described being adopted as the standard method of propagation in the operation of this nursery. Wedge (cleft) grafting was selected as the most efficient method of joining the stem cuttings. About 65,000 plants were propagated from wedge grafted stem cuttings and were grown to salable size in containers, 1961-63. These plants consisted of 50 hybrid tea, grandiflora and floribunda cultivars grafted on R. fortuniana stock; they included grafts made with fresh scions from plants in the nursery and grafts made from scion wood shipped to the nursery.

When fresh scions were used, 16 of the 50 cultivars gave 80 to 99 percent survival, which was comparable to the graft survival obtained at Gainesville. The other cultivars used ranged from 30 to 79 percent survival. When grafts were made with shipped scion wood, the survival of all cultivars was consistently less than 30 percent. These results demonstrated the importance of using fresh stem cuttings they also showed the expected differences in compatibility to be found among cultivars grafted on any single rootstock.

**Needed Improvement**

The technique described has given best results when the R. fortuniana “mother” plants were actively producing vegetative growth, May until January. Under field conditions, the least amount of vegetative growth is produced January through April; a decreased survival of cutting grafts made during this period is related to an increased failure of the R. fortuniana stock cuttings to initiate roots. While this seasonal limitation in the yearly schedule for propagating cutting grafts has not seriously impaired commercial production of container-grown roses, obtaining more uniform, year-long production of grafted liners does represent a desirable objective for the future.

**LITERATURE CITED**


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FREEZE-HARDY ORNAMENTAL PLANTS FOR CENTRAL PENINSULAR FLORIDA

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The freezing weather that occurred on December 12 and 13, 1957 and again on December 13 and 14, 1962 points out that Florida is subject to periods of weather that are damaging to many of the ornamental plants we grow as well as subtropical fruit trees.

The low temperatures recorded at the Citrus Experiment Station, Lake Alfred, on December 12 and 13, 1957 were 24°F and 20°F respectively. A strong, cold wind dropped temperatures on the morning of December 12 to the low 20’s on high and low ground locations in northern and central districts of Florida (1). On December 13 and 14, 1962 the low temperatures for these dates recorded at the Experiment Station were 16°F and 22°F respectively. The night of December 13 was windy with no temperature difference between high and low ground locations. It was classified by the Weather Bureau at Lake-land as the severest freeze of this century (2).

Ornamental plants on the protected side of lakes or sheltered by buildings show less injury during freezing weather than more exposed plants of the same variety. The vigor of individual plants is an important factor in cold hardiness. Vigorous plants in a dormant or semi-dormant condition can endure colder weather without injury while weak plants of the same species and variety growing in the same location may be seriously injured. Factors contributing to lack of freeze hardiness are: disease, insect or nematode infestation, lack of soil moisture and poor cultural conditions during the growing season. Late fall pruning of hedges, clipped plants and tender ornamental trees should be avoided as it encourages tender, succulent growth which is easily frozen. Late fertilizing or excessive watering after a dry spell in the fall encourages succulent winter growth especially if accompanied by warmer weather. Adequate moisture in the soil is most desirable to resist the drying effect of cold weather and the winds that frequently accompany such weather.

The following lists have been developed by

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observation of ornamental plants following the freezes of 1957 and 1962 throughout the central portion of peninsular Florida. One list includes only freeze hardy plants that are adapted to this area. The second list is made up of plants that were injured by the 1962 freeze but not injured or injured very little during the 1957 freeze. This includes plants injured in 1962 that made a rapid return to full landscape value. Many of our more desirable ornamentals are on this list. They give our plantings a Florida atmosphere.

A number of freeze-hardy plants such as spirea, redbud, wisteria and oriental magnolia that bloom well after a cold winter are not adapted to the warmer portions of central Florida as they require more cold weather than we usually have. Their use is restricted to cold locations of central Florida and north Florida so they are not included on the freeze-hardy list.

Properties landscaped with plant hardiness in mind can use freeze-hardy plants exclusively. This will result in minimum maintenance and little, if any loss following a freeze. Where some of the less hardy ornamental plants are preferred, but a reasonably freeze-proof landscape is desired, the trees, vines and principle shrubs can be freeze-hardy with less hardy plants used where their loss due to freezing will not detract too much from the appearance of the landscape.

Many ornamental plants that can not be placed on either list are worth growing. They should be placed in the landscape plan so that their loss following a freeze does not seriously detract from the appearance of the property until they regain landscape value or can be replaced with new plants.

The following ornamental plants were not injured or were injured very little by the freeze of December 13 and 14, 1962.

### TREES

**Conifers**
- Bald Cypress *Taxodium distichum*
- Bunya-Bunya *Araucaria bidwellii*
- Cypress-Pine *Callitris robusta*
- Deodar Cedar *Cedrus deodara*
- Italian Cypress *Cupressus sempervirens*
- Japanese Juniper *Juniperus chinensis sylvestris*
- Pines *Pinus spp.*
- Pond Cypress *Taxodium ascendens*
- Southern Red-Cedar *Juniperus silicicola*

**Broad-Leaf Evergreens**
- Camphor *Cinnamomum camphora*  

**Deciduous**
- Chaste Tree *Vitex agnus-castus*
- China-Berry *Melia azedarach*
- Florida Dogwood *Cornus florida*
- Fringe-Tree *Chionanthus virginica*
- Goldenrain Tree *Koelreuteria formosana*
- Hickory *Carya spp.*
- Japanese Persimmon *Diospyros kaki*
- Jerusalem-Thorn *Parkinsonia aculeata*
- Loblolly Bay *Gordonia lasianthus*
- Mimosa *Albizia julibrissin* (wilt-resistant type)
- Mulberry *Morus spp.* (fruitless and fruiting)
- Oaks *Quercus spp.*
- Pecan *Carya pecan*
- Red Maple *Acer rubrum*
- Sweet Gum *Liquidambar styraciflua*  

**Palms**
- Butia Palm *Butia capitata*
- Cabbage Palmetto *Sabal palmetto*
- Canary Island Date Palm *Phoenix canariensis*
- Chinese Fan-Palm *Livistona chinensis*
- Date Palm *Phoenix dactylifera*
- Fortunes Windmill Palm *Trachycarpus fortunei*
- India Date Palm *Phoenix sylvestris*
- Mexican Washingtonia *Washingtonia robusta*
- Saw-Cabbage Palm *Paurotis wrightii*  

### SHRUBS

**Conifers**
- Arbovites *Thuja orientalis*
- Hetzi Juniper *Juniperus hetzi chinensis*
- Pfizer Juniper *Juniperus chinensis*
- Podocarpus *Podocarpus macrophylla* (Maki)
- Shore Juniper *Juniperus conferta*

**Broad-Leaf Evergreens**
- Azalea *Rhododendron spp.* (some varieties had twig injury)
- Bamboo *Arundinaria* or *Bambusa spp.* (dwarf and fishpole types hardy)

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*Native species**

**Minor injury to old fronds**
Banana Shrub *Michelia fuscata*
Bottle-Brush *Callistemon* spp. (most species hardy)
Boxthorn *Severina buxifolia*
Burford’s Chinese Holly *Ilex cornuta* var. *burfordii*
Camellia *Camellia japonica* & *C. sasanqua* (most flower buds frozen)
Euonymus *Euonymus japonicus*
Firethorn *Pyracantha* spp.
Glossy Abelia *Abelia grandiflora*
Holly *Ilex* spp.*
Japanese Boxwood *Buxus microphylla* var. *japonica*
Japanese Pittosporum *Pittosporum tobiara* & *P. tobiara variegata*
Nandina *Nandina domestica*
Pineapple Guava *Feijoa sellowiana*
Privet *Ligustrum* spp.
Primrose Jasmine *Jasminum mesnyi*
Sandankwa Viburnum *Viburnum suspensum*
Sweet Anise *Illicium parviflorum* *
Sweet Viburnum *Viburnum odoratissimum*
Texas Silverleaf *Leucophyllum frutescens*
Wax Myrtle *Myrica cerifera* *

Deciduous
Althea *Hibiscus syriacus*
Crape-Myrtle *Lagerstroemia indica*
Hydrangea *Hydrangea macrophylla*
Pomegranate *Punica granatum*
Rose *Rosa* spp. (buds and some succulent growth killed)
Trifoliolate Orange *Poncirus trifoliata*

Miscellaneous
Adams-Needle *Yucca smalliana*
Broad-Leaf Lady Palm *Rhapis excelsa*
European Fan Palm *Chamaerops humilis*
Coontie *Zamia* spp.*
Needle Palm *Rhapidophyllum hystrix* *
Sago Cycas *Cycas revoluta*
Spanish Bayonet *Yucca aloifolia*
Saw Palmetto *Serenoa repens* *

VINES

Evergreen
Climbing Fig *Ficus pumila*
English Ivy *Hedera* spp.
Japanese Honeysuckle *Lonicera japonica* var. *halliana*
Painted Trumpet *Clystostoma callistegioides*

Deciduous
Carolina Yellow Jessamine *Gelsemium sempervirens* *
Trumpet-Vine *Campsis radicans* *
Virginia Creeper *Parthenocissus quinquefolia* *

HERBS

Perennials
Chrysanthemums *Chrysanthemum morifolium* (flowers and buds of late varieties frozen)
Daylilies *Hemerocallis* spp.
Dusty Miller *Senecio cineraria*
Gerbera (Transvaal Daisy) *Gerbera jamesoni*
Pampas-Grass *Cortaderia selloana*
Stokesia *Stokesia laevis*
Violet *Viola odorata*

Bulbs & Fleshy Roots
Agapanthus (African-Lily, Lily-of-the-Nile) *Agapanthus africanus*
Amaryllis *Hippeastrum* spp. (some leaf damage)
Easter Lily *Lilium longiflorum*
Gloriosa Lilies *Gloriosa* spp.
Dwarf Lily-Turf *Ophiopogon japonicus* (mondo grass)
Lily-Turf *Liriope* spp.
Louisiana Iris *Iris* spp.
Native Florida Iris *Iris* spp.* *
Rain-Lilies (Zephyr Lily) *Zephyranthes* spp.

The ornamental plants listed below were injured by the December 1962 freeze but came through the freeze of December 12 and 13, 1957 with little or no damage and can be classed as reasonably hardy except in the coldest locations or winters of central Florida.

TREES

Conifers
Australian-Pine *Casuaria cunninghamiana*
Norfolk Island-Pine *Araucaria excelsa*

Broad-Leaf Evergreens
Brazilian Pepper Tree *Schinus terebinthifolius*
Cajeput (Punk Tree) *Melaleuca leucadendra*
Citrus Tree *Citrus* spp.
Eucalyptus *Eucalyptus* spp.
Jacaranda *Jacaranda australasia*
Kumquat *Fortunella* spp.
Peltophorum *Peltophorum dubium*
Silk Oak *Grevillea robusta*

Palms
Gru Gru *Acrocomia totai*
Phoenix Palms *Phoenix* spp. (*P. roebeleni* less hardy than trees)
Queen Palm *Arecastrum romanzooffianum*

*Native species
SHRUBS

Broad-Leaf Evergreens
- Chalcas (Orange Jessamine) *Murraya paniculata*
- Garden Mallow or American Hibiscus *Hibiscus spp.*
- Gardenia *Gardenia jasminoides***
- Coral-Plant *Russelia equisetiformis***
- Oleander *Nerium oleander***
- Coral Ardisia *Ardisia crenata*
- Plumbago *Plumbago capensis***
- Silver Thorn *Eleagnus pungens***
- Surinam Cherry *Eugenia uniflora***
- Thryallis *Thryallis glauca***
- Variegated Vitex *Vitex trifolia var. variegata*

VINES

Evergreen
- Asparagus Ferns *Asparagus spp.***
- Confederate-Jasmine *Trachelospermum jasminoides***
- Jasmines *Jasminum spp.***
- Trailing Lantana *Lantana montevidensis***

HERBS

Perennials
- Aspidistra *Aspidistra lurida*
- Ferns—Most commonly planted genera
- Morea *Morea spp.*
- Philodendron, self-heading *Philodendron selloum* and hybrids***
- Shrimp-Plants *Beloperone spp.***
- Slipper-Flower *Pedilanthus tithymaloides***
- Sansevieria *Sansevieria spp.***
- Wedelia *Wedelia trilobata***

Bulbs and Fleshy Roots
- Bird-of-Paradise Flower *Strelitzia reginae*
- Blackberry Lily *Belamcanda chinensis*
- Calla Lily *Zantedeschia aethiopica*
- Crinum Lily *Crinum spp.***

Miscellaneous
- Bromeliads—Common species
- Century Plants *Agave spp.*
- Purple Queen *Setcreasea purpurea***
- Wandering Jew *Zebrina pendula***

***Fast recovery after 1962 freeze

LITERATURE CITED

ORNAMENTAL EUCLYTPS FOR SOUTH FLORIDA

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Since the vast forests of the Australian continent were first described by Bennett (1), Nicolay (2) and other explorers, the genus *Eucalyptus* has fascinated botanists, foresters and horticulturists. To the botanist this group of more than 500 species has presented a challenge since L’Heritier named and described the genus from specimens brought to Europe by Cook’s third expedition to Tasmania prior to 1788 (3). To the forester the eucalypts represent a genus containing many hardwood species which attain immense size in a very short time, producing tall, straight trunks devoid of branches to great height. Many have durable wood, a feature of particular interest to the forest industry. This highly diversified genus is of interest to ornamental horticulturists because it contains many species which tolerate temperatures of 0° F. and below, and others which thrive in climates where frost rarely or never occurs (1) (4). Many species have excellent form and the great majority are extremely rapid growers.

The need today for landscape trees which grow rapidly is increased by the mobility of our population and by the mass production methods used in the building industry. In suburban residential building, the industry can produce new homes most efficiently if building sites are leveled and cleared of all or most natural vegetation. However much we may deplore the practice, this procedure is likely to be continued because this is the method by which houses can be produced at lowest cost. The horticulturist, landscape architect and nurseryman probably can best improve this unfortunate situation not by criticizing the methods of the building industry but by developing more plants which erase the build-