

The Demonstration Citrus Trial Garden

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First submitted for review January 20, 2020

Final edited version: January 24, 2020

If you love to garden and are curious about the scientific method, we invite and encourage you to visit our Demonstration Citrus Trial Garden! Many may not know that along with its educational and outreach programs, our Fort Bend Master Gardener association is engaged in a structured research project to determine the cold hardiness of 12 varieties of dwarf Satsuma Oranges – all of which are on display and will soon be in beautiful and fragrant bloom.

Our research Citrus garden has an interesting history, which began in 2013. The scientific design of the project required the citrus under study to all be of similar variety, to be grown on the same rootstock, to be grown in the same soil and to be under the same environmental conditions. Plans called for planting of purchased three-year-old trees, grown on Flying Dragon – a dwarfing rootstock. Once established in the test plot, cold-hardiness data was gathered over the course of two years.

As it turned out, Satsumas on Flying Dragon rootstock were very difficult to find in the marketplace, necessitating a redesign of the project - Flying dragon rootstock would be grown, and once the rootstock had reached a pencil-thick diameter, Satsuma cuttings (known as bud wood) would be grafted onto it. The resulting trees would be grown for three years, then data collection would begin.



Growing the Flying Dragon rootstock was the first of many interesting challenges faced by the research team. This rootstock grows very slowly, especially in a greenhouse, and it took two attempts before plants were successfully grown and nurtured to the required size needed

Next came grafting of the buds onto the rootstock. Grafting is a delicate process that requires great expertise for a graft to have high probability of success. Several highly experienced people participated in the process, grafting 152 plants. Of those, 72 went into the test plot, carefully arranged in

rows according to variety. Some scions (the top, grafted part of the plant) did not survive the first winter and were re-grafted. By trial and error, it was learned that some varieties, such as Clementine, grafted easily and others, such as Bumper, Arctic Frost and Orange Frost required repeated re-grafting before success was had.

Regular and proper care is always essential in a garden, and especially so in a test plot. During a major freeze, the young grafted trees needed special protection in order to withstand the extreme cold – they were wrapped in housing insulation, and they survived! Throughout the trial, trees have experienced the same growing environment - the same soil; like exposure to sun, rain and wind; a hand-weeded growing area that is consistently maintained and uniform pest control measures (i.e., ant control). A citrus test plot managed in this manner makes it possible to reliably test for one variable – in this case, the cold-hardiness of each dwarf satsuma variety. In other words, how low a temperature can each variety endure and still survive? This type of information is important to gardeners!

Since the study began, two new diseases affecting citrus have become of critical concern in Texas and other citrus-growing states: Citrus Canker and Citrus Greening. Both have led to changes in how nurseries propagate root stock and grow newly grafted trees – these activities are now done exclusively in carefully designed and managed certified greenhouses. By eliminating exposure to the outdoors, trees are protected from the bacterium of Citrus Canker and bacterium of Citrus Greening (vectored by Asian Citrus Psyllid).



While this new situation has had no direct impact on our research project, it has impacted the availability of dwarf trees grown on Flying Dragon rootstock – a rootstock which produces citrus trees 75% smaller than full-size trees. With the new requirement to cultivate rootstock and young trees in the greenhouse, commercial appeal to grow slow-growing Flying Dragon rootstock has diminished – other trifoliolate rootstock grows much more quickly.

The upshot is that dwarf citrus trees, which are especially appealing to the home fruit grower, are less available in the commercial market. While growing on Flying Dragon does impart an additional 1-2 degrees of cold-hardiness, the data we are collecting is applicable to full-size Satsuma trees – so all growers will benefit from the knowledge gleaned.

Scientific research is a fascinating endeavor that involves unexpected challenges to be met and overcome - and with each challenge presented comes the benefit of new knowledge. Such has been our experience. When this trial ends, in approximately two years, another will begin. Our interest in learning as Master Gardeners never ends!

When you visit the garden, look for a post-mounted brochure box where you will find an informative flyer. Additional information is available on our website, www.fbm.org, under “Demonstration

Gardens.” More citrus growing information can be found on Texas A&M AgriLife Extension website:
<https://agrilifeextension.tamu.edu>

This article is based on a January 2020 interview with Master Gardener Deborah Birge, Chair of the Demonstration Citrus Garden.

Fort Bend County Master Gardeners are trained volunteers who assist Texas A&M AgriLife Extension Service in educating the community using research-based horticultural information.