybrid).

After germination, 117 plantlets were analysed using flow cytometry for ploidy levels determination. Major part of progenies was triploid in the 3 crosses (61-76%). However diploid and tetraploid plantlets were also found for the 3 crosses.

Molecular analysis with SSR markers revealed that:

- Tetraploids were issued from a diploid male gamete and an unreduced female gamete.
- Triploids were the result of a haploid ovule and diploid male gamete.
- Diploids origin is a haploid ovule and a viable haploid male gamete in the cross with Fortune mandarin.
- Diploids origin result of Eureka lemon apomixis in the crosses with lemon.

This study reveals that these progeny ploidy variations were owed to meiotic dysfunction during meiosis of the female diploid parents leading to tetraploids. Diploids were issued from apomixes or from viable male haplogamete coming from the somatic hybrids.

Keywords: Citrus polyploid hybridization SSR marker