

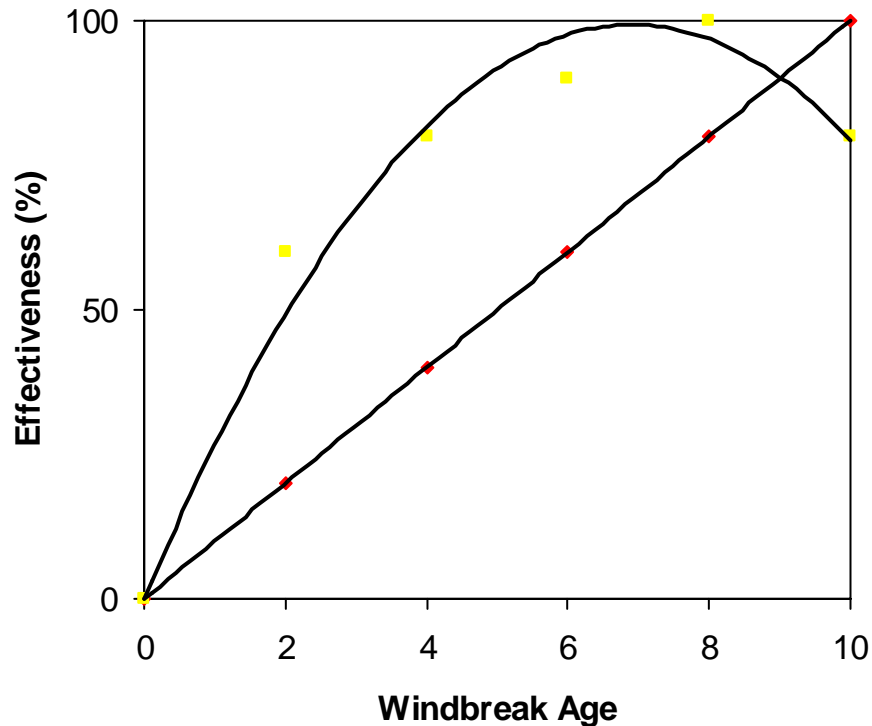
The background of the slide features a blue gradient, transitioning from a darker blue at the top to a lighter cyan at the bottom. A black silhouette of a forest, composed of various tree shapes, runs along the bottom edge of the slide.

# Forest Trees for Citrus Windbreaks

D. L. Rockwood

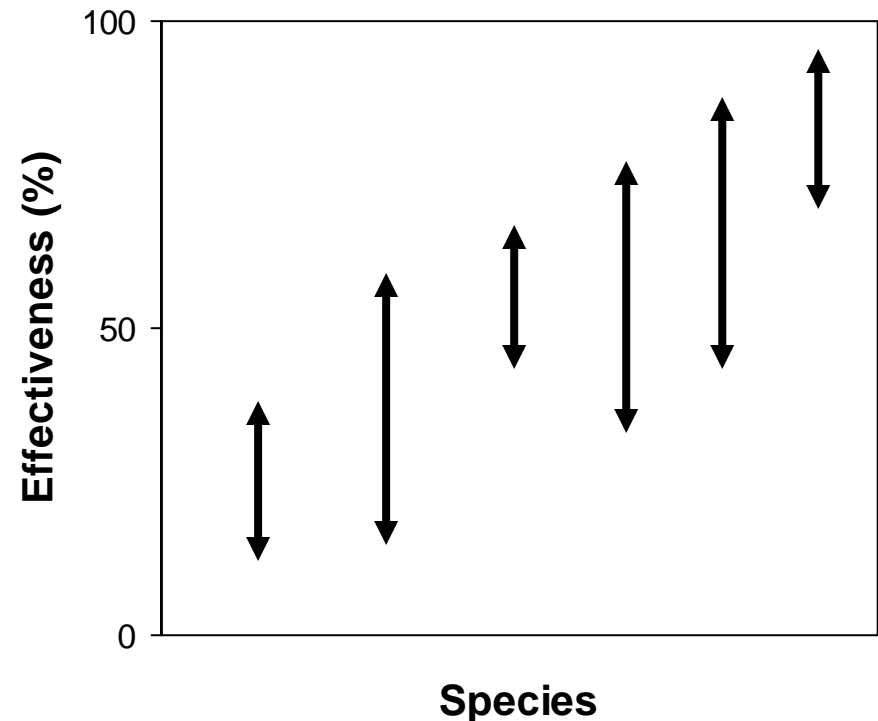
School of Forest Resources and Conservation,  
IFAS/University of Florida

# Windbreak Effectiveness



**Determined by:**  
**Culture**  
**Planting design**  
**Genetics: Species, ...**

## Genetic Variation



# Candidates for Windbreaks

**Cedar**

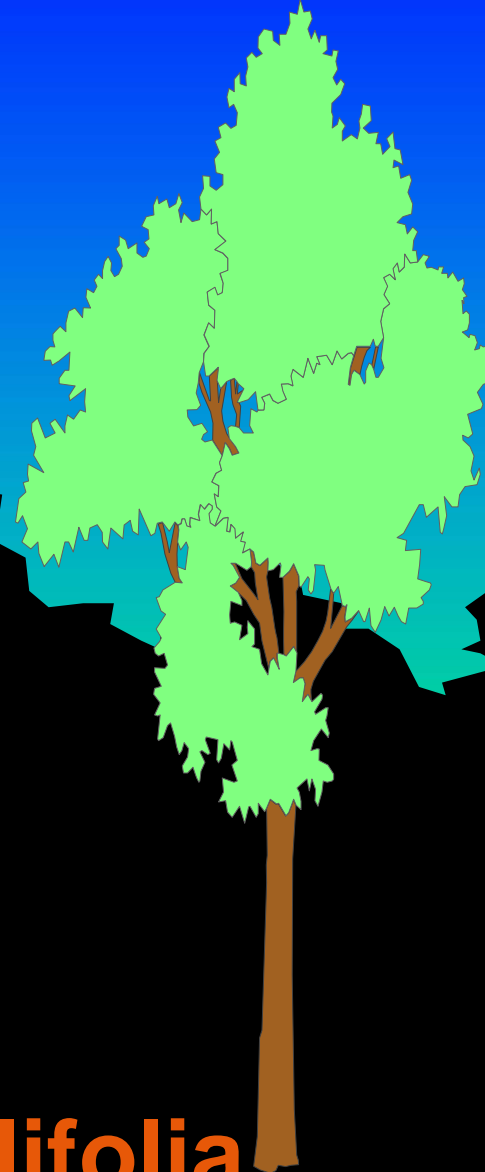
**Magnolia**

**Eucalyptus amplifolia**

**Sand Pine**

**Slash Pine**

**E. grandis**



# Evaluation for Citrus Windbreaks

Criterion	Characterization
Height	Annual; Total
Culture	Minimum; Maximum
Invasive	Potential for spread
Windfirm	Documented wind resistance
Crown	Extent; Density
Evergreen	Foliage retention
Competition	Mixing potential
Stress	Cold/Drought/Heat tolerance
Coppice	Sprout after harvest
Genetics	Provenance; Orchard; "Cultivar"
Pests	Insects/Diseases/Canker
Propagation	Bareroot (B); Containerized (C); Potted (P)
Expense	Cost per tree
Availability	Time; Quantity
Market	Timber Products; Mulch; Biofuels; Credits

# Cedar (JV) for Citrus Windbreaks

Criterion	JV
Growth (')	up to 3'; 40'
Culture	Moderate
Invasive	No
Windfirm	?
Crown	Complete, Full
Evergreen	Yes
Competition	?
Stress	High
Coppice	No
Genetics	?
Pests	?
Propagation	Bareroot, Containers, Pots
Expense (\$/tree)	0.35/1.50
Availability	Winter, Any, Any; Limited
Market	?

# **Sand Pine for Citrus Windbreaks**

**Varieties: Ocala, Withlacoochee, Choctawhatchee**

**Various Orchards**

# Sand Pine (PC) for Citrus Windbreaks

Criterion	PC
Growth (‘)	up to 3’; 70’
Culture	Low
Invasive	No
Windfirm	?
Crown	Medium, Full
Evergreen	Yes
Competition	?
Stress	High
Coppice	No
Genetics	W; 3 provenances; Orchard
Pests	?
Propagation	Bareroot, Containerized, Potted
Expense (\$/tree)	0.05+
Availability	Winter, Any, Any; Limited
Market	Pulpwood

# Magnolia (MG) for Citrus Windbreaks

Criterion	MG
Growth (')	up to 3'; 70'
Culture	Moderate
Invasive	No
Windfirm	Yes
Crown	Complete, Full
Evergreen	Yes
Competition	?
Stress	High
Coppice	No
Genetics	Wild; 3 cultivars
Pests	?
Propagation	Containers, Pots
Expense (\$/tree)	2.50+
Availability	Any, Any; Limited
Market	?



# **Slash Pine for Citrus Windbreaks**

**Varieties: N FL, S FL**

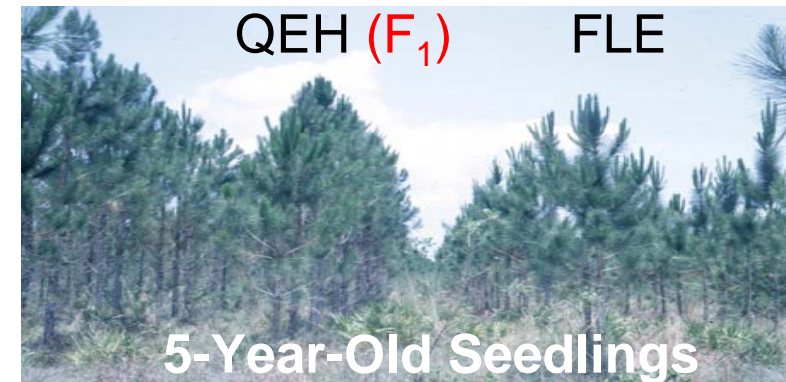
**Various Orchard Collections**

**Hybrid Clones**

# Slash Pine for Citrus Windbreaks

Criterion	PE
Growth (')	up to 5'; 90'
Culture	Moderate
Invasive	No
Windfirm	High
Crown	High, Full
Evergreen	Yes
Competition	Yes
Stress	High
Coppice	No
Genetics	O, C
Pests	Yes
Propagation	B, C, P
Expense (\$/tree)	0.04/1.50
Availability	Winter, Any, Any; High
Market	Pulp, Mulch

**Planted Seedlings**



**5-year-old Clone 545**



# E. amplifolia (EA) for Citrus Windbreaks

Criterion	EA
Growth (')	up to 20'; 90
Culture	Moderate
Invasive	No
Windfirm	?
Crown	High, Open
Evergreen	Yes
Competition	Yes
Stress	High
Coppice	Yes
Genetics	Orchard; Clones
Pests	?
Propagation	Containers
Expense (\$/tree)	0.20/0.75
Availability	Very Limited
Market	Mulch, Biofuels, Credits



# E. grandis (EG) for Citrus Windbreaks

GO73/GO77



Euc Clone Test



2006/01/05



2005/05/11



4.5-year-old *E. grandis*  
at the Tampa Port Authority



# E. grandis (EG) for Citrus Windbreaks

Criterion	EG
Growth (')	up to 25; 150
Culture	Low
Invasive	No
Windfirm	High?
Crown	High, Open
Evergreen	Yes
Competition	Yes
Stress	High
Coppice	Yes?
Genetics	Orchard; Clones
Pests	?
Propagation	Containers
Expense (\$/tree)	0.20/0.75
Availability	Limited
Market	Mulch, Biofuels, Credits

**1.75  
years**



**2.75  
years**

**4-mo-old  
Coppice**



# Casuarina for Citrus Windbreaks

Rockwood et al. [www.na.fs.fed.us/spfo/pubs/silvics\\_manual/volume\\_2/casuarina/casaurina.htm](http://www.na.fs.fed.us/spfo/pubs/silvics_manual/volume_2/casuarina/casaurina.htm)

Crane et al. 1994. HortTechnology 4(1):21-27

Criterion	C. glauca	C. equisetifolia	C. cunninghamiana
Growth (')	up to 8; 70	up to 6; 109	up to 7; 96
Culture	Moderate	Moderate	Moderate
Invasive	Yes	Yes	Yes
Windfirm	?	?	?
Crown	Continuous, Full	High, Partial	Continuous, Full
Evergreen	Yes	Yes	Yes
Competition	Yes	No	No
Stress	Some Cold Tolerance	Freeze Susceptible	Freeze Sensitive
Coppice	Suckers	Yes	Yes
Genetics	?	?	?
Pests	?	?	?
Propagation	Containers	Containers	Containers
Expense (\$/tree)	?	?	?
Availability	Very Limited	Very Limited	Very Limited
Market	Mulch	Mulch	Mulch

Forest Trees for Citrus Windbreaks						
Criterion	JV	PC	MG	PE	EA	EG
Growth (')	<3'; 40'	<3'; 70'	<3'; 70'	up to 5'; 90'	<20'; 90	<25; 150
Culture	Moderate	Low	Moderate	Moderate	Moderate	Low
Invasive	No	No	No	No	No	No?
Windfirm	?	?	Yes	High	?	High?
Crown	Com, Full	Med., Full	Com, Full	High, Full	High, Open	High, Open
Evergreen	Yes	Yes	Yes	Yes	Yes	Yes
Competition	to 0	?	?	Yes	Yes	Yes
Stress	High	High	High	High	High	High
Coppice	No	No	No	No	Yes	Yes?
Genetics	?	W; 3 ; O	W; 3	O, C	O; C	O; C
Pests	?	?	?	Yes	?	?
Propagation	B, C, P	B, C, P	C, P	B, C, P	C	C
Expense (\$/tree)	0.35/1.50	0.05+	2.50+	0.04/1.50	0.20/0.75	0.20/0.75
Availability	Limited	Limited	Limited	High	Very Limited	Limited
Market	?	Pulpwood	?	Pulp, Mulch	M, B, C	M, B, C



# Tree Species for Windbreaks

Cedar

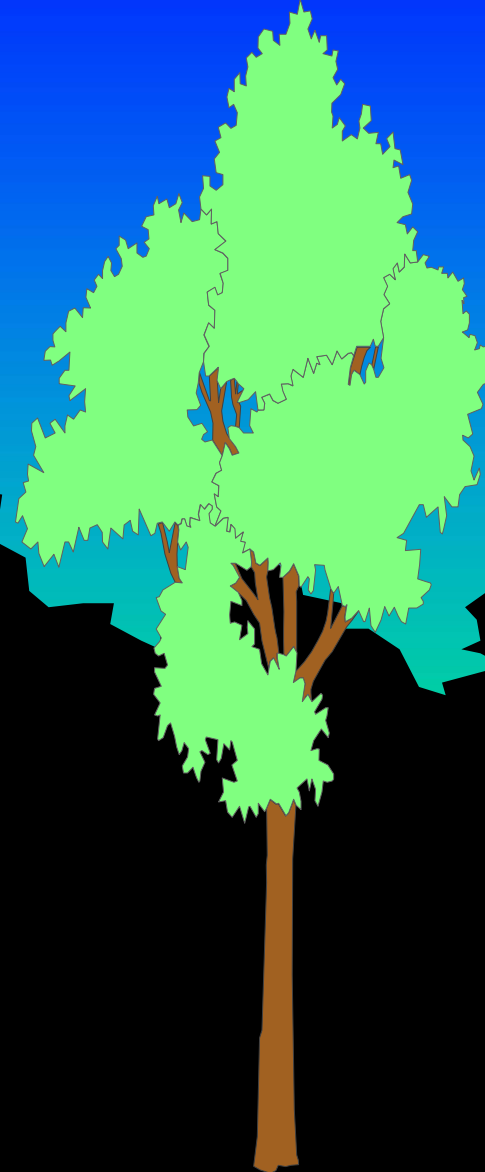
Sand Pine

Magnolia

Slash Pine

*E. amplifolia*

*E. grandis*



4.5-year-old *E. grandis*  
at the Tampa Port Authority



# **E. grandis Availability for Citrus Windbreaks in 2006**

**~20,000 Seedlings in July**

