Figure 1. Three-year-old dooryard Sugar Belle® tree on UFR-17 rootstock, grown under heavy HLB pressure in Winter Haven with controlled-release fertilizer.

Niche market and dooryard citrus for the HLB world

By Jude Grosser, Manjul Dutt and Fred Gmitter

The University of Florida Institute of Food and Agricultural Sciences (UF/IFAS) citrus improvement team at the Citrus Research and Education Center (CREC) has developed a broad citrus germplasm base. This provides opportunities to generate diverse, interesting and possibly lucrative selections with niche market and dooryard potential. Several such selections are showing reasonable levels of HLB (huanglongbing or citrus greening disease) tolerance, which is a very important attribute for trees to be grown by home gardeners.

Tolerance is the ability of the tree to continue to grow and produce good quality fruit once infected by the citrus greening bacteria. Combining these selections with new rootstocks exhibiting greater HLB tolerance, and growing trees with enhanced nutrition programs, provides small growers and dooryard citrus enthusiasts with a real chance to get back into enjoyable fresh citrus production.

The UF/IFAS citrus variety pipeline features several categories of fruit, including sweet oranges, mandarins, grapefruit/pummelos, acid fruits (lemon-lime-citron) and finger limes. This article presents just a few examples of the types of new selections becoming available and advice on how to grow them in the HLB world.

MANDARIN HYBRIDS

Sugar Belle®, a truly wonderful fruit, has turned out to be the most HLB-tolerant citrus variety grown in Florida (Figure 1). Sugar Belle® is a mandarin hybrid that produces delicious fruit similar to that of the Minneola Honeybell, but with better color, flavor and slightly earlier maturity (Figure 2A, page 19). Trees are vigorous, productive and more HLB-tolerant and Alternaria-resistant than Honeybell. Along with true lemons, Sugar Belle® is probably the easiest variety to grow in dooryards now that citrus greening disease has become endemic in Florida.

Another promising HLB-tolerant new release from the UF/IFAS program is the mandarin hybrid 13-51 (Figure 2B, page 19). This selection produces beautiful fruit that develop an attractive deep-orange color and are very easy to peel. 13-51 is highly ranked for flavor, aroma and overall eating quality, suggesting very good potential in the gift fruit market. Additionally, this variety is at peak maturity from mid-November into early January, the ideal time for holiday gift purchasing.

PUMMELOS

Traditional grapefruit is highly susceptible to citrus greening disease and at present is quite difficult to grow in a dooryard situation. However, the citrus improvement team has identified a few tasty pummelo selections that are showing significantly better HLB and canker tolerance than grapefruit. The team is working to make these selections available for small growers and dooryard enthusiasts.

A favorite among these selections is a nearly seedless clone of the previously released 5-1-99-2 Pummelette. The fruit, about the size of a grapefruit with dark red flesh and great flavor, is

Figure 2A. Fruit of Sugar Belle® mandarin hybrid

Figure 2B. Fruit of 13-51 mandarin hybrid

less bitter and sweeter than grapefruit. Pummelette is a favorite at UF/IFAS fruit displays, and fruit is best from November to January.

Another delicious and attractive pummelo showing better HLB tolerance is N40-7-4 (Figure 3A, page 20). It's affectionately referred to as Monster because of its large fruit, some approaching the size of a bowling ball. Monster has an exceptionally sweet grapefruit flavor. Due to its thin skin and large segment size, one fruit can feed an entire family. Monster produces a seedy fruit, but the seeds are tight to the central core and do not interfere with eating.

ACID FRUITS

Traditional lemon trees generally show HLB symptoms in winter but can outgrow the disease each season, producing good crops of quality fruit, even in the dooryard environment. The UF/IFAS program has developed a nearly seedless selection of Eureka lemon, which will be made available for both industry and dooryard use soon.

Another interesting group is the triploid acid fruit hybrids. Several triploid hybrids with unique flavors have been produced, and a few are showing good HLB tolerance. An example of one selection being prepared for industry and dooryard release is C4-9-33 (Figure 3B, page 20), which is one-third lime, one-third lemon and one-third orange, thus the name lemorlime. Although lime is the dominant flavor, a bit of lemon and orange can be tasted. It makes an exquisite pie!

FINGER LIMES

Finger limes are commonly known as citrus caviar. Trees produce

Figure 3A. Fruit of Monster (N40-7-4) pummelo

Figure 3B. Fruit of C4-9-33 lemorlime

finger-shaped fruit, up to 10 cenimeters long, with compressed juice vesicles that burst when the fruit is cut (Figure 4, page 21). Conventional citrus contains tender, tear-drop-shaped juice sacs while finger limes have round and firm translucent vesicles. These juice vesicles resemble caviar and are extremely flavorful. They have been used by chefs around the world to garnish dishes and by mixologists to produce trendy finger lime cocktails. Finger limes come in a variety of colors, including white, pink, red, yellow and green. Recent studies indicate finger limes are more HLB tolerant than most commercially grown citrus cultivars.

The finger lime, in its native Australian habitat, is an understory shrub and can grow up to 20 feet in height. As an understory shrub, finger limes will grow under dappled sunlight in the backyard, but no growth retardation has been observed when grown in full sun. Trees are columnar in nature and do not take up much horizontal space, even when fully grown. The tree can be kept small and compact with regular pruning. A thick pair of gloves is recommended to be worn at all times when pruning to prevent thorn-related injuries. Purchasing trees budded onto dwarfing rootstocks will further restrict the vertical growth of the tree.

In a home garden situation, finger limes can be planted in the yard or in large pots. The UF/IFAS citrus improvement team has several exciting new finger lime selections currently under evaluation. These will be released in the coming years and make excellent dooryard trees.

Finger lime trees can be a bit frustrating after planting. Trees are slow to establish, and the homeowner will not see much growth in the first year after planting. This is normal, and rapid vegetative growth is usually observed after 15 to 18 months in the ground. Trees will flower intermittently in the first three years but can be expected to bear regularly after year three.

GROWING DOORYARD CITRUS

Citrus trees planted in Florida usually become infected with HLB before they reach two years of age, even if treated with systemic insecticides. Several brands of insect-proof tree nets are now available that prevent psyllids, the insect vector, from feeding on the tree, thus preventing HLB inoculation and infection. However, at some point, new trees are going to become infected, and other means are required to maintain a healthy, productive tree.

Choosing an HLB-tolerant rootstock is the first key to success. Several new rootstocks from the U.S. Department of Agriculture (USDA) and UF/IFAS rootstock breeding programs have been released, but so far it is difficult to find dooryard trees on any of these rootstocks at retail outlets. More tolerant rootstocks include UF/IFAS rootstocks UFR-1, UFR-4, UFR-5 and UFR-17; and USDA rootstocks US-942, US-802 and the new Super Sours.

New rootstocks with even better HLB tolerance are in the USDA and UF/FAS breeding pipelines and should be available soon. Breeders plan to engage with nurseries growing trees for niche market growers and dooryard retail outlets to inform them of the new scion and rootstock opportunities available and to encourage them to produce new

trees on the improved rootstocks.

Another important consideration is the type of fertilizer now required to grow and maintain a healthy, productive tree. Researchers have learned that HLB causes severe secondary and micronutrient deficiencies in infected trees, especially in the roots. To compensate for these deficiencies, fertilizers need to contain enhanced levels of the impacted micronutrients, and the enhanced nutrition needs to be provided year-round. The most practical way for homeowners to achieve this is by using controlled-release fertilizers (CRF).

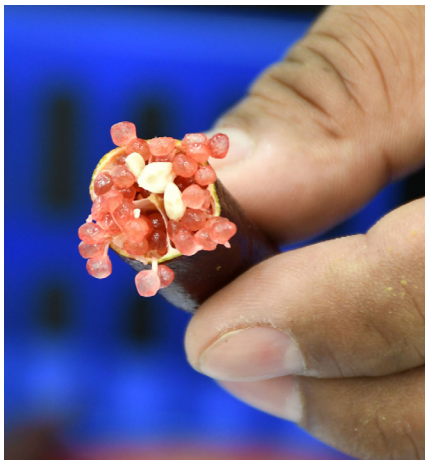

Figure 4. This is one of the exciting new red pulp finger lime selections being evaluated at the Citrus Research and Education Center.

Several companies are now making quality CRF citrus products with enhanced micronutrient packages, and the release times range from 2 to 12 months. For homeowners, two applications of a quality 6-month product or a single application of a 12-month product should work fine. Such fertilizers are environmentally friendly, as they slowly release their nutrients as they are needed by the tree, thereby reducing nutrient runoff into local water systems. It is also important to maintain the soil pH for dooryard trees between 5.5 and 6.5.

The combination of improved genetics and nutrition bodes well for the future of niche market and dooryard citrus!

Jude Grosser and Fred Gmitter are professors and Manjul Dutt is a research assistant scientist, all at the UF/IFAS CREC in Lake Alfred.