Practical tips for establishing By Bill Castle and Bob Rouse

h, but I may as well try and catch the wind." Those "catchy" words are from a song by Donovan, Britain's answer to Bob Dylan. He probably wasn't actually thinking about Florida and windbreaks, but if you are thinking about trying to catch the wind, read on.

A number of growers have made substantial investments in the past two years to protect their fresh fruit from canker. From those experiences have come the practical tips presented here. We deem them to be quite reliable because they are shared experiences, i.e., virtually everyone has encountered the same situations and reached the same conclusions. Clearly, plant species, size and condition, design considerations, site preparation and weed management are critical for successful windbreaks.

PLANTS

The popular plants being used

as windbreaks remain those recommended for quick establishment and rapid growth: Eucalyptus grandis and Corymbia torelliana. Eucalyptus seeds from local sources appear to be in short supply at the moment. Some nurserymen have purchased seeds of unknown selections from California and elsewhere. Supplies of seedlings have increased, but while plants are somewhat easier to find, it is still best to arrange an order in advance. Eucalyptus seeds germinate rapidly so plants for the field can be available within months. Corymbia seeds are available through University of Florida. Plants are available in some citrus and other nurseries, but it is best to order ahead.

Twyford Labs, Apopka, is producing by tissue culture, superior E. grandis clones released by Don Rockwood (UF/ School of Forest Resources and Conservation, professor emeritus). They have been patented and licensed for use as sources of energy wood. Those se-

lections offer certain growth and environmental advantages, but are not recommended by IFAS for windbreaks because of general concerns about Eucalyptus and invasive potential.

When you've seen both *E. grandis* and *C. torelliana*, you can't help but be struck by their similarities and differences. They are



very similar in their behavior as nursery plants and growth in the field, but the latter produces a much rounder canopy with larger leaves and more branches from top to bottom (Fig. 1). There are still questions about the cold tolerance of *C. torelliana*, but this past winter had little effect on seedlings or young plants. However, in Immokalee, small seedlings of *E. grandis* that were about pencil size and smaller were cold-damaged.

OTHER SPECIES

Slash pine and southern red cedar are two other species proving to be excellent choices, especially if planted before the citrus. They are not as fast-growing as *E. grandis* and *C*. torelliana, but we have found four- to six-foot-tall pine trees in three-gallon containers at affordable prices. When you plant trees that size, there is a visible windbreak that will have some function at the time of planting. Note also that with containerized plants, it is likely that the root ball must be broken apart and the tree planted firmly; otherwise, the trees tend to lodge and may need to be staked. Such trees planted at Water Conserv II and Hunt Bros. have had excellent survival and began flushing soon after planting (Fig. 2).

Lots of pines and cedars are available in one-gallon containers and can be purchased for about \$1.25 to \$1.50. Red cedar is a tough plant with very good survival when planted virtually anywhere. In our trials at commercial sites, plants in one-gallon pots have easily grown 5 to 6 feet in one full year in the field with good care and irrigation.

WHO HAS PLANTED WINDBREAKS, AND WHERE?

The observations of the following grower-cooperators are the foundation of this article. In the Indian River area, considerable *Eucalyptus grandis* and *Corymbia torelliana* have been planted by the Estes Citrus Company (contact Jim Hoffman) and Packers of Indian River (contact Tom Stopyra). A trial was planted in Indiantown with Gardinier Citrus as the cooperator to study *C. torelliana* combined with *Murraya* (Orange Jessamine), gold lantana and onion species to see if canker and psyllids can be managed.



Figure 1. C. torelliana about one year after planting at 8 feet apart (upper photo) near Frostproof, where temperatures this past winter dipped to the low 20s; mature trees (lower photo) planted 10 feet apart as a windbreak for a vegetable operation in South Florida.



Figure 2. Slash pine trees grown in 3-gallon pots and recently planted on the Ridge.



Figure 3. A red cedar (left), slash pine (middle) and Eucalyptus amplifolia (right) windbreak after 1.5 years, Citra, Florida.

On the Ridge, a pine/cedar windbreak was planted in July around a 20-acre research grove at Water Conserv II. At Hunt Bros. (contact Deeley Hunt), Lake Wales, we planted various trial windbreaks around a square 40-acre Murcott block. Those windbreaks were pine/cedar, or a single perimeter cedar row with pines planted inside the grove in a grid pattern, or *E. grandis* and *C. torelliana*. We also planted a square 40-acre grapefruit grove divided into 10-acre blocks with each block surrounded on two sides by a three-row combination of E. grandis on the inside, slash pine in the middle and red cedar on the outside row; the interior sides have a single pine tree row. Another windbreak was planted at the UF research farm in Citra with a different species of *Eucalyptus*, *E*. amplifolia, which is not suited for the citrus-growing regions of Florida. That trial also has sides planted with threerow windbreaks of Eucalyptus on the inside, pines in the middle and cedar as the outer row (Fig. 3).

In the Gulf Region, a trial windbreak with some of the same plants surrounds a 10-acre Open Hydroponic System trial outside LaBelle. Windbreaks of *E. grandis* and C. torelliana were planted on the south side of the Southwest Research and Education Center, Immokalee, to buffer the prevailing southeast winds.

The trees were planted in April 2008 in double rows at 3 and 6 feet in-row spacing with drip tape along the rows for irrigation. The E. grandis were 4 to 5 feet tall at planting and have grown to 8 to 10 feet tall. On the north side, a double row was planted with E. grandis and red cedar. The E. grandis were 8 to 10 inches tall in cone tubes and the red cedar were 6 to 12 inches tall in

one-gallon containers. The *E. grandis* plants suffered considerable loss from three freezes of 27 degrees F in the winter of 2009; the survivors are 3 feet tall. The red cedar plants were undamaged and are 2 feet to 3 feet tall.

WINDBREAK DESIGN

Windbreak design has not proven to be especially critical so far. For *Eucalyptus*, it is preferable to plant the trees in double offset rows with the rows some distance apart that is compatible with your weed management approach and 3 feet (if planting a single row) to 6 feet (double offset rows) apart in the row. *C. torelliana* trees have been planted 6 feet to 10 feet apart in single rows and doing very well at 8 feet (Fig. 1). You can expect both plants with irrigation and good care to be 10 feet to 16 feet tall after one year. Also, as Tom Stopyra noted, "Remember that, in most cases, you are retrofitting the grove. As a result, compromises and concessions will have to be made ..."

SITE PREPARATION

Site preparation is absolutely the key to success after adequate planning. And it is very clear that weed management is the most critical element. A common procedure is to kill weeds in the rows with glyphosate first, then disk or otherwise clean up the rows followed by application of a residual herbicide. Timing of that application will make a difference. The windbreak plants must have the maximum opportunity for growth before additional herbicide is needed. It is recommended that windbreaks be irrigated, but synchronizing site preparation, herbicide applications and planting with the beginning of the rainy season was described by Hoffman as very beneficial. That coordination plus some luck was certainly helpful in planting Eucalyptus at Water Conserv II. The site had been treated with a combination of Solicam and Surflan and then the E. grandis was planted. It rained at the end of the day and regularly for a few days thereafter. Within two weeks, many plants had doubled in height (Fig. 4).

WEED MANAGEMENT

We are investigating weed management in a field study and with plants in containers. With the guidance and participation of Megh Singh, a grower-



Figure 4. Eucalyptus grandis at planting (left photo), Water Conserv II, and two weeks later (right photo)



Figure 5. Eucalyptus grandis treated with Solicam.

cooperator field trial was established near Vero Beach. In that trial, all the currently recommended plant species are being treated with several common residual herbicides. The early results confirm grower experience suggesting that when the plant stem begins to "show some bark" or turn brown, glyphosate can be carefully used for knock down followed by a residual herbicide. We have sprayed Solicam at label rates directly on Eucalyptus and other plants with no apparent harm, but it is safer to use the lower label rate as *E. grandis* and *C. torelliana* plants showed some sensitivity at the higher label rates (Fig. 5).

PLANT SIZE AND PLANTING TECHNIQUE

In large-scale windbreak projects, plant size and planting technique also determine survival and subsequent success. Purchasing trees in one-gallon pots may not be viewed as affordable. Eucalyptus

and *C. torelliana* plants in smaller, cone-shaped containers are common and cheaper; but, if they are not planted early enough in the year to allow the plants to gain size, then you risk cold damage. Also, because of their small size, they can literally disappear in weeds. However, excellent weed management for a year seems to be sufficient because, thereafter, *Eucalyptus* and *Corymbia* plants will outgrow any weeds. Pine trees and red cedars seem to survive and compete with weeds reasonably well, too, but clearly grow better without weed competition. Adding some organic material to the planting hole and a small amount of slow release fertilizer has been practiced. If planting pines in grove soil, the pH may be too high. We have surface applied Tiger 90 sulfur pellets with quick results. At Water Conserv II, we pre-plant amended the *Eucalyptus* rows with either Calphos, a phosphate industry by-product, ordinary red road clay, or an organic mulch incorporated to a shallow depth.

The full benefits of windbreak use are yet to be determined, but there are some other interesting observations. Hoffman and Stopyra report that windbreaks should not be planted too close to the lip of drainage ditches. Planting on the south side provides shade and may help with aquatic weed control, and is helping with ditchbank erosion.

Much more can be discovered on the windbreak Web site (http://www. crec.ifas.ufl.edu/extension/windbreaks/ index.htm).

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