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## Windbreaks in Citrus

### Windbreaks in Citrus:

#### An Evaluation of Plant Species Conducted at the UF/IFAS/Indian River Research and Education Center (IRREC) Between 2000 and 2004

**Ed Stover** ([ewstover@ucdavis.edu](mailto:ewstover@ucdavis.edu))

Formerly of the IRREC, Ft. Pierce; presently with the USDA, Davis , CA.

**James Salvatore** ([JJSalvatore@mail.ifas.ufl.edu](mailto:JJSalvatore@mail.ifas.ufl.edu))

Biological Scientist, IRREC, Ft. Pierce

**Don Rockwood** ([DLRockwood@ifas.ufl.edu](mailto:DLRockwood@ifas.ufl.edu))

Professor, Forest Tree Improvement, UF School of Forest Resources and Conservation

**Bill Castle** ([castle@crec.ifas.ufl.edu](mailto:castle@crec.ifas.ufl.edu))

Professor, UF/IFAS/Citrus Research and Education Center, Lake Alfred

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### I. The Plants and the Details of the Investigation

Several species were planted on different sites at the IRREC to assess their potential as windbreaks in the Indian River area:

- Four selections each of *Eucalyptus grandis* and *Populus deltoides*
- Southern Red Cedar (( *Juniperus silicicola* )

The *Eucalyptus* and *Populus* were selected for projected adaptation, rapid growth and the ability to coppice (rapidly

regrow from the stumps when cut to control tree height). Southern Red Cedar (not Eastern Red Cedar, *J. virginiana*) is a hardy plant that is adapted to a wide range of conditions and produces a tree with good foliage from top to bottom.

All trees were obtained from nurseries in the Gainesville area and planted September 2000 through June 2001 as 5-tree experimental units with each unit repeated four times, i.e., 4 replications for a total of 20 trees/selection on each of two soil types. The trees were planted in a double off-set row with 3 feet between plants and rows and on each of two soil types. Approximately 180 trees were planted adjoining citrus groves at each of two sites at the IRREC.

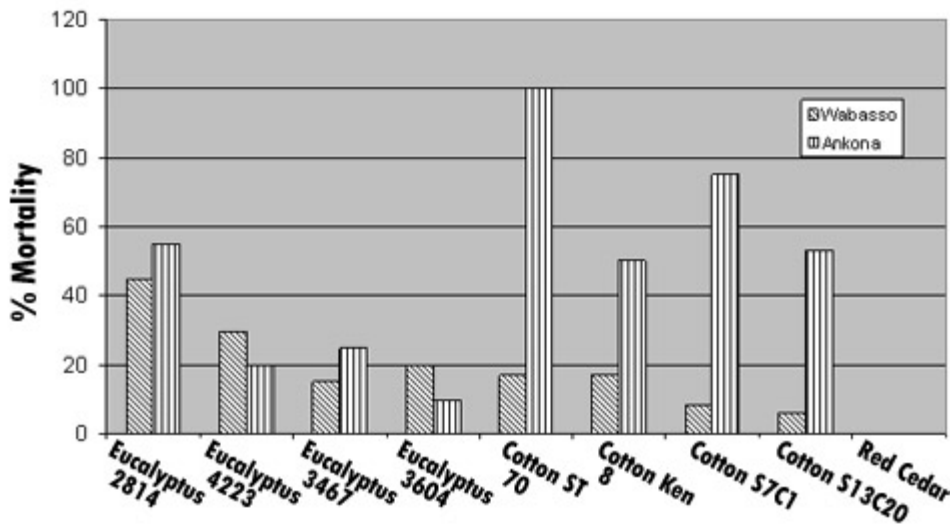
- Ankona sand, a poorly drained Spodosol where the depth from the soil surface to the top of the spodic horizon is between 30 to 50 inches and an argillic horizon (clay layer) occurs beneath the spodic horizon
- Wabasso sand, also a poorly drained Spodosol, however, the depth to the top of the spodic horizon is 20 to 30 inches and there is an underlying argillic horizon.

In all cases, trees were planted adjacent to a ditch with the soil surface of the ditch bank well above the water level in the drainage ditch.

*Eucalyptus* and *Populus* were established by rooting cuttings under mist. Southern Red Cedar were obtained as potted trees from a commercial nursery and were much larger than the other species at planting. All planted received irrigation during establishment and for the following two years, but no fertilization. Weeds were controlled through mowing and glyphosate applications.

## II. Outcomes

Mortality was much higher (fewest surviving trees) in *Populus* than in the other genera particularly on the Wabasso site (Fig. 1). *Eucalyptus* trees survived well with mortality rates generally below 30% and most below 20%; however, there was clonal variability with 3467 and 3604 having the best survival. All trees of Southern Red Cedar survived, i.e., no mortality.



**Fig. 1.** The mortality of various windbreak species in a trial conducted at the UF/IRREC. Mortality in most instances is based on 40 trees planted in each soil type although there are some exceptions primarily among the cottonwood species.

**Growth.** *Eucalyptus grandis* trees grew very quickly, achieving heights as great as 12 feet within two years, but there appeared to be differences in performance between the clones and the soil types (Figs. 2 and 3). Most of the clones grew better on the Wabasso soil than the Ankona soil.

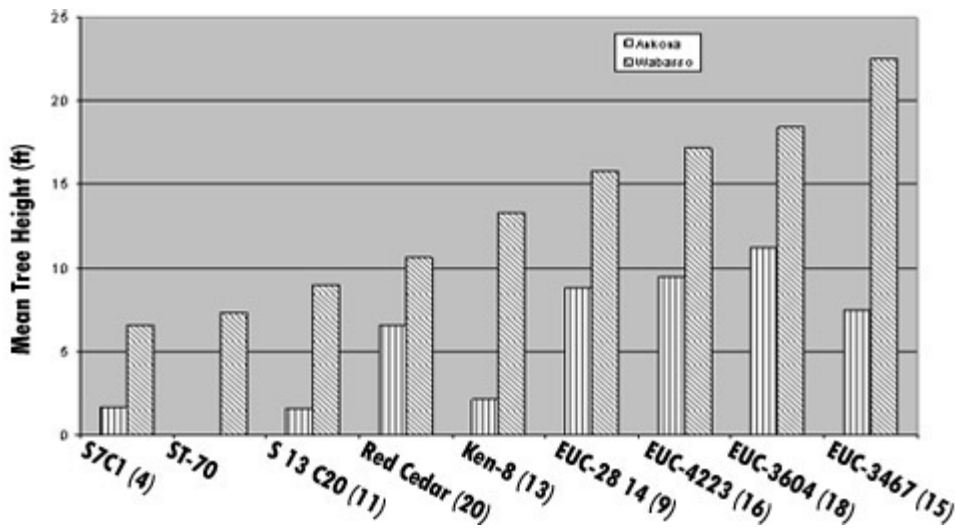


Fig. 2. Plant height after 4 years of various windbreak species in a trial conducted at the UF/IRREC, Fort Pierce.

*Populus deltoides* grew more poorly than *Eucalyptus* and was even more variable. Neither species developed a very dense canopy, with *Eucalyptus* often bare to 8 ft. Southern red cedar which is native to the area, had a dense and fine texture canopy, but is much slower growing and is more expensive to establish.

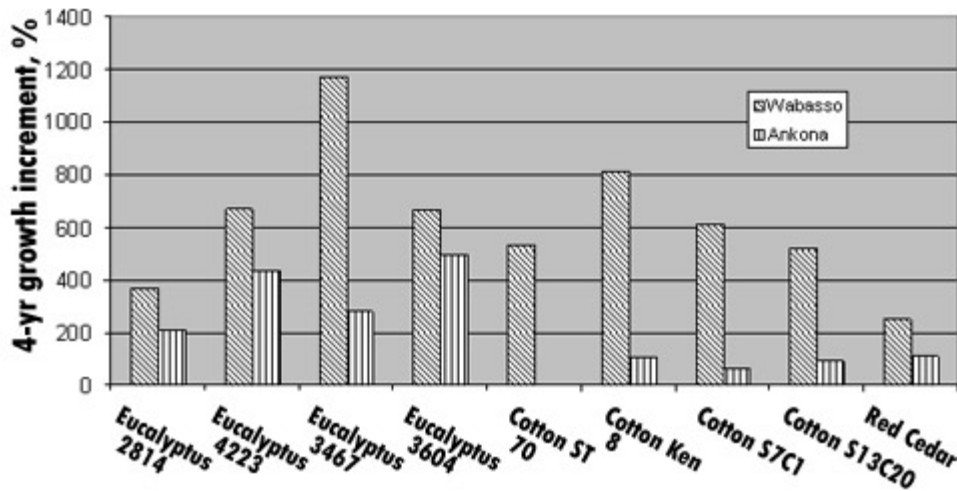


Fig. 3. The percent increase in plant height over 4 years of various windbreak species in a trial conducted at the UF/IRREC, Fort Pierce.

Windbreak management . Because of the poor branching pattern in *Eucalyptus spp.* , it is probably advisable to top trees when they reach a reasonable intermediate height. It should also be noted that the *Eucalyptus* trees are capable of bearing viable seed at maturity and have been invasive in several locations. Therefore, it may be advisable to cut back *Eucalyptus* to the ground every 3 to 4 years. If a *Eucalyptus* windbreak is established with 3 to 4 rows, then a rotational pattern can used to manage the plants by cutting one row each year back to the ground and allowing it to regrow or coppice. These plants are capable of 20 feet of regrowth in one year following cutting.

### III. Is *Eucalyptus grandis* a suitable windbreak for citrus in Florida ?

- The results from this study and other experiences in Florida are encouraging.
- Clones of this species may be suitable for the poorer soils of the flatwoods.
- It appears that the best windbreak design is to plant as 3-4 rows, harvest one row annually to generate range of canopy heights for better wind coverage and to prevent flowering.
- Pruning and cutting of *Eucalyptus* is best done in Dec. – Feb.

Spacing should be about 3 ft between trees.

- Note that Eucalyptus mulch is valued at \$10/ton. The trees should produce 10-15 tons/ harvested acre, but it may be better to mulch and use on site.
- As there are many clones, the best *Eucalyptus grandis* clones can be selected and vegetatively propagated. Desirable traits include thicker canopy, desirable coppice characteristics, soil adaptation, and plants would cost \$0.40-0.50 each versus \$0.11 for seedlings.

#### IV. General Summary

Species/clone	Mortality Winder	Mortality Wabasso	Maintenance	Hurricane performance	Overall**
Euc-2814	45%	55%	Topping/hedging	Poor, brittle	Not recommended, high mortality rate.
Euc-4223	30	20	Topping/hedging	Poor, brittle	Prefers Wabasso, but good in Winder.
Euc-3467	15	25	Topping/hedging	Poor, brittle	Prefers Winder, good in Wabasso.
Euc-3604	20	10	Topping/hedging	Poor, brittle	Prefers Ankona, but good in Wabasso.
Cotton ST-7018		100	Drops leaves in winter, may clog some water ways	Good/fair breakage	Moderate in the Wabasso, poor in Ankona.
Cotton KEN 8	18	50	Drops leaves in winter, may clog some water ways	Good/fair breakage	The best cottonwood in Wabasso.
Cotton S7C1 8	8	75	Drops leaves in winter, may clog some water ways	Good/fair breakage	Good in Wabasso, poor, high mortality in Ankona.
Cotton S13C20	5	55	Drops leaves in winter, may clog some water ways	Good/fair breakage	Moderate growth in Wabasso, poor in Ankona.
Red Cedar	0	0	Very little to none, except weeds in first 2 years	No breakage, some leaning	Highly recommended; slow grower, but steady, full look, either soil type.

\*\* These observations are based on establishment and subsequent growth with irrigation only during the first two