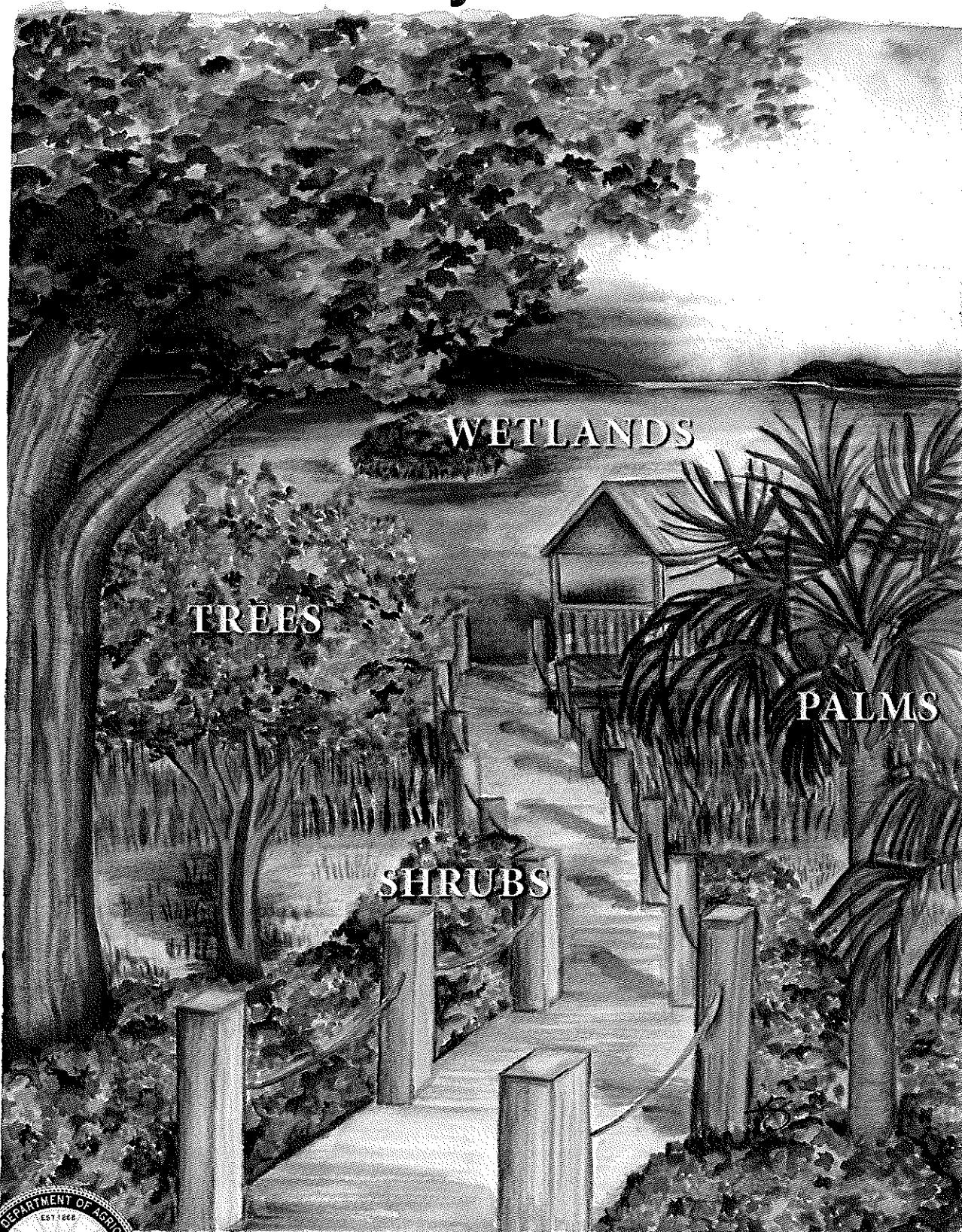


# Florida Grades and Standards for Nursery Plants 2015



Florida Department of Agriculture and Consumer Services  
Adam H. Putnam, Commissioner

# Florida Grades and Standards for Nursery Plants

## Guidelines for Electronic Viewing of Document

To go directly to individual sections,  
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**TREES**

**PALMS**

**SHRUBS**

**WETLANDS**

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# FLORIDA GRADES AND STANDARDS FOR PLANTS

## INTRODUCTION

Florida's unique and diverse climate provides environmental conditions favorable for the growth of about 25,000 plant species (T.J. Sheehan, Professor Emeritus, University of Florida). This vast number of plants, coupled with the many different sizes and shapes of plants that enter the market, clearly indicates the need for precise communication between buyer and seller. This is further necessitated as buyer and seller specify and negotiate plant quality. For example, the designation 'three gallon' can be interpreted in various ways, but in order to communicate effectively, additional specifications are needed. The Florida Grades and Standards for Plants, passed by the Florida Legislature in 1955 and codified with Section 581.031 (2)(3), Florida Statutes, establishes a vehicle for buyer and seller communication.

Consumer knowledge, preferences and awareness are demonstrated in their purchases of plants. Therefore, the nursery industry must precisely communicate the attributes of its valued product. To this end, as much detail as possible and other attributes which facilitate communication are used in these revised standards and categories of plants.

## ACKNOWLEDGMENTS

The Florida Department of Agriculture and Consumer Services gratefully acknowledges the assistance of the Florida Nursery, Grower and Landscape Association and its many members, who, along with the University of Florida's Institute of Food and Agriculture Sciences contributed their time and plant materials for the development of this manual. For this fifth edition of the Florida Grades and Standards, the Department acknowledges the contributions of the members of the ad hoc and section committees. Committee members included landscape architects, inspectors, designers, growers, and contractors.

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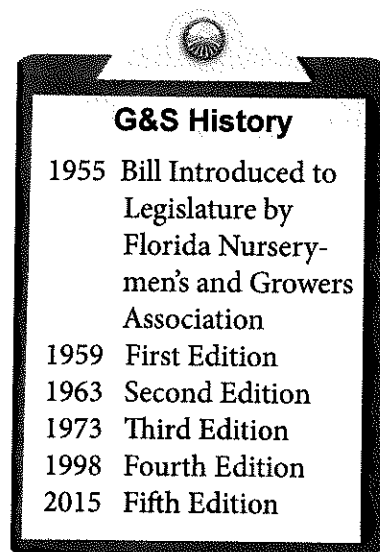
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## PLANT NAMES

The accepted scientific name, according to the international code insofar as possible, and the preferred common name(s) for plants are used in this publication. The scientific name is needed to positively identify a plant. In addition, other scientific names (synonyms, horticultural names, invalid scientific names) and other common names are included.

Since many scientific names for plants are in dispute by plant taxonomists, the names listed in “The New Royal Horticultural Society Dictionary of Gardening” are used as authoritative. For changes made subsequent to the dates of these publications, individual specialists and taxonomists were consulted. We are grateful for the assistance of Dr. Patti Anderson, Botanist, Division of Plant Industry, Florida Department of Agriculture and Consumer Services who used the 3rd Edition of the Guide to the Vascular Plants of Florida, authored by R.P. Wunderlin and B. F. Hansen for taxonomic referencing.

The accepted scientific names and preferred common names listed will be used in compliance with the labeling requirement, Item 3, under General Requirements, until changed by competent authority. The ‘other scientific names’ and ‘other common names’ are included to assist the users of this publication in the standardization of plant names.

## CONTRACT GUIDELINES

**Verification of specified grades are to be determined at the time of delivery.** Grades determined at the time of initial inspection or during the course of conducting a regrading inspection shall be based on the growth characteristics and condition of the plant at the time of grading. The grade shall not be based on any future or predicted growth potential of the plant.

Within 30 days following plant delivery, if any of the parties identified in the contract have cause to believe that any trees, shrubs, groundcover or other horticultural materials are not of the specified grade, they may at their discretion request a regrading inspection by the Division of Plant Industry, and upon the findings provided, thereby seek further remedy by requesting replacements of plant materials or other corrective actions, including but not limited to legal redress.

## PLANTS NOT LISTED IN INDEX

Landscape architects and contractors have requested that quality of plants for which grades have not been established be consistent with those plants for which grade standards have been established.

The following paragraph is only a recommendation to be included in contracts, provided the landscape architect or landscape contractor wishes to ensure that the quality of plants whose grade has not been established will be Florida No.1 according to several grading factors. The following is not a part of the grading law, but it is binding under the contract and gives a basis for inspection and legal testimony if necessary.

ALL PLANTS NOT LISTED IN GRADES AND STANDARDS FOR NURSERY PLANTS, PUBLISHED BY THE FLORIDA DEPARTMENT OF AGRICULTURE AND CONSUMER SERVICES, SHALL CONFORM TO A FLORIDA NO.1 AS TO: (1) HEALTH AND VITALITY, (2) CONDITION OF FOLIAGE, (3) ROOT SYSTEM, (4) FREEDOM FROM PEST OR MECHANICAL DAMAGE, AND, (5) HEAVILY BRANCHED AND DENSELY FOLIATED ACCORDING TO THE ACCEPTED NORMAL SHAPE OF THE SPECIES.

The tree section is meant to be used for ANY tree sold in Florida. To establish the grade for trees not listed, first determine the natural crown form, or growth habit of the tree, then identify which one of the three matrix types matches this form, and proceed through the grading process.

### NONCOMPLIANCE CASES OR VIOLATIONS

Any dispute over the grade of a plant(s) should be called to the attention of the Division of Plant Industry within 30 days following delivery to the landscape project, if the Division is expected to assist in settling the case. This is necessary to protect both the buyer and the seller. The grade of a plant can decline very rapidly if that plant is improperly handled or neglected, thus making regrading difficult.

Anyone considering a complaint should, for their own protection, see that the plant(s) in question receives the best of care and is kept segregated from other plants so that definite identity is maintained. Cases of dispute may be settled by:

1. Agreement of the buyer and the seller;
2. Having the plants in question regraded by an authorized representative of the Division of Plant Industry. The report of regrading inspection can then be used for (1) above or (3) below, or as evidence for legal action;
3. Action taken by the Division of Plant Industry relative to plant disease and insect problems.

### REGISTERING COMPLAINTS

All complaints or requests for regrading inspection should be made in writing and directed to the attention of the Chief Plant Inspector, Division of Plant Industry, P.O. Box 147100, Gainesville, Florida 32614-7100. The Chief Plant Inspector will direct the appropriate Division of Plant Industry representative to conduct the initial investigation of such complaints.

### UNDERSIZING AND SUBSTITUTION OF SPECIES

Noncompliance with plant size specifications should not be confused with plant grading regulations. If a landscape design, contract, bid or plant list specifies a Florida No. 1 grade for all plants, the contract or design usually specifies a certain size for each plant.

Plants may be undersized and make a specific grade, and not be the size specified in the contract.

**Undersizing is a breach of contract or bid but not a violation of Grades and Standards.  
A substitution of one species or cultivar for another is also a contract violation,  
but has no bearing on plant grading.**



## GENERAL REQUIREMENTS

Any landscape contract that specifies a grade shall be governed by the following requirements.

1. Be eligible for certification by the Division of Plant Industry; that is, meet tolerances for plant pests and all pertinent Division rules and regulations.
2. Originate from a registered nursery under inspection with the Division of Plant Industry, or certified and have met the requirements of Chapter 581, Florida Statutes, and Title 5B, Florida Administrative Code.
3. Meet the grade standards set forth hereafter.
4. Be correctly labeled as to name, grade and date of delivery. Plants shall be plainly and legibly labeled by the nurseryman to show the scientific or accepted common name, including variety and rootstock when applicable, and the grade. Only one name and grade label is needed on a group of plants of the same variety, rootstock and grade when addressed to one consignee, provided that the label is also marked to indicate the number of plants in the group for which the label is intended. Any invoice may be used in lieu of labels to indicate the number, name and grade of plants, provided such invoice accompanies the plants and a copy of the invoice is given to the consignee at the time of delivery.
5. Be living stock and not be in a dying condition or seriously broken, frozen or damaged.

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# TREES

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## GRADING TREES

### INTRODUCTION

Since most trees have a life expectancy of many years, it is important to plant quality trees. The quality or grade of a tree at planting can have a large impact on longevity in the landscape. Tree quality is based on trunk, branch, crown, leaf and root characteristics.

Large-maturing trees which are allowed to develop a double or multiple trunk should not be planted. These may be sturdy when they are small, but become increasingly prone to failure as they grow larger.

Trees graded **Florida Fancy** should have one dominant trunk up through the crown to the top of the tree. The exception would be for small-maturing trees (standard or multi-trunked) such as crape-myrtle, Japanese ligustrum and others. Branch diameter should not be larger than  $\frac{3}{8}$  the diameter of the trunk measured directly above the branch union. There should be no flush cuts anywhere on the tree, and no open wounds on the trunk or major branches. The crown should be full of foliage and show little, if any, evidence of chlorosis, necrosis, disease or insect infestation. The root ball should be appropriately sized (see any matrix, e.g., p. 13) and be free of severe defects.

Trees graded **Florida No. 1** may require some corrective pruning (Appendix A, Part 1, p. 29) so they develop good trunk and branch structure. They may have minor trunk injuries or could have other defects. Defects can be corrected by pruning the tree at planting and/or once or twice within a year or two after planting.

**Florida No. 2** is a lesser grade. These trees require major corrective pruning to form a structurally strong tree, or are misshapen. Large pruning dose will be required to develop a structure in these trees which will promote longevity. Defects may take several prunings over time to correct.

**Cull** is the lowest grade. These trees lack vigor or vitality and/or have poor trunk and branch structure or circling roots. They have other problems such as large open wounds, flush cuts or a loose root ball which may prevent them from becoming established in the landscape. Defects may take several years to correct or may not be correctable.

The better grades of trees will require less pruning after planting, and they are likely to establish more quickly. These have been properly trained and pruned in the nursery to develop a structure which resists damage from winds and other outside forces. Most tree maintenance budgets have not been developed to allow for pruning a tree after planting, so it makes sense to start with a tree which is healthy and well formed. If there is a large tree pruning allocation in the landscape maintenance budget, trees with the lesser grades may be trained into sturdy trees in the landscape by skilled arborists.

**Grades established for trees (Florida Fancy, Florida No. 1, and Florida No. 2) do not apply to trees used in wetland mitigation. For trees used in wetland mitigation, refer to the wetland section of this manual.**

**Grades and Standards do not apply to specialty trees like braided stems, poodles, espalier, topiary and bonsai.**

## STEPS FOR DETERMINING THE GRADE OF A TREE

**Step 1.** Choose the appropriate tree matrix type.  
(Matrix 1 – p. 13; Matrix 2 – p. 14;  
Matrix 3 – p. 15.)

Appropriate matrix type: \_\_\_\_\_

- a) For multi-trunked small maturing trees such as crape-myrtle and wax privet (Index of Small-Maturing Trees, p. 26), measure the container size or root ball diameter of the tree you are grading and ignore the caliper. For standard small maturing trees, measure the caliper of the tree. For all small maturing trees, skip Step 2.
- b) For all other trees, measure the caliper of the tree.

Caliper: \_\_\_\_\_

**Step 2.** Grade the tree according to trunk structure (see Fig. 1, p. 10). Trees with one dominant trunk are graded Florida Fancy. Those with double or multiple trunks are given a lesser grade depending on the size and location of the defect. Circle the appropriate grade below based on trunk structure only. This step is skipped if grading a small-maturing tree (Index of Small-Maturing Trees, p. 26).

**Florida Florida Florida Cull**  
**Fancy No. 1 No. 2**

**Step 3.** Grade the tree according to crown uniformity (see Fig. 2, p. 11). Circle the appropriate grade below based on crown uniformity only.

**Note:** For crown uniformity there is no Florida No. 1 or cull grade.

**Florida Florida**  
**Fancy No. 2**

**Step 4.** Record the lowest grade determined in Step 2 or 3.

**Grade:** \_\_\_\_\_

**Step 5.** If one of the following statements is true, reduce the grade determined in Step 4 by one. If two or more are true, reduce the grade by two. Reference tree caliper and appropriate matrix for 5a, 5b, and 5d. For multi-trunked small-maturing trees, use container size or root ball diameter (not caliper) for 5b and skip 5a and 5d.

- |                          |                          |   |
|--------------------------|--------------------------|---|
| T                        | F                        |   |
| <input type="checkbox"/> | <input type="checkbox"/> | a) Tree does not meet height requirement.   |
| <input type="checkbox"/> | <input type="checkbox"/> | b) Crown does not meet diameter requirement.  |
| <input type="checkbox"/> | <input type="checkbox"/> | c) Root ball is not secure enough to successfully transplant.   |
| <input type="checkbox"/> | <input type="checkbox"/> | d) Root ball or container is undersized. If two or more sizes, reduce grade by two.   |
| <input type="checkbox"/> | <input type="checkbox"/> | e) Tree with a trunk caliper larger than two inches requires a stake to hold the trunk erect. For multi-trunked trees, this applies to each trunk individually. |

**Grade:** \_\_\_\_\_

**Step 6.** If two of the following statements are true, reduce the grade determined in Step 5 by one. If three or more of the statements are true, reduce the grade by two. It takes only one true statement to reduce Florida Fancy to Florida No. 1.

T F

- a) Flush cuts were made when pruning branches from the trunk (Fig. 3, p. 12).
- b) Branch stubs were left beyond the collar (Fig. 3, p. 12). A branch stub can be removed and not reduce the grade.
- c) Open trunk wounds are evident. Wounds are considered open when they are greater than 10% of trunk circumference and/or more than two inches tall. Open or closed proper pruning cuts, surface abrasions or scratches to the bark should not be downgraded. See Glossary: **Trunk wound**.
- d) More than 10% of the crown exhibits necrosis, chlorosis or damage from pests, diseases or tip dieback.
- e) The crown is thin and sparsely foliated. Some species are thin and sparsely foliated in fall through early spring. Recently harvested field grown trees might also be thin and should not be downgraded.
- f) There is included bark between the trunk and a major lateral branch or between main trunks (Appendix B, p. 37).
- g) Trunks and/or major branches are touching.

**Step 7.** The tree is a Cull if one of the following conditions is true:

- a) The top-most structural root (roots among largest on the tree) emerges from trunk (root collar) more than two inches below the top of the root ball surface. Soil, substrate and/or roots can be removed from the top 1/3 of the root ball to conform to this depth requirement. For example, see Appendix A, Part 2, p. 30-31.
- b) One or more roots greater than 1/10 the trunk caliper, circle more than 1/3 of trunk in the top 1/2 of the root ball. All three conditions (> 1/10 trunk caliper, 1/3 around, top 1/2 of the root ball) must be true to grade as a Cull. One or more circling roots less than 1/3 the trunk diameter can be cut at the point just inside where they begin to circle. For multi-trunked trees, caliper equals the sum of the three largest trunks. Following cutting, the tree is no longer a Cull. For example, see Appendix A, Part 2, p. 30-31).

**Note:** Grades and Standards do not apply to specialty trees like braided stems, poodles, espalier, topiary and bonsai.

**Final Grade:** \_\_\_\_\_

**EXAMPLE I**

Grade a container-grown live oak (pictured below) with a three-inch caliper trunk measured six inches above the ground. The tree is 14-feet tall with a 66-inch crown diameter. The crown is uniform. The container is 45 gallons. The bark is intact and there are no flush cuts evident. There are several recent pruning cuts (not closed) along the lower trunk.

**Step 1.** Choose the appropriate tree matrix type.  
(See Index of Trees on pages 19-26 for guidance).

**Appropriate matrix type: Type 1 Matrix, Tall and Wide. (The Index of Trees indicates Type 1 Matrix is appropriate for live oak.)**

Measure the caliper of the tree and locate it in the left column of the appropriate matrix.

The caliper of the example tree is three inches.

**Step 2.** Grade the tree according to trunk structure based on the information on p. 10. Trees with one dominant trunk are graded Florida Fancy. Trees with double or multiple trunks are given a lesser grade depending on the extent of the defect.

**Grade: Florida No. 2**

**The drawings and description of a Florida No. 2 in Fig. 1 most closely match the condition of the example tree. That is, the trunk divides into two equal-sized trunks in the lower ½ of the tree. This is difficult to see in this photograph. Look carefully at the bottom of the crown. See arrow in photo above right.**

**Step 3.** Grade the tree according to structural uniformity (see Fig. 2, p. 11).

**Grade: Florida Fancy**

**The example tree has a uniform crown as shown on p. 11.**

**Step 4.** Record the lowest grade determined in Step 2 or Step 3.

**Grade: Florida No. 2**

**The grade determined in Step 2 = Florida No. 2 and in Step 3 = Florida Fancy.**



*Quercus virginiana* - live oak  
Florida No. 2

**Step 5.** If one of the following statements is true, reduce the grade determined in Step 4 by one. If two or more are true, reduce the grade by two. Reference Type 1 Matrix and three-inch caliper for 5a, 5b and 5d.

- a) Tree does not meet height requirement.
- b) Crown does not meet diameter requirement.
- c) Root ball is not secure enough to successfully transplant.
- d) Root ball or container is undersized. If two or more sizes, reduce grade by two.
- e) Tree with a trunk caliper larger than two inches requires a stake to hold the trunk erect. For multi-trunked trees, this applies to each trunk individually.

**Grade: Florida No. 2**

**The grade determined in Step 4 is not reduced because all statements in Step 5 are false.**

- Step 6.** If two of the following statements are true, reduce the grade determined in Step 5 by one. If three or more of the statements are true, reduce the grade by two. It takes only one true statement to reduce Florida Fancy to Florida No. 1.
- a) Flush cuts were made when pruning branches from the trunk (Fig. 3, p. 12).
  - b) Branch stubs were left beyond the collar (Fig. 3, p. 12). A branch stub can be removed and not reduce the grade.
  - c) Open trunk wounds are evident. Wounds are considered open when they are greater than 10% of trunk circumference and/or more than two inches tall. Open or closed, proper pruning cuts, surface abrasions or scratches to the bark should not be downgraded. See Glossary: **Trunk wound**.
  - d) More than 10% of the crown exhibits necrosis or chlorosis or damage from pests, diseases or tip dieback.
  - e) The crown is thin and sparsely foliated. Some species are thin and sparsely foliated in fall through early spring; recently harvested field grown trees might also be thin and should not be downgraded.
  - f) There is included bark between the trunk and a major lateral branch or between main trunks. (Appendix B, p. 37.)
  - g) Trunks and/or major branches are touching.

**Grade: Florida No. 2**

**The grade determined in Step 5 is not reduced because all statements in Step 6 are false.**

**Step 7.** The tree is a Cull if one of the following three conditions are true:

- a) The top-most structural root (roots among largest on the tree) emerges from trunk (root collar) more than two inches below the top of the root ball surface. Soil, substrate and/or roots can be removed from the top ½ of the root ball to conform to this depth requirement. For example, see Appendix A, Part 2, p. 30-31.
- b) One or more roots greater than ¼ the trunk caliper circle more than ½ of trunk in the top ½ of the root ball. All three conditions (> ¼ trunk caliper, ½ around, top ½ of the root ball) must be true to grade as a Cull. One or more circling roots less than ½ the trunk diameter can be cut at the point just inside where they begin to circle. For multi-trunked trees, caliper equals the sum of the three largest trunks. Following cutting, the tree is no longer a Cull. For example, see Appendix A, Part 2, p. 30-31.

**Final Grade: Florida No. 2**

**The grade determined in Step 2 is Florida No. 2. None of the statements in Steps 6 and 7 are true, so the grade remains Florida No. 2.**



## EXAMPLE 2

Grade a six-foot tall wax privet with a six-foot crown diameter grown in a 30-gallon container (pictured below). The tree stands erect by itself and root ball is secure enough to transplant. There is chlorosis on 4% or 5% of the crown, and the crown was sheared. There is bark included between the trunks but no trunks or major branches are touching one another. Skip Step 2 because you are grading a small-maturing tree (Index of Small-Maturing Trees, p. 26).



*Ligustrum japonicum* - wax privet

**Step 1.** Find the container size or root ball diameter. Choose the appropriate tree matrix (see Index of Trees on pages 19-26 for guidance). Skip Step 2.

**Appropriate tree matrix type: Type 3 Matrix, Short and Wide/Multi-Trunked. (The Index of Trees indicates Type 3 Matrix is appropriate for ligustrum.)**

**Step 2.** Skip because the tree you are grading is a small-maturing multi-trunked tree.

**Step 3.** Grade the tree according to structural uniformity (see Fig. 2, p. 11).

**Grade: Florida Fancy**  
The example tree has a small portion of the crown missing and most closely matches the Florida Fancy drawings in Figure 2.

**Step 4.** Record the lowest grade determined in Step 3.

**Grade: Florida Fancy**  
Step 2 was skipped, and Step 3 = Florida Fancy.

**Step 5.** If one of the following statements is true, reduce the grade determined in Step 4 by one. If two or more are true, reduce the grade by two. For multi-trunked, small-maturing trees, use container size or root ball diameter (not caliper) for 5b and skip 5a and 5d. Reference Type 3 Matrix for 5b.

- a) Tree does not meet height requirement.
- b) Crown does not meet diameter requirement.
- c) Root ball is not secure enough to successfully transplant.
- d) Root ball or container is undersized. If two or more sizes, reduce grade by two.
- e) Tree with a trunk caliper larger than 2 inches requires a stake to hold the trunk erect. For multi-trunked trees, this applies to each trunk individually.

**Grade: Florida Fancy**  
There is no reason to reduce the grade from Step 4 since none of the above are true.

**Step 6.** If two of the following statements are true, reduce the grade determined in Step 5 by one. If three or more of the statements are true, reduce the grade by two. It takes only one true statement to reduce Florida Fancy to Florida No. 1.

- a) Flush cuts were made when pruning branches from the trunk (Fig. 3, p. 12).
- b) Branch stubs were left beyond the collar (Fig. 3, p. 12). A branch stub can be removed and not reduce the grade.

- c) Open trunk wounds are evident. Wounds are considered open when they are greater than 10% of trunk circumference and/or more than two inches tall. Open or closed, proper pruning cuts, surface abrasions or scratches to the bark should not be downgraded. See Glossary: **Trunk wound**.
- d) More than 10% of the crown exhibits necrosis or chlorosis or damage from pests, diseases or tip dieback.
- e) The crown is thin and sparsely foliated. Some species are thin and sparsely foliated in fall through early spring. Recently harvested field grown trees might also be thin and should not be downgraded.
- f) There is included bark between the trunk and a major lateral branch, or between main trunks. (Appendix B, p. 37.)
- g) Trunks and/or major branches are touching.

**Grade: Florida Fancy**

**The grade determined in Step 5 is not reduced because only one statement is true: (f).**

**Two statements must be true in order to downgrade a Florida Fancy to Florida No. 1.**

**Step 7.** The tree is a Cull if one of the following conditions are true:

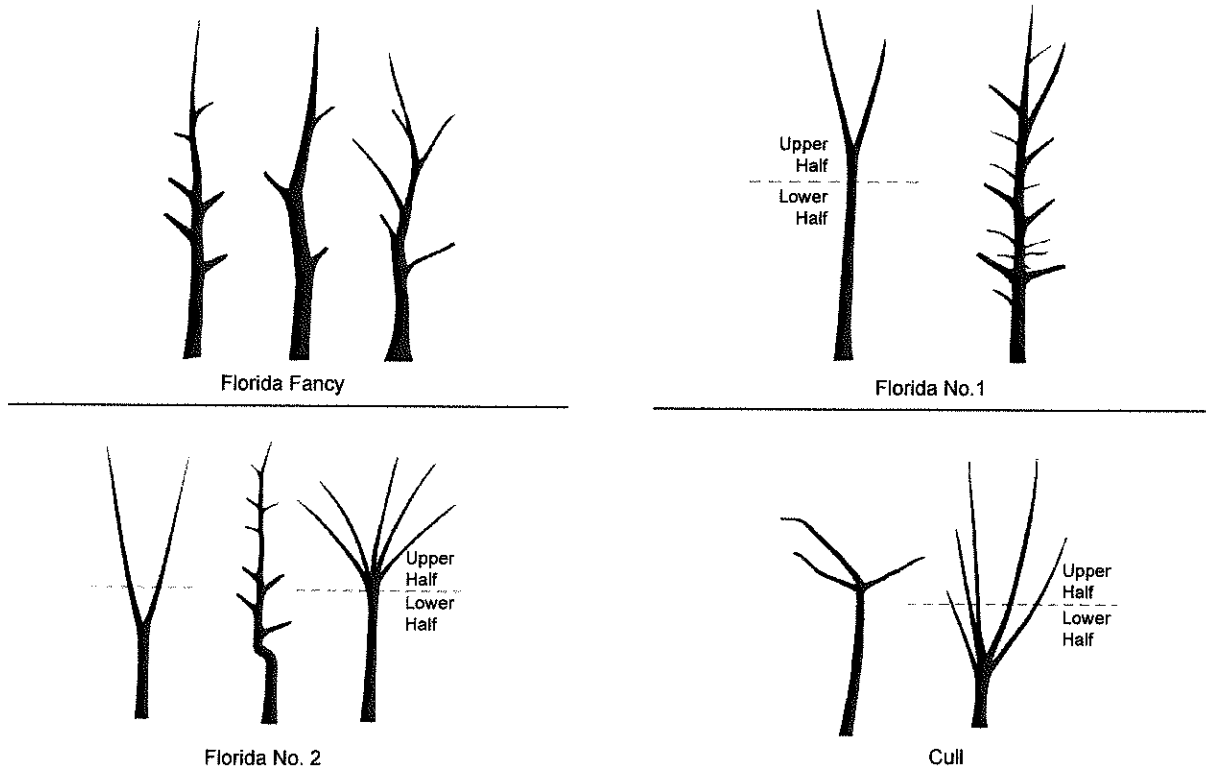
- a) The top-most structural root (roots among largest on the tree) emerges from trunk (root collar) more than two inches below the top of the root ball surface. Soil, substrate and/or roots can be removed from the top  $\frac{1}{3}$  of the root ball to conform to this depth requirement. For example, see Appendix A, Part 2, p. 30-31.
- b) One or more roots greater than  $\frac{1}{10}$  the trunk caliper, circle more than  $\frac{1}{2}$  of trunk in the top  $\frac{1}{2}$  of the root ball. All three conditions ( $> \frac{1}{10}$  trunk caliper,  $\frac{1}{2}$  around, top  $\frac{1}{2}$  of the root ball) must be true to grade as a Cull. One or more circling roots less than  $\frac{1}{3}$  the trunk diameter can be cut at the point just inside where they begin to circle. For multi-trunked trees, caliper equals the sum of the three largest trunks. Following cutting, the tree is no longer a Cull. For example, see Appendix A, Part 2, p. 30-31.

**Final Grade: Florida Fancy**

**None of the statements in Steps 6 and 7 are true, so the grade remains Florida Fancy.**

## STEP 2—Determining the Quality of Trunk Structure

**Instructions:** Locate the drawing, caption and associated text below that most closely represents the trunk structure of the tree you are grading. Select the appropriate tree grade at the end of Step 2 on page 4. For photographic examples, see pages 16-18 and 34-35. Skip Step 2 when grading small-maturing trees (Index of Small-Maturing Trees, p. 26).



**Figure 1.**

**Florida Fancy** — There is one trunk, more or less in the center of the tree as shown above; trunk does not have to be perfectly straight. The tip of the leader on the main trunk must be intact and its terminal bud must be the highest part of the tree. No trunk or branch can have a diameter greater than  $\frac{2}{3}$  the trunk diameter measured directly above the branch union. If the trunk divides in two nearly equal diameter stems in the upper 10% of the tree, the trunk is not downgraded to a Florida No. 1.

**Florida No. 1** — The trunk divides into two nearly equal diameter trunks in the upper  $\frac{1}{2}$  of the tree. If one trunk is  $\frac{2}{3}$  or less than the diameter of the other trunk, they do not have equal diameters, making the tree a Florida Fancy. Pruning in the upper  $\frac{1}{2}$  of the tree to subordinate the competing trunk may leave a noticeable void in the crown. The tip of the leader on the main trunk must be intact and its terminal bud must be the highest part of the tree.

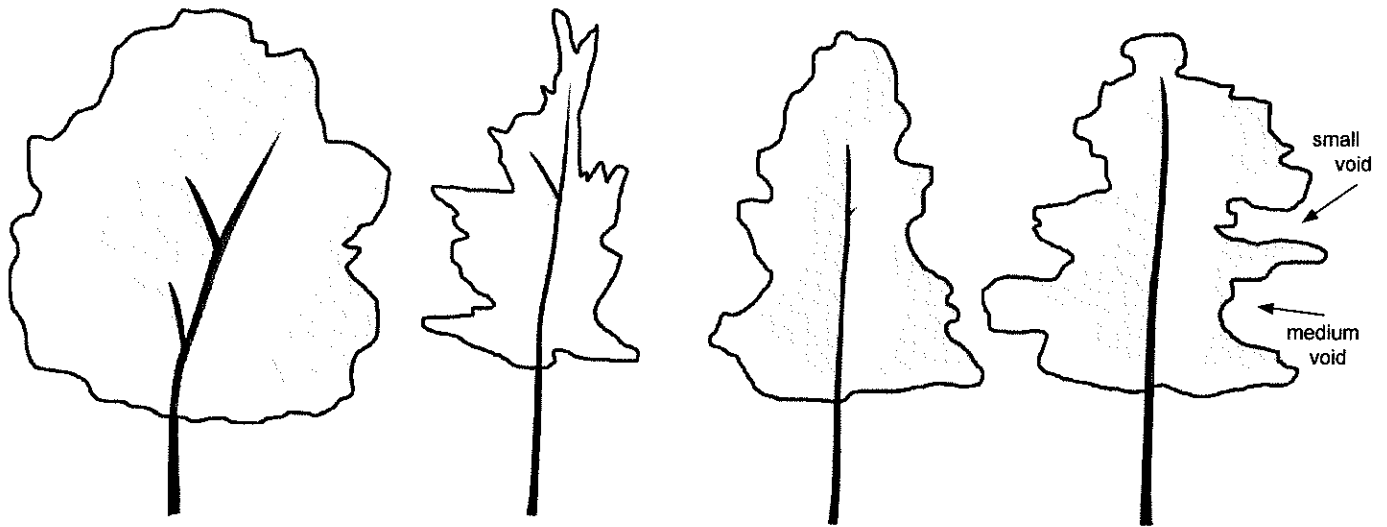
**Florida No. 2** — The trunk divides into two nearly equal trunks along the lower  $\frac{1}{2}$  of the tree or the trunk divides into three or more nearly equal diameter trunks in the upper  $\frac{1}{2}$  of the tree. Do not downgrade the tree if competing trunks are  $\frac{2}{3}$  or less the diameter of one main trunk measured above the union. Pruning to subordinate competing trunks will leave a large void in the crown. If there is a dogleg in the clear trunk portion of the tree, grade the tree a Florida No. 2. A dogleg in the crown of the tree is not a downgrading factor. (See Glossary: **Dogleg**).

**Cull** — The trunk divides into three or more nearly equal diameter trunks along the lower  $\frac{1}{2}$  of the trunk.

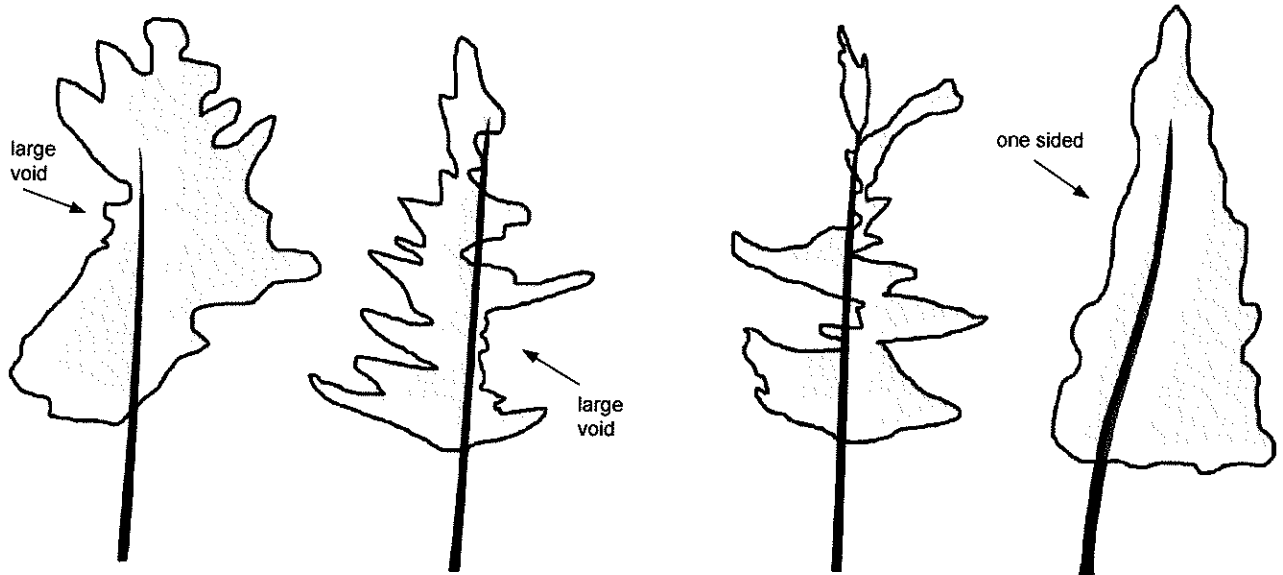
**Note:** See Appendix A - Best Management Practices, Part One, p. 29, for corrective pruning suggestion.

**STEP 3 — Determining the Crown Uniformity**

**Instructions:** Identify the drawing, caption and associated text below that most closely represents the crown uniformity of the tree you are grading. Select the appropriate tree grade, Florida Fancy or Florida No. 2, at the end of Step 3 on page 4.



Florida Fancy



Florida No. 2

**Figure 2.**

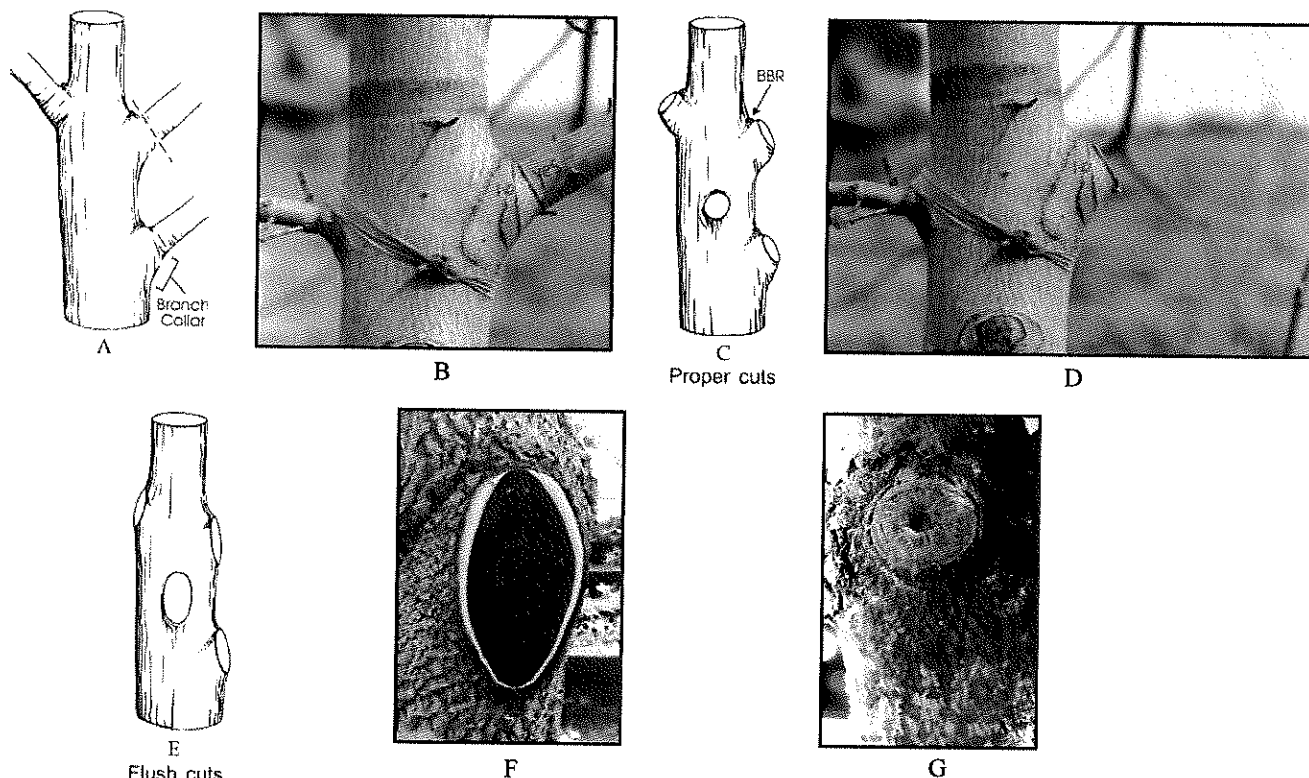
**Florida Fancy** — There may be small to medium voids, and crown shapes may vary.

**Florida No. 2** — There are large voids, and/or the tree may be one sided.

Not all shapes and forms are represented here. These images include a sample of what would be considered acceptable for Florida Fancy and Florida No. 2. **Note:** For crown uniformity there is no Florida No. 1 or cull grade. Carry a Florida Fancy or Florida No. 2 grade to Step 4.

### Step 6 (a) — Determining if Pruning Cuts Were Made Correctly

**Instructions:** Locate the photograph, drawing, caption and associated text below which most closely represents the condition of the pruning cuts on the tree you are grading. Check the 'true' column in Step 6 (a & b) if incorrect pruning cuts were made.



**Figure 3.**

**Figure 3A** — Notice the swelling at the base of each branch. This is branch and trunk tissue (referenced as the collar) which helps hold the branch securely on the trunk. A proper cut is made along the dashed line. Some species have no swelling at the base of branches, and it may be more difficult to determine exactly where to make a proper pruning cut. Always begin the cut to the outside of the branch bark ridge, and angle it away from the trunk.

**Figure 3B** — Cut along the line just to the left of the word 'yes' to properly remove the branch. If the cut is made closer to the trunk, this is a flush cut. If it is made farther from the trunk, a stub will be left.

**Figure 3C** — This shows how to properly remove branches from the trunk. Always cut to the outside of the branch collar and branch bark ridge (BBR). Notice that the BBR is still visible on top of the pruning cut and the pruning cut is nearly circular.

**Figure 3D** — The right hand side of photograph shows a properly executed pruning cut with BBR and collar intact.

**Figure 3E** — Never make a flush cut as shown here. Notice that the BBR is missing from the top of the pruning cut. This improper cut, usually oval, initiates trunk decay and can reduce growth in the nursery and landscape after planting.

**Figure 3F** — The pruning cut and the woundwood or callus which closes over a flush cut is often shaped like an oval. Woundwood is often missing from the top or bottom of a flush cut.

**Figure 3G** — Woundwood or callus around a proper pruning cut is circular.

<b>TYPE 1 MATRIX — TALL AND WIDE FORM</b> <b>Examples:</b> black-olive, golden shower tree, live oak, mahogany, red maple, river birch, royal poinciana, southern magnolia, sycamore, winged elm				
Trunk caliper	Tree height greater than or equal to	Crown diameter greater than or equal to	B&B root ball diameter greater than or equal to	Container volume greater than or equal to
1½"	5'	34"	20"	15 Gal.
2"	6'	42"	24"	25 Gal.
2½"	7'	48"	28"	25 Gal.
3"	8'	54"	32"	45 Gal.
3½"	9'	5'	36"	65 Gal.
4"	10'	6'	40"	100 Gal.
4½"	12'	7'	44"	100 Gal.
5"	14'	8'	44"	100 Gal.
5½"	16'	9'	50"	200 Gal.
6"	17'	10'	52"	200 Gal.
7"	18'	11'	60"	300 Gal.
8"	19'	12'	70"	300 Gal.
9"	20'	13'	80"	670 Gal.
10"	20'	14'	80"	670 Gal.

**Notes:**

1. Trees to be graded under this matrix are listed in the Index of Trees on pages 19-26.
2. Root ball depth on B&B stock shall be at least ⅓ of the root ball diameter shown. Trees grown in soils with high water table can have shallower root balls provided the root ball diameter is increased to the next larger tree size in the table.
3. For the purpose of determining minimum root ball size, hardened-off field grown trees can have a caliper up to one inch larger than indicated in the table.
4. If caliper does not appear in matrix, use the next smallest matrix caliper.

**Note:** ANSI standards Z60.1 designations for container size (e.g. #3, #15, #30, etc.) can be substituted for container volume.

<b>TYPE 2 MATRIX — TALL AND NARROW FORM</b>				
<b>Examples:</b> bald-cypress, Eagleston holly, East Palatka holly, Italian cypress, Japanese blueberry, little gem magnolia, pine, southern red-cedar				
<b>Trunk caliper</b>	<b>Tree height greater than or equal to</b>	<b>Crown diameter greater than or equal to</b>	<b>B&amp;B root ball diameter greater than or equal to</b>	<b>Container volume greater than or equal to</b>
1½"	5'	20"	20"	15 Gal.
2"	6'	22"	24"	25 Gal.
2½"	7'	25"	28"	25 Gal.
3"	8'	28"	32"	45 Gal.
3½"	9'	32"	36"	65 Gal.
4"	10'	36"	40"	100 Gal.
4½"	12'	48"	44"	100 Gal.
5"	14'	54"	44"	100 Gal.
5½"	16'	5'	50"	200 Gal.
6"	17'	6'	52"	200 Gal.
7"	18'	7'	60"	300 Gal.
8"	19'	8'	70"	300 Gal.
9"	20'	9'	80"	670 Gal.
10"	20'	10'	80"	670 Gal.

**Notes:**

1. Trees to be graded under this matrix are listed in the Index of Trees on pages 19-26.
2. Root ball depth on B&B stock shall be at least ⅓ of the root ball diameter shown. Trees grown in soils with high water table can have shallower root balls provided the root ball diameter is increased to the next larger tree size in the table.
3. For the purpose of determining minimum root ball size, hardened-off field grown trees can have a caliper up to one inch larger than indicated in the table.
4. If caliper does not appear in matrix, use the next smallest matrix caliper.

**Note:** ANSI standards Z60.1 designations for container size (e.g. #3, #15, #30, etc.) can be substituted for container volume.

<b>TYPE 3 MATRIX — SHORT/WIDE AND MULTI-TRUNKED FORM</b> <b>Examples: bottle-brush, crape-myrtle, figustrum, pigeon plum, sea-grape, silver buttonwood, tabebuia, wax-myrtle, yaupon holly</b>				
Trunk caliper	Tree height greater than or equal to	Crown diameter greater than or equal to	B&B root ball diameter greater than or equal to	Container volume greater than or equal to
1½"	5'	24"	20"	15 Gal.
2"	6'	30"	24"	25 Gal.
2½"	6'	36"	28"	25 Gal.
3"	7'	42"	32"	45 Gal.
3½"	8'	4'	36"	65 Gal.
4"	9'	5'	40"	100 Gal.
4½"	10'	6'	44"	100 Gal.
5"	12'	7'	44"	100 Gal.
5½"	14'	8'	50"	200 Gal.
6"	14'	8'	52"	200 Gal.

**Notes:**

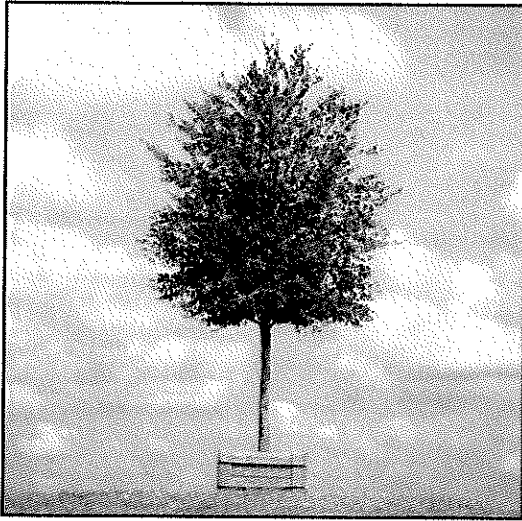
1. Trees to be graded under this matrix are listed in the Index of Trees on pages 19-26.
2. Root ball depth on B&B stock shall be at least ⅓ of the root ball diameter shown. Trees grown in soils with high water table can have shallower root balls provided the root ball diameter is increased to the next larger tree size in the table.
3. For the purpose of determining minimum root ball size, harden off trees field grown can have a caliper up to one inch larger than indicated in the table.
4. If caliper does not appear in matrix, use the next smallest matrix caliper.
5. For multi-trunked small-maturing trees, find the container size or root ball diameter of the tree you are grading and ignore the caliper.
6. Multi-trunked, small-maturing trees should not be downgraded if they are shorter than the minimum height.

**Note:** ANSI standards Z60.1 designations for container size (e.g. #3, #15, #30, etc.) can be substituted for container volume.

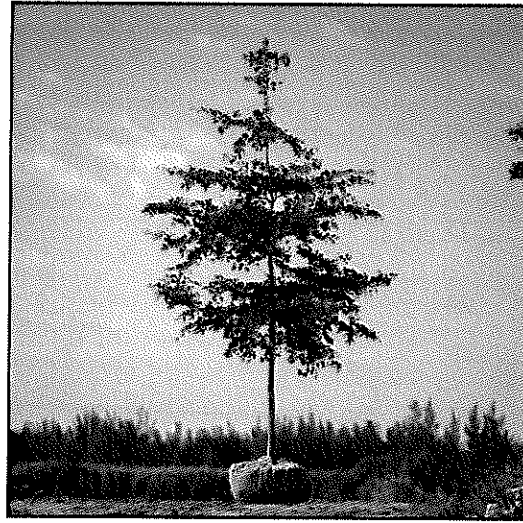


### Florida Fancy Examples

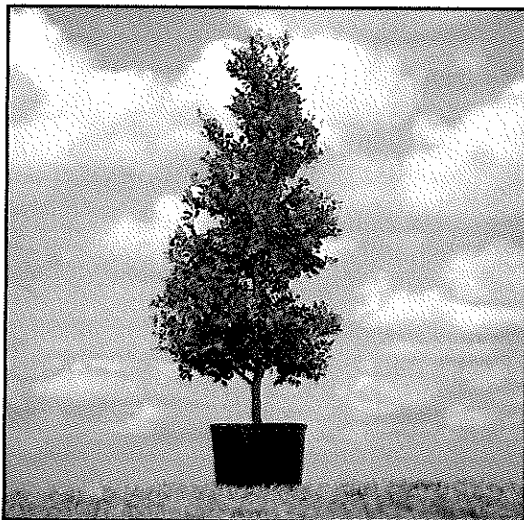
Tree has one dominant trunk or is multi-trunked. Crown uniformity is Florida Fancy on all six crowns shown.



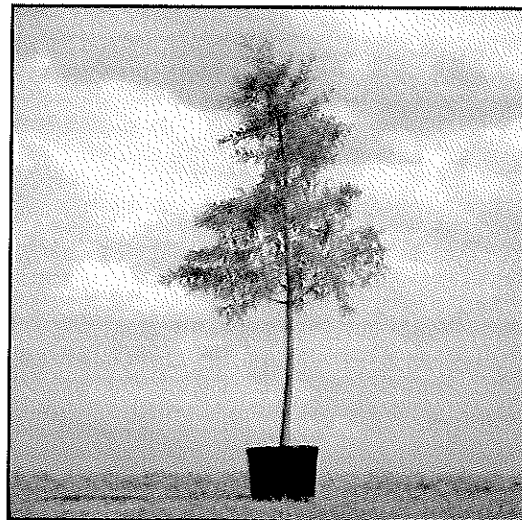
**Type 1 Matrix: live oak**



**Type 1 Matrix: black-olive**



**Type 2 Matrix: East Palatka holly**



**Type 2 Matrix: bald-cypress**



**Type 3 Matrix: wax privet**

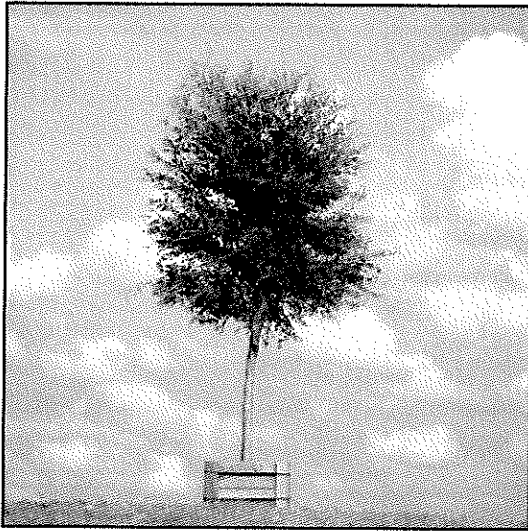


**Type 3 Matrix: loblolly bay**

### Florida No. 1 Examples

Tree is downgraded for a double trunk in top half, or a narrow crown.

Crown uniformity is Florida Fancy on all six crowns shown.



**Type 1 Matrix: live oak**



**Type 1 Matrix: sycamore**



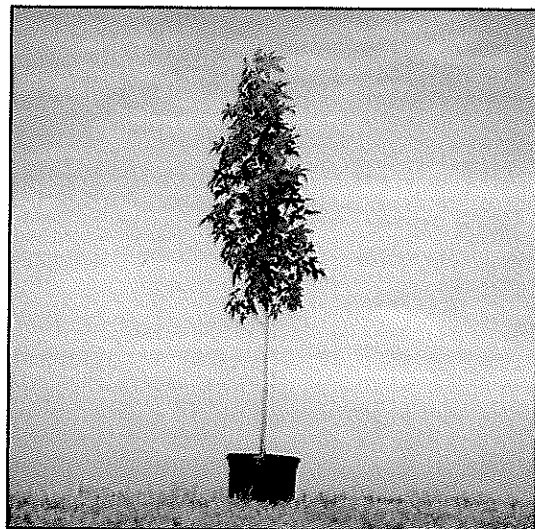
**Type 2 Matrix: East Palatka holly**



**Type 2 Matrix: bald-cypress**



**Type 1 Matrix: red maple**



**Type 1 Matrix: sweetgum**

**Florida No. 2 Examples**

Trees below represent a variety of downgrades including double trunk in the lower half, a dogleg in the clear trunk or a non-uniform crown. Not all downgrades are present on every tree.



**Type 1 Matrix: live oak**



**Type 1 Matrix: black-olive**



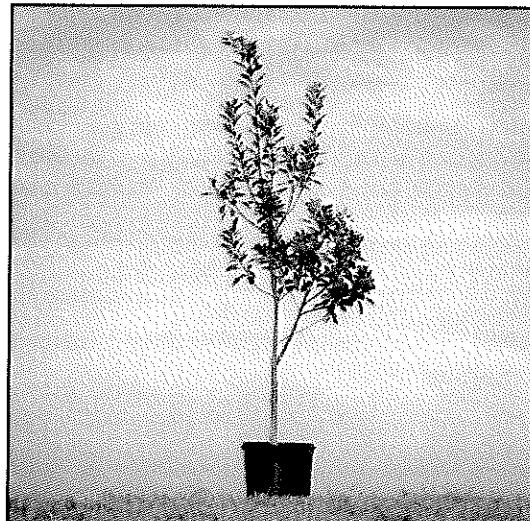
**Type 1 Matrix: red maple**



**Type 1 Matrix: sweetgum**



**Type 3 Matrix: citrus**



**Type 3 Matrix: loblolly bay**

**INDEX OF TREES COMMONLY SOLD BY FLORIDA NURSERIES  
LISTED BY COMMON NAME AND MATRIX TYPE**

**Instructions:** Find the tree you are grading in the list below and note the matrix type in the left column. Return to Step 1 on page 4.

<b>Matrix type</b>	<b>Common Name*</b>	<b>Scientific Name</b>
3	acacia, sweet	<i>Acacia farnesiana</i>
1	African tulip tree	<i>Spathodea campanulata</i>
1	almond, tropical	<i>Terminalia catappa</i>
2	American hophornbeam	<i>Ostrya virginiana</i>
3	arborvitae	<i>Platycladus orientalis</i>
1	ash	<i>Fraxinus</i> spp.
1	avocado	<i>Persea americana</i>
2	bald-cypress	<i>Taxodium distichum</i>
3	Barbados-cherry	<i>Malpighia emarginata</i>
1	basswood	<i>Tilia americana</i>
1	bauhinia	<i>Bauhinia</i> spp.
2	bay, loblolly	<i>Gordonia lasianthus</i>
3	bay, red	<i>Persea borbonia</i>
2	bay, sweet	<i>Magnolia virginiana</i>
3	beech, blue	<i>Carpinus caroliniana</i>
1	birch, river	<i>Betula nigra</i> & cvs.
1	black-gum	<i>Nyssa sylvatica</i>
1	black ironwood	<i>Krugiodendron ferreum</i>
1	black-olive	<i>Bucida buceras</i>
3	blue-beech	<i>Carpinus caroliniana</i>
3	bottle brush	<i>Callistemon</i> spp.
3	Brazilian beauty leaf	<i>Calophyllum antillanum</i>
3	carambola	<i>Averrhoa carambola</i>
3	cassia	<i>Cassia</i> spp.
2	cedar, eastern red	<i>Juniperus virginiana</i>
1	cedar, Japanese	<i>Cryptomeria japonica</i>
2	cedar, southern red	<i>Juniperus silicicola</i>
3	cherry, Barbados	<i>Malpighia emarginata</i>
3	citrus	<i>Citrus</i> spp.
1	cottonwood	<i>Populus</i> spp.
3	crape-myrtle cultivars	<i>Lagerstroemia</i> hybrids and
3	crape-myrtle, queen	<i>Lagerstroemia speciosa</i>
2	cypress, bald	<i>Taxodium distichum</i>
2	cypress, Italian	<i>Cupressus sempervirens</i>
2	cypress, Leyland	<i>X Cupressocyparis leylandii</i>
2	cypress, pond	<i>Taxodium ascendens</i>
3	dogwood, flowering	<i>Cornus florida</i> & cvs.
3	elder, yellow	<i>Tecoma stans</i>
1	elm, American	<i>Ulmus americana</i>
2	elm, lace bark	<i>Ulmus parvifolia</i>
1	elm, winged	<i>Ulmus alata</i>

\*Hyphens in the common names indicate that the name used does not correspond to the name ordinarily given to that particular group of plants. For example, yellow-elder is not a true elder, and China-fir is not a fir.

Matrix type	Common Name	Scientific Name
2	eucalyptus	<i>Eucalyptus</i> spp.
3	fig, rusty	<i>Ficus rubiginosa</i>
1	floss silk tree	<i>Chorisia speciosa</i>
3	frangipani	<i>Plumeria rubra</i>
3	fringetree	<i>Chionanthus virginicus</i>
3	fringetree, Chinese	<i>Chionanthus retusus</i>
3	geiger tree	<i>Cordia sebestena</i>
2	ginkgo	<i>Ginkgo biloba</i> & cvs.
3	glorybush	<i>Tibouchina urvilleana</i>
1	golden rain tree	<i>Koelreuteria elegans</i>
1	golden shower tree	<i>Cassia fistula</i>
1	green buttonwood	<i>Conocarpus erectus</i> & cvs. & vars.
3	guava	<i>Psidium guajava</i>
1	gum, black	<i>Nyssa sylvatica</i>
1	gumbo limbo	<i>Bursera simaruba</i>
2	hackberry	<i>Celtis laevigata</i>
3	hawthorn	<i>Crataegus</i> spp.
1	hickory	<i>Carya</i> spp.
1	holly, American	<i>Ilex opaca</i>
2	holly, dahoon	<i>Ilex cassine</i> & vars. & cvs.
2	holly, Eagleston	<i>Ilex x attenuate</i> 'Eagleston'
2	holly, East Palatka	<i>Ilex x attenuata</i> 'East Palatka'
2	holly, Foster	<i>Ilex x attenuata</i> 'Fosteri'
3	holly, Nellie R. Stevens	<i>Ilex</i> 'Nellie R. Stevens'
2	holly, Savannah	<i>Ilex x attenuata</i> 'Savannah'
2	holly, weeping yaupon	<i>Ilex vomitoria</i> 'Pendula'
3	holly, yaupon	<i>Ilex vomitoria</i>
1	Indian-rubber tree	<i>Ficus elastica</i>
1	jacaranda	<i>Jacaranda mimosifolia</i>
3	Jamaican dogwood	<i>Piscidia piscipula</i>
3	Japanese blueberry	<i>Elaeocarpus decipens</i>
2	Japanese cedar	<i>Cryptomeria japonica</i>
3	Japanese fern tree	<i>Filicium decipiens</i>
1	Japanese pagoda tree	<i>Sophora japonica</i>
3	Jerusalem thorn	<i>Parkinsonia aculeata</i>
1	kapok	<i>Ceiba pentandra</i>
3	lignum-vitae	<i>Guaiacum sanctum</i>
3	ligustrum, wax privet	<i>Ligustrum japonicum</i>
3	loquat	<i>Eriobotrya japonica</i>
3	lychee	<i>Litchi chinensis</i>
3	Madagascar olive	<i>Noronhia emarginata</i>
2	magnolia, 'Bracken Brown' Beauty	<i>Magnolia grandiflora</i> 'Bracken Brown' Beauty
2	magnolia, 'Little Gem'	<i>Magnolia grandiflora</i> 'Little Gem'
3	magnolia, saucer	<i>Magnolia x soulangeana</i>
1	magnolia, southern	<i>Magnolia grandiflora</i>
1	mahogany	<i>Swietenia mahagoni</i>
3	mango	<i>Mangifera indica</i> & cvs.

\*Hyphens in the common names indicate that the name used does not correspond to the name ordinarily given to that particular group of plants. For example, yellow-elder is not a true elder, and China-fir is not a fir.

<b>Matrix type</b>	<b>Common Name</b>	<b>Scientific Name</b>
3	mangrove, black	<i>Avicennia germinans</i>
1	maple, Florida	<i>Acer floridanum</i>
3	maple, Japanese	<i>Acer palmatum</i>
1	maple, red	<i>Acer rubrum</i> & cvs.
1	maple, silver	<i>Acer saccharinum</i>
1	mastic tree	<i>Sideroxylon foetidissimum</i>
1	oak, bluff	<i>Quercus austrina</i>
1	oak, laurel	<i>Quercus laurifolia</i>
1	oak, live	<i>Quercus virginiana</i>
1	oak, pin	<i>Quercus palustris</i>
1	oak, post	<i>Quercus stellata</i>
1	oak, sand live	<i>Quercus geminata</i>
1	oak, sawtooth	<i>Quercus acutissima</i>
1	oak, Shumard	<i>Quercus shumardii</i>
1	oak, southern red	<i>Quercus falcata</i>
1	oak, swamp-chestnut	<i>Quercus michauxii</i>
1	oak, water	<i>Quercus nigra</i>
1	oak, white	<i>Quercus alba</i>
1	oak, willow	<i>Quercus phellos</i>
3	olive, black	<i>Bucida buceras</i>
3	olive, spiny black	<i>Bucida molinetii</i>
1	paradise tree	<i>Simarouba glauca</i>
3	pigeon plum	<i>Coccoloba diversifolia</i>
2	pine	<i>Pinus</i> spp.
3	pine, screw	<i>Pandanus utilis</i>
3	pistache, Chinese	<i>Pistacia chinensis</i>
3	pitch-apple	<i>Clusia rosea</i>
3	plum, Chickasaw	<i>Prunus angustifolia</i>
3	plum, pigeon	<i>Coccoloba diversifolia</i>
2	podocarpus, Japanese yew	<i>Podocarpus macrophyllus</i>
2	podocarpus, nagi	<i>Podocarpus nagi</i>
2	podocarpus, weeping	<i>Podocarpus gracilior</i>
3	poinciana, dwarf	<i>Caesalpinia pulcherrima</i>
1	poinciana, royal	<i>Delonix regia</i>
1	poinciana, yellow	<i>Peltophorum pterocarpum</i>
1	red-bay	<i>Persea borbonia</i>
3	redbud	<i>Cercis canadensis</i>
1	river birch	<i>Betula nigra</i> & cvs.
3	rubber tree, Indian	<i>Ficus elastica</i>
1	satinleaf	<i>Chrysophyllum oliviforme</i>
3	screw-pine	<i>Pandanus utilis</i>
3	sea-grape	<i>Coccoloba uvifera</i>
1	silk-cotton tree, red	<i>Bombax ceiba</i>
3	silver buttonwood	<i>Conocarpus erectus</i>
3	small leaf clusia	<i>Clusia guttifera</i>
3	spiny black-olive	<i>Bucida molinetii</i>
3	stopper	<i>Eugenia</i> spp.

\*Hyphens in the common names indicate that the name used does not correspond to the name ordinarily given to that particular group of plants. For example, yellow-elder is not a true elder, and China-fir is not a fir.

<b>Matrix type</b>	<b>Common Name</b>	<b>Scientific Name</b>
1	sweet gum	<i>Liquidambar styraciflua</i> & cvs.
1	sycamore	<i>Platanus occidentalis</i>
3	syzygium	<i>Syzygium</i> spp.
3	tabebuia	<i>Tabebuia</i> spp.
1	tamarind	<i>Tamarindus indica</i>
1	tamarind, wild	<i>Lysiloma latisiliquum</i>
1	tropical-almond	<i>Terminalia catappa</i>
1	tulip tree, African	<i>Spathodea campanulata</i>
1	tulip-poplar	<i>Liriodendron tulipifera</i>
1	tupelo	<i>Nyssa ogeche</i>
3	verawood	<i>Bulnesia arborea</i>
3	wax-myrtle	<i>Myrica cerifera</i>
1	weeping willow	<i>Salix babylonica</i>
3	wild-tamarind	<i>Lysiloma latisiliquum</i>

\*Hyphens in the common names indicate that the name used does not correspond to the name ordinarily given to that particular group of plants. For example, yellow-elder is not a true elder, and China-fir is not a fir.

**INDEX OF TREES COMMONLY SOLD BY FLORIDA NURSERIES  
LISTED BY SCIENTIFIC NAME AND MATRIX TYPE**

**Instructions:** Find the tree you are grading in the list below and note the matrix type in the left column.  
Return to Step 1 on page 4.

<b>Matrix Type</b>	<b>Scientific Name</b>	<b>Common Name*</b>
3	<i>Acacia farnesiana</i>	acacia, sweet
1	<i>Acer floridanum</i>	maple, Florida
3	<i>Acer palmatum</i>	maple, Japanese
1	<i>Acer rubrum</i> & cvs.	maple, red
1	<i>Acer saccharinum</i>	maple, silver
3	<i>Averrhoa carambola</i>	carambola
3	<i>Avicennia germinans</i>	mangrove, black
1	<i>Bauhinia</i> spp.	bauhinia
1	<i>Betula nigra</i> & cvs.	birch, river; river birch
1	<i>Bombax ceiba</i>	silk-cotton tree, red
1	<i>Bucida buceras</i>	black-olive; olive, black
3	<i>Bucida molinetii</i>	olive, spiny black; spiny black-olive
3	<i>Bulnesia arborea</i>	verawood
1	<i>Bursera simaruba</i>	gumbo limbo
3	<i>Caesalpinia pulcherrima</i>	poinciana, dwarf
3	<i>Callistemon</i> spp.	bottle brush
3	<i>Calophyllum antillanum</i>	Brazilian beauty leaf
3	<i>Carpinus caroliniana</i>	blue-beech; beech, blue
1	<i>Carya</i> spp.	hickory
1	<i>Cassia fistula</i>	golden shower tree
3	<i>Cassia</i> spp.	cassia
1	<i>Ceiba pentandra</i>	kapok
2	<i>Celtis laevigata</i>	hackberry
3	<i>Cercis canadensis</i>	redbud
3	<i>Chionanthus retusus</i>	fringetree, Chinese
3	<i>Chionanthus virginicus</i>	fringetree
1	<i>Chorisia speciosa</i>	floss silk tree
1	<i>Chrysophyllum oliviforme</i>	satinleaf
3	<i>Citrus</i> spp.	citrus
3	<i>Clusia guttifera</i>	small leaf clusia
3	<i>Clusia rosea</i>	pitch-apple
3	<i>Coccoloba diversifolia</i>	pigeon plum; plum, pigeon
3	<i>Coccoloba uvifera</i>	sea-grape
3	<i>Conocarpus erectus</i>	silver buttonwood
1	<i>Conocarpus erectus</i> & cvs. & vars.	green buttonwood
3	<i>Cordia sebestena</i>	geiger tree
3	<i>Cornus florida</i> & cvs.	dogwood, flowering
3	<i>Crataegus</i> spp.	hawthorn
1	<i>Cryptomeria japonica</i>	cedar, Japanese; Japanese cedar
2	<i>Cupressus sempervirens</i>	cypress, Italian
1	<i>Delonix regia</i>	poinciana, royal
3	<i>Elaeocarpus decipens</i>	Japanese blueberry
3	<i>Eriobotrya japonica</i>	loquat

\*Hyphens in the common names indicate that the name used does not correspond to the name ordinarily given to that particular group of plants. For example, yellow-elder is not a true elder, and China-fir is not a fir.



Matrix Type	Scientific Name	Common Name
2	<i>Eucalyptus</i> spp.	eucalyptus
3	<i>Eugenia</i> spp.	stopper
1	<i>Ficus elastica</i>	Indian-rubber tree; rubber tree, Indian
3	<i>Ficus rubiginosa</i>	fig, rusty
3	<i>Filicium decipiens</i>	Japanese fern tree
1	<i>Fraxinus</i> spp.	ash
2	<i>Ginkgo biloba</i> & cvs.	ginkgo
2	<i>Gordonia lasianthus</i>	bay, loblolly
3	<i>Guaiacum sanctum</i>	lignum-vitae
3	<i>Ilex</i> 'Nellie R. Stevens'	holly, Nellie R. Stevens
2	<i>Ilex cassine</i> & vars. & cvs.	holly, dahoon
1	<i>Ilex opaca</i>	holly, American
3	<i>Ilex vomitoria</i>	holly, yaupon
2	<i>Ilex vomitoria</i> 'Pendula'	holly, weeping yaupon
2	<i>Ilex x attenuata</i> 'East Palatka'	holly, East Palatka
2	<i>Ilex x attenuata</i> 'Fosteri'	holly, Foster
2	<i>Ilex x attenuata</i> 'Savannah'	holly, Savannah
2	<i>Ilex x attenuata</i> 'Eagleston'	holly, Eagleston
1	<i>Jacaranda mimosifolia</i>	jacaranda
2	<i>Juniperus silicicola</i>	cedar, southern red
2	<i>Juniperus virginiana</i>	cedar, eastern red
1	<i>Koelreuteria elegans</i>	golden rain tree
1	<i>Krugiodendron ferreum</i>	black ironwood
3	<i>Lagerstroemia</i> hybrids and cultivars	crape-myrtle
3	<i>Lagerstroemia speciosa</i>	crape-myrtle, queen
3	<i>Ligustrum japonicum</i>	ligustrum, wax privet
1	<i>Liquidambar styraciflua</i> & cvs.	sweet gum
1	<i>Liriodendron tulipifera</i>	tulip-poplar
3	<i>Litchi chinensis</i>	lychee
1	<i>Lysiloma latisiliquum</i>	wild-tamarind; tamarind, wild
1	<i>Magnolia grandiflora</i>	magnolia, southern
2	<i>Magnolia grandiflora</i> 'Bracken Brown' Beauty	magnolia, 'Bracken Brown' Beauty
2	<i>Magnolia grandiflora</i> 'Little Gem'	magnolia, 'Little Gem'
2	<i>Magnolia virginiana</i>	bay, sweet
3	<i>Magnolia x soulangeana</i>	magnolia, saucer
3	<i>Malpighia emarginata</i>	Barbados-cherry; cherry, Barbados
3	<i>Mangifera indica</i> & cvs.	mango
3	<i>Myrica cerifera</i>	wax-myrtle
3	<i>Noronhia emarginata</i>	Madagascar olive
1	<i>Nyssa ogeche</i>	tupelo
1	<i>Nyssa sylvatica</i>	black-gum; gum, black
2	<i>Ostrya virginiana</i>	American hophornbeam
3	<i>Pandanus utilis</i>	pine, screw
3	<i>Pandanus utilis</i>	screw-pine
3	<i>Parkinsonia aculeata</i>	Jerusalem thorn
1	<i>Peltophorum pterocarpum</i>	poinciana, yellow
1	<i>Persea americana</i>	avocado

\*Hyphens in the common names indicate that the name used does not correspond to the name ordinarily given to that particular group of plants. For example, yellow-elder is not a true elder, and China-fir is not a fir.

Matrix Type	Scientific Name	Common Name
1	<i>Persea borbonia</i>	red-bay
2	<i>Pinus</i> spp.	pine
3	<i>Piscidia piscipula</i>	Jamaican dogwood
3	<i>Pistacia chinensis</i>	pistache, Chinese
1	<i>Platanus occidentalis</i>	sycamore
3	<i>Platyclusus orientalis</i>	arborvitae
3	<i>Plumeria rubra</i>	frangipani
2	<i>Podocarpus gracilior</i>	podocarpus, weeping
2	<i>Podocarpus macrophyllus</i>	podocarpus, Japanese yew
2	<i>Podocarpus nagi</i>	podocarpus, nagi
1	<i>Populus</i> spp.	cottonwood
3	<i>Prunus angustifolia</i>	plum, Chickasaw
3	<i>Psidium guajava</i>	guava
1	<i>Quercus acutissima</i>	oak, sawtooth
1	<i>Quercus alba</i>	oak, white
1	<i>Quercus austrina</i>	oak, bluff
1	<i>Quercus falcata</i>	oak, southern red
1	<i>Quercus geminata</i>	oak, sand live
1	<i>Quercus laurifolia</i>	oak, laurel
1	<i>Quercus michauxii</i>	oak, swamp-chestnut
1	<i>Quercus nigra</i>	oak, water
1	<i>Quercus palustris</i>	oak, pin
1	<i>Quercus phellos</i>	oak, willow
1	<i>Quercus shumardii</i>	oak, Shumard
1	<i>Quercus stellata</i>	oak, post
1	<i>Quercus virginiana</i>	oak, live
1	<i>Salix babylonica</i>	weeping willow
1	<i>Sideroxylon foetidissimum</i>	mastic tree
1	<i>Simarouba glauca</i>	paradise tree
1	<i>Sophora japonica</i>	Japanese pagoda tree
1	<i>Spathodea campanulata</i>	African tulip tree; tulip tree, African
1	<i>Swietenia mahagoni</i>	mahogany
3	<i>Syzygium</i> spp.	syzygium
3	<i>Tabebuia</i> spp.	tabebuia
1	<i>Tamarindus indica</i>	tamarind
2	<i>Taxodium ascendens</i>	cypress, pond
2	<i>Taxodium distichum</i>	bald-cypress; cypress, bald
3	<i>Tecoma stans</i>	elder, yellow
1	<i>Terminalia catappa</i>	tropical-almond; almond, tropical
3	<i>Tibouchina urvilleana</i>	glorybush
1	<i>Tilia americana</i>	basswood
1	<i>Ulmus alata</i>	elm, winged
1	<i>Ulmus americana</i>	elm, American
2	<i>Ulmus parvifolia</i>	elm, lace bark
2	<i>X Cupressocyparis leylandii</i>	cypress, Leyland

\*Hyphens in the common names indicate that the name used does not correspond to the name ordinarily given to that particular group of plants. For example, yellow-elder is not a true elder, and China-fir is not a fir.

## INDEX OF SMALL-MATURING TREES

<b>Scientific Name</b>	<b>Common Name*</b>
<i>Acacia farnesiana</i>	acacia, sweet
<i>Acer palmatum</i> and cultivars	Japanese maple
<i>Callistemon</i> spp. and cultivars	bottle-brush
<i>Cassia bicapsularis</i>	cassia
<i>Chionanthus retusus</i>	Chinese fringetree
<i>Chionanthus virginicus</i>	fringetree
<i>Citrus</i> spp.	citrus
<i>Guaiacum</i> spp.	lignum-vitae
<i>Ilex vomitoria</i> and cultivars	yaupon holly
<i>Lagerstroemia</i> hybrids and cultivars	crape-myrtle
<i>Ligustrum japonicum</i>	ligustrum, wax privet
<i>Magnolia x soulangiana</i>	magnolia, saucer
<i>Malpighia emarginata</i>	Barbados-cherry
<i>Myrica cerifera</i>	wax-myrtle
<i>Parkinsonia aculeata</i>	Jerusalem thorn
<i>Platycladus orientalis</i>	arborvitae
<i>Prunus</i> spp. and cultivars	plum
<i>Psidium</i> spp.	guava
<i>Tecoma stans</i>	elder, yellow

\*Hyphens in the common names indicate that the name used does not correspond to the name ordinarily given to that particular group of plants. For example, yellow-elder is not a true elder, and China-fir is not a fir.

**Note:** This list is not inclusive of all small-maturing trees. Other trees can be considered small-maturing as long as they naturally remain small at maturity.

## GLOSSARY OF TREE TERMS

**Balled and burlapped (B&B):** A soil ball containing roots of the plant wrapped and secured in natural or treated burlap and/ or wire.

**Branch stub:** The typically short portion of a branch left beyond the collar.

**Caliper:** Trunk caliper (trunk diameter) is measured six inches from the ground on trees up to and including four inches in caliper, and 12 inches above the ground for larger trees. Since trunks are seldom round, the average of the largest diameter and that perpendicular to it, is referred to as caliper. Any accurate device including a diameter tape may be used to measure caliper. Trees are placed in diameter classes in order to grade them. For example, trees in the two-inch class include those calipering two inches up to, but not including 2½ inches. Those in the 2½-inch class include trees calipering 2½ inches up to, but not including three inches, and so forth.

**Callus:** Undifferentiated, meristematic tissue with little lignin formed by the cambium layer; callus can form sprouts.

**Chlorosis:** A lightness or bleaching (typically yellowing) of green color in the foliage unlike the normal color. This indicates that the plant has not been maintained in the best of health. Chlorosis is not to be confused with normal yellowing of foliage common on many deciduous species late in the season. It is also not to be confused with yellowing of leaves on evergreens just prior to a new leaf flush, or with the normal yellow coloration of variegated foliage.

**Clear trunk:** That portion of the trunk maintained free of branches. The clear trunk is the lower portion of the trunk measured from the soil line up to the first major branch. Small temporary branches may exist on a clear trunk.

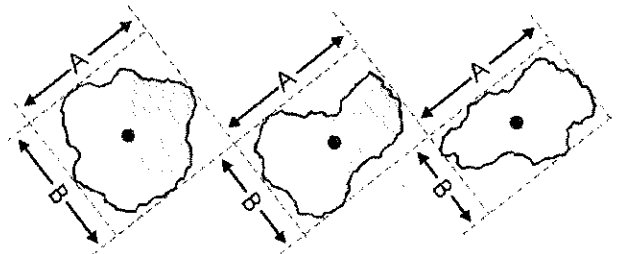
**Container:** A vessel made from plastic, fabric, wood or other material held above ground or partially in the ground that holds substrate and a root system.

**Collar:** The swelling formed by the trunk and branch wood intermingling in a union with a branch much smaller than the trunk.

**Corrective pruning:** Pruning which removes or shortens one or more branches or trunks to create strong, well-structured architecture.

**Crown:** The branches, twigs and leaves that make up the foliage portion of the tree.

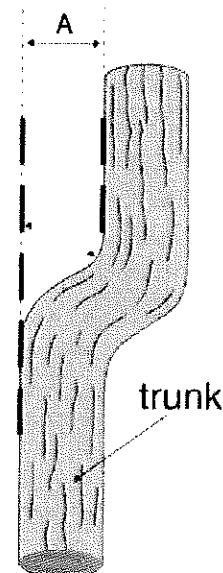
**Crown diameter:** Crown diameter is the average of the widest branch spread and that perpendicular to it (see Fig. 4).



**Figure 4.** Add A and B together and divide by two to obtain crown diameter.

**DBH:** Diameter at breast height (4½ feet from the ground). This is not an appropriate method for measuring nursery trees.

**Dogleg:** A significant S-shaped deformation in the trunk below the crown (see Fig. 5). If there is a dogleg in the clear trunk portion, the tree is graded Florida No. 2. If the dogleg is in the crown portion of the tree, the tree is not downgraded.



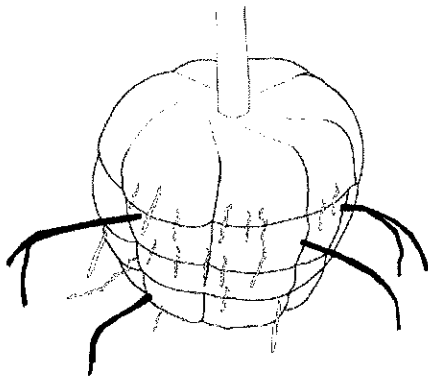
**Figure 5.** The distance 'A' can be no more than the trunk diameter.

**Dominant trunk:** The trunk that grows up through the crown of the tree and obviously dominates the rest of the branches.

**Flush cut:** A pruning cut made too close to, or flush with, the trunk. This type of cut is detrimental to tree health and is not recommended (Fig. 3, p. 12).

**Grow-bag:** A fabric container used for trees in field soil. Synthetic fabric grow bags must be removed prior to planting. Fabric used to hold substrate and the plant above ground is considered a container.

**Hardened-off trees:** Field-grown trees that are balled and burlapped in the nursery with visible roots growing through the burlap (Fig. 6).



**Figure 6.** Hardened-off trees have roots growing through the burlap.

**Included bark:** Bark between a branch and trunk or between trunks that is squeezed together in the branch union (see page 37).

**Leader:** That part of the trunk that extends into the top ¼ on the tree.

**Major lateral branches:** Branches growing from the main trunk that are among the largest on the tree.

**Multi-trunked:** Several stems growing from the ground or from a short trunk.

**Necrosis:** Dead, typically brown, foliage and/or stem tissue.

**Root ball diameter:** The average diameter of the widest portion of the root ball and that perpendicular to it.

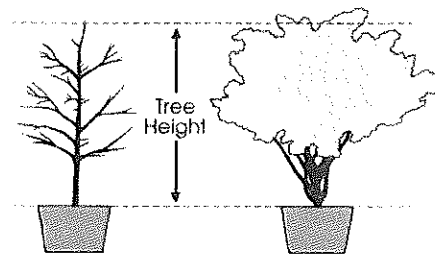
**Small-maturing:** Trees that remain small in stature, even in old age.

**Specialty trees:** A formal, man-manipulated plant form, either tree or shrub, developed and maintained by frequent clipping and shearing. Such forms include sheared pyramids, espaliers, columns, animal topiaries, large bonsai and other special shapes. Grades and Standards do not apply to specialty trees.

**Standard:** Tree trained to grow with a single trunk below the crown.

**Subordination (subordination pruning):** Removing the terminal, typically upright or end portion of a parent branch or stem to slow growth rate so other portions of the tree grow faster.

**Tree height:** The distance from the ground to the top most portion of the tree (see Fig. 7). On small, multi-trunked trees such as crape-myrtle, Japanese ligustrum and wax-myrtle, tree height is measured to the top of the main body of the crown.



**Figure 7.** Measuring tree height.

**Trunk wound:** Wood (xylem) exposed due to injury (from mechanical, biological, or environmental agents) that killed or removed bark. Wounds are considered open when they are greater than 10% of trunk circumference and/or more than two inches tall. The following are not considered trunk damage: scrapes, surface abrasions or discoloration; shallow gouges; evidence of rubbing that does not expose wood; closed pruning wounds, or the woundwood growing over or around any wound.

**Vitality:** Ample growth as a result of cultural conditions.

**Vigor:** Ample growth as a result of genetic capacity.

**Woundwood:** Differentiated woody tissue forming around a wound, such as a pruning cut; typically follows callus.

## APPENDIX A - BEST MANAGEMENT PRACTICES (BMP)

**IMPORTANT NOTE: This BMP Appendix is NOT part of the grading process!**

### Introduction

The Best Management Practices (BMP) contained within this section are NOT part of the grading process. Specifying that trees meet a particular grade in the Grades and Standards for Nursery Plants does not imply that the practices outlined in the BMPs are recommended or required. They are presented to teach the best available research- and experience-based practices associated with tree planting and maintenance. Their use is completely optional unless the contract specifications and details call for their inclusion, in which case they are a part of the contract, not the grading process.

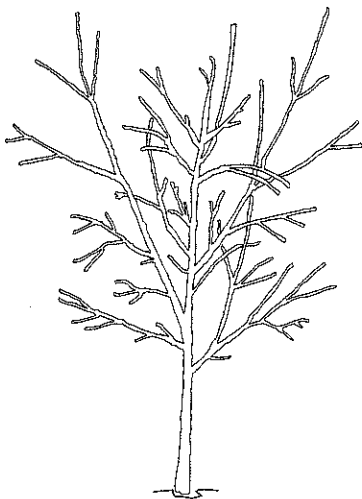
### Part One:

#### Pruning Before, At, or After Planting

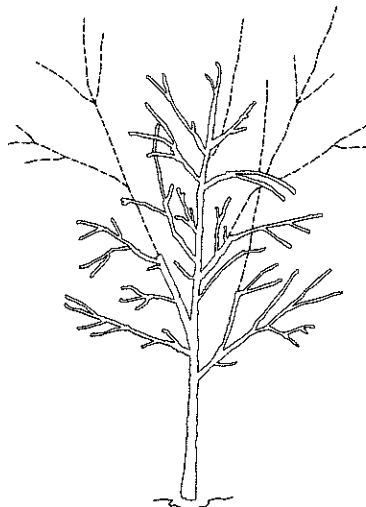
Trees may be delivered with a dominant trunk, but without one leader to the top of the tree. Florida Fancy and Florida No. 1 grades both meet this condition. Under normal nursery practices, it is impractical to maintain every tree with one leader to the very top of the tree. Trees can be pruned before planting, at planting, or after planting without impacting establishment or root growth. Trees pruned as suggested below, generally develop better structure at maturity than those not receiving this treatment (Kristoffersen et al. 2010; Gilman 2014). Following pruning, the tree must meet the grade called for by the project.

The illustrations below are for the very simple case of two stems competing with the central leader. Real-world scenarios are more complicated and require a skilled professional to make judgments as to which branches should be pruned and by how much. This can depend on the tree species, time of year, extent of defects and other factors. Refer to the University of Florida Landscape Plants website at <http://hort.ifas.ufl.edu/woody/pruning.shtml> for more detail.

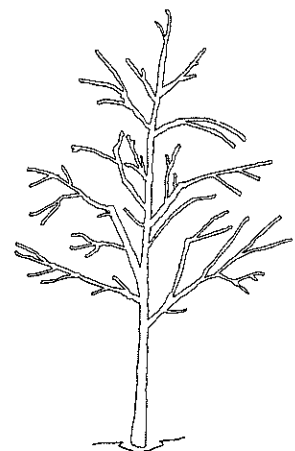
**Several stems competing with leader**



**Remove stems competing with leader**



**After pruning, one leader dominates crown**

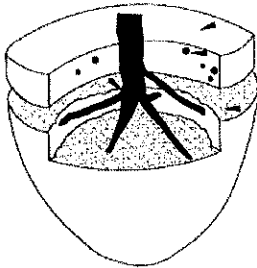


**Part Two:  
Root Ball Correction**

Distance between the substrate or soil surface and the root collar is largely set by the original planting depth in the nursery. The root collar is the point where the top-most structural roots meet the trunk and may or may not be associated with a swelling depending on tree species or age. In some cases, the root collar may be too deep in the root ball. Substrate soil, and/or roots can be removed so the root collar is closer to the root ball top surface. Roots circling or crossing over structural roots can be removed by cutting at the point just before a root turns abruptly to circle or plunge (descend) deeper into the root ball. Roots growing at the edge of the root ball can be removed at time of planting.

**Remove soil and roots over the root collar**

Root collar

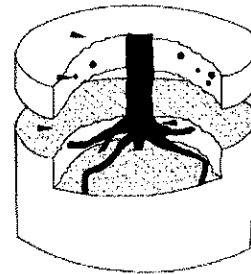


Remove excess soil  
Remove excess roots  
New root ball surface

Tree planted too deeply in root ball.  
Remove excess soil and roots.

**Remove soil and roots over the root collar**

Remove excess substrate/soil  
Remove excess roots  
New root ball surface

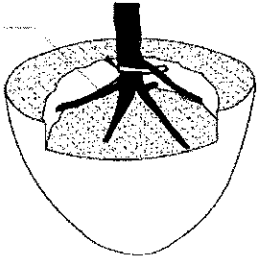


Root collar

Tree planted too deeply in root ball.  
Remove excess soil and roots.

**Remove defects**

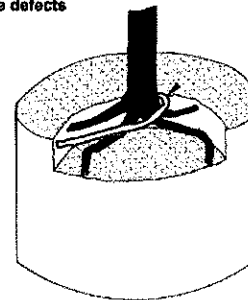
Cut here  
Structural root



Structural (large) roots shown in black.  
Remove defective root shown in white.

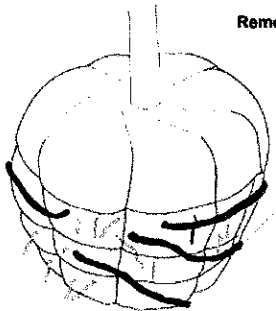
**Remove defects**

Cut here



Four structural roots shown in black.  
Remove root (white) growing over structural roots.

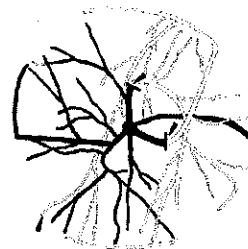
**Remove defects**



Remove structural roots deflected on the outer edge of root ball.

**Remove defects**

Cut here



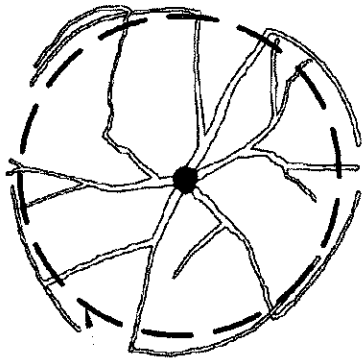
Root ball outer edge

Cut structural root just before they make abrupt turn by cutting tangent (parallel) to the trunk (two cuts shown).  
Note: Not all roots in the root ball are shown.

**Root Ball Correction (continued)**

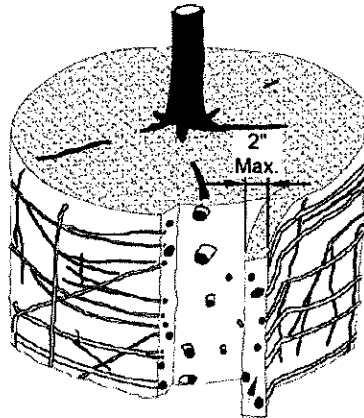
It has been recognized that trees cannot be grown without roots present on the outer edge of the container or hardened-off field-grown root balls. Roots growing up, down and around the edge is a normal condition on nursery-grown trees. Woody (non-fibrous) roots can be removed individually at planting just prior to where they turn. The outer one or two inches (depending on root ball size) of a container root ball can be shaved from the root ball.

**Before Shaving**



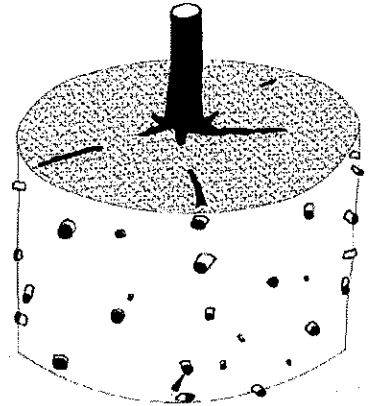
Shave root ball here to remove all roots growing on outer edge of root ball.

**Shaving Process**



Shave outer edge of root ball 1" to 2" thick.

**Shaving Complete**

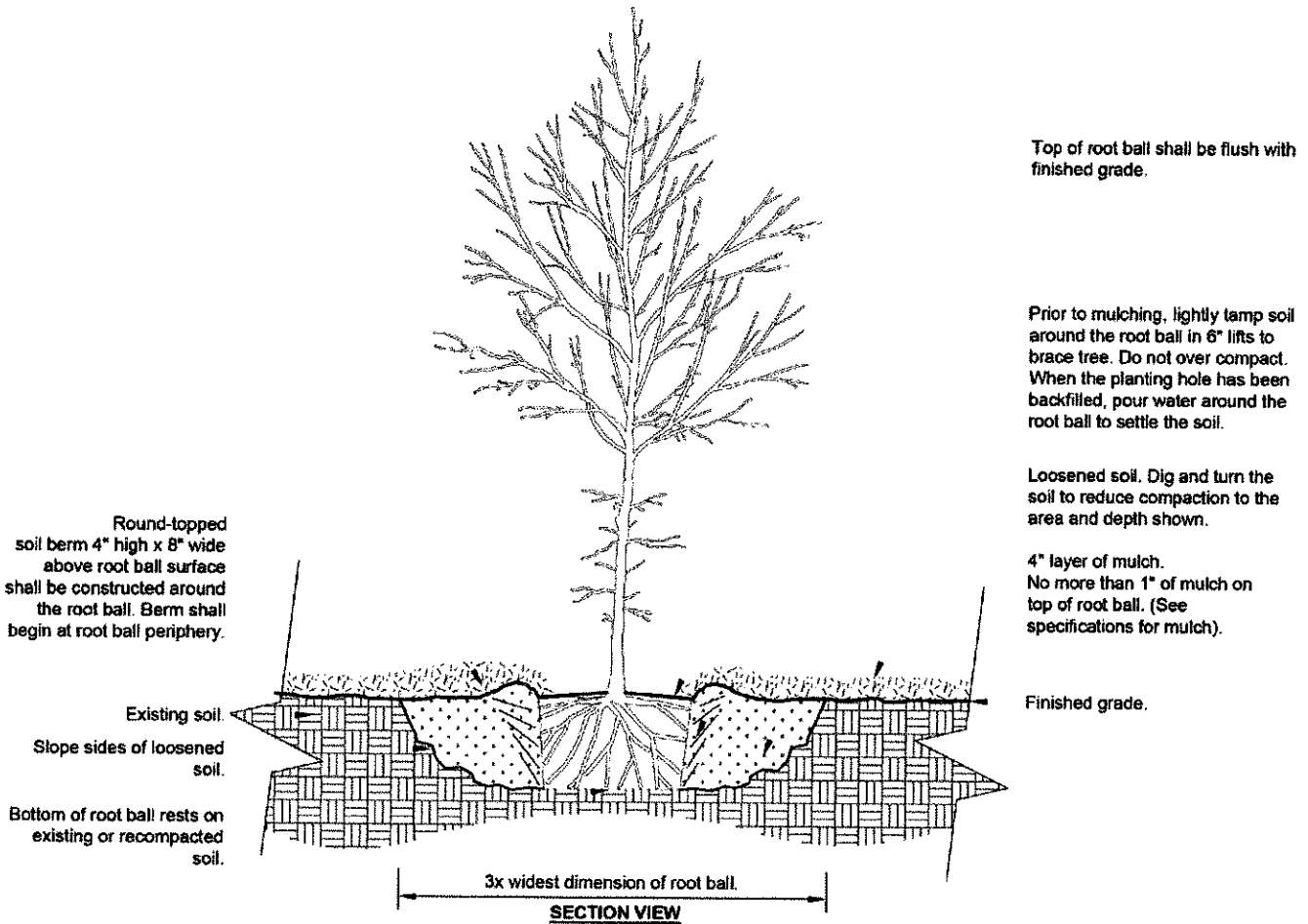


Root tips exposed at edge of root ball. All roots growing around edge are removed.



**Part Three:  
Planting Detail**

The generalized planting detail presented below is designed for a well-drained, good soil. Modify with written specifications and details as needed. Examples of these in dwg. and pdf. formats can be found at <http://hort.ifas.ufl.edu/woody/details-specs.shtml>.



**Note:** Details from pages 29-32 are printed from open-source, editable, and free details and specifications. Thanks to the Urban Tree Foundation, Visalia, California for permission to use these images.

**Part Four:**

**Irrigation After Planting and During Establishment**

Regular irrigation after planting is essential for survival and establishment of almost all trees. Establishment is the amount of time required for trees to grow a sufficient root system to support growth in their planted environment. Regular irrigation after planting encourages rapid root growth that is essential for establishment. Irrigation also helps maintain and encourage the desirable dominant leader in the tree crown on large-maturing shade trees. Instead of a dominant leader, trees that are under-irrigated during the establishment period can die back, and often develop undesirable, low, codominant stems and double leaders that can split from the tree later.

<b>Size of nursery stock</b>	<b>Irrigation schedule for vitality</b>	<b>Irrigation schedule for survival</b>
< 2-inch caliper	Daily for two weeks, every other day for two months, weekly until established	Two to three times weekly for two to three months
2 - 4-inch caliper	Daily for one month, every other day for three months, weekly until established	Two to three times weekly for three to four months
> 4-inch caliper	Daily for six weeks, every other day for five months, weekly until established	Twice weekly for four to five months

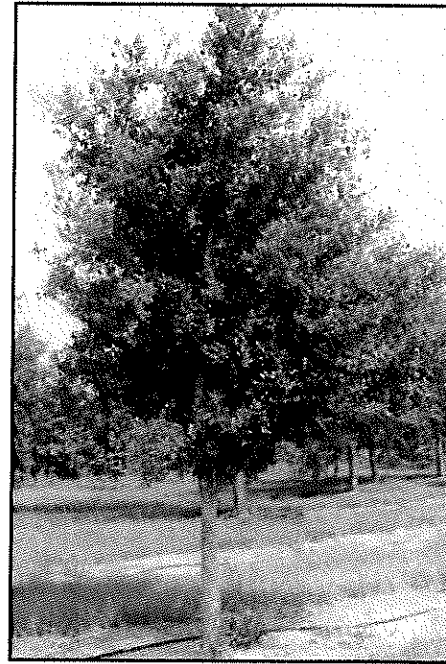
**Table notes:**

1. At each irrigation, apply two to three gallons per inch trunk caliper to the root ball surface. Apply it in a manner so all water soaks the entire root ball. Do not water if root ball is wet/saturated on the irrigation day.
2. When irrigating for vitality, delete daily irrigation when planting in winter or when planting in cool climates. Establishment takes three (hardiness zones 10-11) to four (hardiness zones 8-9) months per inch trunk caliper. Never apply irrigation if the soil is saturated.
3. When irrigating for survival, trees take much longer to establish than regularly irrigated trees. Irrigation may be required in the normal hot, dry portions of the following year.

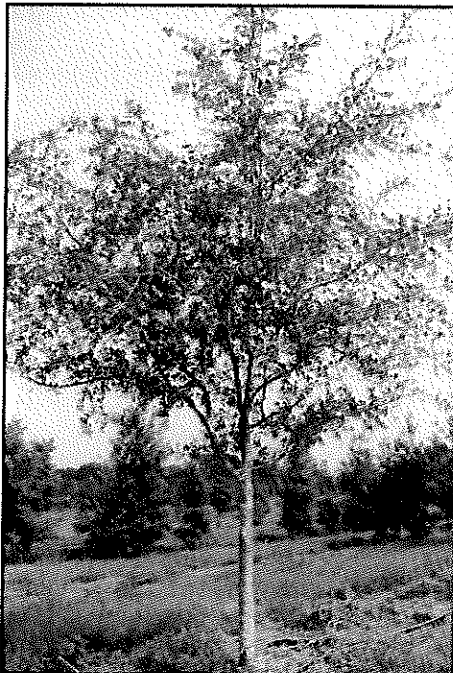
**APPENDIX B - SHADE TREE GRADING EXAMPLES**



**1.** Florida Fancy live oak in winter. There is one dominant trunk.



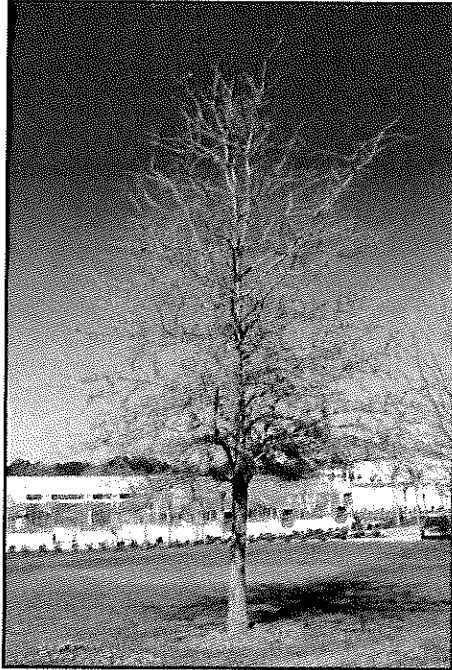
**2.** Florida Fancy live oak in late spring. The dominant trunk curves slightly up through the crown. This is perfectly acceptable for a Florida Fancy.



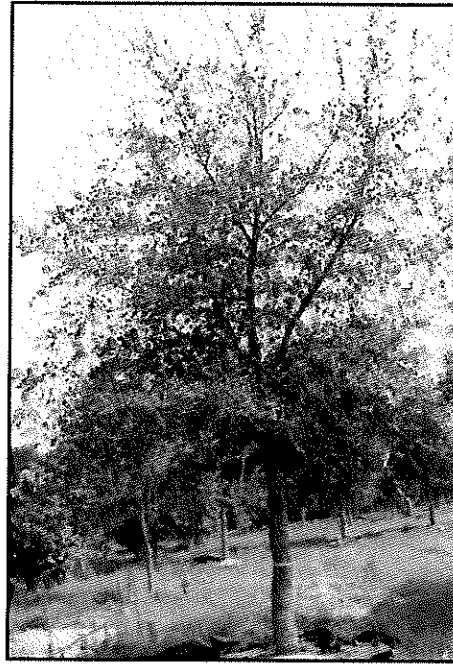
**3.** Florida Fancy live oak. Major branches are less than  $\frac{1}{4}$  the trunk diameter. Several small diameter branches are growing upright at the top of the tree. These can be removed, or preferably cut back to a more horizontal branch, to ensure the trunk remains dominant.



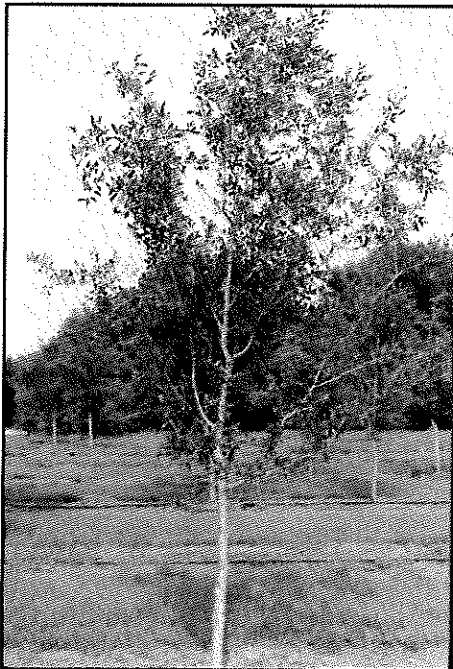
**4.** Florida Fancy southern magnolia in spring. One trunk dominates the tree.



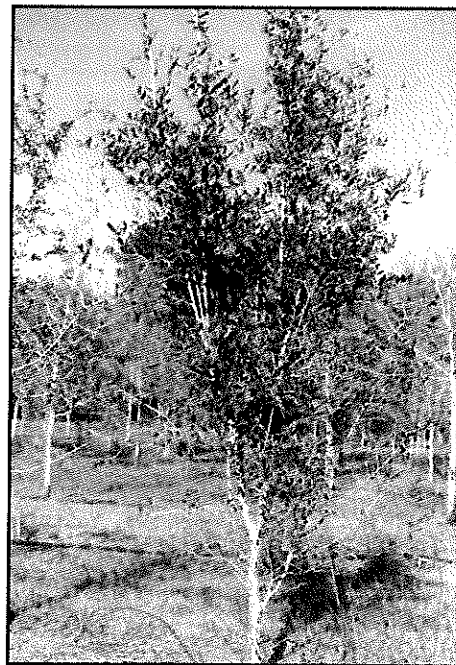
**5. Florida No. 1 live oak.** There is one dominant trunk in the lower half of the tree, but the trunk forks in the top half. If one of the two small trunks at the top of the tree were removed, the tree would probably grade to a Florida Fancy. Another alternative which takes less foliage out of the tree is to cut one of the two trunks back to a more horizontally oriented branch.



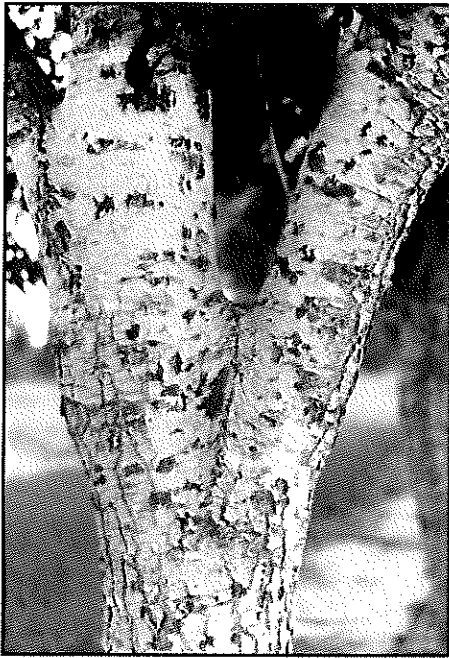
**6. Florida No. 2 live oak.** The large branch on the right is larger than  $\frac{2}{3}$  the trunk diameter and is in the lower half of the tree, making it a Florida No. 2.



**7. Take out the right hand stem at the top of the tree, and this Florida No. 1 becomes a Florida Fancy.**



**8. Two equally sized trunks originate from the lower half of the tree, making this a Florida No. 2. Remove the left trunk now, and in about 18 months the crown will probably be upgraded to at least a Florida No. 1.**

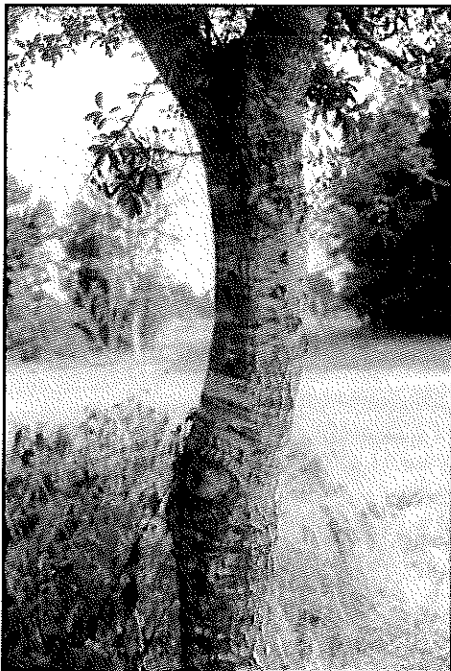


9. The diameter of a branch relative to the trunk is an important comparison that is made in the Tree Section of the Grades and Standards. Measure the branch diameter just beyond the union and beyond the swelling that may be present at the base of the branch. Measure the trunk diameter just above the

branch union. The tree is downgraded if the branch diameter is greater than  $\frac{1}{4}$  the trunk diameter.



10. This is a Florida Fancy trunk because none of the branches are larger than  $\frac{1}{4}$  the diameter of the trunk. Note that the trunk does not have to be straight on a Florida Fancy.



11. This trunk has a slight dogleg but not enough to downgrade it to a lower grade.



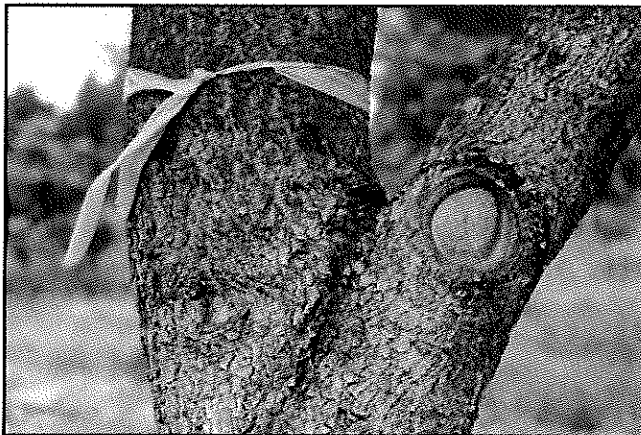
12. This trunk has a dogleg nearly bad enough to downgrade the tree. If the dogleg was worse, the tree would be downgraded. This bend in the trunk is not a downgrade for two reasons: 1) it is in the crown of the tree, and 2) it is not severe enough to downgrade the tree.



**13.** Note the included bark in the branch union. The branch bark ridge is not visible because it is included inside the union. The union is shaped like the letter V.



**14.** Note the included bark in the branch union. The branch bark ridge is not visible because it is included inside the union. The union is shaped like the letter V.



**15.** There is no included bark in this union. The branch bark ridge is clearly visible in the union as a raised area of bark tissue.



**16.** There is no included bark in this union. The branch bark ridge is clearly visible in the union as a raised line of bark tissue. The union is more or less shaped like the letter U.

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# PALMS

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## GRADING PALMS

### INTRODUCTION

Florida Grades and Standards for Palms is constructed to measure only the health of palms at the time of delivery. Palm health is measured by an examination of the leaves, trunk and root ball.

These health characteristics are defined in a format used in calculating the grade of a palm. Form and dimensional characteristics are preferential criteria and are not used in the grading process. Therefore, palm grading is a process using this document, and palm specifying is a separate process left to the design professional. This document contains two glossaries of terms: one for palm grading and one for palm specifying. The glossary used by specifiers is included in the Processes for Specifying Palms.

This practical approach allows contractors, municipalities, inspectors and others charged with grading palms, to grade objectively using quantifiable benchmarks to identify quality-grown palms with health characteristics that have the best chance of transplant success.

The grade of the palm is assigned at the time of delivery. Although design specifications may require palms be maintained at a particular grade for a period of time, that requirement is outside the scope of this document.

## GLOSSARY OF PALM GRADING TERMINOLOGY

The following terms are presented for use in the grading process.

**Abrupt tapering:** A taper greater than 10% within the top foot of the woody trunk, reducing the trunk diameter, indicating a stressed condition.

**Chlorosis:** The loss of chlorophyll from leaves resulting in light green, yellow, orange, or white tissue. The presence of chlorosis denotes a nutrient deficiency, a physiological problem or the presence of a disease.

**Clustering palms:** Palms that naturally have more than one trunk.

**Container Grown Palm:** Palms grown in container allowing transplanting without cutting roots. The roots must be completely contained within the container.

**Depression:** Mechanically produced indentation into the vascular tissue of a palm.

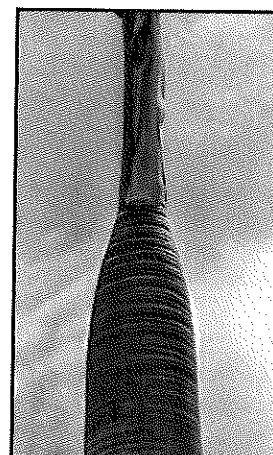
**Excellent leaf:** A fully emerged leaf (all leaflets are fully expanded) with a strong petiole with less than 1% of the area showing chlorosis, necrosis, nutrient deficiencies, leaf spots, pests or insect damage, or physical damage.

**Extreme succulence:** Soft, tender, elongated, weak petioles caused by over-fertilization, over-irrigation or over-crowding in the nursery. The palm may not survive when transplanted. Typically identified by weak elongated petioles.

**Field Grown Palm:** Palms grown and harvested from the ground by cutting the roots.

**Good leaf:** A fully emerged leaf (all leaflets are fully expanded) with a strong petiole with 1% to 10% of the area showing chlorosis, necrosis, nutrient deficiencies, leaf spots, pests or insect damage, or physical damage.

**Grade:** A designation of palm health assigned at the time of delivery using this document to evaluate the palm. One of three grades is possible: Florida Fancy, Florida No. 1 or Florida No. 2.



**Abrupt taper**



**Chlorosis**



**Extreme succulence**

## GLOSSARY OF PALM GRADING TERMINOLOGY

**Leaf count:** The number of fully emerged (all leaflets are fully expanded) good or excellent leaves counted during the grading process.

**Necrosis:** Desiccated plant tissue typically but not necessarily brown, tan or gray in color.

**Primary Trunk:** Trunks  $\frac{3}{4}$  or greater the height of the tallest clear trunk in clustering palms and single trunk palms intentionally grown with more than one trunk.

**Pup scars:** Scars near the base of the trunk in clonally produced palms (palms propagated by division or propagated from offshoot removal; e.g., *Phoenix dactylifera*) that are the result of offshoot or pup removal. These scars present no health risk to the palm.

**Re-grade:** An official re-grade is conducted by the Florida Department of Agriculture and Consumer Services Division of Plant Industry. The request must be submitted to the Chief Plant Inspector, Division of Plant Industry within 30 days following delivery.

**Root ball measurement:** Measurement from the lowest part of the trunk exclusive of exposed roots or persistent leaf bases perpendicular out to the edge of the root ball for field grown palms. Gradable palms in containers are not subject to root ball measurements.

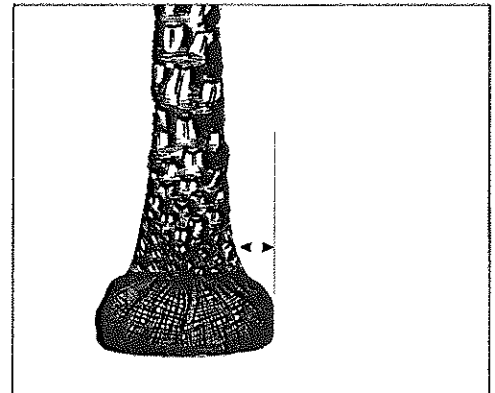
**Tipped Leaf:** A specified procedure of shortening the leaves by cutting the leaf tips. Tipped leaves are not gradable therefore this must occur after the grading process.

**Vascular tissue:** Water and carbohydrate conducting plant tissue that is covered by the outer non-vascular pseudobark.

**Vertical fissures:** Naturally occurring vertical expansion cracks. These present no health risk to the palm when less than one-inch deep.



Pup scars



Root ball measurement

## REQUIREMENTS FOR LEAF COUNT AND ROOT BALL MEASUREMENT

Each of the palm species in Table 1 has been assigned a minimum leaf count of good or excellent leaves and root ball measurement to qualify as gradable. Note that minimum leaf counts are to establish a root-to-shoot ratio for transplant success, and are not necessarily the recommended leaf counts for established palms.

Species not listed in Table 1 are graded using the downgrading and eliminating factors other than the minimum leaf count and root ball measurement. For clustering palms and single trunked palms intentionally grown with more than one trunk, each primary trunk is graded as a single trunk palm. The final grade of the palm is the lowest grade applied to the primary trunks.

Use the grading forms to evaluate eliminating and downgrading factors.

**Table 1. Palms Commonly Used in Florida  
(Revised May 2015)**

Scientific Name	Common Name	Minimum Leaf Count*			Minimum Root Ball Measurement in Inches**
		FL FANCY	FL No. 1	FL No. 2	
<i>Adonidia merrillii</i>	Christmas Palm	6	5	4	9
<i>Archontophoenix alexandrae</i>	Alexandra Palm	TBD	TBD	TBD	TBD
<i>Archontophoenix cunninghamiana</i>	Piccabeen Palm	TBD	TBD	TBD	TBD
<i>Arenga engleri</i>	Dwarf Sugar Palm	5	4	3	9
<i>Arenga pinnata</i>	Sugar Palm	TBD	TBD	TBD	TBD
<i>Arenga tremula</i>	Dwarf Sugar Palm	5	4	3	12
<i>Bismarckia nobilis</i>	Bismarck Palm	6	5	4	15
<i>Brahea nitida</i>	Oaxaca Palm	18	14	11	9
<i>Butia odorata</i> (formerly <i>B. capitata</i> )	Pindo Palm	15	12	9	9
<i>Butiagrus nabonmandii</i>	Mule Palm	12	10	7	9
<i>Carpentaria acuminata</i>	Carpentaria Palm	TBD	TBD	TBD	TBD
<i>Caryota mitis</i>	Clustering Fishtail Palm	6	5	4	9
<i>Chamaedorea cataractarum</i>	Cat Palm	5	4	3	6
<i>Chamaedorea erumpens</i>	Bamboo Palm	TBD	TBD	TBD	TBD
<i>Chamaedorea seifrizii</i>	Reed Palm	TBD	TBD	TBD	TBD
<i>Chamaerops humilis</i>	European Fan Palm	30	24	18	9
<i>Chambeyronia macrocarpa</i>	Red Feather Palm	TBD	TBD	TBD	TBD
<i>Coccothrinax</i> spp. (incl. <i>C. alta</i> , <i>argentata</i> , <i>crinita</i> , <i>mira-guama</i> )	Silver Palm	6	5	4	9
<i>Cocos nucifera</i>	Coconut Palm	6	5	4	12
<i>Copernicia alba</i>	Caranday Palm	TBD	TBD	TBD	TBD
<i>Copernicia baileyana</i>	Bailey Palm	TBD	TBD	TBD	TBD
<i>Copernicia macroglossa</i>	Cuban Petticoat Palm	TBD	TBD	TBD	TBD
<i>Copernicia prunifera</i>	Carnauba Palm	TBD	TBD	TBD	TBD
<i>Dictyosperma album</i>	Princess Palm	TBD	TBD	TBD	TBD
<i>Dypsis cabadae</i>	Cabada Palm	TBD	TBD	TBD	TBD

\* Refer to Leaf Count Definition in the Grading Glossary

\*\* Refer to Root Ball Measurement Definition in the Grading Glossary

\*\*\* Exempt from abrupt tapering grading factors

<i>Dypsis decaryii</i>	Triangle Palm	TBD	TBD	TBD	TBD
<i>Dypsis lastelliana</i>	Teddy Bear Palm	TBD	TBD	TBD	TBD
<i>Dypsis lutescens</i>	Areca Palm	4	3	2	9
<i>Heterospathe elata</i>	Sagisi Palm	TBD	TBD	TBD	TBD
<i>Hyophorbe lagenicaulis</i> ***	Bottle Palm	4	3	2	9
<i>Hyophorbe verschafeltii</i>	Spindle Palm	4	3	2	9
<i>Latania loddigesii</i>	Blue Latan Palm	TBD	TBD	TBD	TBD
<i>Latania lontaroides</i>	Red Latan Palm	11	9	7	9
<i>Latania peltata sumawongii</i>	Elegant Licuala	TBD	TBD	TBD	TBD
<i>Latania spinosa</i>	Spiny Licuala	TBD	TBD	TBD	TBD
<i>Licuala grandis</i>	Licuala Palm	TBD	TBD	TBD	TBD
<i>Livistona australis</i>	Australian Fan Palm	TBD	TBD	TBD	TBD
<i>Livistona chinensis</i>	Chinese Fan Palm	10	8	6	12
<i>Livistona decipiens</i>	Ribbon Palm	20	16	12	9
<i>Livistona decora</i> (formerly <i>L. decipiens</i> )	Ribbon Palm	TBD	TBD	TBD	TBD
<i>Livistona nitida</i>	Carnavon George	18	14	11	12
<i>Phoenix canariensis</i>	Canary Island Date Palm	15	12	9	12
<i>Phoenix dactylifera</i>	Date Palm	29	23	17	12
<i>Phoenix reclinata</i>	Senegal Date Palm	12	10	7	12
<i>Phoenix roebelenii</i>	Pygmy Date Palm	20	16	12	6
<i>Phoenix sylvestris</i>	Wild Date Palm	40	32	24	12
<i>Pritchardia spp.</i>	Pritchardia Palm	TBD	TBD	TBD	TBD
<i>Pseudophoenix sargentii</i>	Buccaneer Palm	TBD	TBD	TBD	TBD
<i>Ptychosperma elegans</i>	Solitaire Palm	5	4	3	9
<i>Ptychosperma macarthurii</i>	Macarthur Palm	5	4	3	9
<i>Ravenea rivularis</i>	Majesty Palm	TBD	TBD	TBD	TBD
<i>Rhapidophyllum hystrix</i>	Needle Palm	TBD	TBD	TBD	TBD
<i>Rhapis excelsa</i>	Lady Palm	7	6	4	6
<i>Rhapis multifida</i>	Finger Palm	TBD	TBD	TBD	TBD
<i>Roystonea regia</i>	Royal Palm	6	5	4	12
<i>Sabal sp.</i>	Cabbage Palm (Regenerated)	4	3	2	4
<i>Sabal sp.</i>	Cabbage Palm (Cropped)	0	0	0	2
<i>Serenoa repens</i>	Saw Palmetto	TBD	TBD	TBD	TBD
<i>Syagrus romanzoffiana</i>	Queen Palm	8	6	5	9
<i>Thrinax radiata</i>	Florida Thatch Palm	8	6	5	9
<i>Trachycarpus fortunei</i>	Windmill Palm	TBD	TBD	TBD	TBD
<i>Veitchia arecina</i> (formerly <i>V. montgomeryana</i> )	Montgomery Palm	5	4	3	9
<i>Washingtonia robusta</i>	Mexican Fan Palm	8	6	5	12
<i>Wodyetia bifurcata</i>	Foxtail Palm	5	4	3	9

\* Refer to Leaf Count Definition in the Grading Glossary

\*\* Refer to Root Ball Measurement Definition in the Grading Glossary

\*\*\* Exempt from abrupt tapering grading factors

## PALM GRADING STEPS

Following are the steps to complete the Palm Grading Form:

**Step 1.** Refer to Table 1 and note the minimum leaf count and root ball measurement for the species being graded.

**Step 2.** Examine the palm using the list of eliminating factors on the Palm Grading Forms. If there are no eliminating factors, proceed to Step 3.

**Step 3.** Examine the palm against the list of downgrading factors on the Palm Grading Forms.



**PALM GRADING FORM**  
(For sabal species, see sabal grading forms)

**Palm #** \_\_\_\_\_ **Species:** \_\_\_\_\_

**Step 1.** Initial grade established by Table 1: \_\_\_\_\_

**Step 2.** Eliminating factors are severe problems that decrease the palm's chance for survival in the new site.

Any one of these factors eliminates the palm from Grades and Standards consideration. The palm is termed "Not Gradable," regardless of other attributes.

Answer 'YES' if true

- a) Evidence of palm weevils or symptoms of lethal diseases such as Fusarium Wilt, Ganoderma butt rot, phytoplasma diseases, Thielaviopsis trunk rot, or Phytophthora bud rot. a) \_\_\_\_\_
- b) Wood boring insect damage. b) \_\_\_\_\_
- c) Failure to meet the minimum requirements for root ball measurement or Florida No. 2 leaf count in Table 1. c) \_\_\_\_\_
- d) Damage to the vascular tissue greater than ½" deep and more than 1" wide or 3" long.\* d) \_\_\_\_\_
- e) Abrupt tapering within the top foot of the woody trunk reducing the diameter by more than 20%. e) \_\_\_\_\_
- f) Palms improperly staked causing vascular tissue injury. f) \_\_\_\_\_
- g) Extreme succulence. g) \_\_\_\_\_
- h) Naturally occurring vertical fissures exceeding one-inch in depth. h) \_\_\_\_\_

**One or more 'YES' responses to the eliminating factors listed above renders the palm not gradable.**

Answer 'YES' if true

**Step 3.** Downgrading Factors

- a) Damage to the vascular tissue ¼" to ½" deep and more than 1" wide or 3" long (one downgrade for each occurrence).\* a) \_\_\_\_\_
- b) Abrupt tapering within the top foot of woody trunk reducing the diameter by 10% to 15%. b) \_\_\_\_\_
- c) Abrupt tapering within the top foot of woody trunk reducing the diameter by 16% to 20%. This in addition to the previous abrupt tapering downgrade. c) \_\_\_\_\_

**GRADES**

**Florida Fancy:** A palm with no eliminating or downgrading factors, meeting the requirements shown in Table 1 with 100% excellent leaves. One 'YES' response to the downgrading factors listed above renders the palm a Florida No. 1.

**Florida No. 1:** A palm with no eliminating factors, meeting the requirements shown in Table 1. One 'YES' response to the downgrading factors listed above renders the palm a Florida No. 2.

**Florida No. 2:** A palm with no eliminating factors, meeting the requirements shown in Table 1. One 'YES' response to the downgrading factors listed above renders the palm not gradable.

\* Excluding pup scars in clonally produced palms and excluding pseudobark damage

**Final Grade:** \_\_\_\_\_

**PALM - SABAL SPECIES GRADING FORM  
(Regenerated Sabal)**

Palm # \_\_\_\_\_ Species: \_\_\_\_\_

Step 1. Initial grade established by Table 1: \_\_\_\_\_

Step 2. Eliminating factors are severe problems that decrease the palm's chance for survival in the new site. Any one of these factors eliminates the palm from Grades and Standards consideration. The palm is termed "Not Gradable," regardless of other attributes.

Answer 'YES' if true

- a) Evidence of palm weevils or symptoms of lethal diseases such as Fusarium wilt, phytoplasma diseases, Ganoderma butt rot, Thielaviopsis trunk rot or Phytophthora bud rot. a) \_\_\_\_\_
- b) Wood boring insect damage. b) \_\_\_\_\_
- c) Failure to meet the minimum requirements for root ball measurement or Florida No. 2 leaf count in Table 1. c) \_\_\_\_\_
- d) Damage to the vascular tissue greater than ¾" deep and more than 1" wide or 3" long.\* d) \_\_\_\_\_
- e) Abrupt tapering within the top foot of the woody trunk reducing the diameter by more than 15%. e) \_\_\_\_\_
- f) Root ball vertical surface has less than 50% covered by visible roots, excluding top six inches. f) \_\_\_\_\_
- g) Palms improperly staked causing vascular tissue injury. g) \_\_\_\_\_
- h) Extreme succulence. h) \_\_\_\_\_
- i) Naturally occurring vertical fissures exceeding one inch in depth. i) \_\_\_\_\_

**One or more 'YES' responses to the eliminating factors listed above, renders the palm not gradable.**

Step 3. Downgrading Factors

- a) Damage to the vascular tissue ½" to ¾" deep and more than one-inch wide or three-inches long (one downgrade for each occurrence). Answer 'YES' if true  
a) \_\_\_\_\_
- b) Abrupt tapering within the top foot of the woody trunk between 5% and 10%. b) \_\_\_\_\_
- c) Abrupt tapering within the top foot of the woody trunk between 11% and 15%. c) \_\_\_\_\_

**GRADES**

**Florida Fancy:** A palm with no eliminating or downgrading factors, meeting the requirements shown in Table 1 with 100% excellent leaves. One 'YES' response to the downgrading factors listed above renders the palm a Florida No. 1.

**Florida No. 1:** A palm with no eliminating factors, meeting the requirements shown in Table 1. One 'YES' response to the downgrading factors listed above renders the palm a Florida No. 2.

**Florida No. 2:** A palm with no eliminating factors, meeting the requirements shown in Table 1. One 'YES' response to the downgrading factors listed above renders the palm not gradable.

\* Excluding pseudobark damage

**Final Grade:** \_\_\_\_\_

**PALM - SABAL SPECIES GRADING FORM  
(Cropped Sabal)**

Palm # \_\_\_\_\_ Species: \_\_\_\_\_

Step 1. Initial grade established by Table 1: \_\_\_\_\_

Step 2. Eliminating factors are severe problems that decrease the palm's chance for survival in the new site. Any one of these factors eliminates the palm from Grades and Standards consideration. The palm is termed "Not Gradable," regardless of other attributes.

- |  |                      |
|--|----------------------|
|  | Answer 'YES' if true |
| a) Evidence of palm weevils or symptoms of lethal diseases such as Fusarium wilt, phytoplasma diseases, Ganoderma butt rot, Thielaviopsis trunk rot or Phytophthora bud rot. | a) _____             |
| b) Wood boring insect damage.  | b) _____             |
| c) Failure to meet the minimum requirements for root ball measurement in Table 1.  | c) _____             |
| d) Damage to the vascular tissue greater than ¼" deep and more than 1" wide or 3" long.*   | d) _____             |
| e) Abrupt tapering within the top foot of the woody trunk reducing the diameter by more than 15%.  | e) _____             |
| f) Palms improperly staked causing vascular tissue injury.   | f) _____             |
| g) Naturally occurring vertical fissures exceeding one inch in depth.  | g) _____             |
| h) Extreme succulence.   | h) _____             |

One or more 'YES' responses to the eliminating factors listed above, renders the palm not gradable.

Step 3. Downgrading Factors Answer 'YES' if true

- |  |          |
|--|----------|
| a) Damage to the vascular tissue ½" to ¾" deep and more than 1" wide or 3" long (one downgrade for each occurrence). | a) _____ |
| b) Abrupt tapering within the top foot of the woody trunk between 5% and 10%.  | b) _____ |
| c) Abrupt tapering within the top foot of the woody trunk between 11% and 15%.                                       | c) _____ |

**GRADES**

**Florida Fancy:** A palm with no eliminating or downgrading factors, meeting the requirements shown in Table 1. One 'YES' response to the downgrading factors listed above renders the palm a Florida No. 1.

**Florida No. 1:** A palm with no eliminating factors, meeting the requirements shown in Table 1. One 'YES' response to the downgrading factors listed above renders the palm a Florida No. 2.

**Florida No. 2:** A palm with no eliminating factors, meeting the requirements shown in Table 1. One 'YES' response to the downgrading factors listed above renders the palm not gradable.

\* Excluding pseudobark damage

**Final Grade:** \_\_\_\_\_

## PROCESSES FOR SPECIFYING PALMS

Florida Grades and Standards for Palms is constructed to measure only the health of palms at the time of delivery. Design professionals seeking specific palm form and dimensional characteristics must include these requirements in the contract documents, along with details and other installation, establishment and warranty requirements. The terms defined in the Glossary of Palm Specifying Terminology are used in the Florida Grades and Standards for Palms as the prescribed language for specifying palms. Some specifications to consider are listed below:

### Trunk Measurements

- Caliper at specified heights
- Clear Trunk
- Clear Wood
- Terminus Height

### Trunk Characteristics

- Curved Trunk or straight trunk or multi trunk
- Type of Leaf Base Trimming
- Pseudobark condition, vertical fissure allowance

### Leaves

- Cropped Palm
- Canopy Spread
- Leaf Tipping (after grading)
- Leaf counts of those species not listed in Table 1

### Other

- Overall Height
- Rootball measurements of those species not listed in Table 1
- Certifications
- Vertical clearance

## GLOSSARY OF PALM SPECIFYING TERMINOLOGY

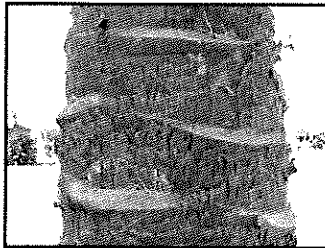
- Abrupt constriction:** A point along the trunk having a reduction in diameter greater than 10% than the diameter within 1 foot above and/or below, typically indicating a period of stress occurred in the past.
- Boot:** The leaf base or enlarged basal portion of the petiole remaining affixed to the trunk after the leaf has died and been broken or cut off.
- Booted:** Used to specify palms with leaf bases still attached to the trunk.
- Caliper:** The diameter of a palm's trunk. The height that this diameter is measured must be specified.
- Canopy spread:** A measurement taken from leaf tip to leaf tip, in their natural state, at the widest point.
- Character palms, Curved palms:** Used to specify unusual trunk shapes.
- Clean trunk:** See "Leaf base trimming (Clean cut photo)."
- Clear trunk:** A measurement from the top of rootball to a point where the lowest untrimmed leaf's petiole diverges from the trunk. Clear trunk measurements are only legitimate in the specifying process when the leaf count meets the minimum requirements of Table 1. When the leaf count is less than the minimum for Florida Fancy, the clear trunk measurement is determined by estimating the point where the leaf's petiole divergence (sufficient to meet the minimum for a Florida Fancy) would have been.
- Clear wood, Gray Wood:** A measurement from the top of rootball to the highest point on the trunk free of persistent leaf bases. On palms with a crownshaft, the measurement is from the top of rootball to the base of the crownshaft. Palms with very persistent leaf bases may not have clear wood.
- Cropped palms:** Palms with all leaves removed before transplanting. Typically performed on field harvested Sabal species. Previously known as Hurricane Cut.
- Crownshaft:** A conspicuous neck-like structure formed by tubular leaf bases on some pinnate-leaved palms.
- Debooted:** See "Clean trunk" definition.
- Fronde:** A common term used to describe a palm leaf.
- Gray wood:** See "Clear wood" definition.
- Hurricane cut:** See "Cropped palms" definition.
- Leaf base:** The basal portion of a leaf that is attached to the trunk.

## GLOSSARY OF SPECIFYING TERMINOLOGY

**Leaf base trimming:** A process of cutting leaf bases to achieve a particular appearance, typically performed by the grower. There are several types of trimming cuts that may be specified including classic, clean, diamond and shelf.



Classic cut



Clean cut



Diamond cut



Shelf cut

**Leaf length:** The distance along the petiole from the point where the petiole diverges from the trunk to the leaf's tip.

**Main trunk:** For clustering palms and single trunk palms intentionally grown with more than one trunk the tallest trunk in the cluster is considered the main trunk.

**Multi-trunk:** A term used to specify multiple single trunked palms grown together.

**Overall height:** The highest point in the canopy measured from the top of rootball to the natural position of the last fully emerged (all leaflets are fully expanded) leaf.

**Pseudobark:** Outer non-vascular portion of the trunk. Pseudobark damage can be unsightly but is not detrimental to palm health.

**Regenerated palms:** Field-grown palms, especially Sabal palms, that have some type of containment placed around the root ball after harvesting and cropping, then are maintained until several new leaves and a substantial number of new roots have been produced. This takes several months or more and can improve transplant success.

**Slick trunk:** Trunk with leaf bases mechanically removed often causing damage to the pseudobark and exposing vascular tissue. This practice is not recommended.

**Sloughing:** The natural degradation and dropping of leaf bases. This is not detrimental to the palm's health.

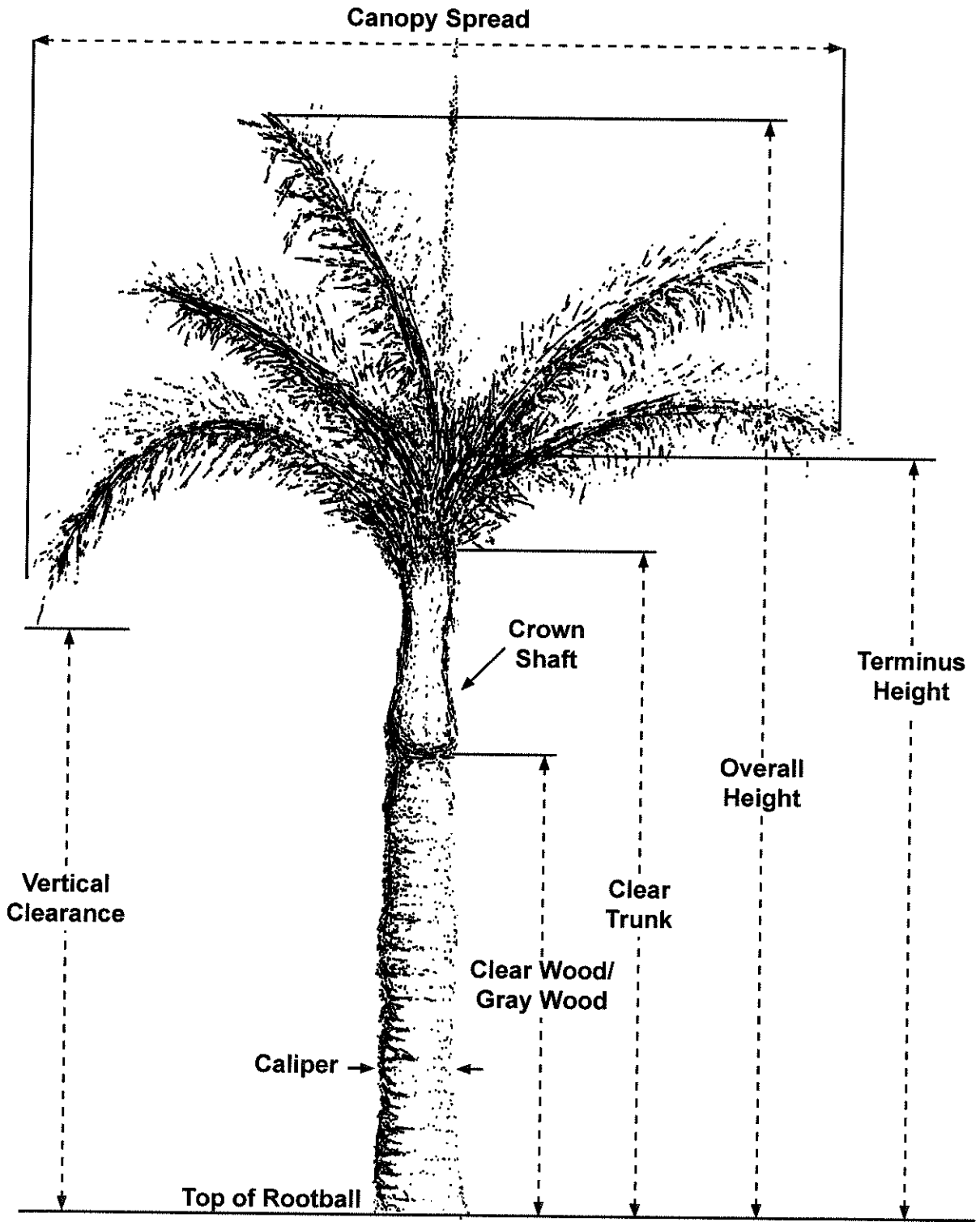
**Suckers:** Small shoots emerging from the base of main trunks in clustering palms.

**Terminus height:** Measurement from the top of rootball to the point of emergence of the spear leaf. This is a practical measurement method for cropped palms.

**Vertical clearance:** A measurement from the top of rootball to the lowest leaf. Pruning may be required to achieve clearance for pedestrians, vehicles, signs, etc. If minimum leaf counts are maintained, grading is not affected.

### PALM SPECIFYING TERMS ILLUSTRATION

Specifications regarding form and dimensional characteristics (other than grading factors) are the responsibility of design professionals. The following illustrates terms that provide a common language for describing parts and measurements of palms.



## TRANSPLANTING PALMS - SABAL SPECIES

Sabal palms (*Sabal palmetto*) are the most widely planted palms in the southeastern United States. Virtually all are mature specimens harvested from natural stands because their slow growth rate makes nursery production uneconomical. Recognizing that sabal palms are harvested from the wild, they have been separated from the other palms in this document and are addressed in this section. **Note that some of the conditions applied to sabal palms as eliminating factors in previous editions are modified in this edition.**

Sabal palms grow naturally in many diverse habitats including swamps, pine flatlands and fire climax ecosystems, and are adaptable to a wide range of landscape environments. They are recognized as a renewable but finite natural resource. In the past, many sabal palms that were otherwise healthy, but had certain downgrading factors such as superficial fire damage, were not collected because they were considered not gradable. This document no longer considers superficial fire damage or superficial methods to remove charred areas as eliminating factors.

It is also important to consider the methods used to harvest sabal palms. Sabal palms are usually harvested using heavy equipment which may cause trunk damage. However, if this damage occurs in pseudobark trunk tissue, it is unlikely to be an entry point for insects and disease and does not compromise the structural integrity of the palm.

Historically, survival rates for transplanted sabal palms were often low. In sabal palms no cut roots survive; however, roots are continually produced from the root initiation zone. In the late 1980s, studies showed that the removal of all leaves (cropping) increased the survival rate of transplanted sabal palms by 30%. Since that time, the standard procedure for transplanting collected sabal palms is to remove all leaves during harvesting operations. Postharvest care greatly affects the survivability of all palms. If the root ball dessicates, newly formed adventitious roots may die.

Inadequate watering may lead to decline and eventual death of the palm. It may also predispose the palm to insect infestation and disease.

Excessive removal of leaf bases is another factor that may affect survivability of transplanted sabal palms and should be avoided. Removal of leaf bases may lead to the desiccation of the palm. This may also increase the likelihood of the introduction of trunk rotting fungi like *Thielaviopsis*. *Thielaviopsis* has become one of the major factors in the death of transplanted sabal palms, resulting in losses of up to 90%. In addition, excessive removal of leaf bases may also predispose the palm to insect infestations such as palm weevils.

Recent postharvest production methods include the concept of regeneration. Regeneration is the establishment of a new root system and leaves. This is accomplished by wrapping the root ball of a freshly harvested sabal palm with multiple layers of plastic sufficient to contain the emerging roots, or placing the freshly harvested palm into a container. The palm is held for a sufficient amount of time to establish a new root system and leaves.



## TRANSPLANTING PALMS - SABAL SPECIES



Regenerated palms



Regenerated root ball

## REFERENCES

### **Palm Transplanting**

Transplanting Palms in the Landscape <http://edis.ifas.ufl.edu/ep001>

### **Nutritional and Physiological Problems of Palms**

Nutrient Deficiencies of Landscape and Field-Grown Palms in Florida <http://edis.ifas.ufl.edu/ep273>

Physiological Disorders of Landscape Palms <http://edis.ifas.ufl.edu/ep263>

### **Palm Diseases**

Bud Rot of Palm <http://edis.ifas.ufl.edu/pp144>

Fusarium Wilt of Canary Island Date Palm <http://edis.ifas.ufl.edu/pp139>

Fusarium Wilt of Queen Palm and Mexican Fan Palm <http://edis.ifas.ufl.edu/pp278>

Ganoderma Butt Rot of Palms <http://edis.ifas.ufl.edu/pp100>

Graphiola Leaf Spot (False Smut) of Palm <http://edis.ifas.ufl.edu/pp140>

Lethal Yellowing (LY) of Palm <http://edis.ifas.ufl.edu/pp146>

Texas Phoenix Palm Decline <http://edis.ifas.ufl.edu/pp163>

Thielaviopsis Trunk Rot of Palm <http://edis.ifas.ufl.edu/pp143>

### **Insect Pests of Palms**

Palmetto weevil, *Rhynchophorus cruentatus* Fabricius (Insecta: Coleoptera: Curculionidae)

<http://edis.ifas.ufl.edu/in139>

Royal Palm Bug, *Xylastodoris luteolus* Barber (Insecta: Hemiptera: Thaumastocoridae)

<http://edis.ifas.ufl.edu/in254>

Silky Cane Weevil, *Metamasius hemipterus sericeus* (Olivier) (Insecta: Coleoptera: Curculionidae)

<http://edis.ifas.ufl.edu/in210>

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# WETLAND PLANTS

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## GRADING WETLAND PLANTS

### INTRODUCTION

Wetland plants are most commonly used for wetland creation (mitigation) and aquascaping. The species listed in this chapter are representative of this vegetation category. The list is not intended to be complete. Other species not listed herein may be included in this category as appropriate.

Standards for wetland trees are contained within this manual beginning on page 3 of the tree section, except for mangroves listed in this section. Grades established for trees (Florida Fancy, Florida No. 1,

Florida No. 2) do not apply when these trees are used for mitigation purposes. Downgrading factors listed in this section apply to trees, as well as other wetland plants, when these plants are used for mitigation or aquascaping.

The collection, possession, cultivation and transportation of wetland plant species may require a permit from the Florida Department of Agriculture and Consumer Services.

### STANDARDS FOR WETLAND PLANTS

1. Specimens shall be free of other plants considered as nuisance or exotic species. Examples include, but are not limited to, Brazilian pepper (*Schinus terebinthifolius*), melaleuca (*Melaleuca quinquenervia*), torpedo grass (*Panicum repens*), hydrilla (*Hydrilla verticillata*), primrose willow (*Ludwigia peruviana*) and cattail (*Typha* spp.).
2. Non-containerized specimens (includes plugs or bare root specimens, either nursery grown or wild harvested):
  - a. Shall exhibit a healthy, well-distributed root structure which extensively penetrates the soil such that at least 75% of the soil mass remains intact. Not applicable to bare root specimens (see Fig. 2a, p. 6).
  - b. Shall exhibit sufficient top growth to ensure viability at the specified water depth or location. Seasonal dieback of foliage is expected and acceptable in collected specimens.
3. Containerized specimens:
  - a. Shall exhibit a healthy, well-distributed root structure which extensively penetrates the soil such that at least 90% of the soil mass remains intact (see Fig. 3a & b, p. 6).
  - b. Shall exhibit vigorous top growth with a base diameter at least 50% of the diameter of the container (see Fig. 3c, p. 6).
4. Specimens in containers 4 inches diameter or less must be grown in those containers for a minimum of 30 days. Specimens in containers greater than 4 inches diameter must be grown in those containers for a minimum of 45 days.
5. The specimen is unacceptable if one of the following conditions are true:
  - a. More than 25% of the total foliage damaged by insects or mechanical injury (see Fig. 4a, p. 7).
  - b. Too few main lateral or feeder roots (see Fig. 4b, p. 7).
  - c. Roots damaged by digging cuts or exposure to light, air or temperature (see Fig. 4c, p. 7).
  - d. Rootbound conditions (see Fig. 4d, p. 7).

**STANDARDS FOR RED<sup>1</sup> AND BLACK<sup>2</sup> MANGROVES**

	Seedling	Black 1 gallon	Red 1 gallon	Black 3 gallon	Red 3 gallon
Height	*	14"	20"	24"	36"
Caliper (min)	*	¼"	½"	½"	¾"
Crown (min)	*	4"	6"	18"	24"
Roots	*	6" branched	6"	12" branched	12"
Time in container (min)	*	6 months	6 months	9 months	9 months

1. *Rhizophora mangle* L.

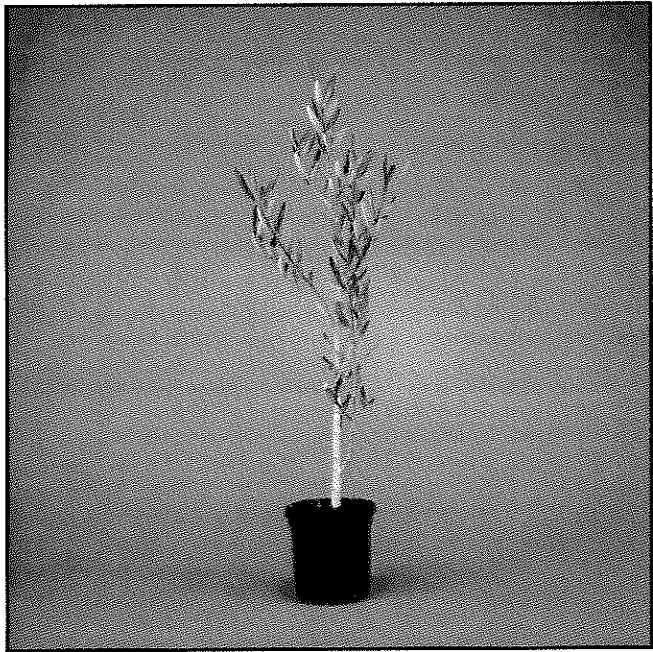
2. *Avicennia germinans* (L.) L.

\* Plants which fail to meet minimum criteria for 1 gallon standard are considered seedlings.

**Figure 1.**



red mangrove  
*Rhizophora mangle* L.



black mangrove  
*Avicennia germinans* (L.) L.

**WETLAND TREES (excluding red and black mangroves)**

	Seedling	1 gallon	3 gallon	7 gallon
Height	>18"	18 - 36"	40 - 72"	60 - 84"
Caliper (min)	>¼"	¼"	⅜"	¾"
Roots	Fully rooted in pot but not rootbound			
Crown (min)	>4"	4"	12"	24"
Time in Container (min)	60 days	90 days	90 days	90 days

**WETLAND SHRUBS**

	Seedling	1 gallon	3 gallon
Height	6 - 12"	10 - 15"	15 - 24"
Roots	Fully rooted in pot but not rootbound		
Time in Container (min)	45 days	60 days	60 days

**WETLAND HERBS**

	2 inch pot	4 inch pot	1 gallon
Roots	Fully rooted	Fully rooted	Fully rooted
Time in Container (min)	45 days	45 days	45 days

## GENERAL GRADING STANDARDS FOR WETLAND PLANTS

Figure 2. Bare Root Specimens

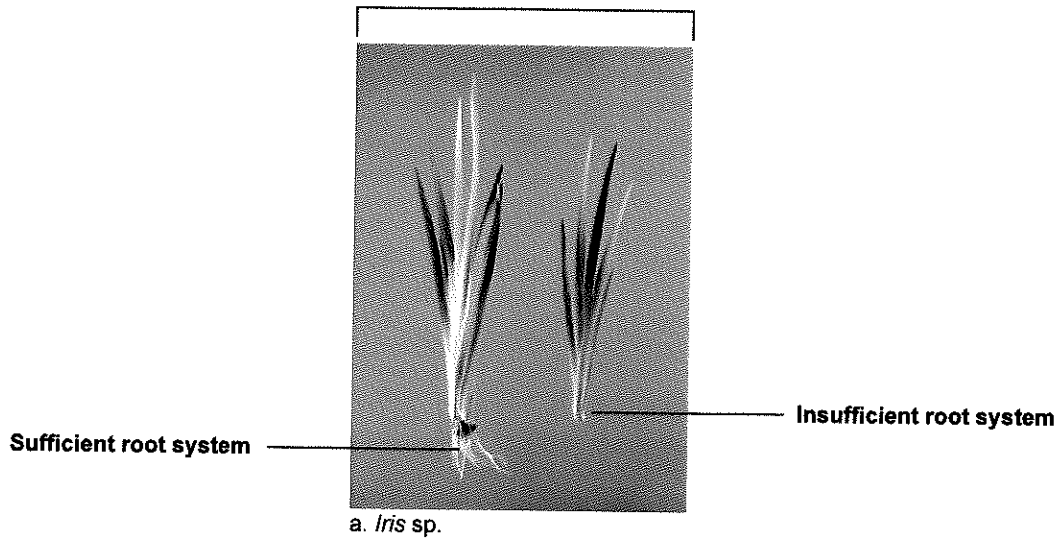
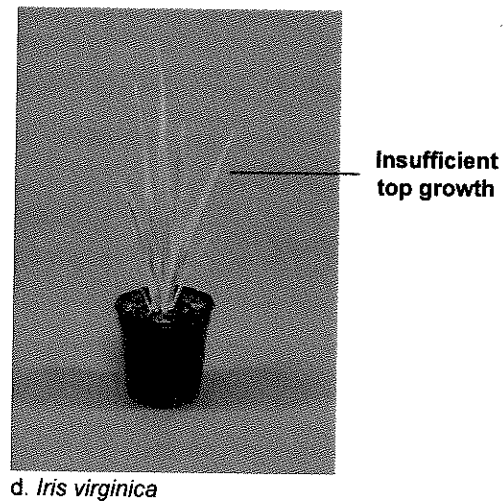
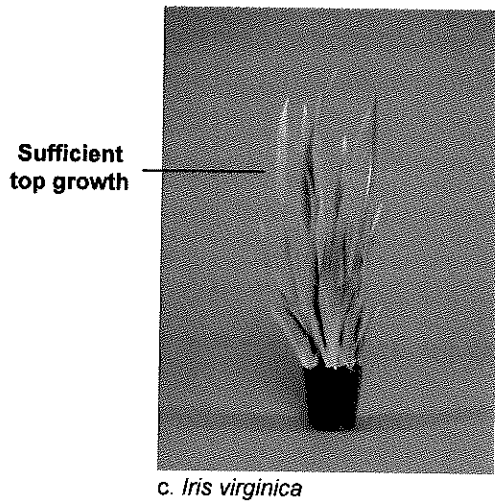
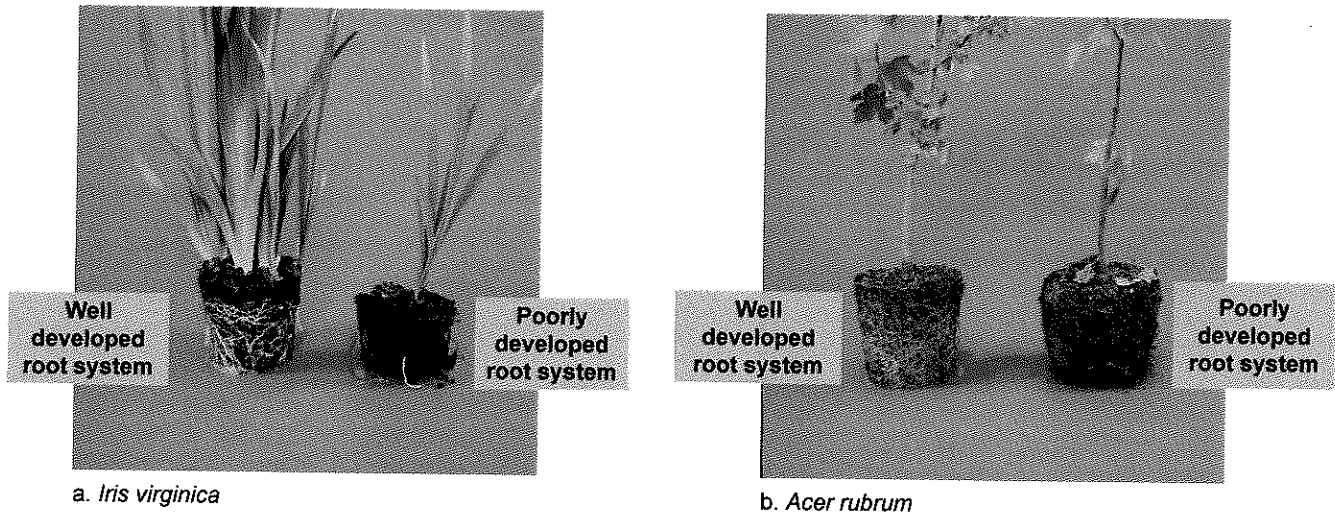


Figure 3. Containerized Specimens



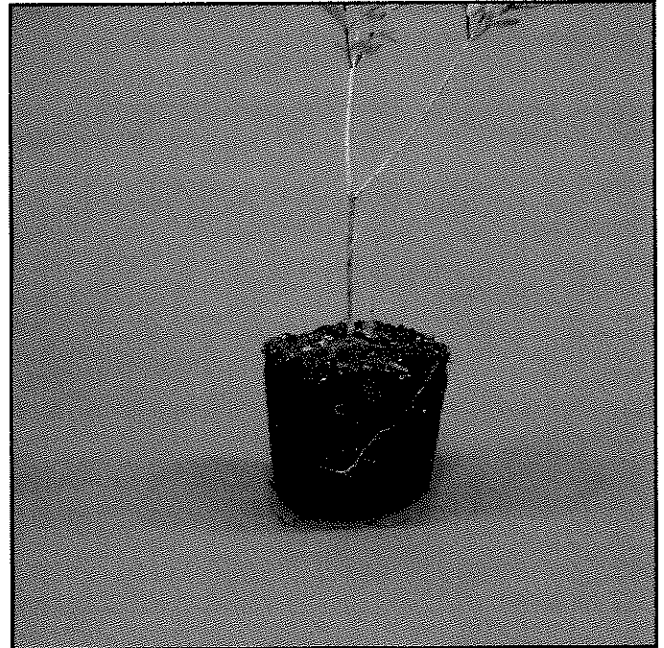


DOWNGRADING FACTORS

Figure 4.



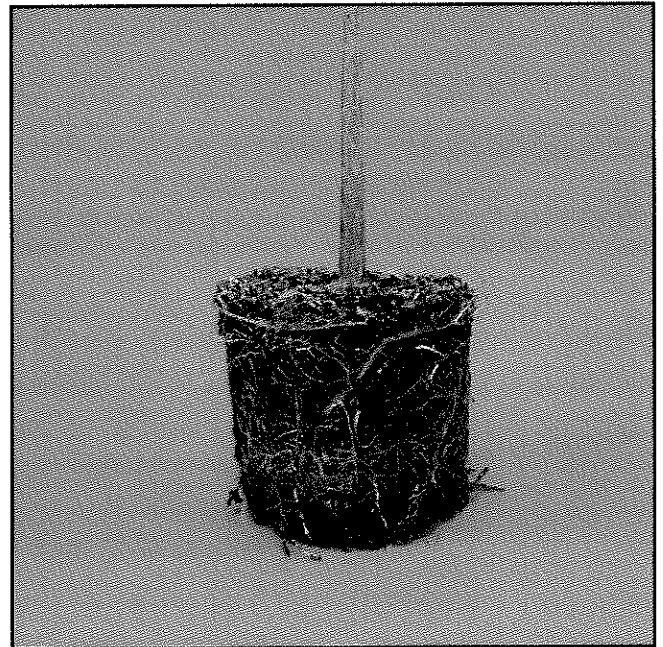
a. *Thalia* sp.  
More than 25% of total foliage damaged by insects.



b. *Cephalanthus occidentalis*  
Insufficient lateral and feeder roots.



c. *Juncus effusus* (collected specimens)  
Roots damaged by digging.



d. *Acer rubrum* (containerized specimen)  
root bound .

## INDEX OF WETLAND SHRUBS

### SCIENTIFIC NAME

*Alnus serrulata* (Aiton)Willd.  
*Baccharis angustifolia* Michx.  
*Batis maritima* L.  
*Cephalanthus occidentalis* L.  
*Clethra alnifolia* L.  
*Cliftonia monophylla* (Lam.) Britton ex Sarg.  
*Conocarpus erectus* L.  
*Cornus foemina* Mill.  
*Crataegus aestivalis* (Walter)Torr. & A.Gray  
*Cyrilla racemiflora* L.  
*Forestiera acuminata* (Michx.)Poir.  
*Hypericum fasciculatum* Lam.  
*Ilex coriacea* (Pursh)Chapm.  
*Ilex decidua* Walter  
*Ilex myrtifolia* Walter  
*Illicium floridanum* J.Ellis  
*Itea virginica* L.  
*Iva* spp.  
*Litsea aestivalis* (L.)Fernald  
*Lyonia lucida* (Lam.)K.Koch  
*Myrica cerifera* L.  
*Myrica inodora* W.Bartram  
*Rosa palustris* Marsh.  
*Styrax americanus* Lam.  
*Symplocos tinctoria* (L.)L'Hér.  
*Viburnum rufidulum* Raf.

### COMMON NAME

American snowbell, storax  
 black titi  
 buttonbush  
 buttonwood  
 coastal sweetpepper bush  
 eastern swamp privet  
 fetterbush  
 Florida anise  
 hazel alder  
 large gallberry; sweet gallberry  
 marsh-elder  
 May haw  
 myrtle holly  
 odorless bayberry  
 pondspice  
 possumhaw  
 rusty blackhaw  
 saltwater false willow  
 saltwort; turtleweed  
 sandweed; peelbark St. John's-wort  
 swamp dogwood  
 swamp rose  
 sweetleaf; horse sugar  
 titi  
 Virginia willow; Virginia sweetspire  
 wax myrtle

### COMMON NAME

hazel alder  
 saltwater false willow  
 saltwort; turtleweed  
 buttonbush  
 coastal sweetpepper bush  
 black titi  
 buttonwood  
 swamp dogwood  
 May haw  
 titi  
 eastern swamp privet  
 sandweed; peelbark St. John's-wort  
 large gallberry; sweet gallberry  
 possumhaw  
 myrtle holly  
 Florida anise  
 Virginia willow; Virginia sweetspire  
 marsh-elder  
 pondspice  
 fetterbush  
 wax myrtle  
 odorless bayberry  
 swamp rose  
 American snowbell, storax  
 sweetleaf; horse sugar  
 rusty blackhaw

### SCIENTIFIC NAME

*Styrax americanus* Lam.  
*Cliftonia monophylla* (Lam.) Britton ex Sarg.  
*Cephalanthus occidentalis* L.  
*Conocarpus erectus* L.  
*Clethra alnifolia* L.  
*Forestiera acuminata* (Michx.) Poir.  
*Lyonia lucida* (Lam.) K.Koch  
*Illicium floridanum* J. Ellis  
*Alnus serrulata* (Aiton)Willd.  
*Ilex coriacea* (Pursh) Chapm.  
*Iva* spp.  
*Crataegus aestivalis* (Walter) Torr. & A. Gray  
*Ilex myrtifolia* Walter  
*Myrica inodora* W. Bartram  
*Litsea aestivalis* (L.) Fernald  
*Ilex decidua* Walter  
*Viburnum rufidulum* Raf.  
*Baccharis angustifolia* Michx.  
*Batis maritima* L.  
*Hypericum fasciculatum* Lam.  
*Cornus foemina* Mill.  
*Rosa palustris* Marsh.  
*Symplocos tinctoria* (L.) L'Hér.  
*Cyrilla racemiflora* L.  
*Itea virginica* L.  
*Myrica cerifera* L.

## INDEX OF WETLAND SEDGES

SCIENTIFIC NAME	COMMON NAME
<i>Carex atlantica</i> L.H. Bailey ssp. <i>capillacea</i> (L.H. Bailey) Reznicek	prickly bog sedge
<i>Carex decomposita</i> Muhl.	cypress knee sedge
<i>Carex leptalea</i> Wahlenb.	bristly stalked sedge
<i>Carex stipata</i> Muhl. ex Willd.	awl fruit sedge
<i>Cladium mariscus</i> (L.) Pohl ssp. <i>jamaicense</i> (Crantz) Kük.	sawgrass
<i>Cyperus articulatus</i> L.	jointed flat sedge
<i>Cyperus haspan</i> L.	haspan flat sedge
<i>Cyperus odoratus</i> L.	fragrant flat sedge
<i>Eleocharis</i> spp.	spike rush
<i>Fimbristylis caroliniana</i> (Lam.) Fern.	Carolina fimbry
<i>Fimbristylis dichotoma</i> (L.) Vahl	forked fimbry
<i>Fimbristylis spadicea</i> (L.) Vahl	marsh fimbry
<i>Fimbristylis vahlii</i> (Lam.) Link	Vahl's fimbry
<i>Fuirena scirpoidea</i> Michx.	southern umbrella sedge
<i>Fuirena squarrosa</i> Michx.	hairy umbrella sedge
<i>Rhynchospora colorata</i> (L.) H.Pfeiff.	star rush whitetop
<i>Rhynchospora corniculata</i> (Lam.) A. Gray	shortbristle horned beaksedge
<i>Rhynchospora divergens</i> Chapman ex M.A. Curtis	spreading beaksedge
<i>Rhynchospora inundata</i> (Oakes) Fern.	narrow fruit horned beak sedge
<i>Rhynchospora latifolia</i> (Baldwin) W.W. Thomas	giant whitetop sedge
<i>Rhynchospora microcarpa</i> Baldwin ex A. Gray	southern beak sedge
<i>Rhynchospora miliacea</i> (Lam.) A. Gray	millet beak sedge
<i>Rhynchospora mixta</i> Britton ex Small	mingled beak sedge
<i>Rhynchospora tracyi</i> Britton	Tracy's beak sedge
<i>Schoenoplectiella erecta</i> (Poir.) Lye	sharp scale bulrush
<i>Schoenoplectus etuberculatus</i> (Steud.) Soják	Canby's bulrush
<i>Schoenoplectus robustus</i> (Pursh) M.T. Strong	salt marsh bulrush
<i>Schoenoplectus tabernaemontani</i> (C.C. Gmel.) Palla	soft stem bulrush
<i>Schoenus nigricans</i> L.	black bogrush
<i>Schoenoplectus americanus</i> (Pers.) Volkart ex Schinz & R. Keller	American bulrush
<i>Scirpus cyperinus</i> (L.) Kunth	woolgrass
<i>Scleria</i> spp.	nut-rush

## INDEX OF WETLAND SEDGES (continued)

### COMMON NAME

American bulrush  
awl fruit sedge  
black bogrush  
bristly stalked sedge  
Canby's bulrush  
Carolina fimbry  
Cuban bulrush  
cypress knee sedge  
ditch fimbry  
forked fimbry  
fragrant flat sedge  
giant whitetop sedge  
hairy umbrella sedge  
Harper's fimbry  
haspan flat sedge  
jointed flat sedge  
marsh fimbry  
millet beak sedge  
mingled beak sedge  
narrow fruit horned beak sedge  
nut-rush  
prickly bog sedge  
salt marsh bulrush  
sawgrass  
sharp scale bulrush  
short bristle horned beak sedge  
soft stem bulrush  
southern beaksedge  
southern umbrella sedge  
spike rush  
spreading beak sedge  
star rush whitetop  
Tracy's beak sedge  
umbrella plant  
Vahl's fimbry  
woolgrass

### SCIENTIFIC NAME

*Scirpus americanus* (Pers.) Volkart ex Schinz & R. Keller  
*Carex stipata* Muhl. ex Willd.  
*Schoenus nigricans* L.  
*Carex leptalea* Wahlenb.  
*Schoenoplectus etuberculatus* (Steud.) Soják  
*Fimbristylis caroliniana* (Lam.) Fern.  
*Oxycaryum cubense* (Poepp. & Kunth) Palla  
*Carex decomposita* Muhl.  
*Fimbristylis schoenoides* (Retz.) Vahl  
*Fimbristylis dichotoma* (L.) Vahl  
*Cyperus odoratus* L.  
*Rhynchospora latifolia* (Baldwin) W.W. Thomas  
*Fuirena squarrosa* Michx.  
*Fimbristylis perpusilla* Harper ex Small & Britton  
*Cyperus haspan* L.  
*Cyperus articulatus* L.  
*Fimbristylis spadicea* (L.) Vahl  
*Rhynchospora miliacea* (Lam.) A. Gray  
*Rhynchospora mixta* Britton ex Small  
*Rhynchospora inundata* (Oakes) Fern.  
*Scleria* spp.  
*Carex atlantica* L.H. Bailey ssp. *capillacea* (L.H. Bailey) Reznicek  
*Schoenoplectus robustus* (Pursh) M.T. Strong  
*Cladium mariscus* (L.) Pohl ssp. *jamaicense* (Crantz) Kük.  
*Schoenoplectiella erecta* (Poir.) Lye  
*Rhynchospora corniculata* (Lam.) A. Gray  
*Schoenoplectus tabernaemontani* (C.C. Gmel.) Palla  
*Rhynchospora microcarpa* Baldwin ex A. Gray  
*Fuirena scirpoidea* Michx.  
*Eleocharis* spp.  
*Rhynchospora divergens* Chapman ex M.A. Curtis  
*Rhynchospora colorata* (L.) H. Pfeiff.  
*Rhynchospora tracyi* Britton  
*Cyperus involucratus* Rottb.  
*Fimbristylis vahlii* (Lam.) Link  
*Scirpus cyperinus* (L.) Kunth

## INDEX OF WETLAND GRASSES

### SCIENTIFIC NAME

*Aristida* spp.  
*Arundinaria gigantea* (Walter) Walter ex Muhl.  
*Axonopus furcatus* (Flüggé) Hitchc.  
*Distichlis spicata* (L.) Greene  
*Leersia* spp.  
*Luziola fluitans* (Michx.) Terrell & H. Rob.  
*Monanthochloe littoralis* Engelm.  
*Muhlenbergia capillaris* (Lam.) Trin.  
*Muhlenbergia schreberi* J.F. Gmel.  
*Panicum hemitomom* Schult.  
*Panicum rigidulum* Bosc ex Nees  
*Panicum virgatum* L.  
*Paspalum distichum* L.  
*Paspalum repens* P.J. Bergius  
*Phanopyrum gymnocarpon* (Elliott) Nash  
*Spartina alterniflora* Loisel.  
*Spartina bakeri* Merr.  
*Spartina patens* (Aiton) Muhl.  
*Spartina spartinae* (Trin.) Merr. ex Hitchc.  
*Sporobolus virginicus* (L.) Kunth  
*Zizania aquatica* L.  
*Zizaniopsis miliacea* (Michx.) Döll & Asch.

### COMMON NAME

three-awn grasses  
giant cane, switch cane  
big carpetgrass  
saltgrass  
cutgrass  
southern watergrass  
key grass, shoregrass  
gulf muhly, hairy awn muhly  
nimblewill muhly  
maidencane  
redtop panicum  
switchgrass  
knotgrass  
water paspalum  
savannah panicum  
smooth cordgrass  
sand cordgrass  
saltmeadow cordgrass  
gulf cordgrass  
coastal dropseed  
annual wild rice  
southern wild rice

### COMMON NAME

annual wildrice  
big carpetgrass  
coastal dropseed  
cutgrass  
giant cane  
gulf cordgrass  
gulf muhly, hairy awn muhly  
key grass, shoregrass  
knotgrass  
maidencane  
nimblewill muhly  
redtop panicum  
saltgrass  
saltmeadow cordgrass  
sand cordgrass  
savannah panicum  
smooth cordgrass  
southern watergrass  
southern wildrice  
switchgrass  
three-awn grasses  
water paspalum

### SCIENTIFIC NAME

*Zizania aquatica* L.  
*Axonopus furcatus* (Flüggé) Hitchc.  
*Sporobolus virginicus* (L.) Kunth  
*Leersia* spp.  
*Arundinaria gigantea* (Walter) Walter ex Muhl.  
*Spartina spartinae* (Trin.) Merr. ex Hitchc.  
*Muhlenbergia capillaris* (Lam.) Trin.  
*Monanthochloe littoralis* Engelm.  
*Paspalum distichum* L.  
*Panicum hemitomom* Schult.  
*Muhlenbergia schreberi* J.F. Gmel.  
*Panicum rigidulum* Bosc ex Nees  
*Distichlis spicata* (L.) Greene  
*Spartina patens* (Aiton) Muhl.  
*Spartina bakeri* Merr.  
*Phanopyrum gymnocarpon* (Elliott) Nash  
*Spartina alterniflora* Loisel.  
*Luziola fluitans* (Michx.) Terrell & H. Rob.  
*Zizaniopsis miliacea* (Michx.) Döll & Asch.  
*Panicum virgatum* L.  
*Aristida* spp.  
*Paspalum repens* P.J. Bergius

## INDEX OF WETLAND RUSHES

### SCIENTIFIC NAME

*Juncus acuminatus* Michx.  
*Juncus bufonius* L.  
*Juncus canadensis* J. Gay ex Laharpe  
*Juncus coriaceus* Mack.  
*Juncus debilis* A. Gray  
*Juncus dichotomus* Elliott  
*Juncus diffusissimus* Buckley  
*Juncus effusus* L.  
*Juncus elliotii* Chapm.  
*Juncus gymnocarpus* Coville  
*Juncus marginatus* Rostk.  
*Juncus megacephalus* M.A. Curtis  
*Juncus pelocarpus* E.Mey.  
*Juncus polycephalus* Michx.  
*Juncus repens* Michx.  
*Juncus roemerianus* Scheele  
*Juncus scirpoides* Lam.  
*Juncus tenuis* Willd.

### COMMON NAME

tapertip rush  
 toad rush  
 Canadian rush  
 leathery rush  
 weak rush  
 forked rush  
 slimpod rush  
 soft rush  
 bog rush  
 Pennsylvania rush, Coville's rush  
 shore rush, grassleaf rush  
 bighead rush  
 annual rush  
 manyhead rush  
 lesser creeping rush  
 needle rush  
 needlepod rush  
 path rush

### COMMON NAME

annual rush  
 bighead rush  
 bog rush  
 Canadian rush  
 forked rush  
 leathery rush  
 lesser creeping rush  
 manyhead rush  
 needle rush  
 needlepod rush  
 path rush  
 Pennsylvania rush, Coville's rush  
 shore rush, grassleaf rush  
 slimpod rush  
 soft rush  
 tapertip rush  
 toad rush  
 weak rush

### SCIENTIFIC NAME

*Juncus pelocarpus* E. Mey.  
*Juncus megacephalus* M.A. Curtis  
*Juncus elliotii* Chapm.  
*Juncus canadensis* J. Gay ex Laharpe  
*Juncus dichotomus* Elliott  
*Juncus coriaceus* Mack.  
*Juncus repens* Michx.  
*Juncus polycephalus* Michx.  
*Juncus roemerianus* Scheele  
*Juncus scirpoides* Lam.  
*Juncus tenuis* Willd.  
*Juncus gymnocarpus* Coville  
*Juncus marginatus* Rostk.  
*Juncus diffusissimus* Buckley  
*Juncus effusus* L.  
*Juncus acuminatus* Michx.  
*Juncus bufonius* L.  
*Juncus debilis* A. Gray

## INDEX OF EMERGENTS

### SCIENTIFIC NAME

*Bacopa caroliniana* (Walter) B.L. Rob.  
*Bacopa monnieri* (L.) Pennell  
*Canna flaccida* Salisb.  
*Crinum americanum* L.  
*Habenaria repens* Nutt.  
*Hymenocallis* spp.  
*Iris hexagona* Walter  
*Lachnanthes caroliniana* (Lam.) Dandy  
*Lobelia cardinalis* L.  
*Lobelia glandulosa* Walter  
*Ludwigia repens* J.R. Forst.  
*Nelumbo lutea* Willd.  
*Nuphar lutea* (L.) Sm.  
*Nymphaea odorata* Aiton  
*Nymphoides aquatica* (J.F.Gmel.) Kuntze  
*Orontium aquaticum* L.  
*Peltandra sagittifolia* (Michx.) Morong  
*Peltandra virginica* (L.) Schott  
*Polygonum* spp.  
*Pontederia cordata* L.  
*Sagittaria* spp.  
*Saururus cernuus* L.  
*Thalia geniculata* L.  
*Xyris* spp.

### COMMON NAME

blue-waterhyssop, lemon bacopa  
 waterhyssop, herb-of-grace  
 golden canna, bandanna-of-the-Everglades  
 swamp lily, string lily  
 water-spider orchid, floating orchid  
 spiderlilies  
 dixie iris, prairie iris  
 red-root  
 cardinal flower  
 glades lobelia  
 creeping primrose willow  
 American lotus  
 spadder dock  
 fragrant water-lily  
 banana-lily, big floating heart  
 golden club  
 spoon flower  
 green arrow arum  
 smartweed, knotweed  
 pickerelweed  
 arrowhead  
 lizard's tail  
 alligatorflag, fireflag  
 yelloweyed-grass

### COMMON NAME

alligatorflag, fireflag  
 American lotus  
 arrowhead  
 banana-lily, big floating heart  
 blue-waterhyssop, lemon bacopa  
 cardinal flower  
 creeping primrose willow  
 dixie iris, prairie iris  
 fragrant water-lily  
 glades lobelia  
 golden canna, bandanna-of-the-Everglades  
 golden club  
 green arrow arum  
 lizard's tail  
 pickerelweed  
 red-root  
 smartweed, knotweed  
 spadder dock  
 spiderlilies  
 spoon flower  
 swamp lily, string lily  
 waterhyssop, herb-of-grace  
 water-spider orchid, floating orchid  
 yelloweyed-grass

### SCIENTIFIC NAME

*Thalia geniculata* L.  
*Nelumbo lutea* Willd.  
*Sagittaria* spp.  
*Nymphoides aquatica* (J.F. Gmel.) Kuntze  
*Bacopa caroliniana* (Walter) B.L. Rob.  
*Lobelia cardinalis* L.  
*Ludwigia repens* J.R. Forst.  
*Iris hexagona* Walter  
*Nymphaea odorata* Aiton  
*Lobelia glandulosa* Walter  
*Canna flaccida* Salisb.  
*Orontium aquaticum* L.  
*Peltandra virginica* (L.) Schott  
*Saururus cernuus* L.  
*Pontederia cordata* L.  
*Lachnanthes caroliniana* (Lam.) Dandy  
*Polygonum* spp.  
*Nuphar lutea* (L.) Sm.  
*Hymenocallis* spp.  
*Peltandra sagittifolia* (Michx.) Morong  
*Crinum americanum* L.  
*Bacopa monnieri* (L.) Pennell  
*Habenaria repens* Nutt.  
*Xyris* spp.

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