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Nota/Note

Potted trees of Rutaceae hybrids from CREA-OFA breeding program

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SUMMARY

Ornamental citrus plants in pots are becoming highly popular worldwide, and represent a product of considerable economic interest. A specific CREA-OFA breeding program yearly produces several hybrids evaluated for their ornamental value. This activity contributed to release new ornamental varieties, meeting the growing consumer demand, enlarging the offer sustained by higher competitive advantage. CREA-OFA ornamental breeding program includes not only *Citrus* and *Fortunella* spp., but also some relatives such as *Eremocitrus*, *Murraya* and others. Based on ornamental value, we selected eight promising hybrids have shown interesting ornamental features in the last two years. Most of interesting features regard fruit shape, flowers and canopy. Moreover, some of these are also remarkable for a good taste, making it possible to associate the ornamental and food value. Recently, inside of CREA-OFA ornamental citrus breeding program, in the framework of ORPRAMed project, was started a screening to assess the potential aptitude of rutaceous to transmit some dangerous diseases such as Citrus Bacterial Canker (CBC) a quarantine disease that could be potentially spread through their commercialization.

Index terms: ornamental-breeding, citrus, Citrus Bacterial Canker (CBC).

Híbridos de Rutaceae ornamentais do programa de melhoramento CREA-OFA

RESUMO

As plantas cítricas ornamentais em vasos estão se tornando altamente populares em todo o mundo e representam um produto de considerável interesse econômico. Um programa específico de melhoramento do CREA-OFA produz anualmente vários híbridos avaliados pelo seu valor ornamental. Esta atividade contribuiu para lançar novas variedades ornamentais, atendendo à crescente demanda dos consumidores, ampliando a oferta sustentada por maior vantagem competitiva. O programa de criação ornamental CREA-OFA inclui não só *Citrus* e *Fortunella* spp., mas também outros gêneros próximos, como *Eremocitrus*, *Murraya* e outros. Com base no valor ornamental, foram selecionamos oito híbridos promissores que apresentaram características ornamentais interessantes nos últimos dois anos. A maioria das características interessantes atendem ao formato do fruto, flores e a copa. Além disso, alguns destes também são ótimos para o consumo, permitindo associar o valor ornamental ao alimentar. Recentemente, dentro do programa de criação de citros ornamentais CREA-OFA, no âmbito do projeto ORPRAMed,

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iniciou-se um rastreamento para avaliar o potencial dos híbridos de Rutaceae em transmitir algumas doenças perigosas, como o cancro cítrico, uma doença de quarentena que pode ser potencialmente espalhados através de sua comercialização.

Termos de indexação: melhoramento de ornamentais, cítros, cancro cítrico.

INTRODUCTION

The European market supply of ornamental citrus is concentrated on a few species; actually, the 90% of the nursery production is constituted by three species (lemon, kumquat and calamondin). The Italian nurseries, located in Tuscany, Calabria and especially in Sicily produce annually about 2.5 million plants. They are the largest suppliers of ornamental citrus in center and north Europe. On the other hand, Portuguese, Spanish and Greek producers have recently invested in modern nurseries; therefore, the diversification, through varietal innovation, remains one of the most efficient systems to differentiate supply and to improve competition. For this purpose from 1999 a CREA-OFA breeding program yearly produces several hybrids to be evaluated for their ornamental value (Recupero et al., 2001, 2011). Thereafter, those considered promising are selected and grown in specialized ornamental nurseries. In less than two years, you get potted plants in form to 'little tree' suitable for the market.

Recently, this activity has made possible patented Arcobal (Meyer lemon × Double blood orange – 19 - Patent 2012) for its particular and unique fruit (Recupero et al., 2012).

The lack of knowledge regarding the interaction of emerging pathogens with *Citrus* relatives genera makes these ornamental plants potential vectors for dangerous diseases. In this regard, CREA-OFA, in the framework of ORPRAMed project, is assessing the host-status of its ornamental hybrids and *Citrus* relatives collection against *Xanthomonas citri* subsp. *citri* causal agents of Citrus Bacterial Canker (CBC) a quarantine disease that severely affects citrus plants not yet reported in the Mediterranean basin.

Here we describe eight ornamental hybrids recently obtained from our breeding program and selected for their ornamental value in the last two years, which phytopathological evaluation against CBC is in progress.

Oval kumquat × *Eremocitrus glauca* (06-I1)

This hybrid appears innovative, indeed shows a peculiar canopy that remembers the weeping willow tree (Figure 1A). The leaves are grey-green and leathery as

Figure 1. Canopy of Oval kumquat × *Eremocitrus glauca* (06-I1) potted tree (A), fruit (B).

the male parent, however it showing a lanceolate shape less linear than *E. glauca.* Small and medium thorns are present in the branches. Fruiting is earlier than kumquat and fruits differ from the male parent in shape, size and color. They are very similar to kumquat but display a yellow color (Figure 1B). The strong attachment to the peduncle ensures a long persistence of the fruit on the tree, making possible the commercialization for a long time.

Oval kumquat × Limequat Lakeland (05-H1.1)

This hybrid produces a medium orangey-yellow fruits similar in shape to limequat Lakeland but bigger. Its taste is comparable to kumquat with a less acid pulp and peel slightly less sweet. The branches are dense with short internodes and very few and small thorns (Figure 2).

Oval kumquat × Clementine rubino (05-D2)

This hybrid is characterized by dense canopy with very little thorns (Figure 3A). The leaves are similar to male parent and the fruit is like a big kumquat, oval, orange at maturity and very aromatic (Figure 3B). Its good taste makes it edible associating the ornamental and food value. The plant represents an interesting innovation with respect to the female parent.

Figure 2. Two-years-old Oval kumquat × Limequat Lakeland (05-H1.1) potted tree.

ISA Red Lemon (ISAL) × Buddha's hand citron (BHC) (06-H14)

The leaves size and shape of this hybrid are very similar to those of BHC but smoother, sharper and less expanded (Figure 4A). The flowers, single or grouped, clustered mainly at the apex of the branches (Figure 4 A and B), but differently from ISAL they are pigmented, they release a pleasant jasmine-like fragrance much intensive and particularly attractive. The fruit is similar to citron without digitations.

ISA Red Lemon (ISAL) × Buddha's hand citron (BHC) (06-H2)

This genotype produces fruit with a very good firmness and an intense red color at maturity similar to female parent (ISAL), but the general features are quite different. The shape is round, with very smooth peel (Figure 5A) and the pulp is more acid than citron. The leaves are medium size of an intense green color; in the branches are present few and little thorns. Potted plants are productive (Figure 5B) and the strong attachment to the peduncle ensures a long persistence of the fruit on the tree, making possible the commercialization of attractive potted trees for a long period.

Chinotto × Buddha's hand citron (CH-MB04)

This hybrid, combining some morphological traits of the chinotto and citron, appears innovative for ornamental purpose because the fruit seems a little orange-citron (Figure 6A). The leaves are more similar to citron than to chinotto (Figure 6B). The fruit is small, oval and its rind is rough and orange when ripe.

Meyer lemon × Double sanguigno orange (LM-DS 29)

This hybrid is characterised by early and abundant fruiting, is vigorous and productive (Figure 7A). The plant is appreciated also for the compact canopy with medium-sized

Figure 3. Oval kumquat × Clementine rubino (05-D2).

Figure 4. ISA Red Lemon (ISAL) × Buddha's hand citron (BHC) (06-H14).

Figure 5. Three-years-old ISA Red Lemon (ISAL) × Buddha's hand citron (BHC) (06-H2) potted trees (A), 06-H2 graffed on Citrumelo rootstock (B).

Figure 6. Chinotto × Buddha's hand citron (CH-MB04). Fruits (A), leaves (B).

leaves, the young shoots and blossoms are intense purple like female parent (Figure 7B). The fruits are smaller than female parent (equatorial Ø: 53 mm, longitudinal Ø: 63 mm), oval and the majority of them present a little neck. They are of brilliant orange color, with rough skin and very persistent on the tree.

Pursha lime × Chinotto (LP-CH11)

The canopy of this hybrid is compact with dense branches, short internodes and very rare thorns. The leaves are medium size of intense green color (Figure 8A). The hybrid produces yellow fruits similar to an oval

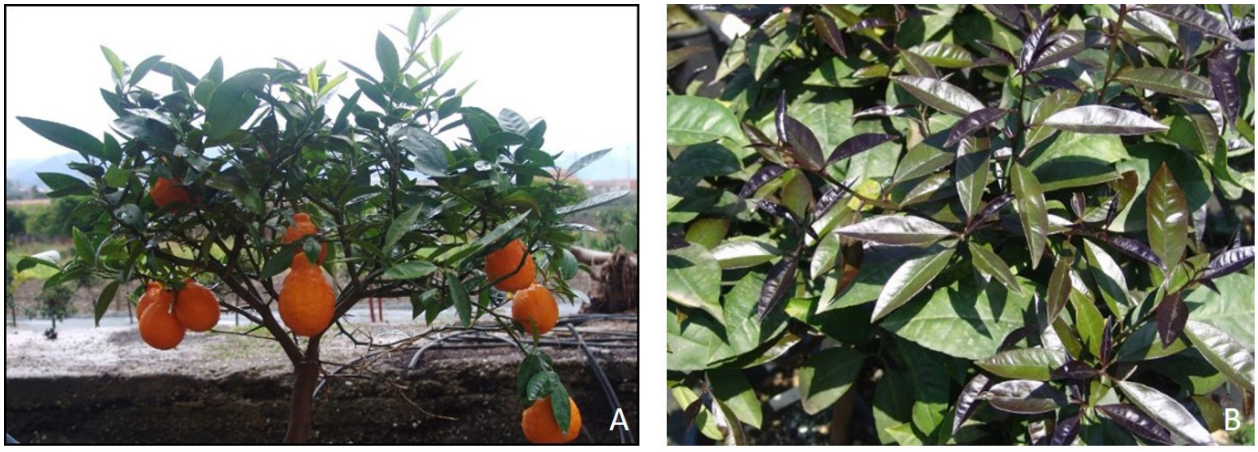

Figure 7. Three-years-old Meyer lemon × Double sanguigno orange (LM-DS 29) potted tree (A), 06-H2 purple young shoots (B).

Figure 8. Pursha lime × Chinotto (LP-CH11). Leaves (A), fruits (B).

small lime with little and depressed apex (Figure 8B). Nurserymen particularly like these features because the fruit remembers the lemon/lime aspect that is very appreciated by consumers.

CONCLUSION

The described hybrids possess unique features concerning fruit shape, flowers and canopy, thus they could be able to increase the supply of ornamental citrus trees. Moreover, some of these are remarkable also for their good taste, making it possible to associate the ornamental and food value.

The preliminary results about the role of rutaceous parents as potential source for alien pathogens from other countries confirm the old previous described results (Peltier & Frederich, 1920) about the behaviour of some *Citrus* and relatives against CBC. The ability of the parents to transmit their resistance to the selected hybrids is now in progress.

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