

Tangerine dreams under a lemonade sky

Lemons in the Living Room

Sue Gray

When speaking of agriculture, “greening” might not sound so bad, but it’s the nickname of a disease that could mean the end of Florida’s annual \$9 billion citrus industry if something isn’t done to stop it.

Named for the color of the misshapen fruit it produces, citrus greening disease was first reported about 70 years ago in China, and has already caused crop failures in Asia, Africa, the Arabian Peninsula, and Brazil.

Virtually all of Florida’s citrus groves have been infected, and the disease has killed millions of trees in the southeastern US. The Florida Citrus Commission said the 2013-14 season will probably end with the lowest orange crop in 29 years.

The disease enters the tree when plant lice called psyllids deposit a bacterium while feeding on leaf sap. The bacterial infection starves the tree of nutrients, turns the fruit green, and eventually kills the tree. There is currently no cure for infected trees.

Federal agriculture officials recently allocated \$25 million to research to prevent further spread of the bacteria, but greening has already been detected in some of California’s backyard citrus trees.

University of Florida researchers think they’ve discovered a chemical that kills the bacteria, but say it might be years before it could be commercially available to growers.

A solution for citrus lovers

In light of the failing Florida citrus industry, people who enjoy orange juice for breakfast or a squeeze of lemon in their iced tea might wonder whether those habits will become too expensive or even impossible in the near future.

“Not to worry,” says Jerome Osentowski, founder of Central Rocky Mountain Permaculture Institute (CRMPI) in Basalt, Colorado— “we can grow our own citrus trees at home.” Osentowski grafts scion wood from 25 varieties of citrus from his greenhouse and indoor nursery, onto dwarf rootstock to produce trees small enough to fit in your sun room. Scion wood is last year’s branch with at least two buds. The rootstock influences mainly the tree’s size, while the scion wood becomes the new trunk and produces your fruit of choice.

CRMPI is one of the premier high-altitude permaculture proving grounds and educational facilities in the world. It’s also integral to the Heritage Fruit Tree Project. In the last five years, Osentowski’s team replicated hundreds of heritage trees by grafting branches from century-old apple, plum, pear, apricot, and cherry trees onto hardy rootstock. The trees were sold to homeowners, schools, and municipalities as a way of preserving the heirloom fruit brought to the area by 19th-century homesteaders.

Using the same method, Osentowski is building a healthy inventory of citrus trees. CRMPI sold over 40 citrus trees last year, and Osentowski hopes to double or triple that next spring.

On a recent tour of the CRMPI grounds and greenhouses perched at 7,200’ (2200 m) on the south side of Basalt Mountain, Osentowski points out tangerine, lemon, and lime trees laden with fruit within a tropical food forest where 75 other tropical species flourish. The trees, most of which are several years old, are growing in the ground under the protection of a massive greenhouse that Osentowski designed and built with Michael Thompson.

Permaculture is a way of symbiotically growing many different varieties of plants, both annual and perennial, in a system that mimics the natural forest. The method has been shown by researchers worldwide to generate healthier and more productive plants. The facility also contains the beginnings of next year’s commercially available container trees. Combining rootstock from three different dwarf citrus, and the scion wood, two buds from various regular-sized citrus trees, Osentowski can create a single small “patio tree” that can produce one or multiple varieties of fruit. That means you can harvest an orange, a lemon, and a lime all from the same tree.

As for the citrus disease problem, Osentowski said his trees have no signs of greening, nor does he expect any—the Asian psyllid can’t live in the Rocky Mountain climate.

“They’re looking for a silver bullet fix,” he said about the research to stop greening disease, “but they’re not considering that the problem might be in how the crops are grown.”

Noting that every major agricultural crop in the world is in crisis, Osentowski believes there will continue to be serious problems because of the unhealthy way crops are grown in monocultures and with heavy fertilizer and pesticide use. “These diseases are evolving faster than we can find silver bullets to fix them,” he said, adding that the current agricultural system is “a big ship, and they can’t turn it very fast.”

In addition to bad farming practices, Osentowski thinks climate change is increasing the difficulty of growing crops in places that were once ideal growing zones. “Climate change means you have to keep going higher in elevation” to grow plants that need cooler temperatures, Osentowski said. But what about plants that normally grow in warm temperatures—like citrus?

Gardening indoors

Local architect Michael Thompson says in a Colorado climate of Zone 4 and 5, you have to design a greenhouse to maintain a Zone 7 to grow citrus. Thompson and Osentowski are partners in Eco Systems Design, Inc., which specializes in developing permaculture greenhouses and growing domes for schools, businesses, and homeowners.

“If you want to grow citrus year-round at this elevation,” said Thompson, “you need to increase your growing climate up to seven zones, to compensate for the frigid temperatures in January and February.” If your house lacks a sunny southern window, that would require investing in a small greenhouse or grow dome. Adding a season-extending structure to your property can cost \$10-50 per sf, said Thompson, depending on your needs and desires.

Along with a half-dozen examples of different sizes and shapes of greenhouses at CRMPI, there are several such structures nearby, including the 42’ -diameter (13 m) grow dome at Roaring Fork High School in Carbondale. The permaculture greenhouse was built with guidance from Thompson and Osentowski in 2010, and is used to teach math and science, as well as produce food for school lunches. Like the CRMPI greenhouses, it contains temperate-zone novelties like olive and fig trees.

The dome was built from a kit, but was fitted with the earth battery or climate battery that is implemented by Thompson and Osentowski in all of their growing structures. The underground heating and cooling system redistributes the sun’s energy, down 3’ (1 m) in the soil, using little if any electricity from the grid, which makes the greenhouse operation in Colorado winters near net zero.

“If we can grow all of these things with net-zero energy use, why stop at growing radishes in a box?” Osentowski asks, referring to the raised-bed gardening methods used by many home gardeners. “We can take it to another level, and citrus is just one little part of it.”

Research and development at CRMPI has shown that high-altitude citrus is a juicy prospect. If greening disease continues to wreak havoc in the Southeast, Colorado might just become the new Florida.

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Sue Gray is an organic garden and landscape specialist in Carbondale, CO. She has served on the Town Environmental Board and is actively involved in the sustainable agriculture community. The CRMPI team is currently finishing a book on permaculture greenhouses titled Bringing the Garden Indoors, which will be published by Chelsea Green.

Quotes

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