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Needle Palm (*Rhapidophyllum hystrix*), the cold-hardest trunk-forming palm in the world.

Foreword

Welcome to the world of Cold Hardy Palms. If you live in USDA Zone 6b or above, you can grow palms. Not just any palms mind you, but native palms too - Especially native palms!

The world of cold hardy palms is curious. Knowledgeable gardeners, nurserymen, and horticultural agents have known about cold hardy palms for decades, but the knowledge somehow hasn't hit the streets. Finally, however, the time of cold hardy palms has come to the limelight, principally because of the Internet and its world-wide-web.

I present to you an introduction to the cold hardy palms. Hardiness is to cold snaps, not extended freezes, (which is why USDA Zone 6b is about the limit).



Dwarf Palmetto (*Sabal minor*), the world's cold-hardest dwarf palm. Jaycee Park, Raleigh, NC.

Figure 1. USDA Climate Zones

USDA ZONE	Winter Lowest Temp. (Avg.) Fahrenheit	Celsius
5a	-20 to -15	-29 to -26
5b	-15 to -10	-26 to -23
6a	-10 to -5	-23 to -21
6b	-5 to 0	-21 to -18
7a	0 to 5	-18 to -15
7b	5 to 10	-15 to -12
8a	10 to 15	-12 to -9
8b	15 to 20	-9 to -7
9a	20 to 25	-7 to -4
9b	25 to 30	-4 to -1
10a	30 to 35	-1 to 2
10b	35 to 40	2 to 4
11a	40 to 45	4 to 7
11b	45 to 50	7 to 10

List of Cold Hardy Palms

USDA Zones 6b to 8a.

* Expect leaf damage from average low in listed zone; ** could be lethal.

List is cumulative upwards.

6b (-5 to 0 F) (-21 to -18 C)

Rhapidophyllum hystrix

Sabal minor

7a (0 to 5 F) (-18 to -15 C)

Sabal 'Birmingham'

Sabal 'Louisiana'

Sabal 'Tamaulipas'

7b (5 to 10 F) (-15 to -12 C)

Sabal 'Brazoria'*

Sabal uresana

Trachycarpus 'Bulgaria'

Trachycarpus fortunei

Trachycarpus nanus

Trachycarpus takil

Trachycarpus wagnerianus

8a (10 to 15 F) (-12 to -9 C)

Brahea armata*

Brahea berlandieri aka B. bella

Brahea decumbens*

Brahea dulcis*

Brahea moorei*

Butia capitata*

Butia eriospatha

Butia capitata odorata

Butia paraguayensis*

Butia purpurascens*

Butia yatay*

Chamaedorea microspadix*

Chamaedorea radicalis*

Chamaerops humilis*

Chamaerops humilis cerifera*

Jubea chilensis**

Nannorrhops ritchiana**

Nannorrhops ritchiana 'Silver'**

Phoenix dactylifera**

Phoenix loureiroi humilis**

Phoenix loureiroi pedunculata**

Phoenix sylvestris**

Phoenix theoprostii**

Sabal domingensis*

Sabal etonia

Sabal maritima*

Sabal mexicana*

Sabal palmetto

Sabal rosei*

Serenoa repens

Trachycarpus latisectus*

Trachycarpus 'manipur'

Trachycarpus martianus*

Trachycarpus 'Naga Hills'

Trachycarpus oreophilus*

Trachycarpus princeps*

Trithrinax brasiliensis*

Trithrinax campestris*

Washingtonia filifera**

Washingtonia filifera-x-robusta**

Washingtonia robusta**

Figure 2. Average Frost Dates USA

Zone	Last	First
Z6b	April 30	Oct 18
Z7a	April 25	Oct 20
Z7b	April 10	Oct 25
Z8a	March 30	Nov 1
Z8b	March 15	Nov 15

NOTE: Whether it is grass, perennials, annuals, trees or palms you are planting, you have to meet the requirements of the plant to succeed. That means: proper site selection; site and soil preparation;

adequate irrigation; selection of the right plant and right size of plant; and planting at the optimal time.

That being said, nature is not perfect. Poor health, diseases, pests, natural disasters, and old age befall people and palms alike. Nothing lasts forever. Palms are not a panacea. They are simply a choice that you may not have known about, a treasure that you have been deprived of, and a new hope.

No guarantee is made, given, or implied. Please understand.



Chamaerops humilis, Manteo, North Carolina

Acknowledgements

What is contained herein was gleaned from the tree of knowledge grown and cared for by many others. This book is a simple documentary of that lovely tree.

If you enjoy this book you can thank my wife and friends for their encouragement and support. They deserve it. If you don't like this book you'll blame me. I rather hope that you like it.

For some twenty years Gary Hollar of New Bern, North Carolina has grown cold hardy palms and sold them to an increasing assemblage of palm smitten gardeners. I never would have discovered cold hardy palms if not for Tony Avent of Raleigh, with his outrageous and mesmerizing catalogs from Plant Delights Nursery. Tony has opened the doors of the world to palms - and so much more! The same is true for Carl Schoenfeld and Wade Roitsch of Yucca Do Nursery and John Fairey of Peckerwood Gardens, both in Hempstead, Texas. We would be ever so much poorer without their efforts. It is impossible to ignore the assiduous work of Martin Gibbons, Tobias Spanner, Nigel Kembrey, Kiril Donovan and their friends overseas. My hat is off to you.

Scott Zona has published his studies of the genus *Sabal*. Thank you Mr. Zona.

Lacepede was right. "It takes centuries to nurture the tree of knowledge and to make it grow, but one crushing blow from the axe of destruction chops it down."

Let us not chop it down.

The Palm And Cycad Society Of Australia (PACSOA) must be thanked for nurturing the tree. They have kindly made this book available for free on their website (www.pacsoa.org.au). Thank you Mike Gray.

This book is free to download, free to copy, free to distribute, and free to translate – just give me credit as author next to your credit as translator. Why free? Sunshine is free. Rain is free. The air we breathe is free. Why not a book!

Special thanks to Robert Craddock for editorial insights at a dark hour - mostly before and after his long day's work.

Key to Cold Hardy Palms¹

USDA Zones 6b-8a

- 1A Trunk absent or creeping or below ground (not upright).....go to.....2
- 1B Trunk upright, even if low and squat.....go to.....9

Non-trunk or Subterranean trunk

- 2A No sharp teeth on petioles.....3
- 2B Sharp teeth on petioles.....4
- 3A Inflorescence terminal (at end and center of stem), upright, extends beyond leaves
- *Nannorrhops ritchiana* Z8b
- 3B Inflorescence not terminal.....4
- 4A Hastula truly palmate; petioles armed.....5
- 4B Hastula costapalmate or strongly costapalmate; petioles not armed...7
- 5A Inflorescence extends well beyond leaves; back of leaves white, front of leaves green - *Brahea moorei* Z8a
- 5B Inflorescence held within leaves....6
- 6A Leaves very white front and back; leaves large (30-36inches across);
- *Brahea decumbens* Z8a; or
- 6B Leaves green, blue-green, or silvery; leaves small (20-24inches across)
- *Serenoa repens* Z8a
- 7A Inflorescence bushy and \leq leaves; hastula costapalmate & often highly skewed - *Sabal etonia* Z8a
- 7B Inflorescence sparse and \geq leaf length; hastula costapalmate.....8
- 8A Seed (not fruit) 4-7mm; hastulas moderately skewed. - *Sabal minor* Z7a-6b
- 8B Seed (not fruit) large 10-13mm; hastulas often extremely skewed;
- *Sabal 'Tamaulipas'* Z7a

Palms with a trunk

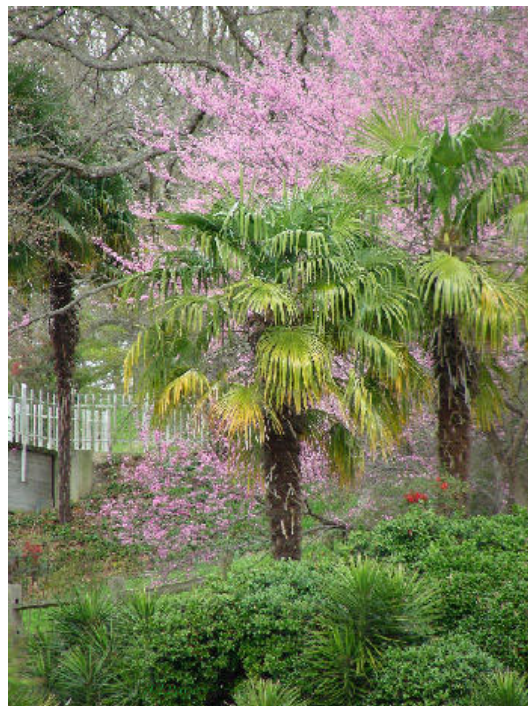
- 9A Leaves pinnate (like fern leaf or ostrich feather).....go to.....10
- 9B Leaves palmate or costapalmate...14
- 10A Thick sturdy trunk, even massive (not thin and narrow).....11
- 10B Thin trunk (very short or up to several feet).....13
- 11A Deep-green glossy leaves (with wide leaf pinnae); pinnae near leaf base not modified into spines; very stout trunk - *Jubea chilensis* Z8b
- 11B Leaves gray-green to green, pinnae long and thin.....12
- 12A Petioles toothed; basal pinnae not modified into spines; *Butia sp.* Z8a
- 12B Basal pinnae modified into spines - *Phoenix sp.* Z8b
- 13A Short, 6-inch trunk at most; red berries
- *Chamaedorea radicalis* Z8b, 8a
- 13B Tall narrow trunk, red berries
- *Chamaedorea microspadix* Z8b, 8a
- 14A Wide, squat, trunk has long, sharp, conspicuous spines; leaves palmate - *Rhapidophyllum hystrix* Z7a, 6b
- 14B Trunk lacks spines (but leaves may have teeth).....15
- 15A Leaf stem bears sharp teeth.....16
- 15B Leaf stem w/o sharp teeth.....21
- 16A Teeth small, trunk average.....17
- 16B Teeth very large, trunk wide.....20
- 17A Hastula palmate:
Loosely clustering leaning trunks
- *Serenoa repens* Z8a; or
Tightly clustering upright trunks
- *Chamaerops humilis* Z8a
- 17B Hastula costapalmate; petioles armed.....18
- 18A Inflorescence >>leaves, hangs gracefully down 6-ft or more
- *Brahea armata* Z9a, 8b
- 18B Inflorescence not as above.....19
- 19A Dead leaves naturally fall off trunk, boot and all, leaving a clean trunk
- *Brahea edulis* Z9a, 8b

¹ For mature, established specimens. If in doubt, see species descriptions.

- 19B Dead leaves remain attached to trunk for some time
- *Brahea dulcis*/ *B. berlandieri* Z8a
- 20A Abundant leaf filaments
- *Washingtonia filifera* Z8b, 8a
- 20B Few leaf filaments
- *Washingtonia robusta* Z9a, 8b
- 21A Inflorescence terminal (at end and center of trunk), upright, and much longer than leaf-length
- *Nannorrhops ritchiana* Z8a
- 21B Inflorescence not terminal.....22
- 22A Leaves truly palmate; Abundant, coarse hair surrounds trunk at leaf bases (although trunk may be bare further down) – *Trachycarpus* sp.
- 22B Leaves costapalmate (or weakly so) Trunk not hairy.....23
- 23A Trunk 20-24 inches wide, not tapering markedly; inflorescence longer than leaves; fruit 12-14mm wide; seed 8-10mm wide.
Sabal domingoensis Z8b.
- 23B Not as above.....go to.....24
- 24A Leaf weakly costapalmate; pinnae divided $\leq 2/3$ leaf length.....25
- 24B Leaf very costapalmate; pinnae divided $\geq 2/3$ leaf length.....26
- 25A Trunk normal - *Brahea nitida* Z9a
- 25B Trunk short & squat except very old specimens where boots have fallen off; Seed (not fruit) 4-7mm
- *Sabal 'Louisiana'* Z7a
- 26A Leaves glaucous; Pinnae very long at ends; inflorescence \geq leaves; Seed (not fruit) 10-14mm
- *Sabal uresana* Z8a, 7b
- 26B Leaves green or greenish.....27
- 27A Pinnae divided $\geq 3/4$ leaf length, ends long, wispy.....29
- 27B Pinnae divided $\leq 3/4$ leaf length; pinnae broad28
- 28A Seed (not fruit) 8-13mm; Inflorescence = leaves
- *Sabal mexicana* Z8b, 8a
- 28B Inflores. \geq leaf - *S. 'Brazoria'* Z7b

29A Inflorescence = leaf; seed 5-9mm;
- *S. palmetto* Z8a

29B Inflorescence \leq leaves; trunk slow – *Sabal 'Birmingham'* Z7a



Trachycarpus fortunei Taylor Form, Pullen Park



Trachycarpus fortunei, Pullen Park, Raleigh, NC

Palm Morphology

Boot: The leaf-base attachment to the trunk. Some palms shed the boot with the leaf. Some retain the boot for long periods, only shedding the oldest ones.

Costapalmate: A leaf where the hastula is elongate and pointy.

Hastula: Found in palmate and costapalmate leaves. The *upper* leaf-end of the stem where the leaf and pinnae are attached (do not confuse with rachis!).

Inflorescence: The branched stem that bears the palm flowers, and later its fruit. May be sparse - having a few short branchlets at long intervals, or bushy - having a congestion of branchlets.

Palmate: A leaf where the hastula is round or ovoid, not elongate and not extending along the leaf midrib; Hastula resembles an arm that ends in a fist.

Petiole: The woody extension that attaches the leaf to the trunk.

Pinnae: Divisions of the leaf found along the midrib in pinnate leaves or as spread fingers in palmate and costapalmate leaves.

Pinnate: The leaf stem continues as the midrib and pinnae are attached to the midrib like filaments of a feather to the feather shaft. Leaf resembles a fern or cicad leaf (see *Butia* & *Phoenix* palms)

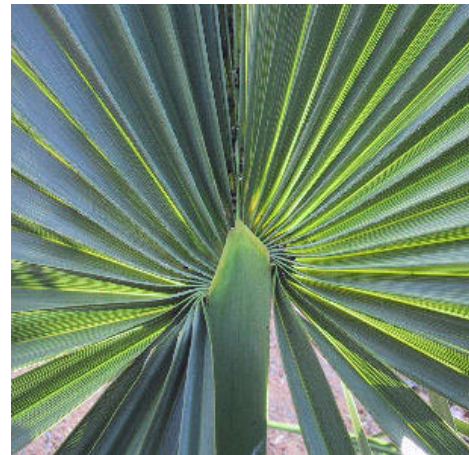
Rachis: The *lower* part of the stem that extends along the *underside* of the leaf along its midrib (Not to be confused with the hastula!).

Trunk: The aerial or underground body that bears the leaves. When visible above ground (aerial), the palm is said to have a trunk.

Very Costapalmate: Hastula resembles a praying hand with a long middle finger.



Palmate hastula.



Costapalmate hastula.



Very costapalmate hastula.



Rachis on a very costapalmate leaf.

Species Descriptions²

BRAHEA (Rock Palm): Species of *Brahea* are native to Baja California, Mexico, Guatemala, Nicaragua, and neighboring areas. Nearly all *Brahea* species require full sun, excellent drainage and low humidity, although a few have been grown in the humid southeast. The non-trunking species (*B. decumbens* & *B. moorei*) are differentiated by their inflorescence and leaf color. The trunking species are sometimes difficult to separate, in which case “species” are ascribed to localized populations. It is useful to know where your plant is from because particular populations may be hardier to cold.



Brahea armata Peckerwood Gardens

Brahea armata Blue Hesper Palm: Native to Baja California, *B. armata* has stiff silvery leaves, and its inflorescences erupt from within the leaves and dramatically weep in long streamers towards the ground. Tall specimens in flower look like alien space craft with numerous golden, downward pointing

jets, or an aerial medusa with long, gold, graceful tentacles. Z8b, 8a

Brahea berlandieri Rock Palm: The northernmost population of the *Brahea dulcis* complex, *Brahea berlandieri* is found in Tamaulipas, Mexico where individuals may cling to sheer rock faces. Adult specimens have survived brief 5F (-15C) exposure in Texas, but I’ve had young plants die at 20F (-7C). Bluish green leaves. Z8b, 8a.



Brahea decumbens Peckerwood Gardens

Brahea decumbens Blue Dwarf Rock Palm: *Brahea decumbens* is perhaps the most coveted palm of this genus. It is absolutely stunning in old age because its leaves are brilliant silvery-blue. Seedlings produce green leaves, taking eight years to produce powdery leaves. Slightly more cold hardy than its showy relative - *Brahea moorei*. Z8b, 8a.

Brahea dulcis Rock Palm: Mexico to Nicaragua. Prefers well-drained sites and low humidity, although excellent specimens are grown in Fairchild Tropical Gardens, Florida. Z8b, 8a.

Brahea edulis Guadalupe Palm: The only *Brahea* that drops its dead leaves, giving it a clean look. Native to Guadalupe Island, it is endangered by goats that eat the seedlings. Fortunately it is popular in southwest landscapes and seedlings are avidly reared. Z9a, 8b.

² When 2 zones are given, the 2nd is riskier.



Brahea moorei Peckerwood Gardens

Brahea moorei Spearmint Rock Palm: Native to northeast Mexico, Sierra Madre Oriental, where it inhabits light shade, *B. moorei* is highly ornamental but doesn't form a trunk. Do not despair, its leaves are arresting. Older specimens have the backs of the leaves frosted pure white, in high contrast to the very green leaf front. Z8b, 8a.

Brahea nitida Guatemala Rock Palm: Native to Guatemala. *Brahea nitida* is the only *Brahea* whose leaf petioles are not armed. Z9a, 8b.



Butia capitata

BUTIA (Jelly Palm): Species of *Butia* are native to Argentina, Brazil, Paraguay, and Uruguay. There are trunking and non-trunking species. *Butia* provides us with the cold-hardest pinnate palms - *Butia capitata odorata* and *Butia eriospatha*. *Butia* prefer well

drained sandy-loam to loamy soils, although adequate moisture is needed. Full sun or part shade is best for most varieties. As the name implies, the fruits of some species are used to make jelly.



Butia capitata Author's Garden

Butia capitata Jelly Palm: Found in Brazil and Uruguay; cultivated in southeastern USA. Significant leaf damage begins about 10F (-12C), but the plant may survive brief periods to about 6F (-14C). Can be grown in clay soils with good drainage. Fruit is large, orange to yellow & reportedly delicious. Z8b, 8a

Butia capitata odorata Southern Jelly Palm: Perhaps the cold-hardest pinnate palm, native to southern Brazil and Uruguay. It has smaller fruit and a more compact form than its northerly neighbors, and greener leaves. Z8a, 7b

Butia eriospatha Woolly Jelly Palm: Native to extreme southern Brazil, the Woolly Jelly Palm gets its name from the fuzzy spathe (sheathing bract) that protects the young flower stalk. It may be cold harder than *Butia capitata odorata*. Z8a, 7b

Butia paraguayensis Dwarf Jelly Palm: From Paraguay and southern Brazil, this jelly palm forms a subterranean trunk that may very slowly become aerial, rarely more than 6-feet tall. Z8b, 8a

Butia purpurascens Purple Jelly Palm: Native to central Brazil, this palm gets its name from its purple fruit (rather than the orange or yellow fruit typical to the genus). Z8b, 8a.



Butia yatay Bamboo Farm, Savannah, Georgia

Butia yatay Yatay Palm: Native to Argentina. Seeds are larger and the trunk is thinner than *B. capitata*. May be prone to bud-rot in humid climates, in which case *Butia capitata* would be a better choice. Z8b, 8a.

Chamaedorea microspadix Bamboo Palm: Native to mountainous areas of Mexico where it inhabits deep shade in very moist, rocky, well-drained soil. Somewhat resembles bamboo in that it has a thin trunk and pinnate leaves. Leaves are cold hardy to 22F (-6C) and the stem is hardy to about 12F (-11C), though it achieves its best form where unharmed by severe frost. Brilliant red berries will reward those who are successful with this nice palm. Z8b, 8a.



Chamaedorea radicalis

Chamaedorea radicalis Another native of mountains of Mexico, but has no or very little trunk. Requirements same as *Chamaedorea microspadix*. Z8b, 8a.



Chamaerops humilis Moody Gardens, Galveston

Chamaerops humilis Mediterranean Fan Palm: Native to lands on the western half of the Mediterranean Sea, this is an easy and rewarding palm in Zone 8a and above, however do not plant where pedestrian traffic is expected as the leaf stems have sharp teeth. Z8b, 8a.

Chamaerops humilis cerifera Blue Mediterranean Fan Palm. Same as above except leaves are silvery blue. Z8b, 8a.

Jubea chilensis Chilean Wine Palm:

This stunning palm is native to cool, windswept areas of Chile. A more dramatic pinnate palm would be hard to find, although reports of its cold hardiness are often exaggerated. Large, very green leaves much like *Phoenix canariensis* grace an immense trunk. Leaf damage begins around 15F (-9C), but individuals have survived exposure to 10F (-12C), possibly lower. It is absolutely dramatic where it can be grown without winter damage, but it dislikes tropical heat. Z8b, 8a



Nannorrhops ritchiana Mazari Palm:

Native to Pakistan & Afghanistan. This palm comes from a desert and requires desert conditions. Perhaps no other palm receives higher unsubstantiated accolades for its cold hardiness. Requires excellent drainage, full sun all day long, and most critical of all, no or little water in winter if freezing

temperatures are to be encountered. Leaves are green to grayish-green. May or may not form a narrow, inclined trunk. The only cold hardy palm whose inflorescence arises from the very end of the stem. The tip of the stem dies back after flowering, like a yucca. Z8b, 8a.

Nannorrhops ritchiana 'silver' The silver form of Mazari Palm, perhaps a separate species, and less cold hardy than the green form. Z8b, 8a

PHOENIX (Date Palm): Native to well drained soils in full sun from Africa and the Mediterranean, *Phoenix* species are pinnate, trunk forming palms, some of which are marginally cold hardy. I list these species only because some enthusiasts in Zone 8a and 8b may want to risk adding a date palm to their outdoor collection. Phoenix species are less cold hardy than the *Butia* species, and I would direct everyone who desires a beautiful, cold hardy pinnate palm to the Butias. Nevertheless, here are the marginally cold hardy date palms. Z9.



Phoenix canariensis Mercer Arboretum

Phoenix canariensis Canary Island Date Palm Z9, 8b. Elegant, long, deep green glossy leaves have dangerously pointed pinnae near their leaf bases (like all Phoenix species). Leaves are damaged at about 18F (-8C). A solitary specimen is impressive, and a grove is simply awe-inspiring. Massive trunk.



Phoenix dactylifera, Moody Gardens, Galveston

Phoenix dactylifera Date Palm. Leaf hardy to about 15F (-9C) or so, this species is easily grown in Mediterranean climates. Forms suckers/offsets from the base. Z9, 8b.

Phoenix loureiroi humilis Mountain Date Palm: As the name implies, this non-suckering species occurs in the mountains from India and China to the Philippines. There is hope that a palm from the Himalayas would be quite cold hardy. Z9, 8b.

Phoenix loureiroi pedunculata Dwarf Mountain Date Palm: As the name implies, this small species occurs in the mountains from India and China to the Philippines. If it forms a trunk, it is short, and it typically has many suckers/offsets, making it easy to distinguish from the subspecies *humilis*. Z9, 8b.

Phoenix sylvestris Silver Date Palm: Silver Date Palm is another beauty for Mediterranean climates, it has silvery leaves and a thin, tall trunk. Z9.



Phoenix theoprastii Bamboo Farm, Savannah

Phoenix theoprastii Crete Date Palm: From Crete comes the reportedly cold hardiest date palm. Crete Date Palm sports silvery green leaves and often multiple trunks. Z8b, 8a.



Needle Palm at Jaycee Park, Raleigh, NC.

Rhapidophyllum hystrix Needle Palm: One of the great native palms of the southeastern USA, Needle Palm is absolutely the cold-hardest trunk-forming palm in the world, able to withstand brief exposure to -20F (-29C), with no leaf damage at -4F (-20C). It naturally occurs in South Carolina, Georgia, Alabama, Mississippi, and

Florida. Its name derives from the fact that its stout trunk is armed with long, tough spines. Needle Palm is remarkable. Although happiest in moist to wet soils in part shade, it also flourishes in full sun in well-drained soils. Despite its cold-hardiness, Zone 6b is not conducive to robust growth of Needle Palm, as the season is short and the number of days at or above 80F (27C) is not great. However, with a well-chosen site Needle Palm may be somewhat content there. Needle Palm seems to be taken for granted, and has been endangered in the wild due to habitat destruction. It truly is a lovely palm in part shade. Z6b. (See: The Curious Distribution).



Sabal palmetto, NC State Fairgrounds, Raleigh.

SABAL Palms of the genus *Sabal* are primarily native to Central and North America and the Caribbean, with at least one species native to South America (*Sabal gretheriae*). Within their native habitats they can be prolific. They are cherished for their beauty and drama - as well as for construction materials. In

Panama, the famous Panama Hat is made from *Sabal* leaves. Throughout the natural range of *Sabals* their leaves have been used to thatch roofs, and their timber to construct piers and buildings. There are only a few extremely cold hardy palms able to withstand 0F (-18C), and two of them are *Sabals* = *Sabal minor* and *Sabal* 'Birmingham'. Much disagreement exists regarding *Sabal* species and varieties within species, especially for the diversity now lumped into *Sabal minor*. No doubt some of the names that appear below stand to be changed in the future. Hold me no grudge. Many *Sabal* species are best suited for Zone 8b and warmer. I will list them for completeness sake: *Sabal bermudana*, *Sabal causiarum*, *Sabal gretheriae*, *Sabal guatemalensis*, *Sabal maritima*, *Sabal mauritiiformis*, *Sabal miamiensis*, *Sabal pumos*, *Sabal yapa*.



Sabal bermudana Mercer Arboretum, Houston

Sabal bermudana Native to the Island of Bermuda, where it grows from dry uplands right down among swamps. It is a magnificent *Sabal* with a wide trunk and prodigious green leaves. It strikes me that the leaves and trunk of *Sabal bermudana* resemble those of *Sabal* 'Birmingham', those of the latter being of a smaller scale. You may rightly consider this useless speculation.



Sabal palmetto (L), *S. 'Birmingham'* (R) at Gary's Nursery, New Bern, North Carolina

Sabal 'Birmingham' Birmingham Palmetto: A source for wonder. *Sabal 'Birmingham'*'s name derives from the fact that a gardener in Birmingham, Alabama grew this amazing palm. All seed stock originated from her plant. Her palm came as seed from California. No native source has been traced for this palm. *Sabal 'Birmingham'* slowly forms a trunk, in old age resembles a small version of *Sabal bermudana*, and is cold hardy to 0F (-18C). *Sabal 'Birmingham'* likes full sun or part shade in moist soil. It is not particular about soil, doing equally well in sandy-loam and amended clay. Seed (not fruit) 8-10mm. Z7b, 7a.



Sabal Brazoria, Peckerwood Gardens

Sabal 'Brazoria'* aka *xtexensis Brazoria Sabal: Unlike *Sabal 'Birmingham'*, we know exactly where this *Sabal* comes from: Brazoria County, Texas. The US Fish and Wildlife Service

manages the San Bernard Wildlife Reserve that is home to the largest remaining stand of these remarkable palms. The tallest specimen is almost 30 feet. It can take more than 10 years for a young plant to form a foot of trunk. Prefers moist, well-drained soil in full sun to part shade. You could be forgiven if you confused this palm with *Sabal mexicana*. *Sabal 'Brazoria'* is hardy to about 5F (-15C). Make sure your seed source is from *Sabal Brazoria*, because unscrupulous or ignorant persons have sold *Sabal mexicana* as *Sabal xtexensis*. This gave *Sabal Brazoria* an undeserved bad rap as being rather cold tender.



Sabal domingensis, Emerald Isle, NC

Sabal domingensis* aka *blackburniana* aka *umbraculifera Hispaniolan Palmetto: Native to the Island of Hispaniola, this *Sabal* has been reported cold hardy to 8F (-13C). *Sabal domingensis* prefers full sun and well-drained, sandy soil. Looks like a robust *Sabal palmetto* because its trunk may reach 60cm (24inches) without the

boots! Its seed is 8-10mm. It's fruit is 12-14mm. Z8b, 8a.



Sabal etonia – yes, I need a better photo!

Sabal etonia Scrub Palm: *Sabal etonia* is native to the endangered Florida Scrub plant community in well-drained sandy soils under the hot, baking sun of Florida's peninsula. *Sabal etonia* does not normally form a trunk, although specimens with several feet of upright trunk are known. Resembles a miniature, trunk-less *Sabal palmetto*. Seed (not fruit) 7-10mm. Z8a, 7b.



Sabal 'Louisiana' Mercer Arboretum, Houston

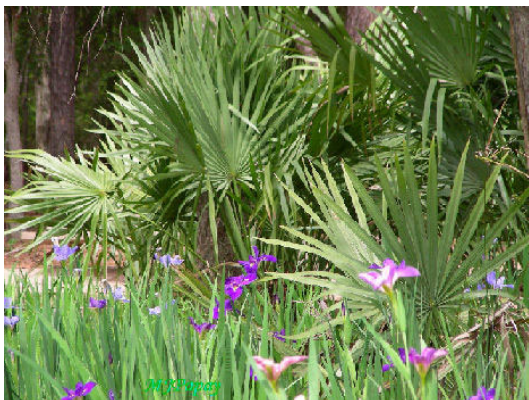
***Sabal* 'Louisiana'** Louisiana Palmetto: The native distribution of *Sabal* 'Louisiana' appears to coincide with that of *Sabal minor*, except that Louisiana Palmetto keeps near the coast. Presently recognized as a trunk-forming variation of *Sabal minor* found in and around Louisiana, though definition needs some changing. Louisiana Palmetto is

nonetheless distinctive. Typically it has bluish leaves that are larger and more numerous than a similar aged specimen of *Sabal minor*, and Louisiana Palmetto slowly forms an aerial trunk. It is not as cold hardy as *Sabal minor* and experiences leaf damage near 5F (-15C). Louisiana Palmetto prefers part shade in moist to wet soil, but specimens in full sun can be stunning. Seed (not fruit) 4-7mm. Z7a.



Sabal mexicana Mercer Arboretum

Sabal mexicana Mexico Palmetto: Native to Texas, but primarily a palm of Mexico and Nicaragua, *Sabal mexicana* is a robust, tall, and impressive palm. The trunk retains the boots of dead leaves for a long time, giving it a stout and imposing appearance. *Sabal mexicana* prefers full sun in a well-drained but moist soil. Expect leaf damage to begin about 14F (-10C). Seed (not fruit) is 9-13mm. This palm likes moisture, and grows mighty wide and tall when well provided. Z8b, 8a



Sabal minor, Mercer Arboretum, Houston, Texas

Sabal minor Dwarf Palmetto: Native to all coastal states from Texas east to North Carolina, and inland to southeast Oklahoma, Dwarf Palmetto is absolutely the cold hardiest dwarf palm in the world. John Fairey, of Peckerwood Gardens, Hempstead, Texas, has discovered *Sabal minor* way down in Mexico. This palm knows no bounds!



Sabal minor Plant Delights, Raleigh, NC

It has survived -24°F (-31°C) with no leaf damage at -4°F (-20°C). Because Dwarf Palmetto hides its trunk underground, it is protected from the worst of the cold. Dwarf Palmetto prefers part shade in

moist to wet soil, with little regard as to sand or clay content. It can also be grown in full sun. It's one tough (but pretty) cookie. Like the very cold hardy Needle Palm, Dwarf Palmetto is neglected by the horticultural world. It is native, dramatic in large sweeps of the landscape or as a solitary specimen, and is easy to care for – so why isn't it as well known and as sought after as *Phlox* or ferns? (See: The Curious Distribution). There are wild populations (subspecies?) of distinct morphology, from true dwarfs to true giants. An extremely cold-hardy form is from McCurtain County, Oklahoma (this is the one that survived -24°F (-31°C)). A giant form up to nine-feet tall, occurs from Morehead City, North Carolina along the coast right up to Virginia. Seed 4-7mm. Hardy as a rock in Z7a, hardy in 6b, possibly colder.



Sabal palmetto, Gary's Nursery, New Bern, NC

Sabal palmetto Palmetto/Cabbage Palm: Palmetto graces the coasts in its native range from North Carolina, south to Florida, east to the Bahama Islands, and

west to Texas. Although in the USA no other trunk-forming palm naturally occurs farther north than Palmetto (Bald Head Island, NC), it experiences leaf damage around 8 to 10F (-13 to -12C). Individuals have survived a brutal and crippling -4F (-20C), but they are the great exception. Palmetto prefers full sun in well-drained soil. Large specimens may be purchased as “hurricane cut” having a small root ball and an even smaller crown denuded of leaves. These should be planted in summer when the soil is warm in order to encourage strong root growth. Such specimens must be regularly watered and fertilized during the growing seasons and very well protected during winters for their first three years. It can be difficult to get Palmetto to grow well inland away from the coast. Called the Cabbage Palm because people once ate the leafy “cabbage” where from the leaves originate, which killed the tree. Best in Zone 8b and warmer, but can be managed as far north as 7b if protected from severe winters. Seed (not fruit) is 5-9mm. (See: The Curious Distribution).



Sabal ‘Lynn Lowery’ Peckerwood Gardens

Sabal rosei Llanos Palmetto: Native to western Mexico in subtropical deciduous forests and plains, *Sabal rosei* has the appearance of a slim-trunked *Sabal mexicana*. Well-drained soil and full sun. Seed (not fruit) 10-15mm. Z8b, 8a



Sabal ‘Tamaulipas’ Peckerwood Gardens

***Sabal* ‘Tamaulipas’** Tamaulipas Dwarf Palmetto: An arresting palm from the Mexico’s State of Tamaulipas. *Sabal* ‘Tamaulipas’ is unique (though people keep trying to lump it into *Sabal minor*). It forms an underground trunk upon which it slowly advances from hither to thither. Many of the leaves have an extremely skewed hastula, sometimes seen in *Sabal etonia*. *Sabal* ‘Tamaulipas’ has large seed (10-13mm), and its leaves can be enormous, especially in part shade. *Sabal* ‘Tamaulipas’ is very cold hardy considering its land of origin, enduring 6F (-14C) with no leaf damage. Z7b, 7a. Discovered by Carl Schoenfeld.



Sabal uresana Peckerwood Gardens, Hempstead

Sabal uresana Sonoran Palmetto: A dramatic glaucous-leaved, cold hardy, trunk-forming palm. It is native to stream valleys of Mexico’s Sonoran Desert. There is a comely silver-blue form available from Yucca Do Nursery.

My small specimen endured 9F (-13C) with no leaf damage, so 6F (-14C) would not surprise me. *Sabal uresana* prefers moist, well-drained soil in full sun. Greener-leaved forms may be hardier to cold. They also seem to grow faster. Seed (not fruit) 10-14mm. 8a, 7b.



Serenoa repens Peckerwood Gardens

Serenoa repens Saw Palmetto: Native to open forests and coastal dunes in Florida, South Carolina, and Georgia, Saw Palmetto is aptly named for the teeth on its leaf petioles. The fruit is extensively collected for an extract used to treat enlarged prostate in men. *Serenoa repens* is a distinctive palm for the landscape. Some specimens produce an aerial trunk to 20 feet. The leaves are typically a yellowish green, but spectacularly white populations are known. Likes well-drained soil with a moist subsoil. In Fairchild Tropical Gardens in Florida, plants practically crawl into the water, making beautiful reflections. The most inland, and cold hardiest population is a green form from Emanuel, Georgia. Don't be fooled. When this palm is happy, it spreads wider and wider, which is nice if you have the room, but problematic when you don't. Oh well, not to worry. When cut back, it can re-sprout from its large roots. Z8a, possibly 7b.



Trachycarpus fortunei, Author's Garden

TRACHYCARPUS (Windmill Palms)

Perhaps the most popular cold hardy trunk forming palms in the world, and deservedly so. Windmill Palms are native to moist temperate forest climates in the orient, principally India and China, where they prefer well-drained soil in part or full sun. Nearly all rapidly form a sturdy, upright trunk. A foot of trunk growth per year is possible. Highly sought after and subject to earnest discussion among palm enthusiasts, Windmill Palms are the ambassadors of the Cold Hardy Palm world.



Trachycarpus fortunei, Plant Delight's

Dichotomous Key to Trachycarpus³

- 1A. Vertical, obvious trunk.....go to....2
- 1B. No - or very small trunk – *T. nanus*
- 2A. Trunk hairy; 48 (+ -) pinnae per leaf; seed kidney-shaped;.....7
- 2B. Bare trunk below leaves (seed either kidney or coffee-bean shape.....3
- 3A. 60 (+ -) pinnae per leaf.....4
- 3B. Perhaps 48 (+ -) pinnae per leaf; Back of leaves white or whitish; seed kidney-shaped. – *T. princeps*
- 4A. Kidney-shaped seed.....5
- 4B. Seed coffee bean shape.....6
- 5A. Inflorescence nearly horizontal; Underside of leaves blue-gray.
T. oreophilus
- 5B. Inflorescence typical, sagging. Undersides of leaves green to white.
– *T. ‘Naga Hills’* syn. *‘Manipur’*
- 6A. Petioles broad, almost 2-inches
T. latisectus
- 6B Petioles narrow -*T. martianus*
- 7A. Leaves stiff, jaunty.
T. wagnerianus & *T. ‘Bulgaria’*
- 7B. Leaves normal - *T. fortunei*
and *T. takil*

Trachycarpus ‘Bulgaria’ Bulgarian Windmill Palm: Not native to Bulgaria, but worthy of recognition. Fifty-year-old specimens in Plovdiv, Bulgaria have withstood numerous exposures to temperatures below 0F (-18C). Seedlings of these palms are highly sought after for good reason. *Trachycarpus ‘Bulgaria’* has smaller leaves and a tighter appearance than *T. fortunei*. Z7b, 7a. We can thank Kiril Donovan for tending to the parent palms, and making this selection widely available to the world.



Trachycarpus fortunei, Pullen Park, Raleigh, NC

Trachycarpus fortunei Windmill Palm

An excellent and impressive cold hardy palm with many forms recognized by palm enthusiasts, or at least politely argued about (*T. ‘Bulgaria’*, *T. ‘Taylor form’*, *T. ‘Takil’*, *T. ‘Darjeeling’*). Old specimens in North Carolina have survived several brutal winters where temperatures dipped to 0F (-18C). No lightweight when it comes to cold hardiness, and worthy of a place in any garden. ‘Taylor form’ has very droopy leaf-tips and was selected from plants at a Florida nursery over 50 years ago by Mr. Taylor of Raleigh, North Carolina. ‘Darjeeling’ is from Darjeeling, India. Both are forms of the species. Z7b, 7a

Trachycarpus latisectus Windamere Palm: *Trachycarpus latisectus* comes from the Sikkim Himalayas of India and was originally known as *T. sikkimensis*. The name was changed to *latisectus* in reference to the wide pinnae (2-inches across) of the leaves. *T. latisectus* naturally sheds its dead leaves, leaving a bare trunk, a trait shared by a few other

³ References to *Trachycarpus* key on page 26.

windmill palms that need a more subtropical climate. Seeds are coffee bean shaped. *T. latisectus* has not so far proved as cold hardy as hoped. Z8b, 8a.

Trachycarpus martianus Himalayan Windmill Palm: Much like *T. latisectus* in appearance (bare trunk & coffee bean shaped seeds) and cold hardiness, except that *T. martianus* has narrower pinnae on its leaves. Z8b, 8a

***Trachycarpus* ‘Naga Hills’** syn *T. ‘Manipur’*. From Manipur, India, *T. ‘Naga Hills’* is like *T. oreophilus*, but has up to 70 pinnae per leaf. New to horticulture. Probably Z8b, 8a.

Trachycarpus nanus Dwarf Windmill Palm: Native to China’s Yunnan Province. A Windmill palm with no or little trunk. Kidney-shaped seed held on vertical infructescence. Z8b, 8a.

Trachycarpus oreophilus Thai Mountain Windmill Palm: Another bare-trunked windmill palm, but the leaves of *T. oreophilus* have 60 pinnae, making them large and very round. Seeds are kidney-shaped. Z8b, 8a.

Trachycarpus princeps Stone Gate Windmill Palm: Distinguished from *T. martianus* and *T. oreophilus* by the very white backside of its leaves, *T. princeps* is another windmill palm suitable for warm temperate and cool subtropical climates. Z8b, 8a.

Trachycarpus takil Kumoan Windmill. From the Himalayas near Kumoan, India, *T. takil* is about as cold hardy as *T. fortunei*. Genetic studies refute the validity of *T. takil* as a separate species. While the morphological characteristics of *T. takil* can be found in the variable populations of *T. fortunei*, it is worth recognizing *T. takil* as a distinctive palm. We do, after-all, know exactly where it comes from. There’s room and need for more study. Z7b, 7a



Trachycarpus fortunei ‘Taylor Form’

Trachycarpus wagnerianus No one is sure where this wonderful windmill palm originated, but it was probably a form of *Trachycarpus fortunei* selected and bred long ago in Japan. Why then is it called *wagnerianus*?⁴ Windmill palms keep you scratching your head. Known only from cultivation, *T. wagnerianus* is differentiated from other windmill palms by its smaller, stiffer leaves and tighter appearance. Whatever the case, *T. wagnerianus* is thought to be cold hardier than *T. fortunei*, though it is hard to believe that it could be cold hardier than *T. ‘Bulgaria’*. Z7b, 7a

⁴ Because Richard Wagner (the famous composer) was enamored with Japan.



Trithrinax brasiliensis Bamboo Farm, Savannah

Trithrinax brasiliensis Brazil Needle Palm: Not to be confused with Needle Palm (*Rhapidophyllum hystrix*) which has needles only on its trunk, Brazil Needle Palm gets its name from the pointy tips of its leaves. It may stab the fool out of you before you get a look at its spiny trunk, so plant it where you and others are likely to see it but unlikely to have a close encounter. Prefers well-drained soils in a rainforest climate. Tolerates cold to about 20F (-7C). Z9a, 8b

Trithrinax campestris Blue Needle Palm: Blue-gray, very stiff leaves, and even more likely to sharply get your attention. It is native to arid regions of Argentina and Uruguay and prefers well-drained soils in full sun in a Mediterranean climate. It is cold hardy to about 13F (-11C) in dry cold, but this is only a guess. More test plantings are needed. Z8b, 8a



Washingtonia filifera Bamboo Farm, Savannah

Washingtonia filifera California Fan Palm: Native to moist microclimates in arid regions of California, Arizona, and Baja California. Does well in full sun or part shade in well-drained but moist soils. An imposing palm because of its mature size, and a bit of hazard when cleaning up its leaves because they are heavily armed with large, jagged teeth (*Washingtonias* are the sawfish of the palm world). Stately as a solitary specimen, but more so when it occurs as a grove of palms or a colonnade. Don't let the small seed size fool you. The seeds germinate quickly and the seedlings grow very rapidly. It may be impossible to over-pot a seedling. The bigger the pot, the faster they grow when provided warmth and good light. Leaf damage begins around 14F (-10C). Large specimens in Truth or Consequences, New Mexico, have survived exposure to 0F (-18C). Z8b, 8a

Washingtonia filifera--x-robusta aka *Washingtonia filibusta*. The common hybrid between the two species. So common, in fact, that it is difficult to find a pure specimen in cities and suburbs, or in trade.



Washingtonia robusta Bamboo Farm, Savannah

Washingtonia robusta Mexican Fan Palm: Native to Mexico and Baja California in the same sort of habitats as *W. filifera*. Mexican Fan Palm also has large teeth on the stems of its leaves, but has a thinner and taller trunk, few leaf filaments, and darker green rounder leaves. As would be expected from its more southerly distribution, *W. robusta* is less cold hardy than its relative, and has leaf damage near 20F (-7C). Z9a, 8b



Washingtonia, Galveston, Texas

Planting Cold Hardy Palms

Create an extensive area of well-amended soil in the area where you intend to plant the palm. Mix in lots of compost and a well-balanced slow release 3, 1, 3 ratio fertilizer. You want the largest area of prepared soil as you can manage so that the root system of your palm is not curtailed. Prepare new

plant beds in fall or winter so that the soil ingredients have time to “cook” by the time spring planting arrives.

Plant AFTER last-frost in spring but before mid-summer. You want the palm to have plenty of new roots established and to be over any transplant shock before it has to endure winter shock.

Plant the largest palm you can afford, gallon-size being the smallest recommended, five-gallon being better, especially with trunk-forming palms. If you purchase quart – or pint-sized palms (as they are often available on the Internet) it is advisable to grow them up to a larger size before planting out unless they are rated one zone hardier than your climate.

If you apply fertilizer, use a slow-release 3, 1, 3 ratio formula in early spring and perhaps again in early summer, but DO NOT fertilize your palms any later than that. You want your palm’s growth to be slowing down with the season, not surging along when frost arrives.

Site your palm in such a way as to mimic its natural habitat as much as possible. It is dangerous to place palms where they will receive a lot of shade in winter, even if they are hardy to -10F (-23C). Even the cold-hardest palms can be damaged or killed by an extended freeze. Their hardiness is to cold snaps, not prolonged freeze.

Maintenance of Cold Hardy Palms

If you follow the planting advice and only plant palms rated for your USDA climate zone, then maintenance of your palms will be minimized. If you push the limits and try growing palms rated beyond your zone, then extra winter care will be needed. I recommend NOT pushing the limits because gardening is

enough work as it is. I want you to enjoy your palms – not worry about them.

If you follow the planting advice, then the most important maintenance issues are: providing correct moisture regime; correct nutrient regime; and removal of old inflorescences and dead leaves.



Trachycarpus fortunei

Moisture / Water

Adequate moisture during the growing season is perhaps the most important factor contributing to robust growth and health of a palm (assuming you have followed the planting advice given).

Except for species native to arid climates, *an inch of water a week during the growing season is a good rule of thumb*. That also happens to be the rule of thumb for lawns - so when your lawn is drying out, so are your palms. Providing adequate moisture can be as complicated and expensive as installing an irrigation system, or easy as dragging around the garden hose. Suit yourself.

Locate species from arid climates in well-drained soils and landscape positions where they are less likely to develop problems from over-watering. If they like sun, give them an open south-facing position in the landscape.



Rhipidophyllum hystrix Jaycee Park, Raleigh

Fertilizer

There are reports that it is advantageous to grow marginally cold hardy palms “hard” – by which is meant without fertilizer. This seems also to be true for cold hardy palms during severe winters. If you consider that cold hardy palms grow naturally and quite well in their native habitat without fertilizer, the act of applying fertilizer seems superfluous (except in impoverished soils).

Whatever the case, *NEVER over-fertilize and ALWAYS provide a proper watering regime*.

A 3, 1, 3 ratio formula (N, P, K) is recommended (where N = nitrogen, P = phosphorous, and K = potassium). I use a slow-release rose fertilizer 16, 5, 13 because it is readily available and approximates the ratio needed. Too much fertilizer may be detrimental to palms. Don't over do it.

Only apply fertilizer in early spring or early summer. A palm's growth needs

to be slowing down as fall and winter approach. Slow-release fertilizers with micronutrients are safest to guard against chemical burn. Nutrient deficiency is only likely in very sandy soils, but should be resolved with typical slow-release fertilizer with micronutrients, or by water-soluble fertilizer.

Not everyone uses fertilizer. Impressive results have been demonstrated with root hormones and a proper watering regime. A product called ‘Superthrive’ provides an artificial rooting hormone that has been shown to be effective. Some growers avow by kelp-derived products that naturally have plant hormones. If you use fertilizers or plant hormones, more is not better. Follow the label cautions and directions.



Chamaerops humilis Bamboo Farm, Savannah

Old Inflorescences & Dead Leaves

The removal of old inflorescences or dead leaves is really only done to maintain the ‘look’ of the palm and control reseeding. If you cut off the inflorescences too soon, the plant may form new ones, making more work for you. Some palms can reseed generously, which is a characteristic of the Sabal species. If you don’t want to bother with unexpected seedlings throughout your landscape, remove the inflorescence after the fruit has set but before it ripens.

The effect of removing dead leaves is not purely esthetics – they may be very important in shielding the trunk and growing bud from severe cold. Someone may think that removing dead leaves improves the ‘look’ of the palm, but what good is that if the palm dies during a cold winter because of the act? Now that you know the possible repercussions, suit yourself - and don’t blame me.



Washingtonia robusta

Winter Protection

If you are not pushing the limits and are only planting cold hardy palms rated for your USDA climate zone, then little or no winter protection of your palms will be needed – except possibly during their first winter in the ground. However, if a record low is predicted, you may want to protect any palms that might be marginally cold hardy for your area.

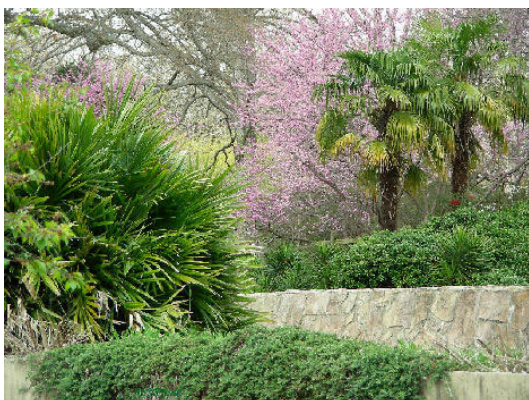
You want to protect the palm from two things: moisture around the growing point (bud/spear), and the cold.

There are many ways to protect palms, depending on their size. Two things need protection, the growing bud and the trunk. Small palms are easiest to deal with because the whole palm can be covered, but palms with large trunks or giant spreads of leaves are difficult.



Sabal 'Brazoria' planted late in the season.

Partially filled water bottles buffer temperature changes. Electric heating pads are available that can be wrapped around the trunk, but some people wrap the trunk in Christmas lights and wrap the whole thing in landscape fabric. Anyhow, the garden can soon look rather unpleasant, and *it is a lot of work putting up and taking down the protective devices – good reason to use only palms suited to your USDA zone.*



Rhapidophyllum hystrix & Trachycarpus fortunei

Winter Damage

Every year there may be some winter damage to the leaves of all but the hardiest of palms for your climate zone. Do not lose heart. If a few or many leaves get brown spots, or if young, emerging leaves (called spears) turn brown and later pull out with a gentle tug, all is not lost.

Young windmill palms are prone to having their spears die in winter, but this is not the end of the world, or the palm. If the spear turns brown, apply a fungicide. The spear(s) may pull out, but new spears should emerge in late May. The fungicide I have used is one designed for aquariums. It is not supposed to harm aquatic plants, and it has not harmed my windmill palms.

If all the leaves of your palm turn brown, it is not a good sign – but be patient. If no new growth appears by June, the palm has probably had it. If the palm is a type that forms suckers/offsets, wait to see if these appear.



Trachycarpus fortunei leaf

Pests & Diseases

Perhaps the most destructive “pests” of palms are voles. Voles should not be confused with moles. Although both moles and voles burrow through the soil, moles are carnivores that eat worms, beetle grubs and beetles, while voles are herbivores and eat roots, tubers, corms, and bulbs. A hungry mole (they are always hungry!) may even eat a vole. Various traps and poisons can be used to control voles.

Scale insects can be the bane of Sabal palms, but Trachycarpus palms seem entirely immune and devoid of scale. Scale insects appear as small gray, white, or brown scales, usually on the

underside of the leaf and along the stem. They can be controlled with horticultural oils, which suffocate the insects. Horticultural oils should not be applied when leaf temperatures near 90F (32C), as this may result in leaf damage. Always read label warnings, adhere to self-protective guidelines, and follow label instructions – even if it is just for horticultural oil.

Seed beetles are Bruchellid beetles. The female lays her eggs, one per seed, in the developing fruit of palms. The adults are rarely seen, but their presence is indicated when the larvae are found in the palm seeds. Control is a matter of destroying infected seeds. Normally the seed beetles are not so abundant that control is necessary.

Spider mites are a common bane of indoor palms and palm seedlings. Infestations of spider mites are controlled with miticides.

Lethal yellowing is a viral disease that has devastated coconut palms, but is transmissible to other palms. There is concern in subtropical regions (such as Florida) that an occasional *Trachycarpus* palm may harbor the virus without symptoms. But in temperate climates this is not a problem simply because there are no tropical palms to infect. It does remind us, however, of the importance of only transporting clean seed and disease free plants.

Always inspect palms to be purchased for any evidence of disease or ailment. Only introduce healthy palms into your landscape or collection.



Peckerwood Gardens, Hempstead, Texas

Germinating Seeds

If you have the time, or nursery specimens are unavailable or too costly, then raising palms from seed can be a very rewarding experience.

Obtain fresh seed! Viability and germination rate decrease with age. Be certain your seeds are fresh. Time to germination can vary from a few weeks to a few years depending on the species and seed quality. Notoriously quick germinators are *Nannorrhops ritchiana*, *Sabal minor*, *Trachycarpus fortunei*, and *Washingtonia filifera*, by which is meant within a month or so, but may be as long as six months or more. Generally the less fresh the seed, the longer it will take to germinate.

Float-test your seeds for viability; if some float and some sink, reject the floaters. If you are uncertain, isolate the floaters and attempt to germinate them separately.

Clean the flesh off the seeds. Removing the flesh is especially important if you intend to mail or transport seed. Removing the fruit flesh can be done manually or by fermentation. If the seed is small, in nature it probably is eaten and distributed by birds or mammals whose digestive systems would remove the fruit flesh and clean the seed. To ferment, place seed in a wide-mouthed

container with just enough water to submerge the seeds. Place the mixture in a warm location for a week or so; empty the water; thoroughly scrub and rinse the seeds as clean as possible; repeat for another week if necessary. This is best done outside or somewhere that people will not be offended by the odor and plethora of midges, gnats, and flies that will be attracted to the brewing concoction.

I have found a 1/4-inch wire mesh screen very useful. I simply place the screen over an empty bucket, put a heaping handful of fermented palm fruits on the screen, rub them vigorously with latex-gloved hands against the screen, then rinse the mess. After a few passes the seeds are quite clean. In this manner I processed roughly 8000 Sabal palmetto seeds in two hours. Palmetto seeds are only slightly larger than the mesh size. Larger seeds are easier to process.

A nurseryman states that he merely plants his seeds after fermenting them, and that there's no need to bother about removing any remaining fruit flesh. If you have thousands of fresh seeds to process, this may do. However, if you have just a few rare seeds, you'd be wise to give them every chance they can get – and clean off the fruit flesh.

Disinfect the seeds. This is important for mail-order seed if it arrives with the fruit flesh intact and harboring fungi. It is also a form of insurance if you are working with very little seed, or seed that is rare or expensive. If your seed is very fresh from a local source, and clean, this step probably is not needed.

Disinfecting solutions can bleach your carpet and fabric and irritate your skin and mucous membranes, so wear eye protection and gloves, and work in a well-ventilated room or outdoors. Create

a 10% bleach solution (one part bleach with ten parts water). Dip the seeds into the solution, and rinse thoroughly with tap water. Alternatively a 5% hydrogen peroxide solution can be used (one part hydrogen peroxide with 20 parts water). Do not overexpose the seeds to disinfectant as it may harm them.

If the seeds are not used immediately, allow them to dry to the touch, then store them in a labeled, sealed plastic bag, or plastic ware, in a cool environment. If they are too moist, fungi or bacteria may grow and damage the seed.

Seeds of palms from temperate regions *may* require a **cold stratification** at 40F (4C) for six-weeks to improve germination. Cold stratification is simple. Place a portion of clean and disinfected seeds in barely moist medium in a sealed plastic container or bag, then refrigerate for six weeks. **DO NOT ALLOW THEM TO FREEZE.** It helps to place the 'remove by' date on the container so you know when to take the seeds out for germination. Since temperate palms produce fruit in the autumn, it is easy enough to store the cleaned seed in an unheated garage during winter. When the garage heats up in spring and summer, germination will commence.

Select a germination method and medium. I recommend old plastic water bottles with the top cut off and a few holes cut into the bottom for drainage. Seeds of palms from arid regions should be germinated in a perlite mix, while seeds of moisture loving palms can be started in potting soil or commercial garden soil. Fill the modified water bottle with medium, push a seed into the center and cover to a depth about 2X the seed diameter. Maintain moisture.

Other methods include placing seeds in a large, broad-rimmed community pot with a growing medium, or in a large re-sealable clear plastic bag with moist perlite. In the latter case it is crucial to check the bag frequently and remove seedlings before their roots become hopelessly entangled.

I have had great success germinating fresh *Sabal palmetto* seed simply by sewing it in rows in a garden bed. I did this in late winter, and by July had seedlings sprouting thick as corn.

Date and label the seed containers. Cover with loose-fitting plastic and **place in a warm site, 80F (27C)** or so. Too high a heat can harm seeds. Check weekly for seedlings. I place the seed containers in my garage. In winter they get exposed to cold (but not freezing), which is required by temperate species. In summer the garage warms up and the seeds germinate.

When either the seed leaf has grown substantially or the taproot begins to show through the bottom of the cell, **transfer seedlings** to a larger pot. Place the seedling in filtered sun or part-shade or under a good grow-lite in a warm location – at least **70F (21C)**.

Fertilizer will speed the growth of seedlings once they have a well-developed seed leaf and adequate light. Keep records of your methods and successes or failures to improve your future results.

Palms as Weeds

Folks, this is simple. If you don't want stray seedlings from a plant, then don't let its fruit ripen. That's any plant, including palms.



Trachycarpus fortunei & Bradford Pear

With many plants, if you remove the inflorescences too soon they will grow new ones. It is better to wait until the fruit is set, but not ripe, and remove it.

Palms, even the very fecund ones, are rarely weedy. There may be a seedling here and there, but not a rampant swath as you may get from Purple Loosestrife, Kudzu, English Ivy, or Japanese Blood Grass for heavens sake. And weeds are hard to kill. If you want to kill a palm, on the other hand, you will likely succeed your first try. Very few palms regenerate from their roots. Once chopped down they are gone. A notable exception is *Serenoa repens*, which can regenerate from its roots - an important trait to have when your habitat is frequently razed by fires.

Personally, I hope all my palms set fruit every year. That way I'll have seed and plants to share with friends.

Palm Names & Synonyms⁵

Valid name, retired name.

Retired name, **valid name**.

Acoelorrhaphe pimo => *Brahea pimo*

Acoelorrhaphe salvadorensis => *Brahea s.*

Brahea aculeata Z10 Synonyms

- *Erythea aculeate*

Brahea armata Z9 Synonyms

- *Erythea armata*
- *Glaucosphaera armata*

Brahea bella => *B. berlandieri*

Brahea berlandieri Z8 Synonyms

- *Brahea bella*

Brahea brandegeei Z9 Synonyms

- *Erythea brandegeei*
- *Erythea lorentensis*

Brahea clara Z9

Brahea conzattii Z8

Brahea decumbens Z8

Brahea dulcis Z8 Synonyms

- *Corypha dulcis*

Brahea edulis Z9 Synonyms

- *Erythea edulis*

Brahea elegans Z9 Synonyms

- *Erythea elegans*

Brahea filamentosa => *Washingtonia*
filifera

Brahea filifera => *Washingtonia filifera*

Brahea minima => *Sabal minor*

Brahea moorei Z8

Brahea nitida Z9 Synonyms

- *Brahea prominens*

Brahea pimo Z9 Synonyms

- *Acoelorrhaphe pimo*
- *Erythea pimo*

Brahea prominens => *Brahea nitida*

Brahea psilocalyx ? Synonyms

- *Paurotis psilocalyx*

Brahea roezlei (=> *B. armata*) Synonym

- *Erythea roezlei*

Brahea salvadorensis Z9 Synonyms

- *Acoelorrhaphe salvadorensis*
- *Erythea salvadorensis*

Brahea serrulata => *Serenoa repens*

Butia amadelpa => *B. paraguayensis*

Butia archeri Z8

Butia bonnettii => *B. capitata*

Butia campicola Z8 Synonyms

- *Syagrus campicola*

Butia capitata Z8 Synonyms:

- *Butia bonnettii*
- *B. c. deliciosa*
- *B. c. elegantissima*
- *B. c. lilaceiflora*
- *B. c. nehrlingiana*
- *B. c. odorata*
- *B. c. pulposa*
- *B. c. pygmaea*
- *B. c. subglobosa*
- *B. c. virescens*
- *B. leiospatha*
- *B. nerhlingiana*
- *Cocos bonnettii*
- *Cocos capitata*
- *Cocos odorata*
- *Cocos pulposa*
- *Syagrus capitata*

Butia deliciosa => *B. capitata*

Butia dyerana => *B. paraguayensis*

Butia elegantissima => *B. capitata e.*

Butia eriospatha Z8 Synonyms

- *Cocos eriospatha*
- *Syagrus eriospatha*

Butia leiospatha => *B. capitata l.*

Butia lilaceiflora => *B. capitata l.*

Butia nerhlingiana => *B. capitata n.*

Butia odorata => *B. capitata o.*

Butia paraguayensis Z8 Synonyms

- *B. amadelpa*
- *B. dyerana*
- *B. poni*
- *B. wildemaniana*
- *B. yatay paraguayensis*
- *Cocos paraguayensis*
- *Syagrus paraguayensis*

Butia poni => *B. paraguayensis*

Butia pulposa => *B. capitata*

Butia pungens => *B. paraguayensis*

Butia subglobosa => *B. capitata*

Butia virescens => *B. capitata*

⁵ See Bibliography, page 27

Butia wildemaniana => *B. paraguayensis*

Butia yatay Z8 Synonyms

- *Cocos yatay*
- *Syagrus dyerana*
- *Syagrus yatay*

Chamaerops aucalis => *Sabal minor*

Chamaerops excelsus => *Trachycarpus fortunei*

Chamaerops fortunei => *Trachycarpus f.*

Chamaerops humilis Z8

Chamaerops humilis cerifera Z8

Chamaerops hystrix => *Rhapidophyllum hystrix*

Chamaerops louisiana => *Sabal minor*

Chamaerops martianus => *Trachycarpus martianus*

Chamaerops ritchiana => *Nannorrhops r.*

Chamaerops sabaloides => *Sabal minor*

Chamaerops serrulata => *Serenoa repens*

Cocos bonnettii => *Butia capitata*

Cocos capitata => *Butia capitata*

Cocos odorata => *Butia capitata*

Cocos eriospatha => *Butia eriospatha*

Cocos paraguayensis => *Butia p.*

Cocos pulposa => *Butia capitata*

Cocos yatay => *Butia yatay*

Copernecia maritime => *Sabal maritima*

Corypha dulcis => *Brahea dulcis*

Corypha maritima => *Sabal maritima*

Corypha minor => *Sabal minor*

Corypha palmetto => *Sabal palmetto*

Corypha pumila => *Sabal minor*

Corypha pumos => *Sabal pumos*

Corypha repens => *Serenoa repens*

Corypha umbraculifera => *Sabal blackburniana*

Chrysophila nana => *Trithrinax aculeata*

Elate sylvestris => *Phoenix sylvestris*

Erythea armata => *Brahea armata*

Erythea brandegeei => *Brahea b.*

Erythea edulis => *Brahea edulis*

Erythea elegans => *Brahea elegans*

Erythea lorentensis => *Brahea brandegeei*

Erythea pimo => *Brahea pimo*

Erythea roezlei => *Brahea roezlei*

Erythea salvadorensis => *Brahea s.*

Glaucotheca armata => *Brahea armata*

Guihaia argyrata Z8 Synonyms

- *Trachycarpus argyratus*

Inodes blackburniana => *Sabal b.*

Inodes causarium => *Sabal causarium*

Inodes exul => *Sabal mexicana*

Inodes japonica => *Sabal yapa*

Inodes mexicana => *Sabal mexicana*

Inodes neglecta => *Sabal domingensis*

Inodes palmetto => *Sabal palmetto*

Inodes rosei => *Sabal rosei*

Inodes schwarzii => *Sabal palmetto*

Inodes texana => *Sabal mexicana*

Inodes uresana => *Sabal uresana*

Jubea chilensis Z9

Nannorrhops ritchiana Z8 Synonyms

- *Chamaerops ritchiana*

Neowashingtonia filifera => *Washingtonia filifera*

Neowashingtonia robusta => *Washingtonia robusta*

Paurotis psilocalyx => *Brahea psilocalyx*

Phoenix abyssinica => *P. reclinata*

Phoenix acaulis Z9

Phoenix andamanensis Z9

Phoenix caespitosa Z9

Phoenix canariensis Z9

Phoenix dactylifera Z9

Phoenix farinifera => *P. pusilla*

Phoenix hanceana => *P. loureiroi*

Phoenix humilis robusta => *P. loureiroi*
var. *humilis*

Phoenix leonensis => *P. reclinata*

Phoenix loureiroi Z9

Phoenix loureiroi humilis Z9 Syns.

- *P. humilis*
- *P. humilis robusta*
- *P. ouseleyana*
- *P. robusta*

Phoenix loureiroi loureiroi Z9 Syns.

- *P. hanceana*

Phoenix ouseleyana => *P. loureiroi*
humilis

Phoenix paludosa Z9

Phoenix pumila => *P. reclinata*

Phoenix pusilla Z9 Synonyms

- *P. farinifera*
- *P. zeylanica*

Phoenix reclinata Z9 Synonyms

- *P. abyssinica*
- *P. leonensis*
- *P. spinosa*

Phoenix robusta => *P. loureiroi humilis*

Phoenix roebelenii Z9**Phoenix rupicola** Z9

Phoenix spinosa => *P. reclinata*

Phoenix sylvestris Z9 Synonyms

- *Elate sylvestris*

Phoenix theoprastii Z9

Phoenix zeylanica => *P. pusilla*

Pritchardia filamentosa => *Washingtonia*
filifera

Pritchardia filifera => *Washingtonia* f.

Rhaphidophyllum hystrix Z7 Synonyms

- *Chamaerops hystrix*

Rhapis excelsa Z9 Synonyms

- *Trachycarpus excelsa*

Rhapis acaulis => *Sabal minor*

Rhapis arundinacea => *Sabal minor*

Sabal adansonii => *S. minor*

Sabal adiantinum => *Sabal minor*

Sabal allenii => *S. mauritiiformis*

Sabal bahamensis => *Sabal palmetto*

Sabal beccariana => *Sabal bermudana*

Sabal bermudana Z9 Synonyms

- *S. beccariana*
- *S. princeps*

Sabal blackburnia => *S. blackburniana*

Sabal blackburniana (ambiguous) Syn.

- *Corypha umbraculifera*
- *Inodes blackburnia*
- *Sabal blackburnia*
- *Sabal umbraculifera*

Sabal 'Birmingham' => uncertain Z7

Sabal causarium Z9 Synonyms

- *Inodes causarium*
- *Inodes glauca*
- *Sabal haitensis*
- *Sabal questeliana*

Sabal dealbata => *Serenoa repens*

Sabal deeringiana => *S. minor*

Sabal domingensis Z8 Synonyms

- *Inodes neglecta*
- *Sabal neglecta*

Sabal dugesii => *S. pumos*

Sabal etonia Z8 Synonyms

- *Sabal adansonii megacarpa*
- *Sabal megacarpa*

Sabal exul => *S. mexicana*

Sabal florida => *S. maritima*

Sabal glabra => *S. minor*

Sabal glaucescens => *S. mauritiiformis*

Sabal gretheriae Z9**Sabal guatemalensis** Z9

Sabal haitensis => *S. causarium*

Sabal jamaicensis => *S. maritima*

Sabal jamesiana => *S. palmetto*

Sabal japa => *Sabal yapa*

Sabal javanica => *S. yapa*

Sabal 'Louisiana' => *S. minor*

Sabal maritima Z8 Synonyms

- *Copernecia maritima*
- *Corypha maritima*
- *S. florida*
- *S. jamaicensis*

Sabal mauritiiformis Z8 Synonyms

- *Sabal allenii*
- *Sabal glaucescens*
- *Sabal morrisiana*
- *Sabal nematoclada*
- *Trithrinax mauritiiformis*

Sabal mayarum => *S. yapa*

Sabal megacarpa => *Sabal minor*

Sabal mexicana Z8 Synonyms

- *Inodes exul*
- *Inodes mexicana*
- *Inodes texana*
- *Sabal texana*

Sabal miamiensis Z9

Sabal minima => *Serenoa repens*

Sabal minor Z7 Synonyms

- *Brahea minima*
- *Chamaerops acaulis*
- *Chamaerops louisiana*
- *Chamaerops sabalooides*
- *Corypha minor*
- *Corypha pumila*

- *Rhapis arundinacea*
- *Rhapis acaulis*
- *Sabal adansonii*
- *Sabal adiantinum*
- *Sabal deeringiana*
- *Sabal glabra*
- *Sabal Louisiana*
- *Sabal minima*
- *Sabal pumila*

Sabal morrisiana => *S. mauritiiformis*

Sabal neglecta => *S. domingensis*

Sabal nematoclada => *S. mauritiiformis*

Sabal palmetto Z8 Synonyms

- *Corypha palmetto*
- *Inodes palmetto*
- *Inodes schwarzii*
- *Sabal bahamensis*
- *Sabal jamesiana*
- *Sabal parviflora*
- *Sabal viatoris*

Sabal parviflora => *Sabal palmetto*

Sabal peregrina => *S. yapa*

Sabal princeps => *Sabal bermudana*

Sabal pumos Z8 Synonyms

- *Corypha pumos*
- *Sabal dugesii*

Sabal rosei Z8 Synonyms

- *Inodes rosei*
- *Sabal uresana roseana*

Sabal serrulata => *Serenoa repens*

Sabal texana => *S. mexicana*

Sabal umbraculifera => *S. domingensis*

Sabal uresana Z7 Synonyms

- *Inodes uresana*

Sabal viatoris => *S. palmetto*

Sabal yapa Z8 Synonyms

- *Inodes yapa*
- *Sabal yapa*
- *Sabal javanica*
- *Sabal mayarum*
- *Sabal perigrina*
- *Sabal yucatanica*

Sabal yucatanica => *S. yapa*

Serenoa repens Z8 Synonyms

- *Brahea serrulata*
- *Chamaerops serrulata*

- *Corypha repens*

- *Sabal dealbata*

- *Sabal serrulata*

- *Serenoa serrulata*

Syagrus campicola => *Butia campicola*

Syagrus capitata => *Butia capitata*

Syagrus dyerna => *Butia yatay*

Syagrus eriospatha => *Butia eriospatha*

Syagrus paraguayensis => *Butia p.*

Syagrus yatay => *Butia yatay*

Trachycarpus argyratus => *Guihaia a.*

Trachycarpus excelsa => *Rhapis excelsa*

Trachycarpus fortunei Z7b Synonyms

- *Chamaerops excelsus*
- *Chamaerops fortunei*

Trachycarpus geminisectus Z9

Trachycarpus khasianus => *T. martianus*

Trachycarpus latisectus Z8

Trachycarpus martianus Z8 Synonyms

- *Chamaerops martianus*
- *Trachycarpus khasianus*

Trachycarpus nanus, aka *T. nana* Z8

Trachycarpus oreophilus Z8

Trachycarpus princeps Z8

Trachycarpus takil Z7b

Trachycarpus wagnerianus Z7b

Trithrinax acanthocoma Z8

Trithrinax aculeata Z8 Synonyms

- *Chrysophila nana*

Trithrinax biflabellata

Trithrinax brasiliensis

Trithrinax campestris

Trithrinax mauritiiformis => *Sabal m.*

Trithrinax schizophylla Z8

Washingtonia filamentosa => *W. filifera*

Washingtonia filifera Z8 Synonyms

- *Brahea filamentosa*
- *Brahea filifera*
- *Neowashingtonia filifera*
- *Pritchardia filamentosa*
- *Pritchardia filifera*
- *Washingtonia filamentosa*

Washingtonia robusta Z9 Synonyms

- *Neowashingtonia robusta*
- *Washingtonia sonorae*

Washingtonia sonorae => *W. robusta*

The Curious Distribution Of Needle Palm



Rapidophyllum hystrix

There are reports that specimens of Needle Palm, *Rapidophyllum hystrix*, have survived a bitter cold snap of -20°F (-29°C) in Tennessee. Not surprisingly, therefore, some people consider Needle Palm to be the world's cold-hardest palm. If you think it holds that title uncontested, you had better think again because there is a well-documented case where Dwarf Palmetto, *Sabal minor*, survived a very bitter cold snap of -24°F (-31°C) in McCurtain County, Oklahoma.

Given that these two palms are native to the southeastern USA, prefer the same habitats - moist lowlands in part shade, and are equally hardy to cold, you might expect them to have virtually the same natural distributions - yet it is not so.

The natural range of Dwarf Palmetto is expansive, having its northern limit in southeastern Oklahoma then extending east all the way to the Atlantic Ocean,

thence south throughout Florida and west through Texas. Needle Palm barely makes it out of north Florida, only just stretching into South Carolina, Georgia, Alabama, and Mississippi.

If that were not curious enough, even Cabbage Palm, *Sabal palmetto*, which is leaf hardy to perhaps 10°F (-12°C), is far more widespread than is the extremely cold hardy Needle Palm. This hardly seems fair. What might account for these discrepancies?

The answer is – fruit. Although Dwarf Palmetto and Cabbage Palm are very different in cold hardiness and in height, their fruit is very much the same, and that of Needle Palm very much different.

The fruits of Cabbage Palm are produced in large number on branches held away from the tall trunk, and although they are held among the leaves, they are nonetheless quite visible. The fruits are shiny black and the size of currants – just the thing for a hungry bird.



Sabal palmetto fruit

Dwarf Palmetto, as it's name suggests, rarely forms more than a few inches of aerial trunk, yet it send its stalks of shiny black fruit well up and beyond the leaves – all the easier for a hungry bird to see.

A bird, having eaten the fruit, flies off to digest it. Later, of course, it has to get rid of the hard little seed that was inside the fruit, which it does by regurgitation or defecation, usually some distance away from the plant that bore the seed. In this way, Dwarf Palmetto and Cabbage Palm have their seeds dispersed widely across the landscape.



Sabal minor

That is all well and good if you're a Dwarf Palmetto or Cabbage Palm, but what of the Needle Palm? Who eats its fruit and distributes its seeds? In order to find out - you must bend down low and inspect the very base of the Needle Palm's trunk.



Needle Palm Fruit

Unlike palmetto fruits that are small, dark, highly visible, and offered in profusion, Needle Palm offers only a few dozen dull, fuzzy fruits the size and color of large brown marbles. They smell like rancid butter, are held very close to the base of the trunk amongst an armory of woody needles, and are hidden behind a veil of leaves. Hardly an invitation for a bird.

If birds don't eat Needle Palm's fruits, what does? It seems certain that a fuzzy, rancid smelling, flesh-covered fruit offered near the ground would attract some sort of mammal, perhaps a raccoon, opossum, squirrel, wild boar, or bear. In fact it has been observed that bears⁶ do eat and distribute the seeds of Needle Palm. A bear, however, is not likely to disperse seeds as far and widely and easily as would a bird. If that weren't bad enough, there is speculation that at least one of the animals for which

⁶ Scott Zona. 2004. Additions to "A Review of Animal-mediated Seed Dispersal of Palms."

the Needle Palm's fruits were originally meant - is now extinct. This may or may not be the case. If it were true, the extinction would be linked to other events also responsible for the current distributions of these palms.

About seventy thousand years ago, gigantic glaciers of the last ice age covered much of North America. As the immense ice sheets extended south, so too the climatic zones were shifted southwards as cold winds blew off the glaciers. As a result, plants and animals from northern regions extended their ranges southward, and plants and animals from the south retreated even further south.

The ice age not only affected the northern hemisphere, but also the southern hemisphere. Between them the glaciers were so immense and extensive that they tied up a significant portion of the world's water, and ocean levels dropped nearly 400 feet. This caused areas of shallow sea floors to be exposed, thus facilitating the movement of creatures to lands from which they were once isolated. One of the creatures that used such a land bridge to reach North America – was man.

Although it is true that man may have reached North America before the newcomers arrived ten thousand years ago or so, the arrivals had a lasting impact on the land, for they specialized in hunting large game – sometimes very large game indeed. So effective were they in hunting large game that they appear to have hunted it to extinction. Not even huge and imposing creatures such as Giant Ground Sloths and Mammoths escaped this fate. Some people speculate that the Giant Ground Sloth was one of the creatures for which Needle Palm's fruit was intended.

Even if one of Needle Palm's seed disperser did not go extinct after the ice age, the advance of the ice sheets kept Needle Palm's range, and those of Dwarf Palmetto and Cabbage Palm, held southwards. When at last the ice age ended and the glaciers retreated, Dwarf Palmetto and Cabbage Palm were able to expand their ranges faster than could Needle Palm, thanks in part, to their partnership with birds.

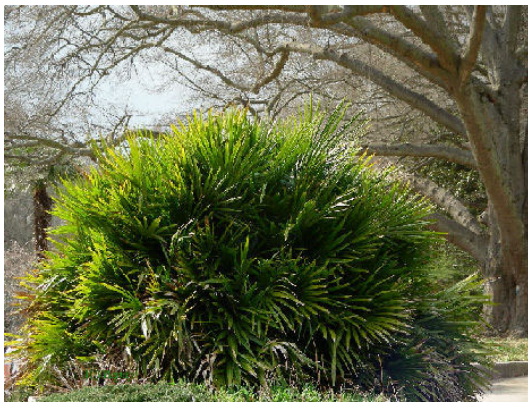
This is not to say that deer, raccoons, and bears do not eat and distribute the seeds of Dwarf Palmetto and Cabbage Palm, for they are known to do just that⁵. The rather slow spread of Needle Palm in comparison to Dwarf Palmetto and Cabbage Palm may be due in part to the fact that Needle Palm not only doesn't have birds assisting it, but has fewer mammals assisting it too.

That's not the end of Needle Palm's troubles, however, for it's one known seed disperser, the black bear, is also known to tear apart palms to devour the pithy palm heart. This kills the palm. It is here, however, as strange as it may seem, that Needle Palm may have an advantage over Dwarf Palmetto and Cabbage Palm. Needle Palm protects its trunk with long, sharp woody needles. Even if a bear somehow bypasses this defense and kills the main trunk, Needle Palm has small offset trunks that will survive. Specimens of Dwarf Palmetto and Cabbage Palm, however, have but a single trunk, and when this is killed the plant is killed.

After having read this account you may not be surprised to discover that Needle Palm has been an endangered species. The primary reason for its endangerment, however, is not black bear attacks or lack of seed dispersers. It is habitat destruction.

Bears need large tracts of undisturbed habitat to maintain their populations, but land is continuously being developed and habitat fragmented. Furthermore, the very land on which Needle Palm survives is being cleared, filled and developed to satiate an ever-growing population moving to or vacationing in the southeastern United States. Not only are Needle Palm's seed dispersers under threat, but Needle palm itself is under threat.

It is curious that the cold-hardest trunk-forming palm in the world should be endangered. You could do yourself *and* Needle Palm a favor – and plant one in *your* yard. It is a beautiful palm.



Rhapidothymus hystrix

Postscript: It has been observed that specimens of Needle Palm planted well outside its natural range produce viable seed. In these cases there is also a seed disperser that is something *other* than a Black Bear. No Black Bears have been seen or are presumed to exist in Raleigh's suburban Jaycee Park! As you might imagine, squirrels, raccoons, opossums, and other furry citizens (perhaps even people?) may be facilitating the spread of Needle Palm.



Cold Hardiness Issues

Cold hardiness observations of palms have been made for many decades. We now have a good idea about the cold hardiness of many species and varieties of palms. We also, unfortunately, have a lot of confusion.

There are many variables that influence cold hardiness (climate, weather, soil conditions, landscape positions, health of the palm, size of the palm, *et cetera*), which means that no two palms will experience exactly the same thing. Even so, when enough observations have been made, general conclusions can be drawn despite the spectrum of results obtained.

Confusion arises when someone focuses on the results or experience of one particular palm or one particular event. The performance of that particular and singularly interesting palm or event should not be ignored, but it must be considered within the context of the species and data as a whole. It is within a comprehensive view that we hope to understand a species' cold hardiness.

Proper care is one place where confusion comes into play. Some people think that a palm that survives in a greenhouse in Nome, Alaska means that *THAT* species is hardy in Nome, Alaska. Others will argue that a greenhouse is a bit extreme, but insist their palms are hardy where

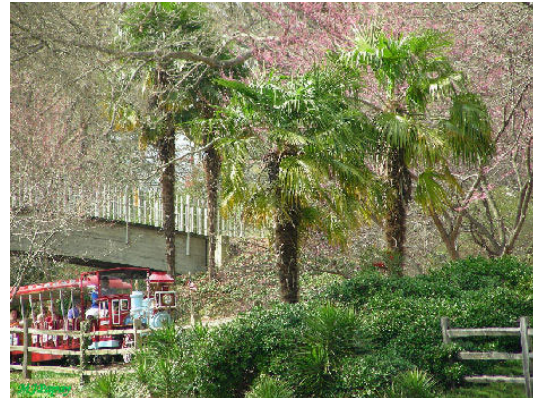
they live - even though in winter they always heavily mulch the trunk and leaves. This is deception, even if it is accidental or unintended. On the other hand, it is wise to protect a transplanted palm for the first two or three years until it is well established. The reason a transplanted palm needs protection from winter stress is because the plant is already stressed from being planted. We might think the plant looks fully established, but we may be mistaken. It is better to protect for the first few years unless the palm is rated for one zone colder than yours.

Cold hardy means that generally an established adult plant of the species on average is expected to survive usual winter conditions *without protection*. That means no mulch, no tarps, no Christmas lights wrapped around it, and no swaddling in blankets or thermal mats or insulation. That does not mean that cold will not damage or even kill the palm. It just means we don't expect it to.

If all of that isn't fretful enough, palms planted in the west coast may be more cold hardy or less cold hardy than the same palms planted in the east coast. The climates are different and the palms respond differently.

Cold hardiness ratings are not a guarantee. They are a prediction based on speculative averages from a range of data that is neither uniform in source nor interpretation. This may make you flail your arms in exasperation, however, there is no Federal Bureau of Cold-hardiness funding uniformly designed studies in national and international research into palm hardiness - and we'd argue about it anyway! We do what we can with what we have. Considering the problems, we have come a long way.

Know your climate and select palms from similar climates.



Pullen Park's Train & *Trachycarpus fortunei*



Phoenix canariensis Mercer Arboretum



Sunset at Galveston Island State Park, Texas

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