

higher proportion of split fruits (15%) than 'Cleopatra' mandarin and 'FA-5' (5%). On the other hand, 'Chislett' orange showed higher proportion of split fruits (10%) than 'Lane-late' orange (< 2%). Peel resistance to puncturing was not significantly modified by the rootstock. However, fruits from trees budded onto 'Carrizo' and 'C-35' citranges presented a thinner peel. On the other hand, cryo-scanning electron microscopy (SEM) of fruit peduncles showed that average area of xylem vessel were larger in fruits from trees budded onto 'Carrizo' and 'C-35' citranges.

S18P16

Rootstocks for 'Lane Late' orange in Valencia

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The performance of 'Lane Late' orange on twelve rootstocks has been evaluated: 'Carrizo' and 'C-35' citranges [*Citrus sinensis* x *Poncirus trifoliata*], 'Cleopatra' mandarin (*Citrus reshni*), *Citrus volkameriana*, *Citrus macrophylla*, 'Swingle' citrumelo [*Citrus paradisi* x *P. trifoliata*], and six new hybrids obtained at the Instituto Valenciano de Investigaciones Agrarias (IVIA): 'Forner-Alcaide 5', 'Forner-Alcaide 13', 'Forner-Alcaide 41' and 'Forner-Alcaide 31' which are hybrids of 'Cleopatra' mandarin and *P. trifoliata*, 'Forner-Alcaide V17' that is a hybrid of *C. volkameriana* and *P. trifoliata* and 'Forner-Alcaide 2324' that is a hybrid of 'Troyer' citrange and 'Cleopatra' mandarin. The plot is located in the Experimental Field of ANECOOP, the "Masia del Doctor", sited ten km north of Valencia (Spain) and planted in 2005. Five first yields have been determined and fruit quality has been analysed. Regarding to the yield, *C. volkameriana* is the rootstock that showed higher cumulative yield, followed by 'Forner-Alcaide 5', 'Forner-Alcaide 13' and 'Carrizo' citrange. The lowest yield was in 'Lane Late' orange grafted in 'Forner-Alcaide V17' and 'Forner-Alcaide 2324'. Differences in fruit quality have been found.

S18P17

Citrus rootstock trials on calcareous soils in California

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Calcareous soils are challenging for citrus production because relatively few rootstocks are well-adapted to such soils and also tolerant to Citrus Tristeza Virus and common soil pathogens. Many rootstocks derive disease resistance from trifoliolate orange which is very susceptible to iron chlorosis and poor growth on calcareous soils. We report results of four rootstock trials on calcareous soils in California that were planted in 1997 and 2001 with 26 to 32 experimental and standard rootstocks budded with navel orange, 'Moro' blood orange, and 'Lisbon' lemon. Data on tree size, health, and chlorosis were collected several times from 1997 to 2011. Tree survival varied among sites and rootstocks but was nearly 100% for 'Carrizo', a fairly susceptible standard rootstock. Trees on trifoliolate orange had moderate or high chlorosis and poor growth at all sites. Rootstocks with low chlorosis overall included 'ASRT' ('African shaddock' x 'Rubidoux' trifoliolate), 'Bitters (C22)', and several unreleased hybrids. At some sites, tree size was not correlated to chlorosis suggesting that other factors limited tree performance.

S18P18

Potential of 'Tahiti' acid lime and 'Flame' grapefruit in the Brazilian semiarid

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The citrus industry of the Brazilian northeastern region is concentrated mainly in the states of Bahia and Sergipe, accounting for 10% of the national citrus production. This region has peculiar characteristics

favorable for the citrus industry expansion. The climate is very hot and semiarid. The rainfall is less than 600 mm and the average annual temperature is 26.2° C, relative humidity of 67% and solar radiation around 3,000h/year, constituting a comparative advantage with regard to biomass production and crops, especially fruits such as acid lime, lemon and grapefruit, supplemented by water via irrigation. This work was planned in order to evaluate the behavior of acid lime 'Tahiti' and 'Flame' grapefruit grafted on different rootstocks in the semiarid northeast. The experiments were conducted at the Experimental Station of Embrapa Semiarid in Juazeiro, Bahia, with 'Tahiti' and 'Flame' scions on twenty rootstocks mostly hybrids of *Poncirus trifoliata*. The rootstocks 'Cleopatra mandarin x 'Swingle trifoliolate-288', 'Rusk' citrange, 'English trifoliolate x Sunki mandarin-26 and 256', 'Cleopatra mandarin x Swingle trifoliolate-294', 'Swingle trifoliolate x Sunki mandarin-314' proved to be most promising rootstocks for 'Flame' and 'Rusk' citrange, 'Volkameriana' lemon, citrange 'C35', 'English trifoliolate x Sunki mandarin-264 and 256', citrange 'Troyer' and 'Swingle trifoliolate x Sunki mandarin-314' for 'Tahiti', both in production and productivity under semiarid conditions.

S18P19

Selection of new citrandarins for citrus rootstocks

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In the 1990s, the Centro de Citricultura Sylvio Moreira / IAC launched a wide program of genetic breeding of citrus rootstocks through controlled crosses. From the hybridizations using several rootstocks varieties, we selected to evaluate 73 citrandarins (hybrids from 'Sunki' mandarin x *Poncirus trifoliata* 'Rubidoux'). The hybrids were grafted with 'Pera' sweet orange and the trials were established in two regions of the São Paulo State. The experimental design was a randomized complete-block with three replications and one plant per plot without irrigation. Our results, in 5-yr-old plants, showed that the citrandarins influenced various horticultural traits of the scion as harvest season, yield, juice quality, and drought tolerance. The °Brix ranged from 8 to 17, the canopy volume ranged from 3.51 to 11.30 m³ and the yield efficiency varied from 3.47 to 18.94 kg/m³. Graft incompatibility with 'Pera' sweet orange was observed in six hybrids among the 73 evaluated. Among the tested hybrids, 19 induced dwarfing into the scion variety. Financial support: FAPESP, CNPq, INCT-Citrus.

S18P20

Initial production of 'Valencia' sweet orange on 40 rootstocks in Northern São Paulo State, Brazil.

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Due to increasing demand for diversification of rootstocks in Brazilian citrus industry, a research work was installed in March 2007 to evaluate 40 different rootstocks for 'Valencia' sweet orange (*Citrus sinensis*), in the Northern region of São Paulo State, Brazil. The experiment has a randomized block design with three replications and five plants per plot. The data regarding accumulated fruit production in 2010 and 2011 were submitted to variance analysis and the means were compared by Scott-Knott test ($P < 0.05$). The ten most productive combinations were those that included the rootstocks 'Rangpur' lime (*Citrus limonia*), 'Malvasio SRA 115' mandarin (*Citrus reticulata*), 'Sunki' mandarin x 'Benecke' trifoliolate (*Citrus sunki* x *Poncirus trifoliata*) 'C-13' citrange (*C. sinensis* x *P. trifoliata*), 'C-54-4-4 SRA 337' mandarin (*C. reticulata*), 'Peau Lisse SRA 267' mandarin (*Citrus deliciosa*), 'Cleopatra' mandarin x 'Rubidoux' trifoliolate (*Citrus reshni* x *P. trifoliata*), ['Rohde Red' 'Valencia' sweet orange plus 'Volkamer' lemon (*C. sinensis* plus *Citrus volkameriana*) 4x], 'East India SRA 414' mandarin (*C. reticulata*), and 'Sunki' mandarin x 'English Palmira' trifoliolate hybrid (*C. sunki* x *P. trifoliata*). Plants on these rootstocks will be further evaluated regarding other important traits such as tolerance to water deficit and to Citrus Sudden Death disease.