

The Uruguayan citrus industry is small compared with the main world citrus producer countries, ranging as the 5th citrus fresh fruit exporter from the Southern Hemisphere. Traditionally Uruguay produces roughly 50% of oranges, 35% of mandarins and 15% of lemons whereas a non-significant grapefruit production is achieved. Since the main goal is to attend consumer demands, the species and varieties grown change quickly, trying to afford the main consumer's interests. Fruit sold in most valuable fresh markets should combine remarkable traits such as attractive shape and rind color, good peelability, outstanding flavor and seedlessness. Though in the last two decades, release of new cultivars has become more frequent and a completely renewed and exciting citriculture is expected to be developed in the near future. The strategy for *Citrus* breeding in Uruguay is based on the creation of new genetic variability, mutation breeding and local prospection of new scions. To create new varieties, during the '80s we started a conventional breeding process by using clementines, Ellendale, Satsuma, common mandarin and Page as parental lines. Twelve new hybrids have been released covering a wide ripening period, good yield, outstanding flavor, parthenocarpic ability and diseases tolerance, mainly to citrus canker and alternaria brown spot. Many of them entered into the mutation breeding program which in the near future will serve to improve seedlessness under cross-pollination conditions.

Financial support: INIA; UDELAR.

Keywords: breeding; new varieties; mandarins.

S17-113

ROOTSTOCK TRIALS FOR TANGO MANDARIN

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Tango mandarin has become the most common late season mandarin in California and is being introduced elsewhere. We report results from three rootstock trials for Tango conducted in the San Joaquin Valley of California. All trees were propagated in the same nursery. The trial at Porterville, planted in 2008, includes 23 rootstocks with 11 replications of single-tree plots planted on a clay loam soil with high organic matter and a pH of 7.7 to 8.3. Data include tree size, health and yields 2013-2015, packline and fruit quality. The trials at Arvin (a warmer site) and Oroshi (the most northern site) were planted in 2009 on more neutral sandy loam soils. At Porterville the highest yields have been from trees on C35, Carpenter, Bitters and an unreleased Sunki x Flying Dragon hybrid. Surprisingly, the largest trees were on C35. Trees on these four rootstocks also produced larger fruit. Most trees had good health ratings except trees on trifoliolate orange which had severe iron chlorosis and grew poorly. Results at the other sites were quite different with the largest trees on Santa Barbara Red lime, Schaub rough

lemon, Furr (Arvin), C35 (Oroshi) and Volk. Results will be updated with additional data and reasons for differences between sites will be discussed.

Financial support: California Citrus Research Board.

Keywords: tree size; fruit quality; tree health.

S17-117

PRELIMINARY FRUIT QUALITY EVALUATIONS OF NEW NAVEL ORANGE CULTIVARS FOR CALIFORNIA

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During the past decade there have been significant changes in the types and cultivars of commercial citrus grown in California. In particular, the increasing demand for the extension of the navel orange marketing window has led to importation of many new selections of late and early season navel oranges. In 2006 we initiated evaluation of several newly introduced navel orange cultivars from different parts of the world: Ceridwen and Robyn (South Africa), Johnson (New Zealand), Cogan (Argentina) and Ricalate (Spain). Soon after, we added UCR Early (California), Fulwood (Australia), Bahianinha SRA 513 (Brazil), Bahianinha araras (Brazil) and finally Everhard (Texas) by 2012. Fruit of all cultivars were harvested from Riverside, Calif. and Exeter, Calif., locations and compared against standards Parent Washington and Lane Late for indications of maturity such as increased soluble solids concentration (SSC), titratable acidity (TA), the California Standard derived from BrimA index and rind color break. Often in both locations, fruit of many cultivars had reached legal maturity by the first sample date in mid-October, but not rind color break. Others were prominently early or late maturing. Maturity patterns also coincided with penetrometer measurements that were conducted in this study. These new alternatives in early and late maturing navel orange cultivars are currently available through the Citrus Clonal Protection Program (CCPP) in California.

Financial support: California Citrus Research Board.

Keywords: navel Orange; California Standard; maturity.

S17-118

PROMISING HYBRID ROOTSTOCKS FOR VALENCIA SWEET ORANGE, IN SOUTHERN BRAZIL

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Among the aspects that enable higher crop yield, one of the most important is the use of suitable rootstocks, adapted to the soil and climate conditions of each region. This study proposed to identify, among 13 rootstocks, in Pelotas, South Brazil, those that induce good fruit produc-

tion and quality to Valencia orange (*Citrus sinensis*). The analyzed variables were: in the field, canopy height (m), canopy volume (m³) and production efficiency (kg m⁻³); in the fruits, diameter (mm), integral weight (g), juice (%), pH, titratable acidity (TA), soluble solids (SS), ascorbic acid (AA). In field analysis, rootstocks HTR207, TSKC x CTQT1439035 and TSKC x CTQT1434 004 had lower canopy height and volume and the HTR207 rootstock showed better production efficiency. In fruit analysis, the rootstock that showed more significant diameter was LVK x LCR010 and the integral weight was TSKC x TRBK007. The juice level was higher for the rootstock HTR207. The pH did not vary significantly among the rootstocks analyzed. The rootstock which was found smaller AT and SS levels was the LVK x LCR010, while rootstocks TSKC x TRDP023, HTR207 and TSKC x CTQT1439 035 achieved high SS content levels. Rootstocks TSKC x CTTR028 and TSKC x TRDP 023 showed higher AA levels. In this evaluation rootstocks provided positive changes in Valencia sweet orange tree production and fruit quality. In general, the rootstock HTR207 stood out in relation to the others.

Financial support: CNPq, CAPES and Embrapa.

Keywords: hybrid; citrus; quality.

S17-122

BEHAVIOR AND CHARACTERISTICS OF NERO AND NEUFINA, TWO CLEMENTINES VARIETIES

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Clementines present excellent organoleptic and nutritional quality and are for these properties a world citrus reference. Their main harvesting period generally covers the months of November and December. However, excessive production causes a decrease in its price that may go below even the real value as a consumer product, reducing producer profits and even causing losses. The answer to this problem requires a re-organization of the varietal structure. In this context, technology innovation altering the genetic characteristics becomes a major necessity in order to obtain new cultivars to extend the offer period and the optimal harvest of fruit. In this presentation we describe the agronomic behavior and fruit characteristics of Nero and Neufina. Nero is an early cultivar of seedless clementine that maintains the excellence of clementine quality. On the other hand, Neufina has excellent perdurability in the tree, making it an ideal option to extend the supply of clementines during winter.

Keywords: acidity; Brix; fruit quality.

S17-123

EFFECTS OF FIVE CITRUS ROOTSTOCKS ON YIELD AND FRUIT QUALITY OF NADORCOTT MANDARIN

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The effects of citrus rootstocks on the performance and fruits characteristics of commercial varieties are known and well documented. These effects, as well as the resistance to biotic and abiotic stresses, constitute the main criteria that direct the rootstock choice for a new citrus orchard. The Moroccan variety Nadorcott mandarin also called W. Murcott and Afourer is relatively new. Thus, there are few undertaken research and available results related to its behavior on the used rootstocks in the main citrus growing areas of Morocco Kingdom. In this paper, the results of a trial carried out in the North West Morocco, a coastal area, to evaluate the effects of five rootstocks on Nadorcott yield and fruit quality are presented. The effects of citrus rootstocks on the performance and fruits characteristics of commercial varieties are known and well documented. These effects, as well as the resistance to biotic and abiotic stresses, constitute the main criteria that direct the rootstock choice for a new citrus orchard. The Moroccan variety Nadorcott mandarin also called W. Murcott and Afourer is relatively new. Thus, there are few undertaken research and available results related to its behavior on the used rootstocks in the main citrus growing areas of Morocco Kingdom. In this paper, the results of a trial carried out in the North West Morocco, a coastal area, to evaluate the effects of five rootstocks on Nadorcott yield and fruit quality are presented.

Keywords: Nadorcott; rootstocks; quality.

S17-127

EVALUATION OF DIFFERENT GRAFTING METHODS IN DIFFERENT CULTIVARS OF CITRUS

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Citrus is one of the most important fruit crops of the world. However, citrus is propagated by sexual and asexual methods. Citrus rootstock is produced sexually while scion cultivars are propagated by asexual methods such as budding, cutting, layering and grafting. In Punjab-Pakistan mostly T budding and T grafting were used to propagate new plant which success percentage is very low. In the current study, we investigated the effects of different methods of grafting such as side, veg and tongue to propagate mandarin's cv. Kinnow and sweet orange cvs. Succri and Jafa. The experiment was laid down following a split plot design, with three replications where a single tree was considered as an experimental unit. Thirty trees were grafted in each method of grafting. The results showed that side grafting was more effective (90%) successful grafting than the veg (25%) or tongue grafting (70%). Similarly, Kinnow mandarins showed significantly higher (90%) sprouting than cv. Succri (80%) and Jafa (70%). The results showed that side graft-