

PALMS IN SOUTHERN NEVADA PART 2

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10/24/2017

UNIVERSITY OF NEVADA COOP EXTENSION

WHERE THE HELL AM I
IT'S HOTTER THAN LAS VEGAS



WATERING PALM



10/24/2017

IRRIGATION



10/24/2017

WATERING PALMS??????

**A MATURE COCONUT PALM CAN TRANSPIRE
28 TO 75 LITERS (7-20 GALS) OF WATER IN A**

24 -HOUR PERIOD

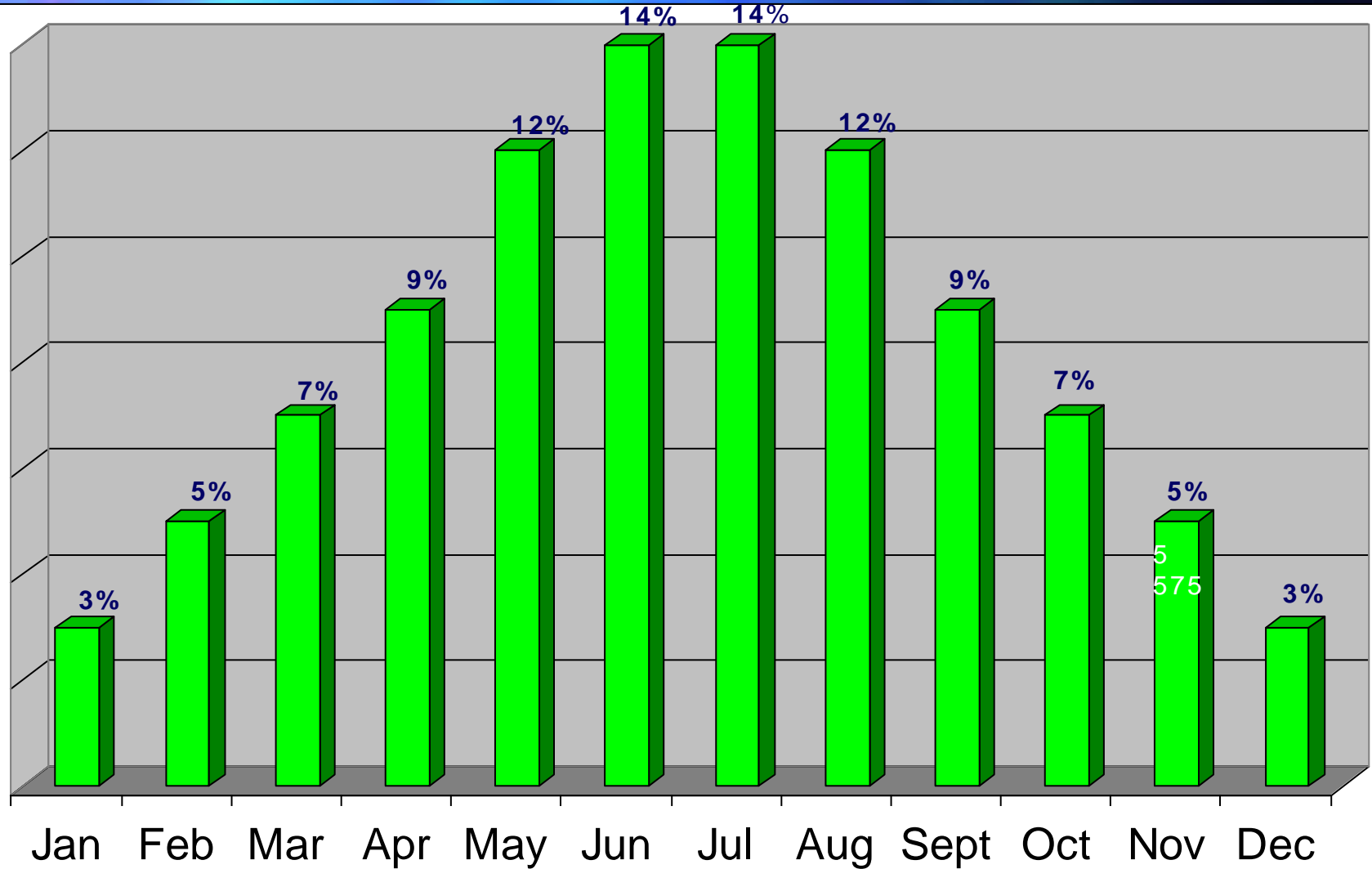
MOSTLY IN THE DAY

REPLENISHING LOST WATER AT NIGHT

WATERING PALMS??????

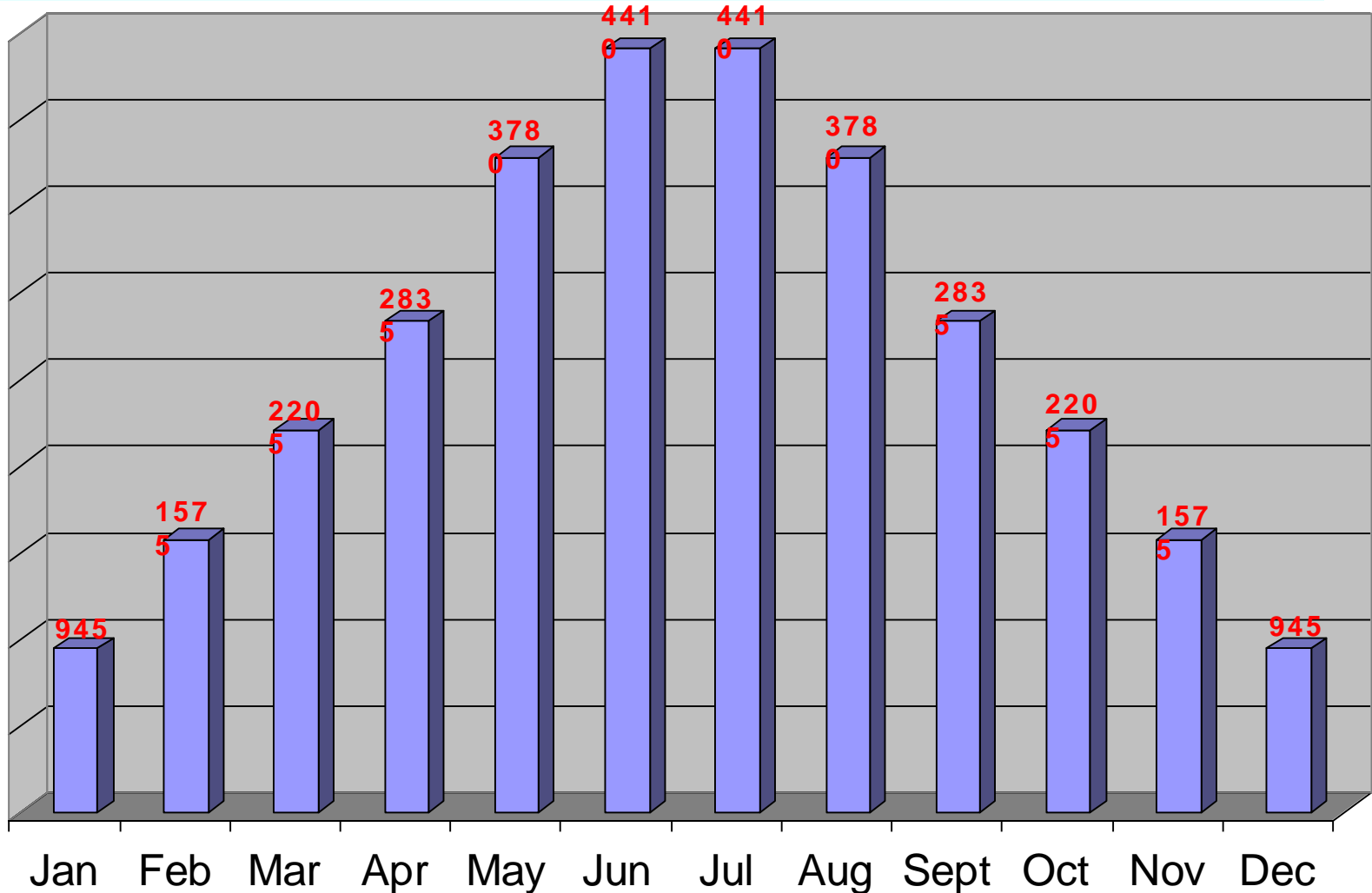
- **WATER THE ROOT BALL WITH HOSE AS IT IS BEING PLANTED**
- **NEVER LET THE ROOT BALL DRY OUT BEFORE OR AFTER PLANTING**
- **MAKE A SOIL BERM AROUND THE ROOT BALL AREA**
- **ONLY PLANT DURING THE SPRING AND EARLY SUMMER WHEN THE SOIL IS WARM AND THE ROOTS WILL ESTABLISH BEST. (BARE ROOT PALMS)**

Monthly % of water use from PET values for Las Vegas, Nevada.



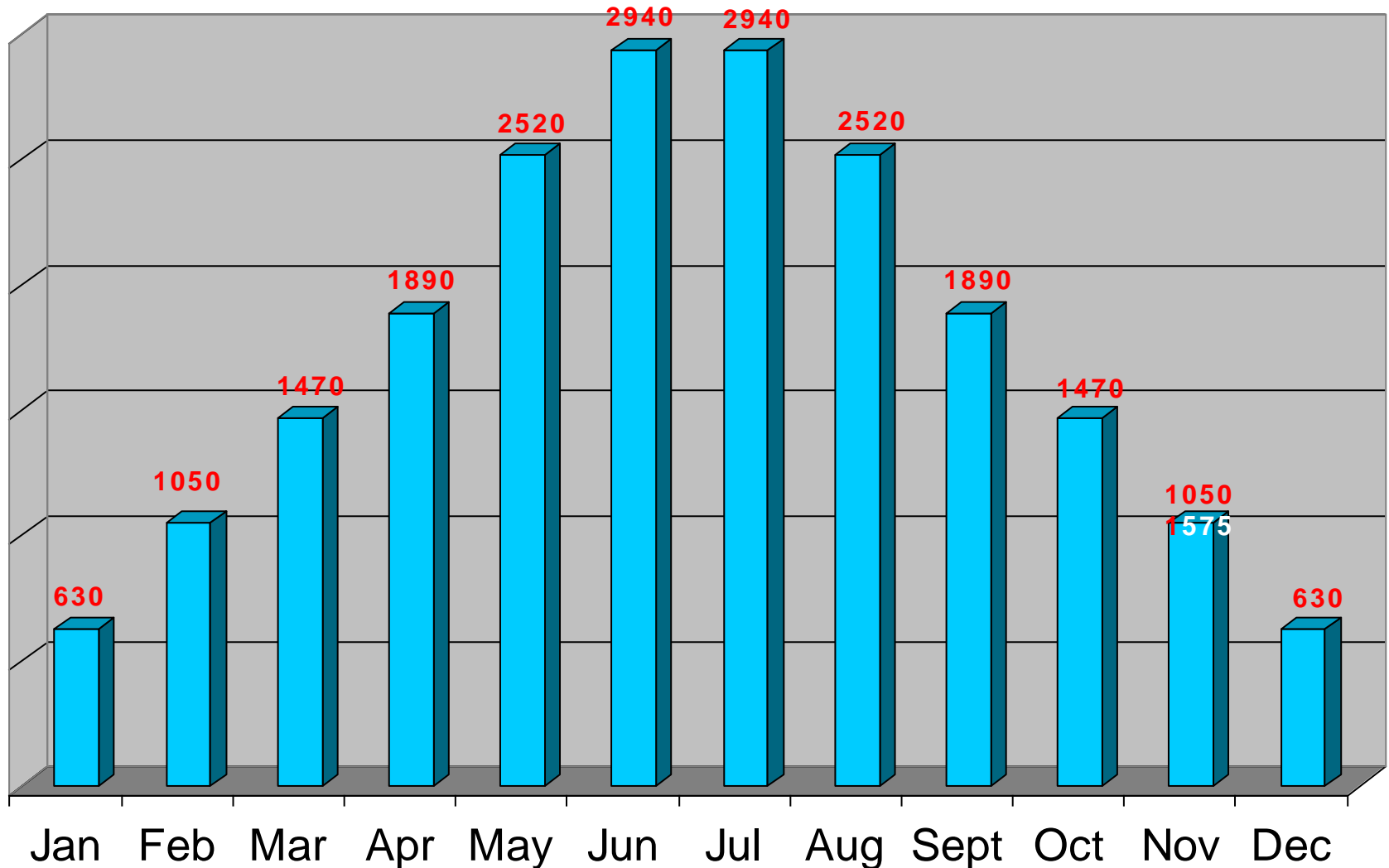
MONTHLY WATER AMOUNTS FOR A MATURE DATE PALM, WATERING AN AREA WITH A 30 FT. DIAMETER CANOPY (700 SQ. FEET)

HIGH MEDIAN WATERING 31,500 GAL/YR



MONTHLY WATER AMOUNTS FOR A MATURE DATE PALM, WATERING AN AREA WITH A 30 FT. DIAMETER CANOPY (700 SQ. FEET).

LOW MEDIAN WATERING 21,000 GAL/YR



WATERING PALMS??????

- ONE INCH OF WATER ON ONE SQUARE FOOT OF SOIL = .62 GALLONS
- FOR A 30 FT. DIAMETER AREA (706.5 SQ. FT.) = 438 GALLONS PER INCH OF IRRIGATION
- FOR JUNE & JULY (2,940 GALS.) = 6.7 INCHES OF IRRIGATION
- FOR JAN. & DEC. (630 GALS.) = 1.3 INCHES OF IRRIGATION

PALMS DO NOT DRINK FROM THEIR TRUNKS!



10/24/2017

**WATER THE ROOT BALL AREA AND BEYOND,
DESIGN THE IRRIGATION SYSTEM TO EXPAND AS THE PALMS GROW**



10/24/2017

**WATER THE ROOT BALL
AREA AND BEYOND**





FOR NEWLY TRANSPLANTED PALMS A BERM WILL
HOLD WATER TO KEEP THE ROOT BALL MOIST

10/24/2017

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HOW NOT TO WATER

DO NOT
STAPLE OR
NAIL TO
TRUNK



HOW NOT TO WATER

ONLY ONE
EMITTER FOR
A LARGE PALM



HOW NOT TO WATER



**MOST OF THE WATER
IS RUNNING OFF**



**REDUCED
SIZE AND
DYING
HEADS**

HOW NOT TO WATER



**SPRINKLER
HEADS**



**OVER SPRAY
ON TRUNKS**



SYMPTOMS OF DROUGHT IN PALMS



WATERED PALM



NEGLECTED PALM

SYMPTOMS OF DROUGHT AND THEN OVER WATERING IN PALMS

**SPLITTING AND COLLAPSING
OF THE TRUNK**



SYMPTOMS OF DROUGHT IN PALMS





FERTILIZING



FERTILIZING PALMS

(REMEMBER LITTLE RESEARCH HAS BEEN DONE ON FERTILIZATION RATES FOR LANDSCAPE PALMS MOST IS ON NURSERY FIELD GROWN PALMS)

- **GRANULAR APPLICATIONS 1.5 LBS/100 SQ. FT. (NOT N) OF CANOPY AREA 3 TIMES A YEAR BEGINNING LATE MARCH ENDING LATE AUGUST OR EARLY SEPTEMBER (TIM BROCHAT UNIVERSITY OF FLORIDA)**
- **BANDING, DIBBLING OR SPIKES ARE INEFFICIENT**
- **FERTIGATION IS ALSO INEFFICIENT AND POTENTIALLY HAZARDOUS BECAUSE OF TO RUN OFF**

(THESE FERTILIZER RATES ARE FOR SLOW RELEASE FERTILIZERS UNDER HIGH RAINFALL. THESE RATES MAY BE TOO HIGH FOR DESERT AREAS WITH MINIMUM IRRIGATION AND MAY BE WHY SOME PALMS DO WELL WITH SMALL AMOUNT OF FERTILIZER EACH YEAR)

10/24/2017

(TIM BROCHAT UNIVERSITY OF FLORIDA)

FERTILIZING PALMS

- **N, P, K, Mg 8-2-12+4** (NITROGEN, PHOSPHOROUS, POTASSIUM AND MAGNESIUM)
- (THIS IS ON SANDY SOILS, CLAY UNKNOWN AT THIS TIME)
- **SULFUR (S), FERTILIZATION 1 TO 2% IRON (Fe) AND MANGANESE (Mn) AND TRACE AMOUNTS OF ZINC (Zn), COPPER (Cu) AND BORON (B) (IF THE SOIL TESTS LOW IN B ONLY)**
- **FOLIAR IS INEFFICIENT METHOD FOR PROVIDING MACRONUTRIENTS (SUCH AS N, K, AND Mg),**

10/24 **BUT GOOD FOR Mn AND Fe**

FERTILIZING PALMS

READ THE BAG

- Contains A Micronutrient Package With High Magnesium Content
- Can Be Used For Landscape Or Nursery Applications
- With Polyon Controlled Release Nitrogen For Up To 3 to 4 Month Feeding

13-3-13

Covers 5,000 Square Feet

- ✓ High nitrogen to potassium formulation recommended for palms
- ✓ Extended nutrient release from Poly Plus
- ✓ Contains several micronutrients for improved plant color and vigor

FERTILIZING IN THE LANDSCAPE

- **100% OF N, K, AND Mg SHOULD BE CONTROLLED RELEASE FORM**
- **USE A BROADCAST ROTARY SPREADER UNDER THE CANOPY OF THE PALM (SINGLE TREES) OR ENTIRE BED OR LANDSCAPE**
- **SOME PALMS LIKE QUEEN PALMS AND MAJESTY NEED MORE NITROGEN THAN OTHERS**

FERTILIZING PALMS

- MOST LANDSCAPES ARE A MIX OF TURF AND ORNAMENTALS
- TURF FERTILIZERS ARE TOO HIGH IN NITROGEN (N) RELATIVE TO POTASSIUM (K)
- DON'T FERTILIZE TURF WITH A HIGH NITROGEN TURF FERTILIZER WITHIN **50 FT** OF PALMS AND TREES
10 FT OF SHRUBS
- BEST TO USE A GOOD PALM FERTILIZER FOR THE ENTIRE LANDSCAPE

FERTILIZING PALMS

- FERTILIZE PALMS LIKE OTHER TREES AND SHRUBS, BROADCAST UNDER AND BEYOND THE CANOPY, NOT NEXT TO THE TRUNK



**YOU CAN'T
FEED PALMS
AT THE TRUNK**





PALM PROBLEMS

PALM PROBLEMS

DIAGNOSING PROBLEMS

- DETERMINE PALM SPECIES**
- LOOK AT ALL SYMPTOMS**
- CHECK THE HISTORY OF THE PALM AND PLANTING SITE**
- CHECK FERTILIZER AND IRRIGATION SCHEDULES**
- DO A SOIL AND TISSUE ANALYSIS**
- CHECK WEATHER HISTORY**

A low-angle, upward-looking photograph of a palm tree against a clear, bright blue sky. The fronds of the palm tree are the dominant visual element, radiating from the center towards the edges of the frame. The lighting is bright, creating a warm, golden-yellow glow on the fronds, particularly in the upper half of the image. The text 'BASIC PALM NUTRIENT' is superimposed in the center of the image in a large, bold, white, sans-serif font with a thin black outline. The text is split into two lines: 'BASIC PALM' on the top line and 'NUTRIENT' on the bottom line.

BASIC PALM NUTRIENT

Chemical Elements Essential To Plant Growth

■ Non-mineral- air and water

- Carbon (C)
- Hydrogen (H)
- Oxygen (O)
- Nitrogen (N)

■ Mineral- from the soil

■ Primary

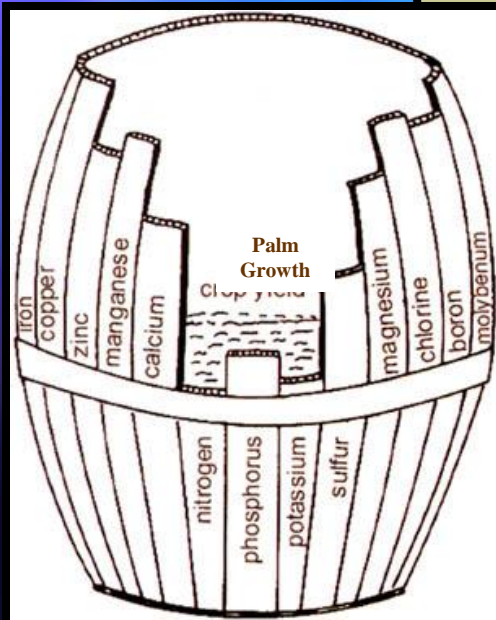
- Nitrogen (N)
- Phosphorus (P)
- Potassium (K)

■ Secondary

- Calcium (Ca)
- Magnesium (Mg)
- Sulfur (S)

■ Micronutrients

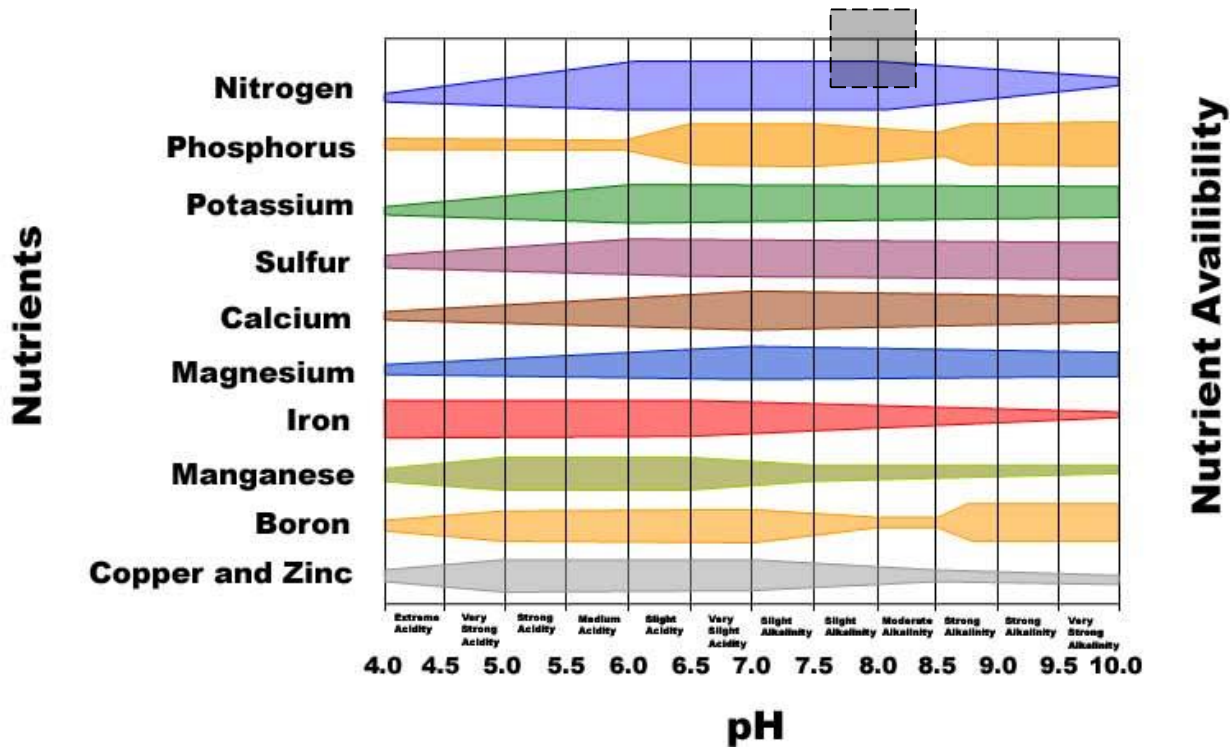
- Iron (Fe), Boron (B), Manganese (Mn), Copper (Cu), Zinc (Zn), Molybdenum (Mo), Chlorine (Cl)



FROM BASIC PALM NUTRITION

JEFF ANDERSON NMSU

Influence of pH on Availability of Plant Nutrients



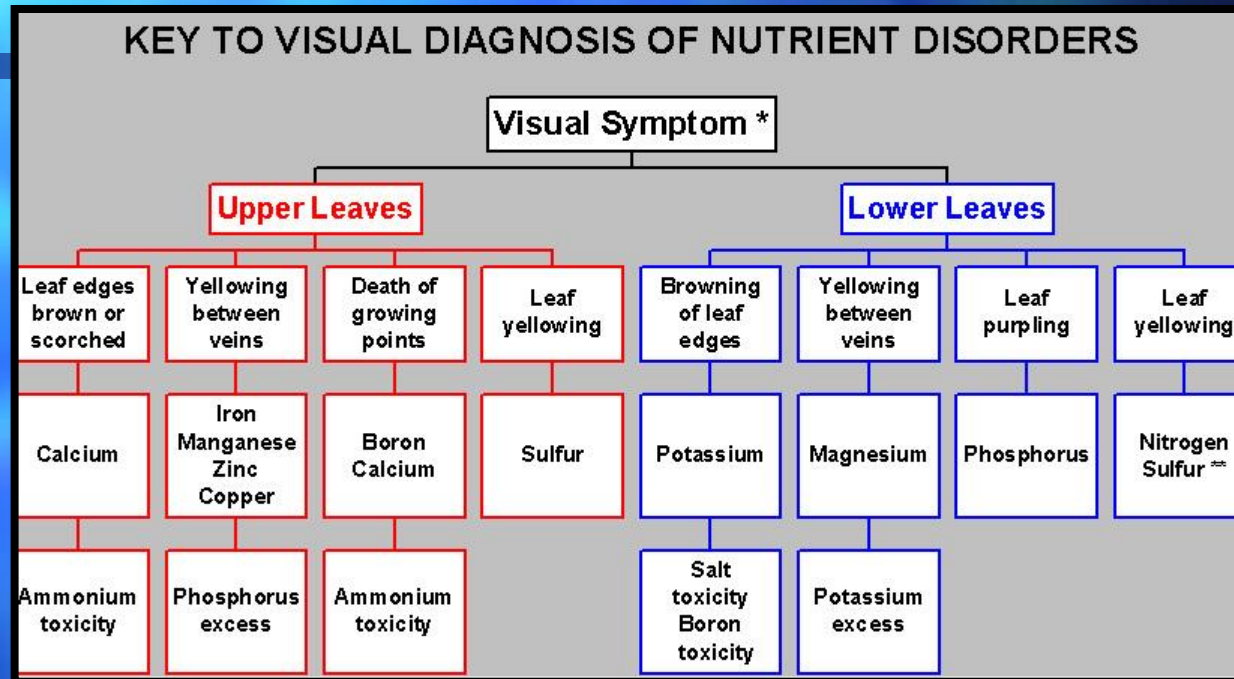
(S.S.S.A.P., 1946. 11:305.)

FROM BASIC PALM NUTRITION

JEFF ANDERSON NMSU

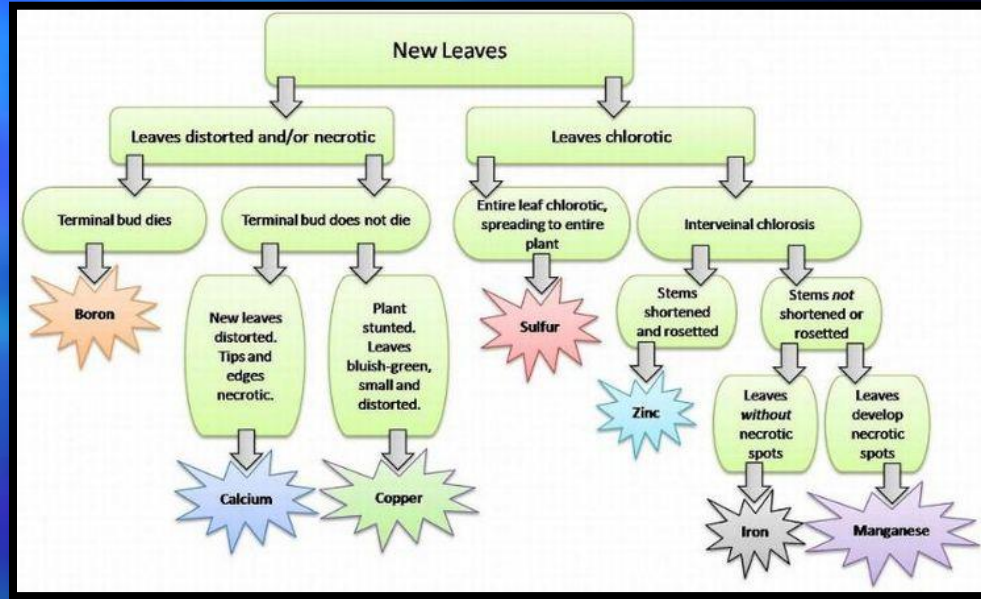
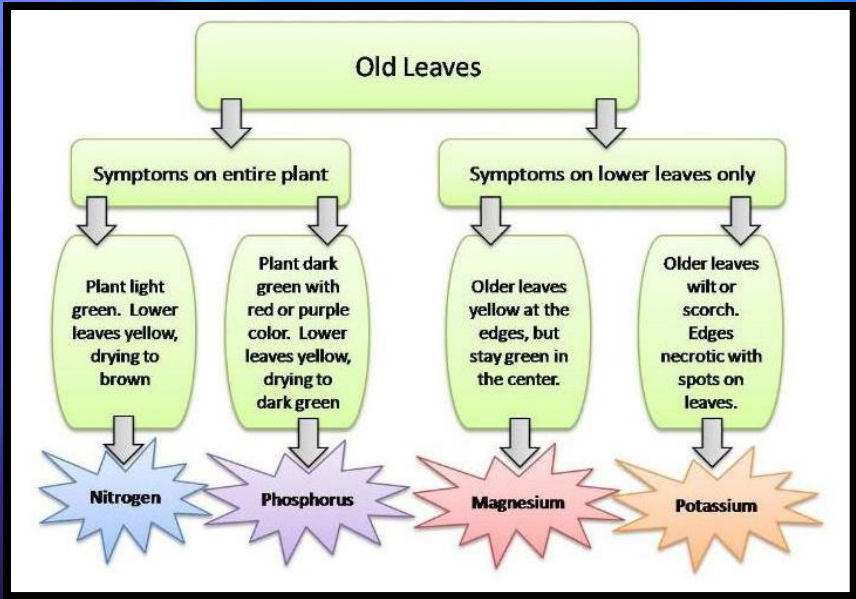


KEY TO VISUAL DIAGNOSIS OF NUTRIENT DISORDERS



FROM BASIC PALM NUTRITION

JEFF ANDERSON NMSU



ESSENTIAL ELEMENTS



MACRONUTRIENTS

- A. THE MOST SEVERE SYMPTOMS ARE IN THE OLDER LEAVES
- B. THERE ARE NOT ENOUGH OF THESE NUTRIENTS IN THE SOIL

C, H, O, N, P, K, CA* Mg, S*

(Ca, Mg, AND S ARE NEEDED IN QUANTITIES AS GREAT AS N-P-K)

* CA AND S ARE RELATIVELY IMMOBILE
SYMPTOMS APPEAR IN NEW LEAVES

C, H, O, N, P, K, CA Mg, S

Fe, Mn, Zn, Cu, B, Mo, Cl

DEFICIENCIES OF LANDSCAPE PALMS :

K, Mn, B, Mg, N, Fe

CONTAINER PRODUCTION PALMS:

N, Fe, Mg



ESSENTIAL ELEMENTS



MICRONUTRIENTS

- A. NEEDED ONLY IN TRACE AMOUNTS
- B. DEFICIENCIES ARE MORE LIKELY TO BE FATAL,
- C. SYMPTOMS APPEAR ONLY ON THE YOUNGEST LEAVES
- D. THERE ARE ENOUGH OF THESE NUTRIENTS IN THE SOIL BUT THEIR UP TAKE IS RESTRICTED

C, H, O, N, P, K, CA Mg, S
Fe, Mn, Zn, Cu, B, Mo, Cl

TIM BROSCHAT UNIVERSITY OF FLORIDA FLREC

DEFICIENCIES OF LANDSCAPE PALMS :

K, Mn, B*, Mg, N, Fe

CONTAINER PRODUCTION PALMS:

N, Fe, Mg











*BORON MOBILITY DIFFERS IN PLANTS

IT IS NOT MOBILE IN PALMS

10/24/2017

CAUSES OF NUTRIENT DEFICIENCIES

-  **INSUFFICIENT NUTRIENTS IN THE SOIL**
-  **NUTRIENTS UNAVAILABLE DUE TO pH OR INTERACTION WITH PHOSPHATES OR ORGANIC MATTER**
-  **NUTRIENT IMBALANCE**
-  **ROOT PROBLEMS** (DISEASES OR POOR SOIL AERATION)
-  **IMPROPER PLANTING DEPTH**
-  **EXCESSIVE IRRIGATION**
-  **COLD TEMPERATURES** (MICRO NUTRIENT UP TAKE)
-  **EXCESSIVE PRUNING** (ESPECIALLY OF DEFICIENT LEAVES)

FERTILIZING PALMS

(REMEMBER LITTLE RESEARCH HAS BEEN DONE ON FERTILIZATION RATES FOR LANDSCAPE PALMS MOST IS ON NURSERY FIELD GROWN PALMS)


- ***GRANULAR APPLICATIONS* based @ 1.5 lbs./100 sq. ft. of canopy area, 3 times a year, beginning late March and ending late August or early September** (Tim Broschat, University of Florida)
- **BANDING, DIBBLING OR SPIKES ARE INEFFICIENT**
- **FERTIGATION IS ALSO INEFFICIENT AND POTENTIALLY HAZARDOUS BECAUSE OF RUN OFF**
- ✓ **THESE FERTILIZER RATES ARE FOR SLOW RELEASE FERTILIZERS UNDER HIGH RAINFALL.**
- ✓ **THESE RATES MAY BE TOO HIGH FOR DESERT AREAS WITH MINIMUM IRRIGATION AND MAY BE WHY SOME PALMS DO WELL WITH SMALL AMOUNT OF FERTILIZER EACH YEAR.**

(TIM BROSCHAT UNIVERSITY OF FLORIDA)

FROM BASIC PALM NUTRITION

JEFF ANDERSON NMSU

OTHER DIAGNOSTIC TECHNIQUES

 **LEAF NUTRIENT ANALYSIS (MAY IDENTIFY OTHER HIDDEN DEFICIENCIES)**

 **SAMPLE 4 TO 6 CENTRAL LEAFLETS FROM THE YOUNGEST FULLY EXPANDED LEAF**

HOW TO SAMPLE

TAKE FROM CENTER OF NEWEST
OPENED LEAF



PALMATE

PINNATE



TAKE FROM CENTER OF NEWEST
OPENED LEAF

CRITICAL LEAF CONCENTRATIONS OF SOME ELEMENTS IN PALMS

(ADAPTED FROM BROCHAT AND MEEROW 200 BY HODEL WESTERN ARBORIST SPRING 2010)

ELEMENT	DEFICIENT	LOW	NORMAL	HIGH
N%	0.85-1.90	0.85-2.40	1.20-3.50	2.75-4.50
K%	0.60-1.20	0.60-1.55	0.85-2.75	2.25-4.00
Mg%	0.19-0.20	0.20-0.25	0.25-1.00	0.75-1.25
Fe ppm	39	40-49	50-300	250-1000
Mn ppm	39	40-49	50-250	250-1000
B ppm	15-17	18-25	20-75	60-100

FROM BASIC PALM NUTRITION

JEFF ANDERSON NMSU

Fertilizer Guidelines

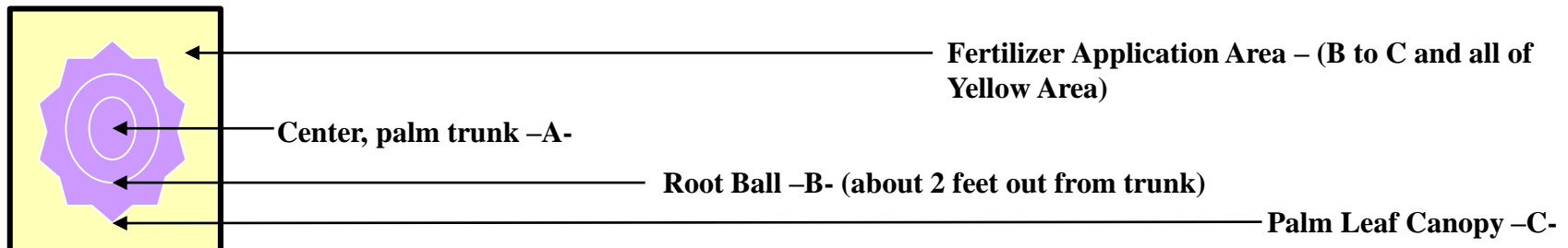
FROM BASIC PALM NUTRITION

JEFF ANDERSON NMSU

Palm fertilizers usually appear as Nitrogen-Phosphorus-Potassium (N-P-K)





---ratios such as; (3:1:2), (2:1:3), or (3:1:3)---

1. For small palms (Dwarf Sabal Palms, European Fan Palms, etc.), use ½–2 lbs (0.22–0.9 kg) per application.
2. For medium palms (Mexican Blue Palms, Mule Palms, etc.), use 3–4 lbs (1.4–1.8 kg) per application.
3. For large palms (California Fan Palms, Phoenix sp. etc.), use 5–7 lbs (2.3–3.2 kg) per application.
4. Apply the fertilizer to the soil surface in a band at the interface between the root ball, palm canopy and up to four feet beyond palm canopy in all directions. Make sure to water in the fertilizer applications properly.



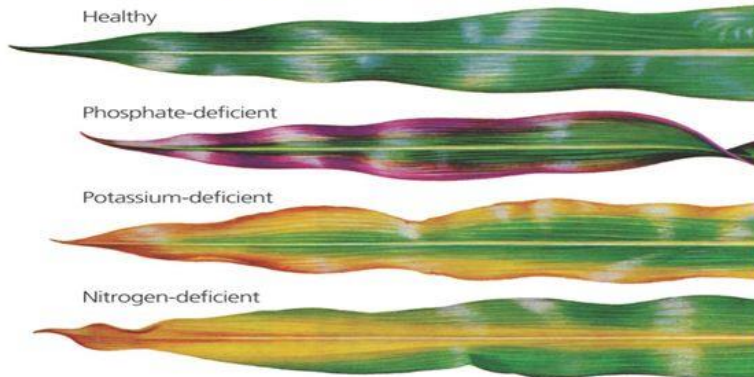
5. Slow-release fertilizer works best when scratched into the soil surface.
5. Fertilizers containing micronutrients can stain concrete, so use caution when applying them.

TREATMENT OF NUTRIENT DEFICIENCIES

-  IDENTIFY THE CAUSE (S) OF THE DEFICIENCY (TISSUE ANALYSIS IS MORE ACCURATE THAN SOIL)
-  CORRECT THE CULTURAL CAUSES
-  APPLY APPROPRIATE FERTILIZER
-  BE PATIENT!!!!

Nutrient deficiencies

Lack of essential nutrients exhibit specific symptoms dependent on function of nutrient dependent on solubility of nutrient



Hydroponics



PREVENTION OF NUTRIENT DEFICIENCIES

- **PROPER FERTILIZATION**
- **GOOD SOIL AERATION**
- **GOOD DRAINAGE**
- **PROPER PLANTING DEPTH**
- **PROPER SOIL pH**

(TIM BROCHAT, UNIVERSITY OF FLORIDA, FLREC)

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PALMS

NUTRIENT DEFICIENCIES

■ NITROGEN



NITROGEN

- NITROGEN IS THE MOST IMPORTANT ELEMENT IN PALM GROWTH.
- RELATIVELY UNCOMMON IN THE LANDSCAPE (EXCEPT FOR SYAGRUS ROMANZOFFIANA AND RAVENEA RIVULARIS NEEDS MORE N THAN OTHER PALMS)
- MOST COMMON IN CONTAINERS
- SYMPTOMS OF N DEFICIENCY OCCUR FIRST ON THE OLDEST LEAVES, PETIOLES AND STEMS (YELLOWING), THEN PROGRESS TO NEWER LEAVES (FURTHER YELLOWING) AS DEFICIENCY CONTINUES, LEAVING THE BUD GREEN.

NITROGEN

- GROWTH SLOWS AND/OR STOPS, ALSO, LEAVES DIMINISH IN SIZE
- NITROGEN IS MOBILE (MOVEABLE) WITHIN THE PLANT AND OCCURS IN THE NH_4^+ , OR NO_3^- FORMS, (EXAMPLES ARE: CaNO_3 , $(\text{NH}_4)_2\text{SO}_4$ OR UREA)
- NITROGEN IS EASILY LEACHED FROM THE SOIL THROUGH OVER IRRIGATION, ESPECIALLY IN SANDY SOILS. NITROGEN CAN BE TIED UP IN SOILS CONTAINING HIGH ORGANIC MATTER DURING DECOMPOSITION.

NITROGEN

- **CORRECTION-APPLY A NITROGEN FERTILIZER**
- **NITROGEN IS MOBILE IT MOVES FROM OLDER LEAVES TO NEWER LEAVES**

PALMS NUTRIENT DEFICIENCIES

- **NITROGEN
AND
POTASSIUM**



10/24/2017

PHOSPHORUS (P)

- Phosphorus refers here to salts of phosphates (PO_4^{3-}), monohydrogen phosphate (HPO_4^{2-}), and dihydrogen phosphate (H_2PO_4^-).
- These anions readily interconvert, and the predominant species is determined by the pH of the solution or soil.
- Phosphorus is noted especially for its role in capturing and converting the sun's energy into useful plant compounds.
- Phosphorus is a vital component of DNA, the genetic "memory unit" of all living things. It is also a component of RNA, the compound that reads the DNA genetic code to build proteins and other compounds essential for plant structure, seed yield and genetic transfer. The structures of both DNA and RNA are linked together by phosphorus bonds.
- Symptoms include poor growth, and leaves that turn blue/green but not yellow—oldest leaves are affected first. Phosphorus is not usually a problem in palms.
- Undersides of tomato plant leaves, and the veins and stems, may turn purple. Stiff, stunted plants with purplish tinge are most commonly seen.



FROM BASIC PALM NUTRITION
JEFF ANDERSON NMSU

NUTRIENT DEFICIENCIES

■ POTASSIUM (MOSTLY IN THE LANDSCAPE)

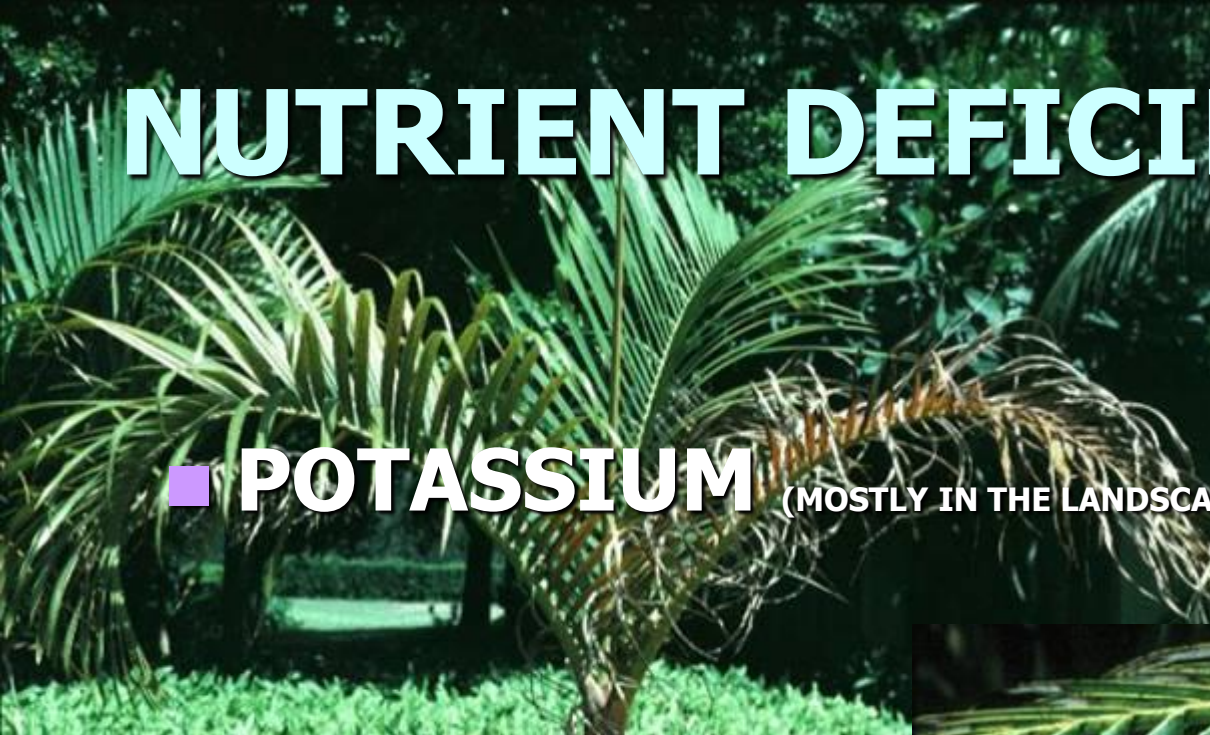


Plate 4. Potassium deficiency of spindle palm (*Hyophorbe verschaffeltii*) showing orange frizzling of older leaves.



Plate 5. Potassium deficiency on pygmy date palm (*Phoenix roebelenii*) showing necrotic leaflet tips and



Plate 3. Potassium deficiency symptoms showing marginal necrosis and necrotic spotting of coconut palm (*Cocos nucifera*) leaf.

NUTRIENT DEFICIENCIES

■ POTASSIUM IN SABAL



NUTRIENT DEFICIENCIES

■ POTASSIUM IN BUTIA CAPITATA



NUTRIENT DEFICIENCIES

■ POTASSIUM IN PHOENIX ROEBELENI



NUTRIENT DEFICIENCIES






■ POTASSIUM IN WASHINGTONIA






POTASSIUM (K)

1. Potassium is one of the key elements necessary for palm health and is required in relatively large amounts.
2. Potassium facilitates many functions in plants, including photosynthesis, enzyme activation, and osmoregulation.
3. It aids in the production of adenosine triphosphate (ATP), which affects the rate of photosynthesis, and acts as a catalyst for over 60 enzymatic processes related to plant growth (Armstrong 2012).
4. Osmoregulation affects the pressure within a plant cell: potassium controls the opening and closing of stomata, the small openings in leaves that regulate gas exchange, plant cooling, and transpiration (Johnston 2010); thus, if potassium levels are low, plant leaves develop symptoms of water stress (Armstrong 2012).
5. Palms may also become more susceptible to disease if important elements, including potassium, nitrogen, boron, and magnesium, are out of balance in soils.
6. Potassium occurs in soils in several forms. Minerals such as feldspar and mica contain much natural potassium, but it is not available to plants until released.
7. Mineralized potassium is gradually changed to the plant-available state, the potassium ion (K^+).





POTASSIUM (MOSTLY IN THE LANDSCAPE)

-  SYMPTOMS SHOW FIRST IN OLDEST LEAVES PROGRESSING TO NEWER LEAVES AS IT BECOMES MORE SEVERE
-  SYMPTOMS VARY
-  TRANSLUCENT YELLOW OR ORANGE SPOTS ON LEAFLETS
-  MAY OR MAY NOT HAVE NECROTIC SPOTS
-  MIDRIB REMAINS ALIVE, IT MAY BE ORANGE INSTEAD OF GREEN

POTASSIUM (MOSTLY IN THE LANDSCAPE)

-  **ONCE ALL K IS REMOVED, PALM WILL DECLINE (INCLUDING REDUCED TRUNK DIAMETER) AND EVENTUALLY DIE**
-  **CAN OCCUR IN CONTAINERS IF FERTILIZERS HAVE LOW K**
-  **TREATMENT: SOIL APPLICATION SULFUR-COATED POTASSIUM SULFATE (3 TO 8 LBS PER MATURE TREE 4X/YR. & 1/3 AS MUCH SLOW RELEASE mg)**

POTASSIUM (MOSTLY IN THE LANDSCAPE)

-  FOLIAR SPRAYS OF K INEFFECTIVE
-  POTASSIUM IS MOBILE LIKE N
-  WHEN GREEN DEFICIENT LEAVES ARE PRUNED OFF THE NEXT GREEN LEAVES BECOME DEFICIENT
-  MOST PALMS WILL HAVE SOME K DEFICIENCY UNLESS A CORRECTLY FORMULATED PALM FERTILIZER HAS BEEN APPLIED OVER THE LAST FEW YEARS

PHOSPHORUS (P)

- Phosphorus refers here to salts of phosphates (PO_4^{3-}), monohydrogen phosphate (HPO_4^{2-}), and dihydrogen phosphate (H_2PO_4^-).
- These anions readily interconvert, and the predominant species is determined by the pH of the solution or soil.
- Phosphorus is noted especially for its role in capturing and converting the sun's energy into useful plant compounds.
- Phosphorus is a vital component of DNA, the genetic "memory unit" of all living things. It is also a component of RNA, the compound that reads the DNA genetic code to build proteins and other compounds essential for plant structure, seed yield and genetic transfer. The structures of both DNA and RNA are linked together by phosphorus bonds.
- Symptoms include poor growth, and leaves that turn blue/green but not yellow—oldest leaves are affected first. Phosphorus is not usually a problem in palms.
- Undersides of tomato plant leaves, and the veins and stems, may turn purple. Stiff, stunted plants with purplish tinge are most commonly seen.

SULFUR (S)

- 1. Sulfate-S is relatively mobile in most soils (similar to nitrate) because it has a double negative charge and is repelled by the negative charge of the soil, unlike nutrients such as potassium, calcium, or magnesium.**
- 2. Sulfur, SO₄-S is easily leached from soils, especially sandy soils.**
- 3. Sulfur deficient palms typically have an overall yellow appearance similar to N deficiency.**
- 4. However S is not as mobile in the plant as N, so lower leaves do not show more severe deficiency symptoms than the upper leaves.**

-If an S deficiency is misdiagnosed as a N deficiency the application of fertilizer N will make the S deficiency worse, so tissue sampling is recommended to positively identify which nutrient is deficient.

***Elemental S* must be oxidized by soil bacteria to SO_4 before becoming plant available. Warm temperatures and good moisture and aeration are required for S-oxidizing bacteria to function. Sulfur oxidation is minimal at soil temperatures less than 50F. Even at 75F the oxidation rate of S is about 15% of that at 85F, so peak rates of S oxidation do not occur until late spring. Since the availability of elemental S may be minimal in early spring, a fertilizer containing some SO_4 in addition to elemental S is preferred over a fertilizer with elemental S alone.**



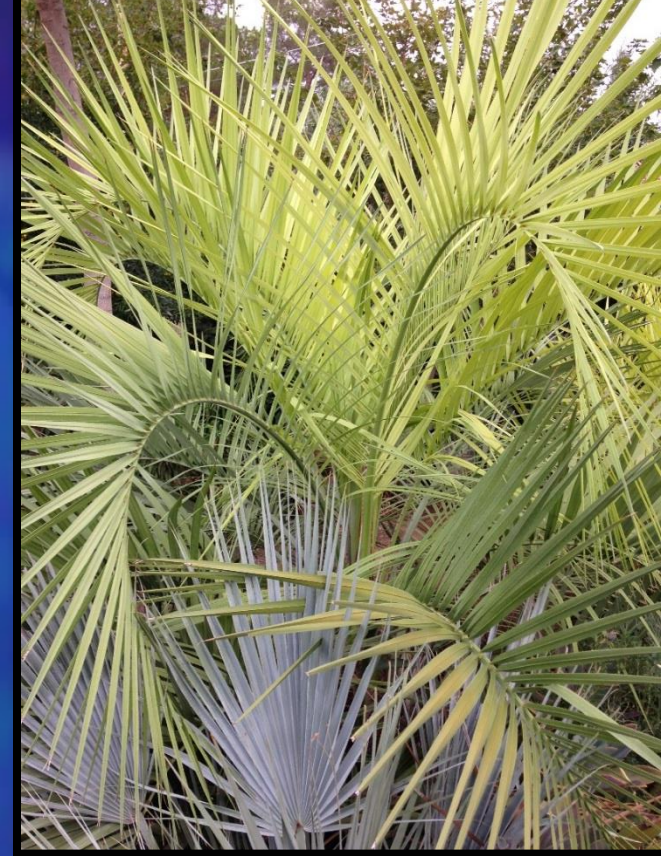
Sulfur Deficiency (S)

FROM BASIC PALM NUTRITION

JEFF ANDERSON NMSU PICTURES BY JEFF ANDERSON



Sulfur Deficiency (S)



FROM BASIC PALM NUTRITION

JEFF ANDERSON NMSU PICTURES BY JEFF ANDERSON



NUTRIENT DEFICIENCIES

■ MAGNESIUM

(MOSTLY IN THE LANDSCAPE ON PHOENIX CANARIENSIS AND NOT OTHER DATES)



Magnesium







(MOSTLY IN THE LANDSCAPE)

- Magnesium is an essential plant nutrient. It has a wide range of key roles in many plant functions.
- **One** of the magnesium's well-known roles is in the photosynthesis process, as it is a **Building block of Chlorophyll**, which makes leaves appear green.

MAGNESIUM

(MOSTLY IN THE LANDSCAPE)

SYMPTOMS

-  SHOW FIRST ON OLDEST LEAVES, PROGRESSES UP THROUGH CANOPY
-  BROAD LIGHT YELLOW BAND ALONG MARGIN
-  CENTER REMAINING GREEN
-  SEVERE CASES LEAFLET TIPS BECOME NECROTIC
-  RARELY FATAL
-  IN CONTAINERS IF POTTING MEDIA IS LOW IN Mg

NUTRIENT DEFICIENCIES

■ MANGANESE (MOSTLY IN THE LANDSCAPE)



Plate 7. Manganese deficiency of Alexandra palm (*Archontophoenix alexandrae*) showing necrotic streaking on otherwise chlorotic new leaves.

MANGANESE DEFICIENCY OR FRIZZLETOP

(MOSTLY IN THE LANDSCAPE)

 **SYMPTOMS: ONLY
ON NEW LEAVES**

 **EMERGE
CHLOROTIC, WEAK,
REDUCED SIZE, AND
NECROTIC
STREAKING**

 **SCORCHED IN
APPEARANCE**

 **Mn INSOLUBLE IN
HIGH pH SOILS**

 **COLD SOILS**



MANGANESE OR BORON DEFICIENCY IN A CHAMAEROPS HUMILIS



10/24/20

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MANGANESE DEFICIENCY OR FRIZZLETOP

(MOSTLY IN THE LANDSCAPE)

TREATMENT

1. SOIL OR FOLIAR
2. MANGANESE SULFATE

MANGANESE DEFICIENCY AT MIDLEVEL



Manganese

Function: Manganese (Mn) is an important plant micronutrient and is required by plants in the second greatest quantity compared to iron. Manganese is used in plants as a major contributor to various biological systems including photosynthesis, respiration, and nitrogen assimilation. Manganese is also involved in pollen germination, pollen tube growth, root cell elongation and resistance to root pathogens.

Symptoms of Manganese Deficiency:
Affects the new emerging leaves, manganese deficiency causes yellowing and necrosis between the veins and a reduction in leaf size. As the deficiency becomes severe, the new leaves wither and have a "frizzled" look. If not promptly treated, manganese deficiency is often fatal to the palm. Manganese deficiency can affect most species of palms. Queen, Paurotis and royal palms are particularly susceptible.



king sago palm with manganese deficiency symptoms

NUTRIENT DEFICIENCIES

■ IRON DEFICIENCY



Plate 11. Early stages of Fe deficiency on queen palm (*Syagrus romanzoffiana*) showing green speckles on chlorotic new leaflet.

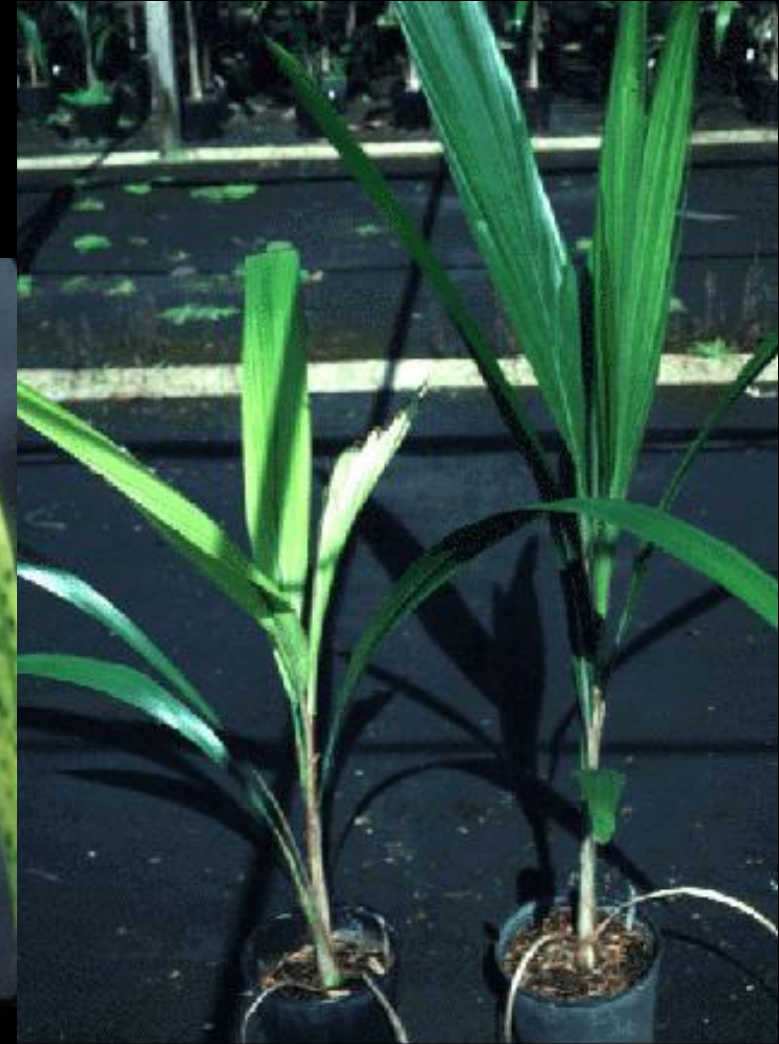


Plate 10. Severe Fe deficiency in queen palm (*Syagrus romanzoffiana*) seedling on left.

Iron (Fe)

- Although required by plants in small amounts, Fe is involved in many important compounds and physiological processes in plants. **Iron is involved in the manufacturing process of chlorophyll**, and it is required for certain enzyme functions. Fe's involvement in chlorophyll synthesis is the reason for the chlorosis (yellowing) associated with Fe deficiency. Iron is found in the iron-containing (heme) proteins in plants, examples of which are the cytochromes. Cytochromes are found in the electron transfer systems in chloroplasts and mitochondria.
- Although most of the iron on the earth crust is in the form of Fe^{3+} , the Fe^{2+} form is physiologically more significant for plants. This form is relatively soluble, but is readily oxidized to Fe^{3+} , which then precipitates.
- Fe^{3+} is insoluble in neutral and high pH, making iron unavailable to plants in alkaline and in calcareous soils. Furthermore, in these types of soil, iron readily combines with phosphates, carbonates, calcium, magnesium and hydroxide ions.

IRON DEFICIENCY



SYMPTOMS:



UNIFORM CHLOROTIC NEW LEAVES



NEW LEAVES WILL SHOW EXTENSIVE TIP NECROSIS & REDUCTION IN LEAF SIZE



MORE COMMON IN CONTAINERS THAN THE LANDSCAPE

IRON DEFICIENCY

CAUSED BY

 HIGH pH

 WATERLOGGED SOILS

 PLANTED TOO DEEP

 TREATMENT

 FOLIAR IRON SULFATE (SHORT TERM)








 CORRECT CULTURAL PROBLEM (LONG TERM)

Boron (B)

Cell wall structure and Division

- Boron is involved along with calcium (Ca) in cell wall structure. Boron is involved in the movement of Ca into the plant and in normal Ca nutrition in plants and animals. There is a similarity between bone development in animals and cell wall development in plants.
- Boron is essential in the actively growing regions of plants, such as root tips, and in new leaf and bud development. This involves the meristematic (growing) tissues in plants or the cells which are rapidly multiplying, allowing plant growth to occur.
- For example, rosetting (stunting) of plants is a common B-deficiency symptom, due to a decrease in cell numbers in the apical (upper) growing regions of palms.

BORON DEFICIENCY

-  **STUNTED, NECROTIC-TIPPED LEAVES**
-  **MULTIPLE OR INCOMPLETELY OPENED LEAVES**
-  **HORIZONTAL GROWTH OR BENDING**
-  **DEATH OF THE MERISTEM**
-  **AFFECTS YOUNGEST LEAVES**
-  **SHOULD BE RARE IN DESERT SOILS**
-  **DRY SOIL MAY BRING IT ABOUT**

**BORON DEFICIENCY IN
CARPENTARIA PALM**



**BORON
DEFICIENCY**



**BORON
DEFICIENCY IN
COCONUT PALM**

BORON DEFICIENCY IN KENTIA PALMS



10/24/2017

BORON DEFICIENCY IN WASHINGTONIAS



BORON DEFICIENCY? IN PHOENIX ROEBELEENII





**BORON DEFICIENCY
IN
PHOENIX
DACTYLIFERA
COMPACTED SOIL**

10/24/2017

CALCIUM (Ca)

- 1. Calcium is an element needed for maintenance of cell wall constituents. It neutralizes the soil from the ill effects of acidity and creates an atmosphere conducive for plant growth.**
- 2. The first symptoms appear on younger leaves and even on the spears, with the occurrence of round yellow spots, becoming brown in the center. These spots appear isolated at first, become coalescent, and finally dry out. Severe distortion of leaflets and leaves also occur**
- 3. Calcium deficiency can be caused by excessive P fertilizer application, which may depress the availability of Ca (due to formation of Ca phosphates in alkaline soils).**
- 4. Ca is less mobile than Mg and K. Because Ca is not re-translocated to new growth.**
- 5. Deficiency symptoms usually appear first on young leaves. Ca deficiency also results in impaired root function and may predispose the to Fe toxicity.**



CALCIUM DEFICIENCY



UNKNOWN SOURCE OF
PHOTOS

SALT TOXICITY



SALT TOXICITY

- ❑ OLD LEAVES BURNED
- ❑ PLANTS UNDER THE PALM DAMAGED, DYING OR DEAD
- ❑ NEW LEAVES GREEN



UNIVERSITY OF FLORIDA IFAS PALM INFORMATION

- http://edis.ifas.ufl.edu/topic_palms
- <http://flrec.ifas.ufl.edu/palmprod/palm-problems-key/>








DISEASES

SOMETIMES YOU HAVE TO GET UP INTO THE PALM







10/24/2017

DISEASES OF PALMS

-  **FUNGICIDES MAYBE USE AS A PART OF AN IMP PROGRAM BUT SHOULD NOT BE USED ALONE**
-  **FUNGICIDES HELP STOP THE SPREAD OF A DISEASE BUT THE SYMPTOMS REMAIN**
-  **SOME FUNGICIDES ON SOME PALMS HAVE ACTED LIKE GROWTH REGULATORS ON PALMS**
-  **THERE IS NO EVIDENCE THAT A SYSTEMIC FUNGICIDE APPLIED TO THE SOIL MOVES FROM THE PALM ROOTS TO THE LEAVES**
-  **MANY SECONDARY PATHOGENS ARE ALWAYS PRESENT LIKE VULTURES WAITING FOR THE OPPORTUNITY TO ENTER THE PALM**

DISEASES OF PALMS

-  **REMOVING SYMPTOMATIC LEAVES AND CONKS (FUNGI FRUITING BODIES) HELP PREVENT THE SPREAD OF A DISEASE**
-  **OVERHEAD IRRIGATION/RAIN CAN HELP IN THE CONTAMINATION OF OTHER PALM (LEAF DISEASES)**
-  **REMOVING THE PALM TRUNK, ROOTS AND SOIL WILL HELP STOP THE SPREAD OF A DISEASE**
-  **DO NOT REPLANT IN THE SAME AREA WITH ANOTHER PALM IF YOU DON'T KNOW WHAT THE PALM DIED OF**

DISEASE TRIANGLE

**RIGHT
HOST**

**PROPER
ENVIRONMENT
(CULTURAL
PRACTICES)**

**PRESENCE OF THE
DISEASE ORGANISM**



PHOTO FROM KATHY KOSTA DEPT. AG OF CA.



- **FUSARIUM WILT: FRONDS DYING ON ONE SIDE MORE RAPIDLY THAN THE OTHER**
- **OLDER TO YOUNGER FRONDS**
- **DISCOLORATION ON BOTH OUTSIDE AND INSIDE OF LEAF AND STEAM**
- **CUT STEAM WITH HANDSAW TO PREVENT OIL STAINING OF STEAM**

FUSARIUM IS SPREAD BY









INFESTED

1. SEEDS
2. SOIL
3. PRUNING EQUIPMENT
4. WATER RUNOFF
5. TRUNK AND ROOT DEBRIS WHEN REMOVING DEAD AND DYING TREES



- **ALWAYS TEST FOR BOTH FUSARIUM AND RACHIS BLIGHT**
- **NEARLY 100% OF INFECTED PALM HAVE BEEN PHOENIX CANARIENSIS**
- **TREATMENT**
- **STERILIZATION OF TOOLS**
- **REMOVAL OF PALM**



-  **IT IS THE AIDS OF P. CANARIENSIS**
-  **NEARLY 100% FATAL**
-  **TREATMENT**
-  **NEARLY 100% PREVENTABLE**
-  **REPLANT WITH DIFFERENT PALMS EXCEPT FOR OTHER PHOENIX PALMS AND WASHINGTONIAN PALMS**
-  **FREQUENTLY PRUNED AND HIGHLY MAINTAINED PALMS**



FUSARIUM



**NEVER REPLANT WITH PALMS
AFTER DIAGNOSING DISEASES
SUCH AS FUSARIUM AS THE
PATHOGENS CAN STAY IN THE
SOIL 25 TO 30 YEARS**



AUGUST



OCTOBER

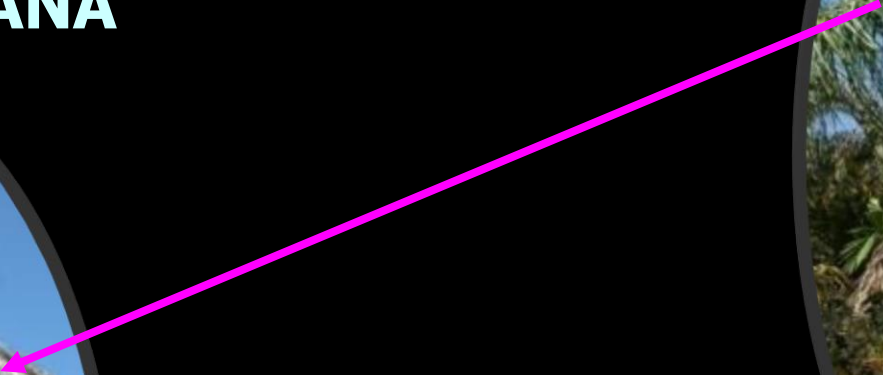
FUSARIUM WILT?

**NEVER REPLANT WITH
PALMS AFTER DISEASES
SUCH AS FUSARIUM
WHICH CAN STAY IN THE
SOIL 25 TO 30 YEARS**



**THE FOLLOWING
YEAR
FUSARIUM WILT?**

**NEW DISEASE IN QUEEN
PALMS SYAGRUS
ROMANZOFFIANA**



**WITH IN A FEW
WEEKS TO A FEW
MONTHS**

FUSARIUM WILT? ¹⁰⁵

RACHIS BLIGHT

- MORE THAN ONE UNOPENED SPEAR MAYBE RACHIS BLIGHT
- STRIP ON THE RACHIS AS THE NECROSIS
- MATURE PALMS ARE MORE LIKELY TO BE AFFECTED
- OLDEST LEAVES FIRST WORKING ITS WAY UP TO YOUNGEST LEAVES



PHOTO A. WILSON UF IFAS



PHOTO M. L. ELLIOTT UF IFAS

10/24/2017

RACHIS BLIGHT

MANAGEMENT

- SANITATION AND WATER MANAGEMENT Low humidity
- REMOVAL AND DESTRUCTION OF SEVERELY INFECTED LEAVES
- ELIMINATE STRESS IN THE PALMS
- CAN SPRAY WITH A BROAD-SPECTRUM CONTACT OR SYSTEMIC FOLIAR FUNGICIDE FOR PROTECTION MAYBE USEFUL
- HOWEVER FUNGICIDE TREATMENT DOES NOT SEEM TO WORK
- FUNGICIDES DO NOT CURE

- IT DOES NOT ATTACK THE LEAVES BUT THEY ARE AFFECTED DUE TO VASCULAR DAMAGE IN THE RACHIS
- SELDOM KILLS THE PALM

PHOTO A. WILSON UF IFAS

10/24/2017



PHOTO M. L. ELLIOTT UF IFAS

RACHIS BLIGHT


MANAGEMENT

 SANITATION AND WATER MANAGEMENT

HIGH HUMIDITY MAY FACILITATE
SPREADING OF THE DISEASE

 REMOVAL AND DESTRUCTION OF
SEVERELY INFECTED LEAVES

 ELIMINATE STRESS IN THE PALMS

 CAN SPRAY WITH A BROAD-SPECTRUM
CONTACT OR SYSTEMIC FOLIAR FUNGICIDE
FOR PROTECTION MAYBE USEFUL

 HOWEVER FUNGICIDE TREATMENT DOES
NOT SEEM TO WORK


 FUNGICIDES DO NOT CURE


DIAMOND SCALE



DIAMOND SCALE

 PRUNE OFF INFECTED LEAVES AND STERILIZE SAWS

 THERE IS NO RESEARCH THAT SHOWS HOW EFFECTIVE THIS IS BECAUSE THE SPORES ARE PROBABLY WIND AND WATER-BORN

 IF DIAMOND SCALE IS A PERSISTENT PROBLEM REPLANT WITH SPECIES SUCH AS BRAHEA, LIVISTONA AND PURE WASHINGTONIA ROBUSTA

 KEEP EXISTING WASHINGTONIAS FILIFERAS IN GOOD GROWING CONDITION



PALM DISEASES

- **PINK BUD ROT IS AN OPPORTUNISTIC DISEASE**
- **PRIMARILY ATTACK STRESSED OR WEAKENED PALMS**
- **BUY DISEASE FREE PLANTS, NO OVERHEAD WATERING (TRUE FOR MOST DISEASES)**
- **KEEP PALMS HEALTHY AND GROWING**
- **DO NOT LAY PALMS ON THE GROUND TO STORE**

PALM DISEASES

- **TRUNK ROTS:**
- **THEILAVIOPSIS ROT**
- **KEEP WATER OFF TRUNKS**
- **ROOT ROTS :**
- **DON'T OVER WATER**



10/24/2017

PALM DISEASES

- 🐛 **GANODERMA: OLDER FRONDS WITHER AND DROP**
- 🐛 **DEATH TAKES 1 TO 2 YEARS**
- 🐛 **AT THE END MUSHROOMS FORM ON LOWER TRUNK**
- 🐛 **REMOVE PALM AND DESTROY DON'T REPLANT WITH A PALM**
- 🐛 **IS NOT SPREAD BY PRUNING**
- 🐛 **THINNING OF MULTI TRUNKED PALMS CAN FACILITATE INFECTION**



PALM DISEASES

ONE CONK CAN
PRODUCE 1 ½
PINTS OF SPORES
over 1 billion



**GANODERMA
INSIDE THE
TRUNK**



**MAKE SURE WHEN CUTTING
AND EXAMINING THAT DARK
AREAS ARE NOT OIL FROM
THE SAW**

10/24/2

NO GANODERMA

GANODERMA INSIDE THE TRUNK



**MAKE SURE WHEN CUTTING
AND EXAMINING THAT DARK
AREAS ARE NOT OIL FROM
THE SAW**



MAKE SURE WHEN CUTTING AND EXAMINING THAT DARK AREAS ARE NOT OIL FROM THE SAW

SUDDEN CROWN DROP

- **CROWN OR HEAD OF THE PALM DROPS WITHOUT WARNING.**
- **THE TOP OF THE PALM (HEAD) APPEARS NORMAL.**
- **INTERNAL TRUNK IS IN DECAY, AND THE OUTER APPEARS NORMAL**
- **MOST OFTEN IN PARTS OF THE TRUNK WITH SERVE PRUNING.**

NEW TEXAS PHOENIX PALM DECLINE

- ORIGINALLY DESCRIBED IN SOUTHERN TEXAS ON PHOENIX CANARIENSIS
- IT IS A PHYTOPLASMA DISEASE (LIKE LETHAL YELLOWING) BACTERIUM WITH NO CELL WALL
- FOUND IN PHOENIX CANARIENSIS, PHOENIX DACTYLIFERA, PHOENIX SYLVESTRIS AND SABAL PALMETTO

FROM UNIVERSITY OF FLORIDA IFAS PUBLICATION #PP243

10/24/2017



NEW

TEXAS PHOENIX PALM DECLINE

■ SYMPTOMS

1. LIKE THAT OF LY
2. DEATH OF INFLORESCENCE AND LEAF SPEAR
3. DISCOLORATION OF OLDER LEAVES BEGINNING WITH LEAF TIPS (REDDISH BROWN)

■ DISEASE MANAGEMENT

1. ONCE THE LEAF SPEAR IS DEAD REMOVE THE TREE TO PREVENT THE SPREAD TO OTHER PALMS
2. THE MOST EFFECTIVE USE OF ANTIBIOTIC INJECTIONS IS AS A PREVENTATIVE
3. DON'T PLANT SUSCEPTIBLE PALMS IN AREAS WHERE THE DISEASE IS KNOWN TO BE





INSECTS

INSECT PESTS OF PALMS

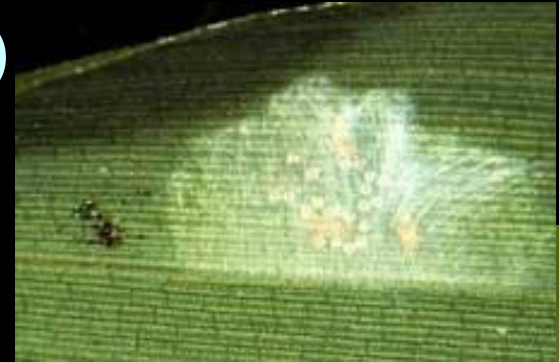
(INTERIOR PALMS)

 spider mites

 scale

 mealy bugs

 spray and wash with clean water,
soap, neem oil, or use predators



SPIDER MITES

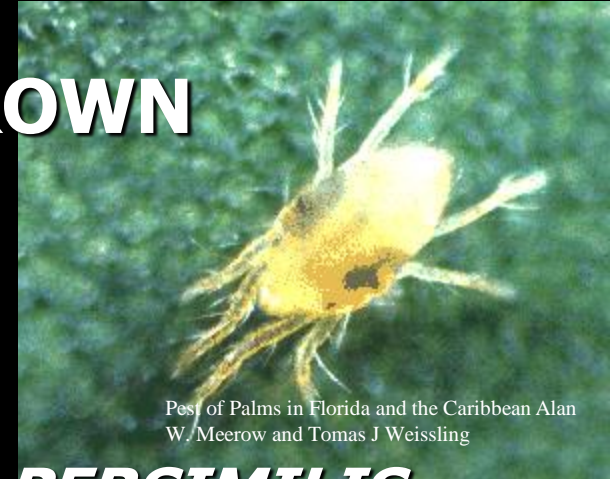
(INTERIOR PALMS)

■ PROBLEM FOR GREENHOUSE GROWN INDOOR PALMS AND ON MANY *CHAMAEDOREA* SPECIES

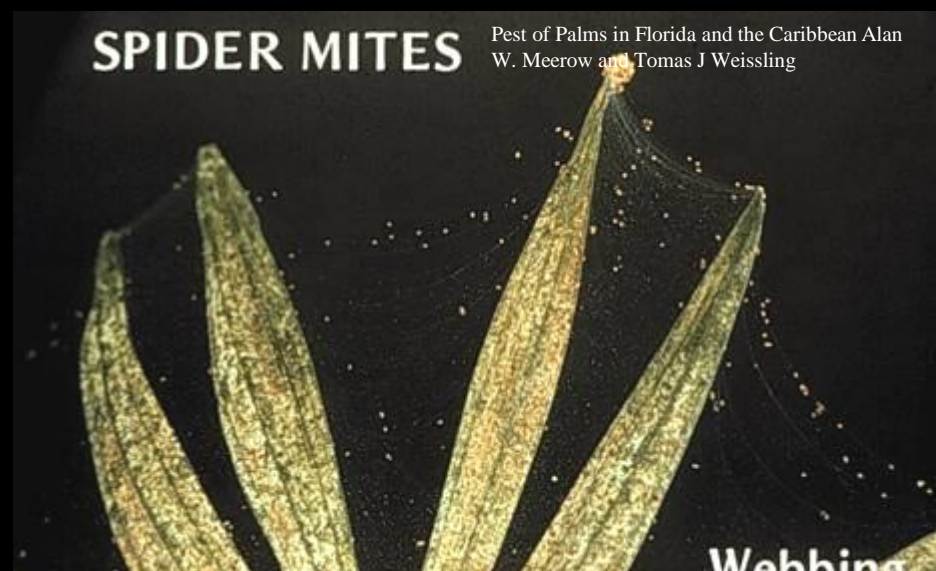
■ CONTROL:

■ PREDATORY MITE, *PHYTOSEIULES PERSIMILIS*, CONTROLS TWO-SPOTTED MITES (*TETRANYCHUS URTICAE*) ON PALMS IN GREENHOUSES AND INTERIORSCAPES

■ CHEMICAL MITICIDES



Pest of Palms in Florida and the Caribbean Alan W. Meerow and Tomas J Weissling



SPIDER MITES

Pest of Palms in Florida and the Caribbean Alan W. Meerow and Tomas J Weissling

Webbing

SCALES

(INTERIOR PALMS)

SCALES ON PALM LEAVES:

 **THREAD SCALE**

 **MAGNOLIA WHITE SCALE**

 **COCONUT SCALE**

 **FLORIDA RED SCALE**

 **ORIENTAL SCALE**







Pest of Palms in Florida and the Caribbean Alan W. Meerow and Tomas J Weissling
Magnolia white scale



Pest of Palms in Florida and the Caribbean Alan W. Meerow and Tomas J Weissling

Thread Scale

SCALES

-  **MOST SEVERE IN GREENHOUSE PRODUCTION AND INTERIORSCAPES, BUT COMMON IN THE LANDSCAPE AS WELL.**
-  **CONTROL: HARD SHELL OF SCALES AND THEIR UNIQUE BIOLOGY REDUCES EFFECTIVENESS OF MANY CHEMICALS**
 -  **MERIT OR MARATHON WORKS SYSTEMICALLY ON SOME SPECIES**
 -  **INSECT PREDATORS AND PARASITOIDS VERY EFFECTIVE ON SOME SPECIES IN SOME SITUATIONS**

SCALE ON SERENOA REPENS FLORIDA OUTSIDE



Giant Palm Borer



10/24/2017

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LARGE HAIRY FLORIDA PALM BOAR

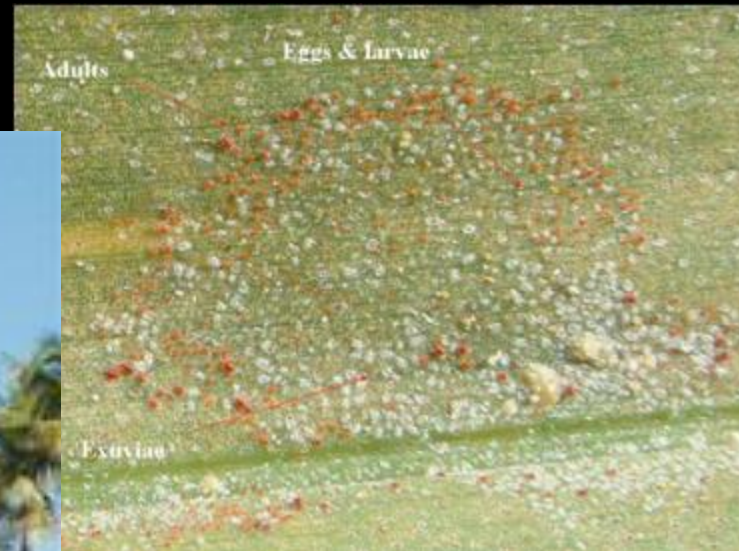


PALM LEAF CATERPILLAR



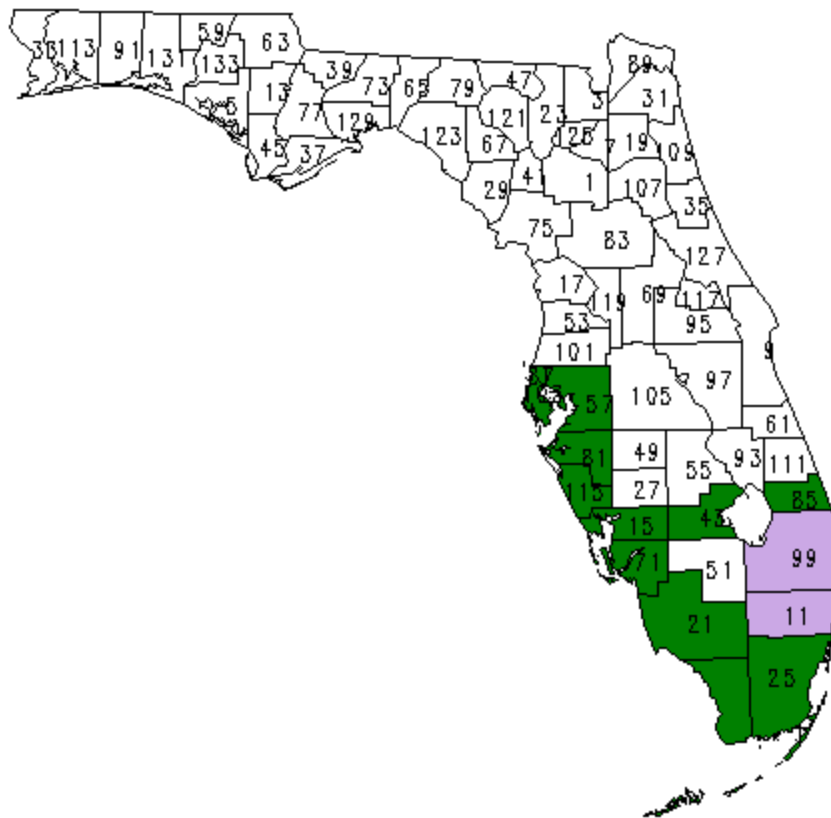
PHOTO BY JEFF KNIGHT

Red Palm Mite (*Raoiella indica*)



Reported Status of
Red Palm Mite , *Raoiella indica*
 in FLORIDA

Data retrieved from National Agricultural Pest Information System on 06/03/2008



The Center for Environmental and Regulatory Information Systems does not certify the accuracy or completeness of the map.
 Negative data spans over last 3 years only.

Myndus crudus

a planthopper

lethal yellowing of palm

Nevada has a quarantine for lethal
yellowing



RED PALM WEEVIL

FOUND IN CALIFORNIA IN 2010

(ESTIMATED \$70 MILLION PALM TREE AND \$30 MILLION DAT PALM INDUSTRIES ARE THREATEN)



Happening inside



Females bore into the tissue to form a hole in which to lay their eggs. The light-yellow eggs (approx. 2.5 mm long) are laid close to the surface of the incision or wound.



On average, females are capable of laying 250 eggs which take three days to hatch.



When hatched, the whitish-yellow young larvae feed on the surrounding tissue. As the larvae feed, they produce frass (chewed up plant fibre) which combines with the plant sap.



On young, growing date palms, the weevils take shelter under the splitting bark and lay eggs within the newly emerging roots. Several are laid together and then the hole is cemented over to protect the eggs.





NEW PALM HOSTS FOR THE RED PALM WEEVIL FOUND IN SICILY



1. ARECA CATECHU
2. ARENGA PINNATA
3. CARYOTA MAXIMA
4. C. URENS
5. COCOS NUCIFERA
6. CORYPHA UTAN
7. C. UMBRACULIFERA
8. ELAEIS GUINEENSIS
9. LIVISTONA DECIPIENS
10. METROXYLON SAGU
11. PHOENIX CANARIENSIS
12. P. DACTYLIFERA
13. P. SYLVESTRIS
14. ROYSTONEA REGIA
15. SABAL UMBRACULIFERA
16. TRACHYCARPUS FORTUNEI
17. WASHINGTONIA SP.

GROWN IN SOUTHERN NEVADA

RED PALM WEEVIL

- **CAN HAVE 8 OR MORE GENERATIONS PER YEAR**
- **EACH FEMALE CAN LAY 50 TO 500 EGGS**
- **THE ENTIRE LIFE CYCLE IS FROM 45 TO 140 DAYS**
- **PUPAE DEVELOP INSIDE THE TRUNK OR AT THE BASE OF THE FRONDS**
- **ADULT WEEVILS ARE STRONG FLIERS. THEY CAN FLY .5 MILES AT A TIME AND UP TO 4 MILES IN 3 DAYS**
- **PALMS CAN HAVE SO MANY WEEVILS IN THEM THAT THE CHEWING CAN BE HEARD**
- **THEY CAN DESTROY AN ENTIRE PALM**

RED PALM WEEVIL MANAGEMENT

- **BUCKET TRAPS WITH AGGREGATION** (MALE SEX HORMONES THAT ATTRACT BOTH SEXES) **PHEROMONES** (IN INDIA MASS TRAPPING HAS LED TO A 70-100% REDUCTION IN THE NUMBER OF DEAD PALMS)
- **SANITATION SUCH AS CHIPPING INFESTED PALMS INTO SMALL PIECES TO KILL THE LARVA AND ADULT WEEVILS**
- **ANNUAL DRENCHING OF ROOTS WITH NEEM OIL CONTAINING 5% AZADIRACHTIN * GAVE A 75% RECOVERY AND 90% REDUCTION IN THE NUMBER OF DEAD PALMS**

*** FOUND NATURALLY IN NEEM SEEDS AT .2 TO .8%**

PALM WEEVIL AND BORE TRAP



**BAIT TRAPS WITH DATE
FRUIT OR PHEROMONES**

Carpenter Bees

Xylocopa sp.



SLIDE BY JEFF KNIGHT NEVADA STATE ENTOMOLOGIST

Webspinners

Embioptera



BARK SCORPIONS AND PALMS

BARK SCORPION



Don't Take a Liability Risk... Hire a Licensed Professional

MEXICAN FAN PALMS

PROFESSIONALLY PRUNED

Licensed 
Insured  \$500,000

Workman Comp on Every Employee

Free Estimates From Your Smart Phone



Is your HOA requiring your palms to be trimmed?? Give us a Call!

Most Palms \$35

Depending on height & amount of growth



PALM FLOWERS NEED TO BE TRIMMED BEFORE THEY BLOW INTO SWIMMING POOLS



LAS VEGAS BARK SCORPION

They love palm trees - keep them trimmed. Scorpions breed in dead dry matted down fronds.

Another Reason to Keep Your Fronds Pruned



FALLING SEEDS SIMPLY A MESS

Most Mexican Fan Palms Pruned \$35.00

Price includes hauling debris away, and leaving area clean....!

Depending on height & amount of growth

Reasons to trim your Fan Palms:

- Excellent Place for Pests to hide
- Dry Fronds - **Extreme Fire Hazard**
- Dead Fronds can fall at anytime, and injury somebody
- The seeds and flowers simply make a mess!
- Email us a photo of your Palms, and we'll give you a **FREE** estimate online

We also do Skinning at extra charge

Simply take a picture of your Palms you need pruned. Send me the photo with a little explanation of what your looking to have done, and I will respond back to your with a very close estimate. Our estimate includes hauling debris away, and leaving area clean.

RATS AND SQUIRRELS



GIANT RATS AND SQUIRRELS?????



THE PALM BEETLE





CLOSE UP OF DYING PALM

10/24/2017



LIGHTNING

PALM AFTER 6 MONTHS



GROVE OF PALMS STRUCK BY LIGHTNING 2 WEEKS LATER





LIGHTNING



10/24/2017



PROBLEMS

?



BRAHEA ARMATA



A close-up photograph of a fan palm frond. The central rachis is visible, with numerous long, narrow, radiating leaflets extending outwards. The leaflets are a vibrant green color and have a slightly waxy texture. The background is dark and out of focus, highlighting the intricate structure of the palm frond.

CHAMAEROPS HUMILIS

A close-up photograph of the fronds of a palm tree, showing the intricate texture and overlapping structure of the leaves. The fronds are dark green and have a distinct ribbed appearance. The lighting creates highlights and shadows, emphasizing the three-dimensional quality of the plant's structure.

CHAMAEROPS HUMILIS



WASHINGTONIA

WHAT IS THE PROBLEM?



WHAT IS THE PROBLEM?



BIRDS

PHOENIX ROEBELENI FASCIATED



10/24/2017



APICAL BUD DAMAGE

PHOTO BY JACK
KELLY UA
EXTENSION

SUN BURN



**MOVED FROM
DEEP SHADE TO
PARTIAL SHADE**

10/24/2017



SOMETIMES THE PALM IS JUST DEAD



THE CROWN OF A PALM CAN REMAIN
ALIVE FOR SEVERAL YEARS AFTER
THE DEATH OF THE ROOTS AND STEM

10/24/2017

DON'T STAIN TRUNKS



WHAT IS WRONG HERE?

NUTRIENT DEFICIENCY?
HERBICIDE DAMAGE ?



BIRTHING LEAVES

10/24/2017

BIRTHING LEAVES



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SYMPTOMS OF DROUGHT AND THEN OVER WATERING IN PALMS

SPLITTING AND COLLAPSING OF THE TRUNK



CAR BLIGHT



10/24/2017

**WASHINGTONIA BUD DAMAGE BORON?
CHEMICAL DAMAGE?
MECHANICAL DAMAGE ?**



**PROBABLY THE TRUNK CUT OFF
IN COOL WEATHER AND BORON?**

10/24/2017

TRUNK EROSION OF THE PSEUDO-BARK OR CORTEX



TRUNK EROSION OR THE PSEUDO-BARK OR CORTEX



THERE ARE MANY REASONS POSSIBLE FOR TRUNK EROSION, COLD DAMAGE, MECHANICAL DAMAGE AND AGE MAY BE FACTORS.

THIS CONDITION DOES NOT SEEM TO HARM THE PALM

SPLITTING OR FLARING OF THE CORTEX AND TRUNK



SPLITTING OR FLARING OF BARK (CORTEX) OCCURS WHEN ARRESTED ROOTS FORM ABOVE THE GROUND. THIS IS A NORMAL PROCESS.

INVERTED ROOT CONE

- CAUSED BY
- PLANTING TOO HIGH
- WEED EATER TRIMMERS

SOLUTION

- MULCH OR ADD SOIL TO ENCOURAGE ARRESTED ROOTS TO GROW



WEED EATER DAMAGE



INVERTED ROOT CONE

WEED EATER DAMAGE



LEAF THREADS

**IN SOME PINNATE PALMS
LEAF THREADS ARE GREEN
AND ARE FOUND AT THE ENDS
OF THE LEAF.**

**IN WASHINGTONIA PALMS
THERE ARE BROWN THREADS
ON THE LEAF AS WELL AS AT
THE ENDS OF THE LEAF.**

**IT IS WHERE THE SPECIES NAME
FILIFERA IS DERIVED FROM,
MEANING THREAD LIKE.**

10/24/2017



A silhouette of a person climbing a ladder against a palm tree with the sun shining through the branches.

PRUNING

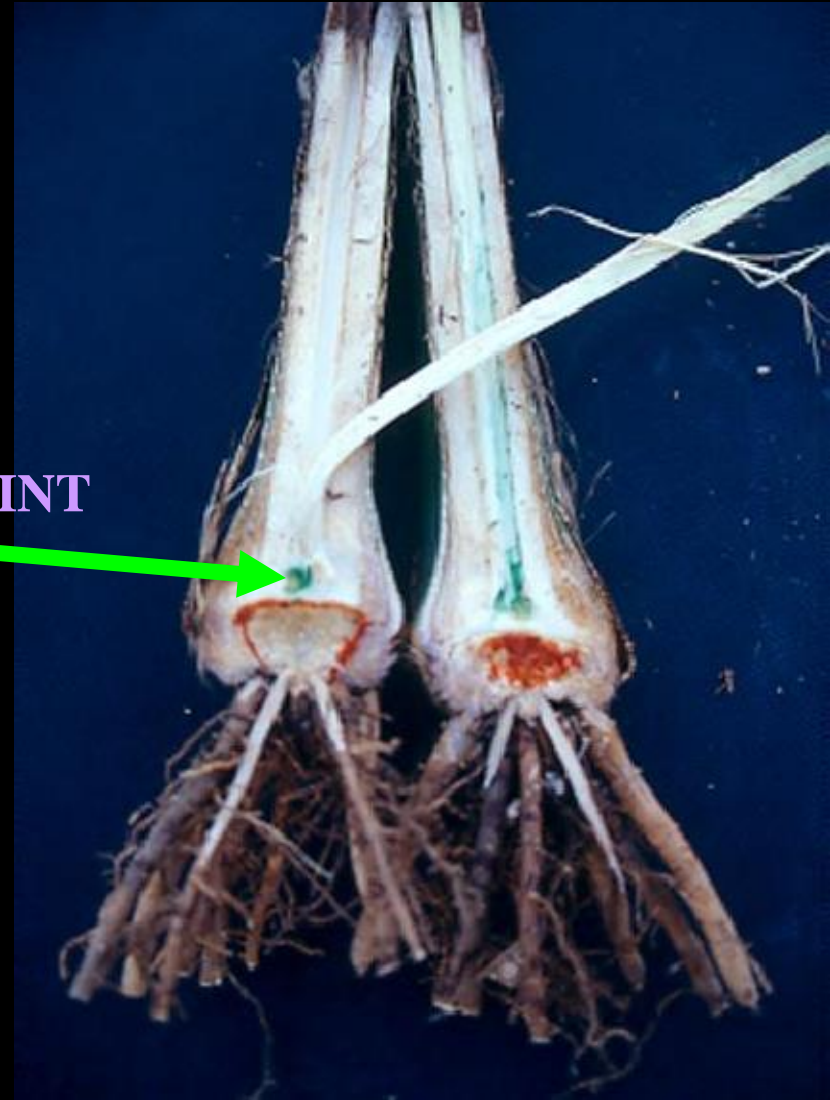
10/24/2017

1980 Clearwater Beach Florida Ozell Chisholm Prune Palm Trees \$(KGrHqJ,!q!E8WqKwsIMBPREpCv2bw





PRUNING PALMS

■ HOW PALMS GROW

GROWING POINT



PALM LEAVES/ FRONDS

-  **PALMS CAN HAVE LESS THAN 12 LEAVES THAT LIVE UP TO 18 YEARS**
-  **CHAMAEROPS HAVE 35 LEAVES THAT LIVE 3 + YEARS**
-  **PHOENIX CANARIENSIS HAVE UP TO 60+ LEAVES THAT LIVE 1-5 YEARS**
-  **WASHINGTONIA HAVE 30 TO 40 LEAVES THAT LIVE 3+ YEARS**

OVER PRUNING PALMS



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OVER PRUNING PALMS



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EXTREME OVER PRUNING OF PALMS



**CUT AT 12 INCHES
AT 4 HOURS**



**CUT AT 12 INCHES
AT 48 HOURS**

**CUT AT 12 INCHES
AT 3 WEEKS OVER
1 METER TALL**





CLOSE UP

10/24/2017



11 NEW LEAVES

**CUT AT 12 INCHES
AT 8 WEEKS OVER
2 METERS TALL**

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**RE-GROWTH OF
TERMINAL BUD
AND FLOWER
STALKS ONE
DAY AND ONE
WEEK AFTER
TRUNK WAS
CUT OFF**

**RE-GROWTH OF TERMINAL
BUD ON SABAL PALMS IF
THE BUD IS NOT KILLED**



**BE CAREFUL OF WHAT
MAY BE IN YOUR PALM
TREES ALWAYS LOOK
BEFORE YOU CLIMB**



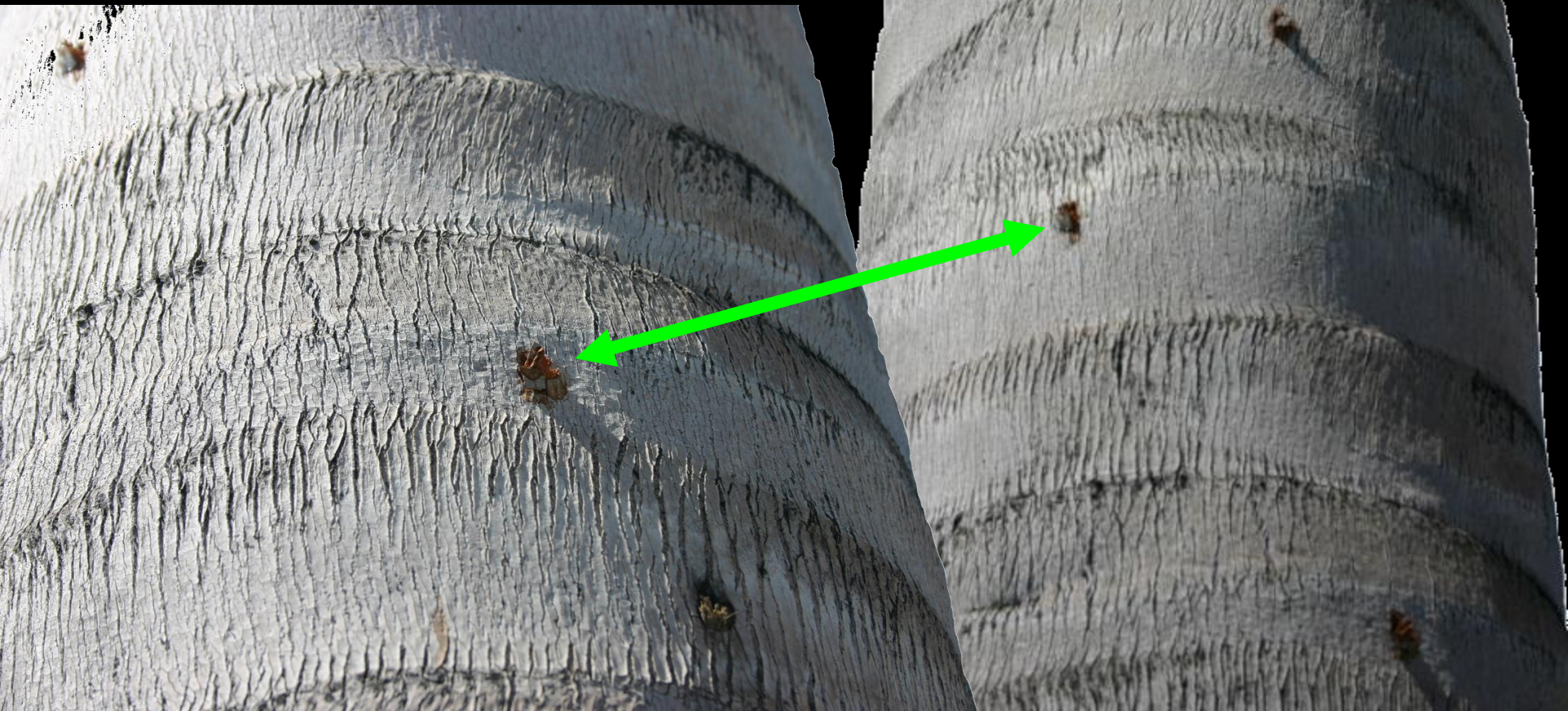
IMPROPER PRUNING METHODS

REMOVING GREEN
FRONDS

CLIMBING
SPIKES



CLIMBING SPIKE HOLES STAY FOREVER



**FOR TALL PALMS
THE USE OF A
CHERRY PICKER
OR HYDRAULIC
LIFT IS THE
SAFEST FOR THE
PERSON AS WELL
AS THE PALM**



**FOR TALL PALMS THE
USE OF A CHERRY
PICKER OR
HYDRAULIC LIFT IS
THE SAFEST FOR THE
PERSON AS WELL AS
THE PALM**

10/24/2017



**REMOVE ONLY DEAD
FRONDS AND GREEN
FRUIT**



NEW RESEARCH !

RESEARCH FROM THE UNIVERSITY OF FLORIDA AND THE UNIVERSITY OF CALIFORNIA SUGGESTS THAT ONLY DEAD LEAVES (FRONDS) OF PALMS SHOULD BE REMOVED TO PREVENT THE SPREAD OF DISEASE BY SAWS ESPECIALLY CHAINSAWS THAT ARE DIFFICULT TO STERILIZE

NEW RESEARCH !



TO CORRECT NUTRITIONAL DEFICIENCIES SUCH AS K OR Mg DEFICIENCY, RATHER THAN REMOVING OLDER DEFICIENT LEAVES.



REMOVAL OF THESE DEFICIENT LEAVES CAN LEAD TO PREMATURE DEATH FROM DEFICIENCIES



ONLY REMOVE DEAD (BROWN) FRONDS

PRUNING PALMS

**AN UN-PRUNED 8 YEAR OLD
TRACHYCARPUS PALM
THIS PALM IS HEALTHY AND
GROWING WELL WITH
MINIMAL CARE**






**RESEARCH HAS SHOWN
THAT REMOVAL OF ALL
LEAVES 4 TIMES A YEAR
OVER SEVERAL YEARS ▲
COULD RESULT IN DEATH
OF TRACHYCARPUS PALMS
AND REDUCED LEAF SIZE
ON WASHINGTONIAS**

10/24/2017









PALM PRUNING IT IS EASY

PRUNE

-  **DEAD, DYING, AND DISEASED LEAVES OFF.**
-  **LEAVES THAT MAYBE A HAZARD VISUALLY (DRIVEWAYS) STRUCTURALLY (TOO CLOSE TO A BUILDING**
-  **ARMAMENT ON LEAF PETIOLES CAN BE REMOVED IF THEY POSE A HAZARD (SUCH AS PHOENIX AND LIVISTONA)**
-  **COLD DAMAGED LEAVES AFTER ALL DANGER OF COLD IS PASSED**
-  **INFLORESCENCES AND INFRUCTESCENCES WITHOUT HARMING OR REMOVING GREEN LEAVES (IF IT WILL BECOME OR ARE A HAZARD)**

PALM PRUNING IT IS EASY

-  **ALWAYS PRACTICE TREE SAFETY INCLUDING NOT WORKING ALONG**
-  **DON'T SKIN PALMS**
-  **UNLESS YOU ARE TAKING A PALM DOWN DON'T USE A CHAIN SAW**
-  **DON'T USE CLIMBING SPIKES**
-  **CLEAN AND STERILIZE ALL SAWS AND OTHER TOOLS BETWEEN PALMS**
-  **NEVER REMOVE MORE THAN 25% OF GREEN LEAVES**

PRUNING PALMS



REMOVING ONLY
BROWN FRONDS
HELPS PREVENT
DISEASE
CONTAMINATION



CORRECTLY PRUNED

10/24/2017

INCORRECTLY PRUNED⁹¹

HOW TO DETERMINE MATURE FRONDS

CROWNSHAFT PALM



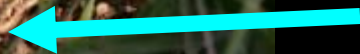
THIS YEAR'S FLOWERS

LAST YEAR'S BLOOM AND FRUIT

MATURE LEAVES



MATURE LEAVES



HOW TO DETERMINE MATURE FRONDS

MATURE FRONDS



THIS YEAR'S FRUIT





10/24/2017

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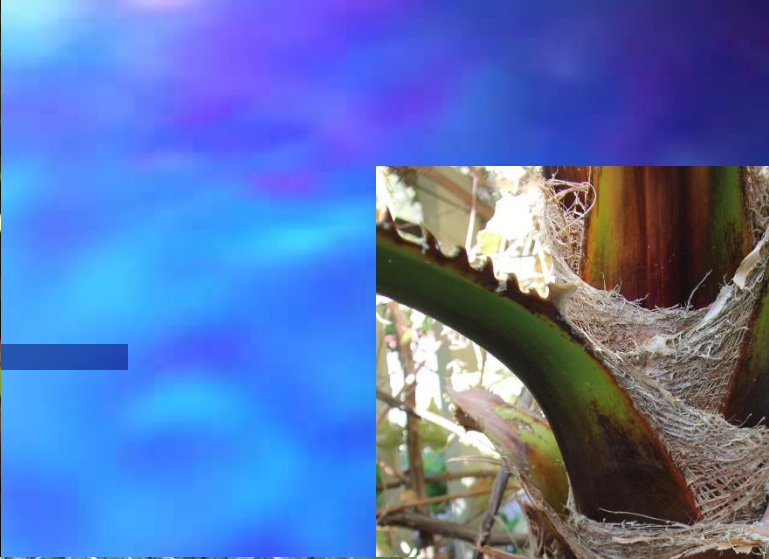


WASHINGTONIAS CAN PRODUCE MANY BLOOM STALKS, THEY CAN BE DECORATIVE WHEN BLOOMING BUT WILL PRODUCE THOUSANDS OF SEEDS THAT WILL LATER GROW AS WEEDS IN THE LANDSCAPE



PRUNE FRUIT AND FLOWER STALKS OFF AND WITHOUT DAMAGING OR REMOVING THE GREEN LEAVES.





10/24/2017



USE A LADDER ON SHORTER TREES ALWAYS WORK WITH A PARTNER



**CORRECT PRUNING
TAKING ONLY
DEAD/DYING FRONDS
AND BLOOM SPIKES**

10/24/2017



**SECURE LADDER TO THE
TREE AND THE SAW TO A
ROPE**

A WELL CARED FOR AND
CORRECTLY PRUNED PALM
WILL HAVE A FULL CIRCLE
OF GREEN LIVE FRONDS,
A BROWN SKIRT IS
ACCEPTABLE BUT NOT
REQUIRED



PRUNING PALMS

A HEALTHY DATE WILL HAVE
OVER 120 GREEN FRONDS

SOME WILL BE 4 TO 6+ YEARS
OLD



**MATURE GREEN
FRONDS
SUPPORT
YOUNGER
FRONDS AND
PRODUCE FOOD
FOR THE PALM**


WIND DAMAGE

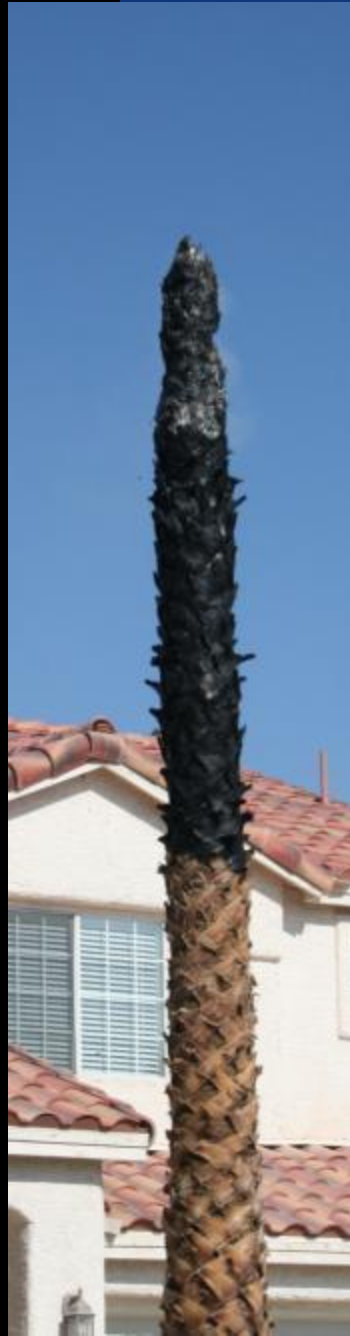


MEDITERRANEAN FAN PALM IN ITS NATURAL UN-PRUNED STATE



TONY@PALMKERNELS TX.

 **IN URBAN AREAS,
DEAD LEAVES
SHOULD BE
PRUNED OFF AS
THEY COULD
CAUSE FIRE OR
WIND DAMAGE TO
BUILDINGS OR
HARBOR PESTS**



10/24/2017

**THESE PALMS WITH
DEAD BROWN
FRONDS ARE A
POTENTIAL FIRE
HAZARD**



10/24/2017



WASHINGTONIA

10/24/2017



**PHOENIX SPP
BRUSH FIRE**

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TOO CLOSE TO BUILDINGS

TOO CLOSE TO THE WALK AND HOUSE



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**OVER PRUNING CAN
LEAD TO PENCIL
NECKING OR THE
NARROWING OF THE
TRUNK**

**OVER PRUNING MAY
NOT CAUSE NUTRIENT
DEFICIENCY BUT IT
CAN ACCELERATE IT**

10/24/2017

TIM BROSCAT 1994



OVER PRUNING





**FRONDS FROM 12
OVER PRUNED PALMS
WITH 50% TO 75% OF
LEAVES REMOVED**

**CORRECTLY PRUNED
PALMS WILL HAVE 50
GREEN LEAVES**

**MORE WASTE
FOR THE
LANDFILL**

10/24/2017





10/24/2017

PRUNING PALMS

REMOVE FRUIT TO

-  PREVENT MESSSES
-  KEEP PESTS AWAY
-  STOP SEEDLINGS FROM GROWING UNDER MOTHER TREES





PRUNING PALMS

**SEEDLING PALMS
BECOME WEEDS IN
THE LANDSCAPE**

DROPPING OF DEAD LEAVES

RESEARCH IN FLORIDA SHOWS
THAT THIS MAY BEGIN WHEN PALMS
ARE 5 TO 10 YEARS OLD, *IN THE WEST*
THEY MAY HANG ON FOR 50 YEARS OR
LONGER.



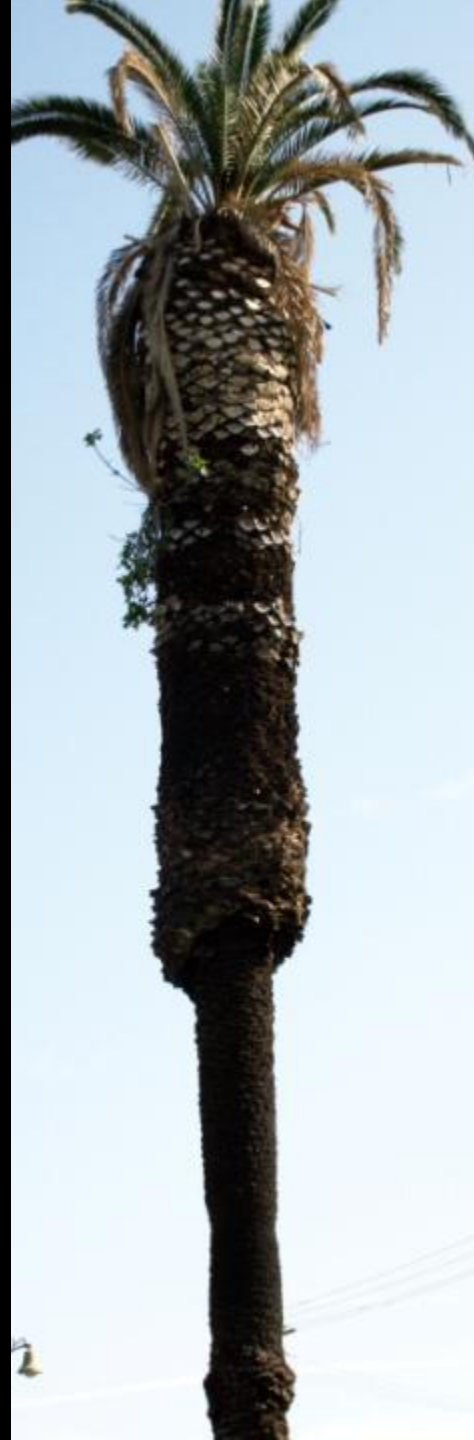
**SHEDDING
OF OLD
BOOTS
NO RHYME
OR REASON**



**SHEDDING OF OLD
BOOTS NO RHYME
OR REASON**







SKINNING PALMS WHY?



SKINNING ADDS TO YARD WASTE IT EXPOSES THE TRUNK PREMATURELY TO COLD, HEAT AND DRYNESS



10/24/2011

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OVER SKINNING

REMOVING
TRUNK TISSUE



10/24/2017

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OVER SKINNING

REMOVING
TRUNK TISSUE



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THERE ARE ANECDOTAL REPORTS THAT OVER TRIMMED PALMS FARE MORE POORLY IN FREEZES THAN PROPERLY TRIMMED PALMS.

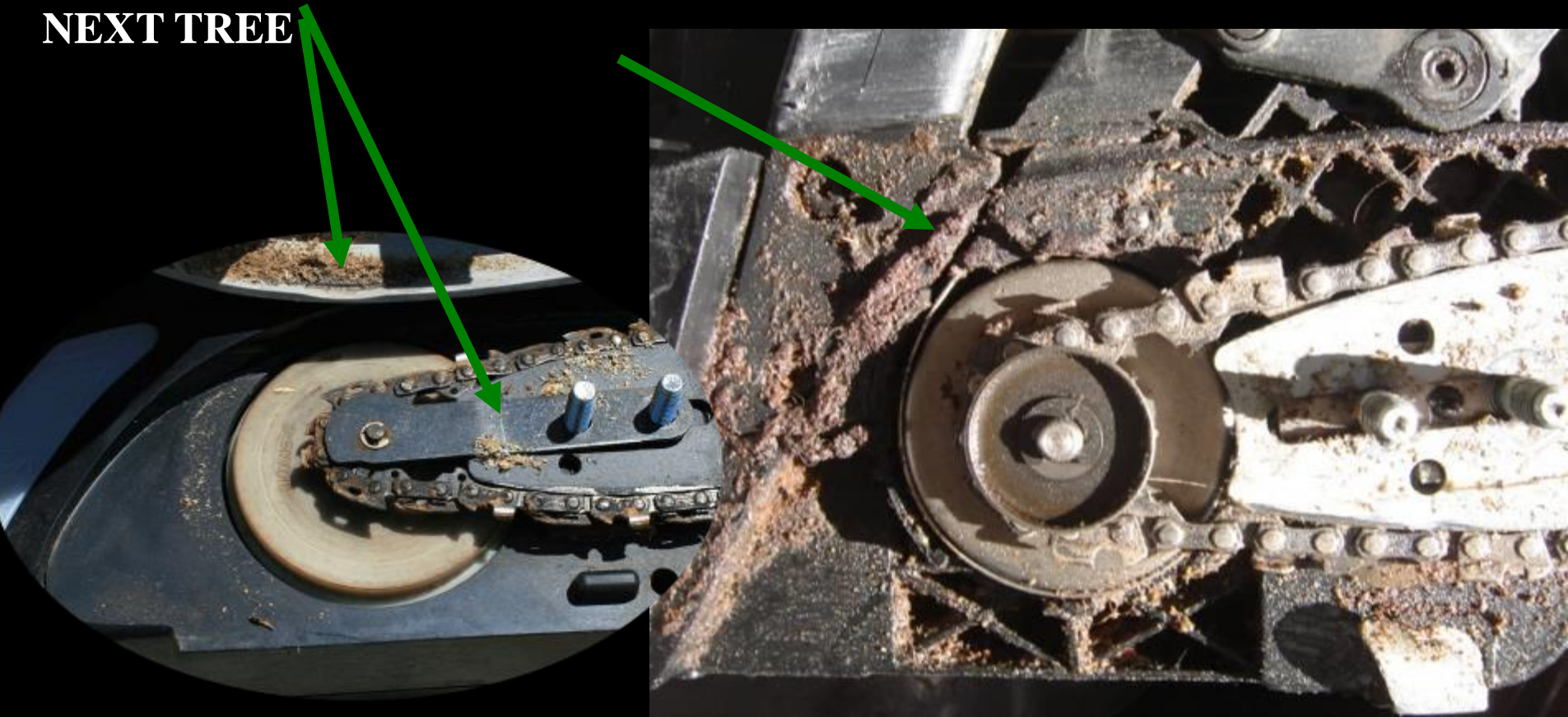
SABAL PALMS, WITH BOOTS (PETIOLES) LEFT ON TEND TO BE SLIGHTLY MORE COLD HARDY THAN THOSE THAT HAVE BEEN SKINNED.

PRUNING OFFSHOOTS OPENS THE PALM TO DISEASE ORGANISMS



PRUNING PALMS

**PART OF THE PALM FIBER
STAYS INSIDE THE SAW AND
MAY CONTAMINATE THE
NEXT TREE**



PRUNING PALMS

■ DON'T USE A CHAINSAW

- CHAINSAWS ARE DIFFICULT AND TIME CONSUMING TO CLEAN
- THEY MUST BE CLEANED AFTER EACH PALM IS TRIMMED
- A HAND SAW OR RECIPROCATING SAWS ARE BETTER



10/24/2017

PRUNING PALMS

HANSAWS



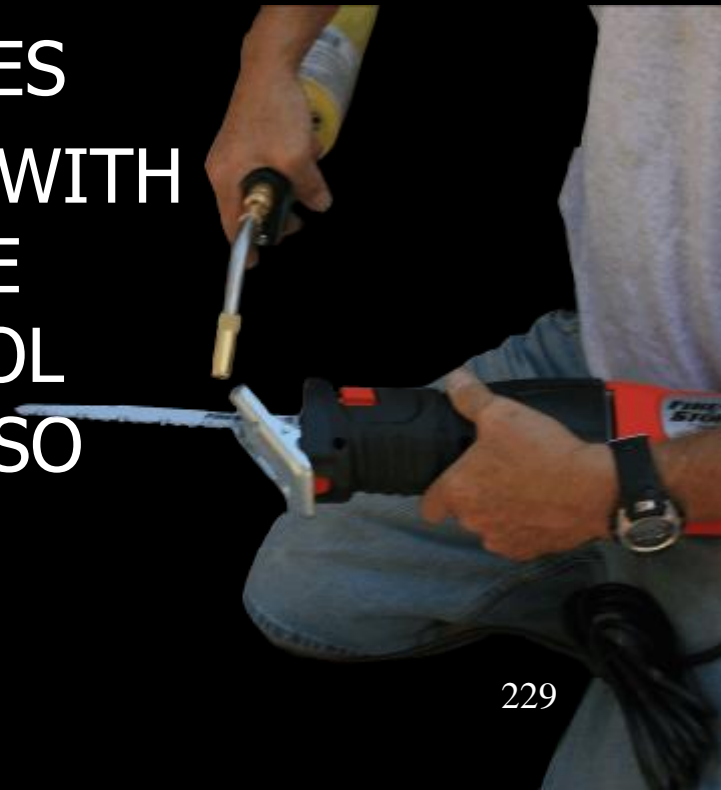
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PRUNING PALMS



- ALWAYS STERILIZE OR CHANGE BLADES BETWEEN PRUNING TREES
- THE BEST WAY TO STERILIZE IS WITH A FLAME, HOWEVER A 10 MINUTE SOAK IN A CHLORINE OR PINE SOL SOLUTION IS RECOMMENDED ALSO



PRUNING PALMS



SAFETY MATTERS

Palm Safety, Part I

By Richard W. Magargal

As a 45-year veteran climber with virtually thousands of palms trimmed or removed during my career, it is my intention to provide information to assist and inform climbers and owners in the landscape and tree-trimming industry. My goal is to describe what can happen during the process of palm trimming or removal, including the danger of death, and provide information on alternatives and safety that will save lives.

This article pertains to the two fan palm species known as Mexican fan palm and California fan palm. The two are similar in appearance, however the Mexican fan palm grows taller and is the more common tree in the southern California and Arizona locations, where most accidents occur. The California fan palm is generally not as tall and has a thicker trunk. The two palms mentioned do cross-pollinate, so variations in size do occur.

TWO CASES IN POINT

In a recent *Los Angeles Times* story Sam Quinones provides a brief history of a young man in Los Angeles County who was able to start a landscape maintenance business. As frequently happens, he was called upon to trim palms as a routine part of his work. During the trimming of his fourth or fifth palm in his brief tree maintenance career, the young man was suffocated beneath a skirt of dead fronds.

In October 2006 in San Diego County an uncertified and unlicensed climber was approximately 50 feet from the ground working on a Mexican fan palm about 70 feet tall. At the same job he had already completed two other palms of the

previous trees. Without warning and likely within five minutes the climber was suffocated to death beneath approximately 10-12 feet of loose fronds. Fire department rescue attempts took about 40 minutes to complete requiring the use of a ladder company. Local newspaper accounts stated the deceased climber had 15 years experience!

OSHA STATISTICS

Statistics published by John Ball, a South Dakota State University professor show that nationally, "tree workers have a fatality rate three to four times that of police officers and firefighters."

The following Cal/OSHA statewide statistics appeared in the *Los Angeles Times* story:

- Since 1990 there have been 394 tree-work accidents, including 67 deaths.
- More than half of those accidents (214) have happened since 2000, including 42 deaths.
- Fourteen of the 67 deaths occurred in palm trees, 11 of them since 2002.

These are California statistics only. Additionally it is assumed due to the nature of the industry that many accidents are not reported. Therefore, the true numbers of accidents and possibly even deaths could be much higher.

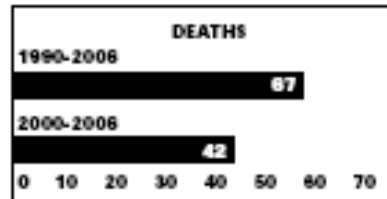
RECOMMENDATIONS

I offer the following guidelines with regard to palms in an attempt to curb the escalating death and accident rate in this industry:

Awareness of sloughing, I believe there is a lack of knowledge with regard to the phenomenon known as "sloughing"



fronds to come loose, remain near the trunk unattached but woven together in a skirt. When the skirt drops nothing can survive beneath it. This fact is frequently unnoticed by the untrained arborist and even an arborist with experience in palms might not notice the potential of sloughing. Usually if a palm is going to slough off it may occur as low as 25-30 feet from the ground.



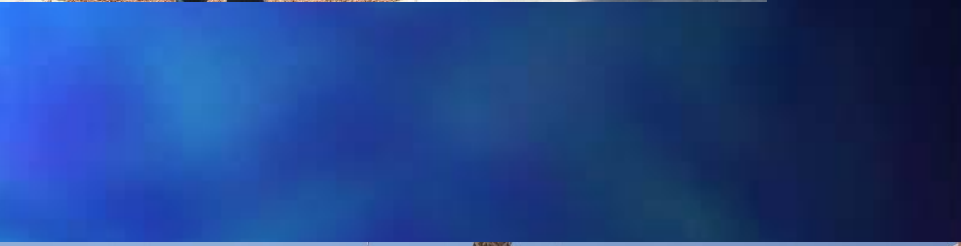
Rescue workers recover the body of a climber who was suffocated beneath a palm tree skirt. Photo courtesy: W. "Blue" Hunt

I was rescued from a height of about 30 feet in the 1970s and I performed a rescue of a climber at about 55 feet a few years ago. In each case it was determined there existed a strong possibility that sloughing would occur. In both cases, someone qualified was ready to perform the rescue immediately. Suffocation is generally the cause of death, so minutes count.

This does not mean that a climber should feel safe to attempt to trim a palm simply because someone is willing to perform a rescue. Aerial rescue in palms requires extensive training and if a large amount of fronds have sloughed onto the climber it is not possible to remove them soon enough to save the life of the victim.

New approaches are being applied to palm trimming and if they are utilized, we can virtually eliminate injury and death from trimming and removing palms. These newer systems, used to obtain access to the tops of palms without being under the fronds, need to be demonstrated via seminars or onsite training. Possibly a video, well done, would be adequate. Obviously the best and safest approach to palm trimming is by the use of aerial equipment (i.e. tower trucks or cranes, etc).

Pride. Many of us in the industry







**ALWAYS
LOOK
BEFORE
PRUNING**



10/24/2017

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Tree Climbing Equipment - \$200 (Las Vegas, NV)

Tree climbing equipment in excellent condition. Safety belt, Safety Lanyard, and spikes for both feet. Everything you would need to get started with a palm tree cutting business. Paid \$750 new, asking \$200. Call



**MORE
TRUNK
DAMAGE**



10/24/2017

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MORE TRUNK DAMAGE



10/24/2017

STAKING PALMS

**WHY STAKE A
PALM?**



FROM THE RJ LAS VEGAS
NV.

STAKING PALMS

**NEVER DRIVE NAILS
INTO THE TRUNKS
OF PALMS**



STAKING PALMS IN LAS VEGAS



**NEVER DRIVE NAILS
INTO THE TRUNKS
OF PALMS**

10/24/2017

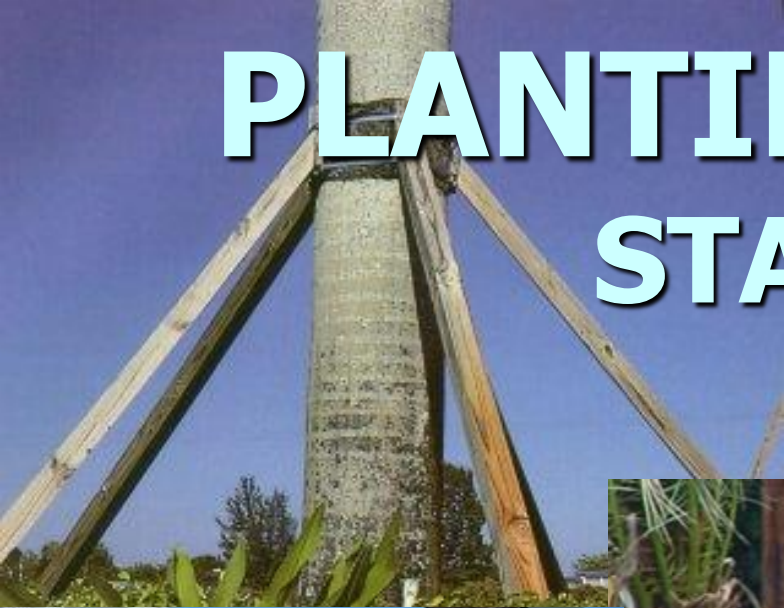
STAKE ONLY SO THE NAILS DO NOT GO INTO THE TRUNK



**NEVER PLANT TOO DEEP TO
AVOID STAKING A PALM**



PLANTING PALMS STAKING





OASIS PALM ANCHOR SYSTEM

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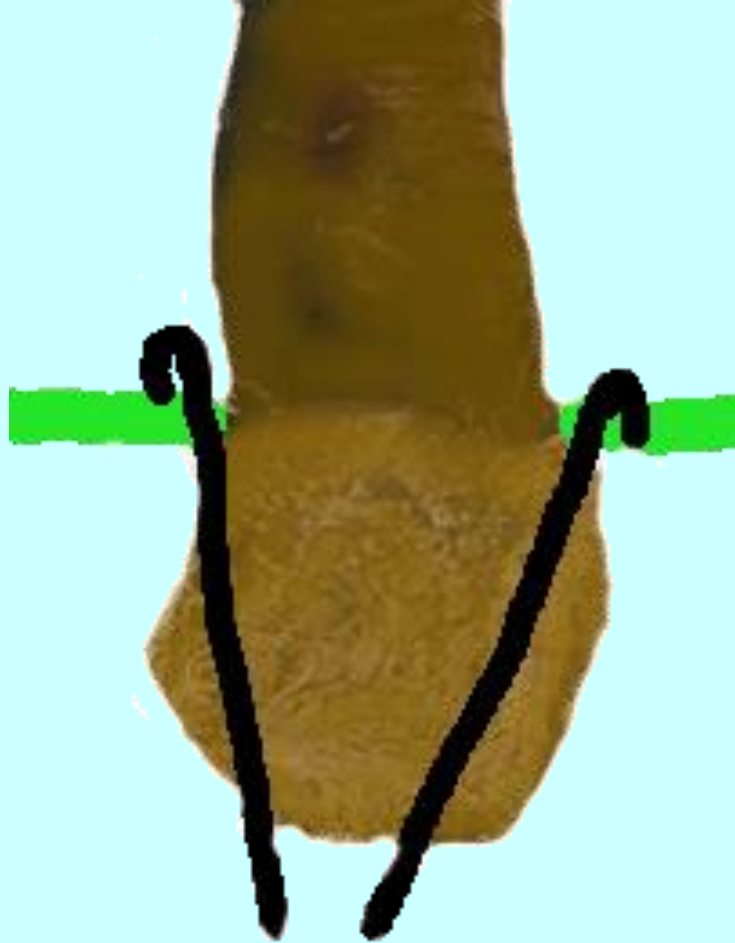




**DECORATIVE
STAKING**



USING REBAR TO STAKE ROOT BALL IN NARROW AREAS



STAKING WITH PLASTIC TAPE

PLASTIC
TAPE



OVER TYING PALMS



10/24/2017

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COLD PROTECTION



10/24

cold protection heating palms in a freeze in 1963 Heaters Scaffolding Save Palm Trees Freezing Belleaire Florida \$(KGrHqVHJDME8f8ym5WRBPnc!bvKow-



PALMS AND COLD

SOME FACTORS TO CONSIDER


 MATURITY AND ESTABLISHMENT OF THE PALM

 HEALTH OF THE PALM

 GENETIC MAKE-UP WHERE DID THE SEED COME FROM?

 WHERE WAS IT GROWN?

 DURATION OF THE COLD

 LONG COOL (33 TO 40) PERIODS CAN CAUSE MORE DAMAGE TO SOME PALMS THAN SHORT COLD AND FREEZING TEMPERATURES (BELOW 32) PERIODS

PALMS AND COLD

- HUMIDITY**

- WAS IT WINDY?**

- PROTECTION**

IS IT GROWING IN A THE MICROCLIMATE LIKE ON THE SOUTH SIDE OF A BUILDING

IS THERE AN OVER HANG OF A BUILDING OR TREE

ARTIFICIAL WRAPS AND COVERINGS

- SOIL MAKE-UP HEAVY OR LIGHT?**

- WAS THE SOIL WELL WATERED OR DRY?**

PALM COLD HARDINESS COMPARISONS

Scientific name	Common Name	Min. Temp. (Cold Hardy Palm Web Site)	Min Temp. California (Southern California Palm Society)	Min. Temp. Florida (Green Escapes palm nursery)	Min Temp Texas (Horticultural Consultants)
<i>Acoelorrhaphe wrightii</i>	Everglades palm	16F	20 F	15 F	
<i>Acrocomia totai</i>		12F		11-16 F	18F
<i>Allagoptera arenaria</i>	Seaside palm		25F		14-18F
<i>Arenga engleri</i>	Sugar palm	15F	20F	15-18 F	23F
<i>Bismarckia nobilis</i>	Bismark palm	22F		22 F	
<i>Brahea armata</i>	Mexican Blue palm	10F	15	10 F	14F
<i>Butia capitata</i>	Jelly palm	8F	15F	8-10 F	10F
<i>Chamaedorea radicalis</i>	Dwarf Bamboo palm	9F	22F	9F	18F
<i>Chamaerops humilis</i>	Mediterranean palm	5F	6F	5 F	10F (Silver 6F)
<i>Copernicia alba</i>	Silver Copernicia	18F	28F	18 F	24F
<i>Dypsis decaryi</i>	Peacock palm	24F	28F	24 F	
<i>Dypsis decipiens</i>			18F	18-22 F	

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**ACTUAL SURVIVAL WILL DEPEND ON MANY FACTORS
 BEYOND TEMPERATURE**

COLD DAMAGE



FOLIAGE AND BUD DAMAGE

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8 YEARS AFTER FREEZE

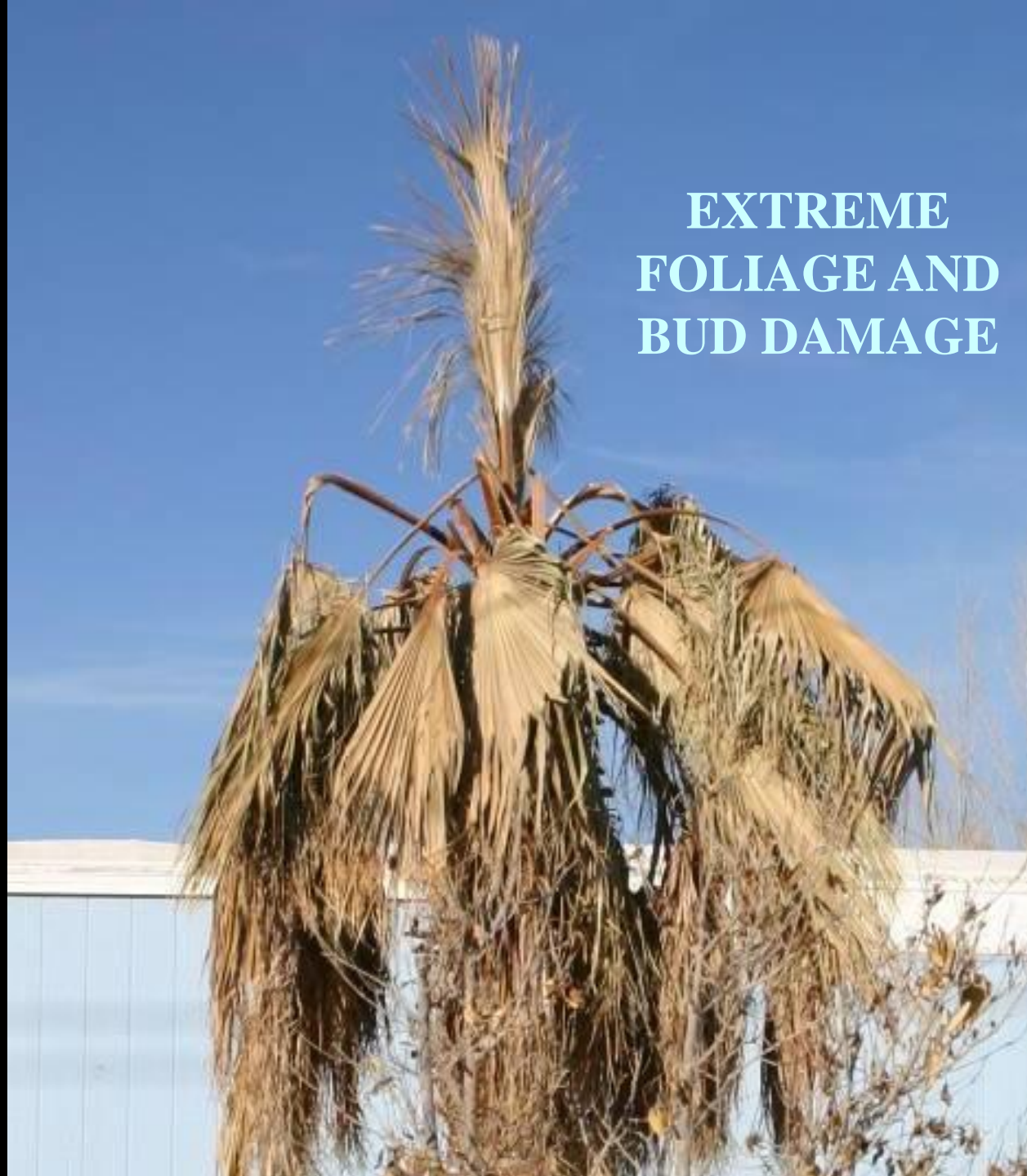


COLD DAMAGE

**DAMAGE
SYMPTOMS
WILL APPEAR
QUICKLY IN A
FEW HOURS TO
A FEW DAY**

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**EXTREME
FOLIAGE AND
BUD DAMAGE**



COLD DAMAGE



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**PROTECTED FROM
WIND**

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COLD DAMAGE 1990 LAS VEGAS NEVADA



10/24/2017

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COLD DAMAGE

**PLANT THE
RIGHT PALM**

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COLD DAMAGE BUD AND LEAVES



BUD ROTTED



**LIVE BUD
RECOVERING FROM
FREEZE DAMAGE**

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COLD DAMAGE TRUNKS



TRUNK DAMAGE

COLD DAMAGE TRUNKS



WIRE AND
CEMENT



COLD DAMAGE TRUNKS





**PULL ON THE BUD TO SEE IF IT
HAS BEEN DAMAGED BY COLD**

COLD DAMAGE



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WHAT TO DO AFTER THE COLD

1 CHECK THE BUD IS IT FIRM OR DOES IT PULL OUT

2 DRENCH THE BUD WITH A COPPER-BASED ANTI-BACTERIAL PRODUCE

3 (NO MORE THAN 2 TIMES)

4 A FUNGICIDE MAYBE HELPFUL ALSO

5 PRUNE DAMAGED LEAVES AFTER ALL COLD DANGER HAS PASSED



10/21/2017

NEW GROWTH AFTER A FREEZE

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**NEW GROWTH AFTER A FREEZE WITH
MOLD ON THE LEAVES**

MICRO CLIMATES AND COLD DAMAGE

most cold damage

More cold damage

Little cold damage



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WASHINGTONIA PALMS 3 YEARS AFTER -13 TO 15 IN ALAMOGODO NEW MEXICO



10/24/2017

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MICROCLIMATES

•A MICROCLIMATE IS AN AREA WHERE THE CLIMATE (TEMPERATURE, LIGHT, HUMIDITY, ETC.) DIFFERS FROM THE SURROUNDING AREA

IT MAY BE AS SMALL AS A FEW SQUARE FEET SUCH AS THE SOUTH SIDE OF A BUILDING OR UNDER A TREE.

IT MAY BE AS LARGE AS SEVERAL SQUARE MILES SUCH AS A VALLEY OR SHORELINE OF A LAKE

LOCATION CAN MAKE THE DIFFERENCE WITH COLD DAMAGE

CYCAD IN OPEN EXPOSED AREA



CYCAD UNDER TREE PROTECTED AREA



COLD DAMAGE



SECOND NEW LEAF AFTER FREEZE

THIRD NEW LEAF AFTER FREEZE

(6 MONTHS)

DEAD LEAVES FROM THE FREEZE

FIRST NEW LEAF AFTER FREEZE



COLD DAMAGE



**THIS COCONUT
PALM IS JUST
BEGINNING TO
GROW OUT OF A
LONG COOL
WINTER AND
FREEZE DAMAGE
IT RECEIVED 8
MONTHS AGO**

COLD DAMAGE



WHY?

LIVE

LIVE

DEAD

DEAD

DEAD

**EACH OF THESE
PALMS ARE A
DIFFERENT
SEEDLING**

COLD PROTECTION



WRAPPING A PROTECTED COLD HARDY PALM?

WRAP AND DUCT TAPE TOO HIGH



HEART 1 (45.72 cm) TO 24 (60.96 cm) INCHES DOWN THE TRUNK

IMPROPER WRAPPING



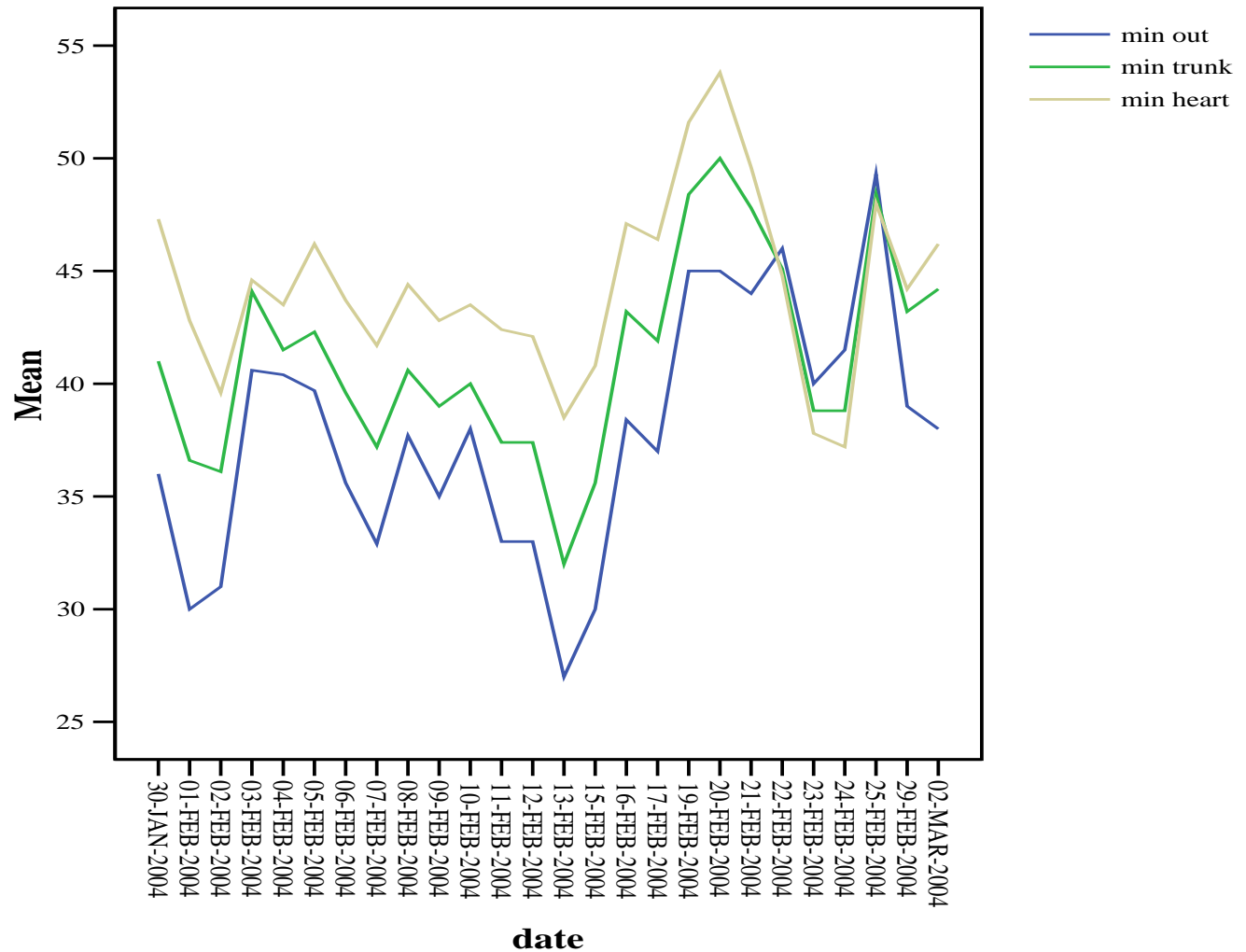
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COLD PROTECTION



PALM COZIES

PALM COZIES BURLAP



Average Minimum Outside Temperature is 37.82 degrees (3.23 C)

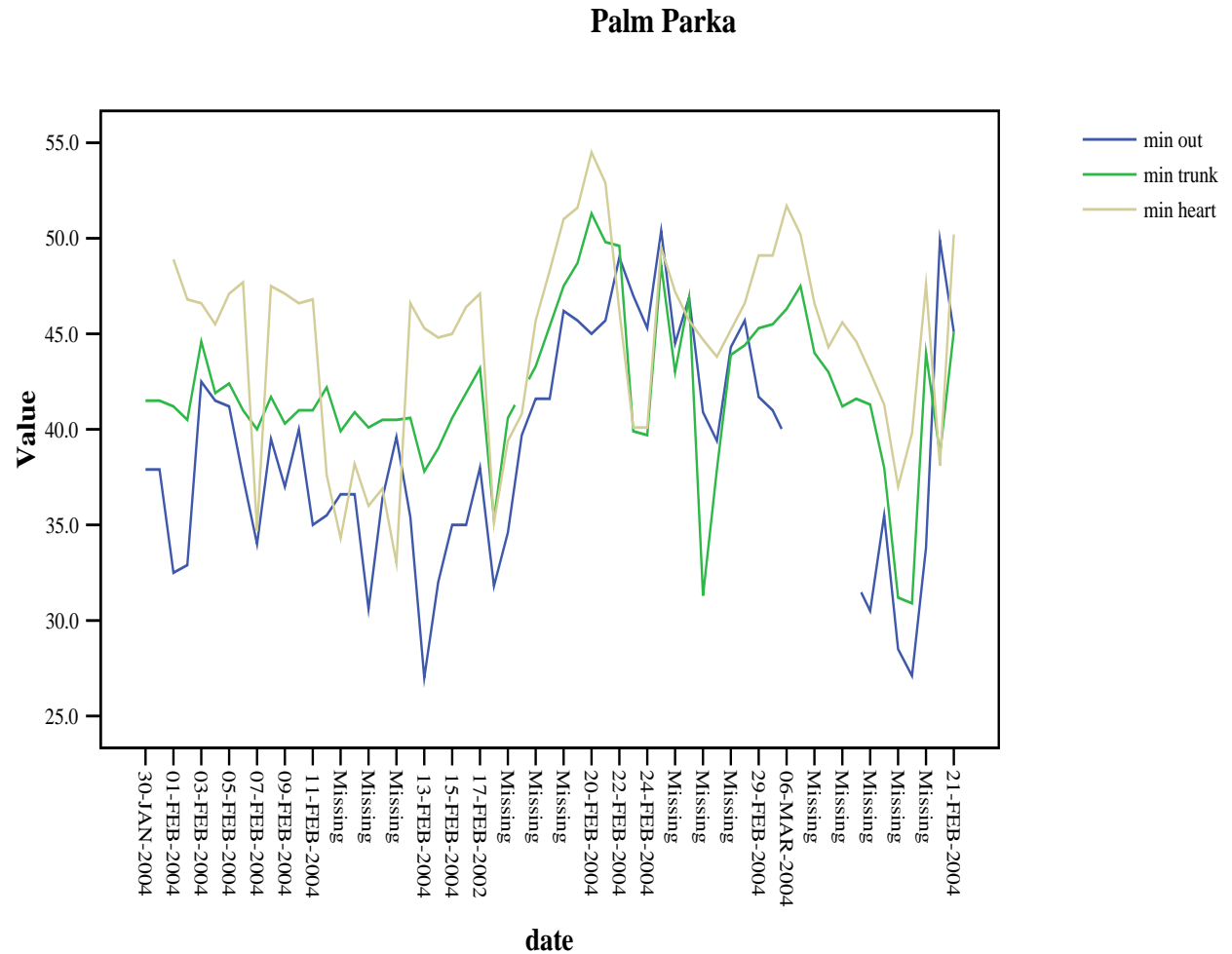
Average Minimum Trunk Temperature is 40.74 degrees (4.86 C).

Average Minimum Heart Temperature is 43.80 degrees (6.56C).

Average Trunk Temperature difference with Burlap wrap is 2.92 (1.62 C) degrees warmer.

Average Heart Temperature difference with Burlap wrap is 5.98 (3.32C) degrees warmer.

PALM COZIES PALM PARKAS



Average Minimum Outside Temperature is 38.97 degrees (3.87 C).

Average Minimum Trunk Temperature is 42.01 degrees (5.56 C).

Average Minimum Heart Temperature is 44.62 degrees (7.01 C).

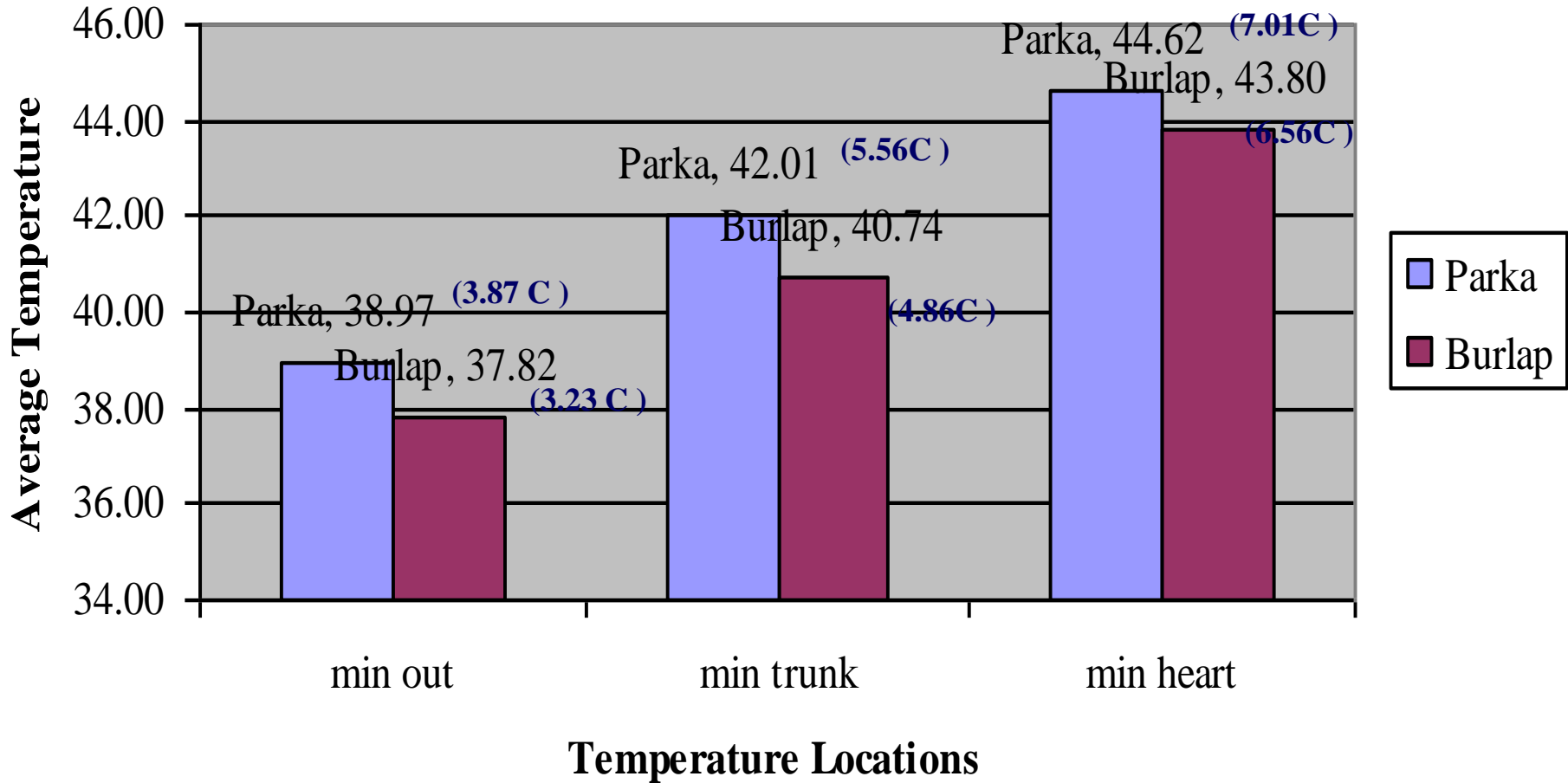
Average Trunk Temperature difference with Palm Parka wrap is 3.04 (1.69 C) degrees warmer.

Average Heart Temperature difference with Palm Parka wrap is 5.65 (1.68 C) degrees warmer.

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Palm Cold Protection Wrap Types



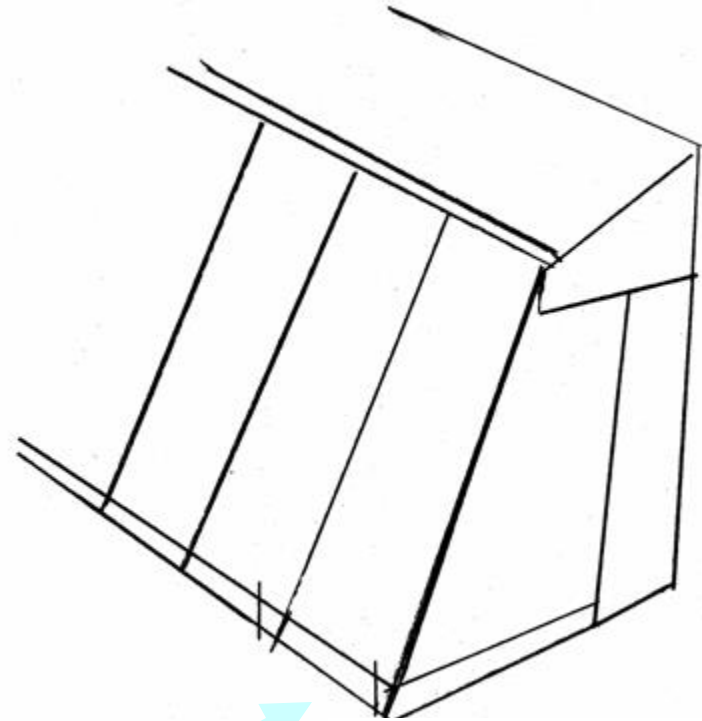
WHICH IS WARMER?

- Average Trunk Temperature difference with Burlap wrap is **2.92** degrees warmer.
- Average Trunk Temperature difference with Palm Parka wrap is **3.04** degrees warmer.
- Average Heart Temperature difference with Burlap wrap is **5.98** degrees warmer
- Average Heart Temperature difference with Palm Parka wrap is **5.65** degrees warmer.

COLD PROTECTION



A LEAN-TO TEMPORARY GREENHOUSE CAN BE FRAMED WITH 2x2s OR 2x4s AND COVERED WITH CLEAR PLASTIC .



USE REBAR OR WOODEN STAKES TO HOLD IN PLACE

LEAVE ENDS SO IT CAN BE OPENED FOR VENTILATION ON WARM/SUNNY DAYS

COLD PROTECTION

TEMPORARY GREENHOUSE



LEAVE ENDS SO IT CAN BE
OPENED FOR
VENTILATION ON
WARM/SUNNY DAYS

COLD PROTECTION



TONY@PALMKERNELS TX.



TONY@PALMKERNELS TX.



TONY@PALMKERNELS TX.



ICE CHEST COVER



TOMATO CAGE COVER



BUBBLE WRAP PALMS IN THE UK





palm cold protection Zone pushers
Gardening Beyond your Zone



HEATING CABLES



THERMOSTAT
CONTROL

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PALM WINTER PROTECTION IN GERMANY BY ANTON AUS DEM SAARLAND

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North American Palm Association

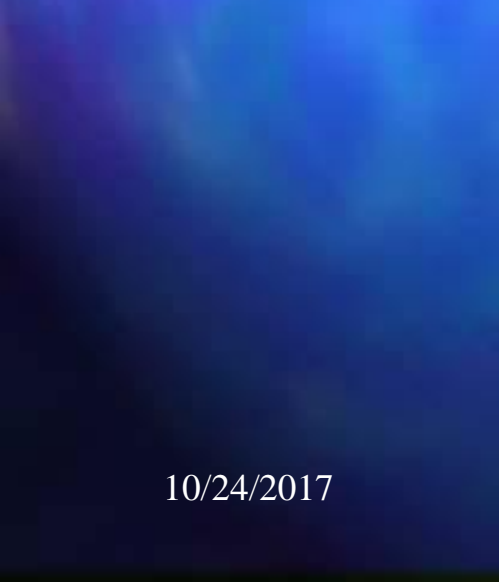


Oklahoma custom innovations





CARLSBAD NM



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Facebook Zone pushers
Gardening Beyond your Zone



MULE PALM IN LONG ISLAND NY LOW 20s



10/24/2017

Picture Mule palm Nursery

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YOU CAN ALWAYS PAINT THEM



10/24/2017

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YOU CAN ALWAYS PAINT THEM

10/24/2017

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THE BEST COLD PROTECTION

- **PLANT ONLY PALMS ADAPTED TO YOUR AREA**
- **PLANT COLD SENSITIVE PALMS IN PROTECTED AREA (MICRO CLIMATES)**
- **TREAT PALM BUD WITH LIQUID COPPER FUNGICIDE BEFORE AND AFTER FREEZES**

WHY TOUGH PALMS ARE NOT USED MORE?

- **THEY ARE SLOW GROWING**
- **MORE EXPENSIVE**
- **LESSER KNOWN TO CONSUMERS AND PROFESSIONALS**
- **ONLY SMALL SIZES AVAILABLE**
- **MANY DO NOT HAVE COMMON NAMES**
- **THEY ARE NOT EASILY PROPAGATED, SEEDS MAY BE HARD TO FIND, EXPENSIVE AND SLOW TO GERMINATE**



**PLANT A PALM,
YOU CAN'T
GO WRONG**

ARTIFICIAL PALMS IN THE LANDSCAPE



TAKING YOUR PALMS ON A TRIP





10/24/2017

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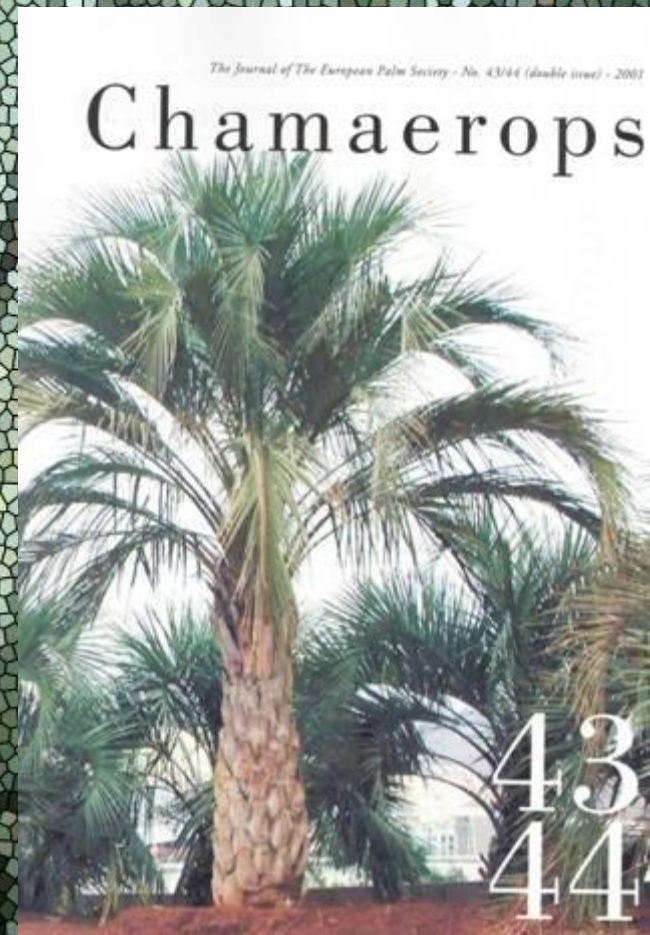
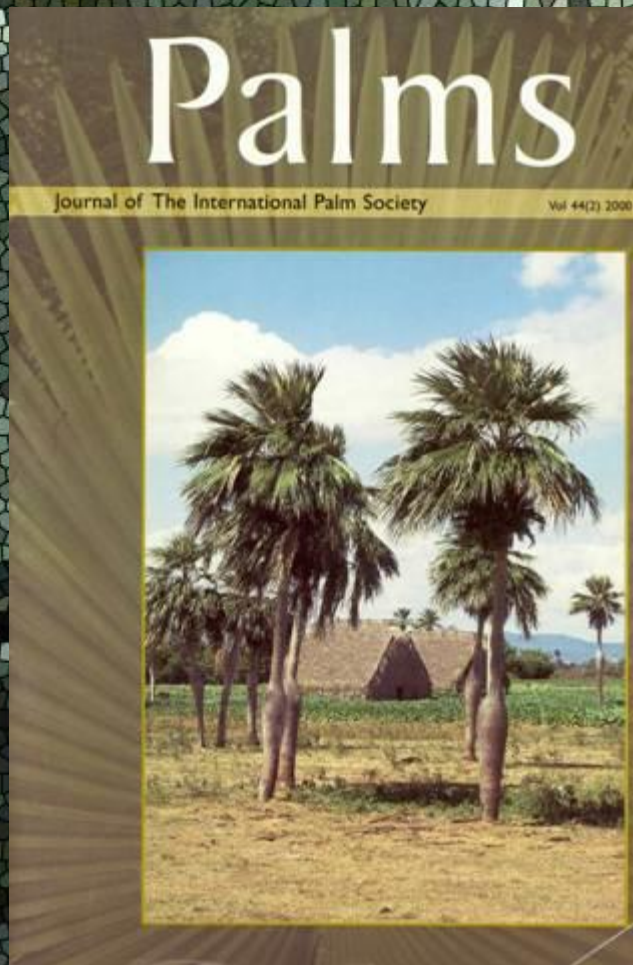


FINDING PALM INFORMATION

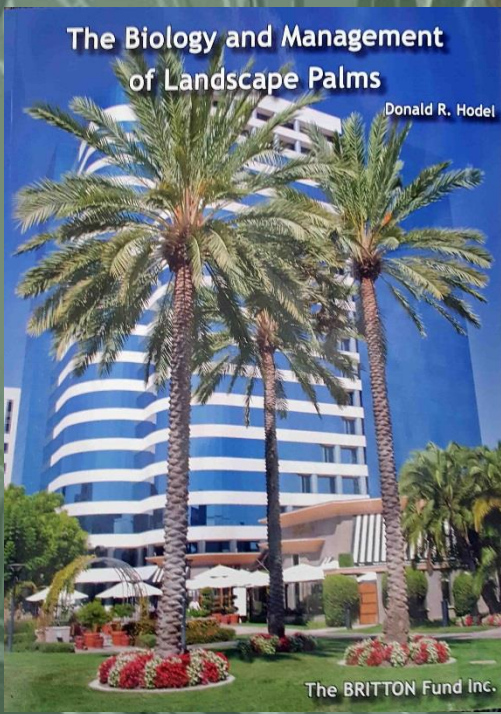
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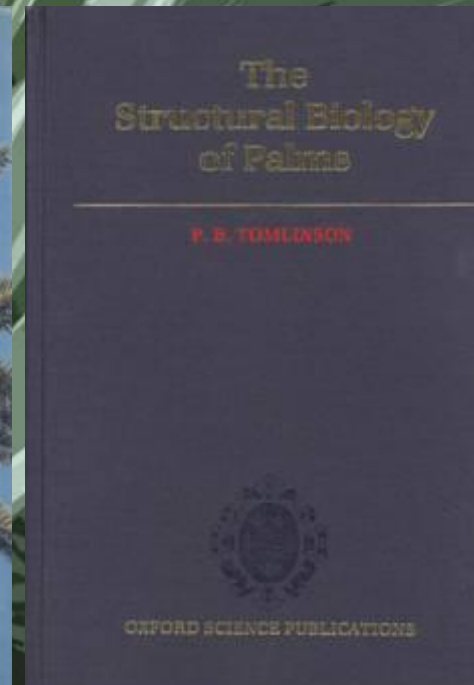
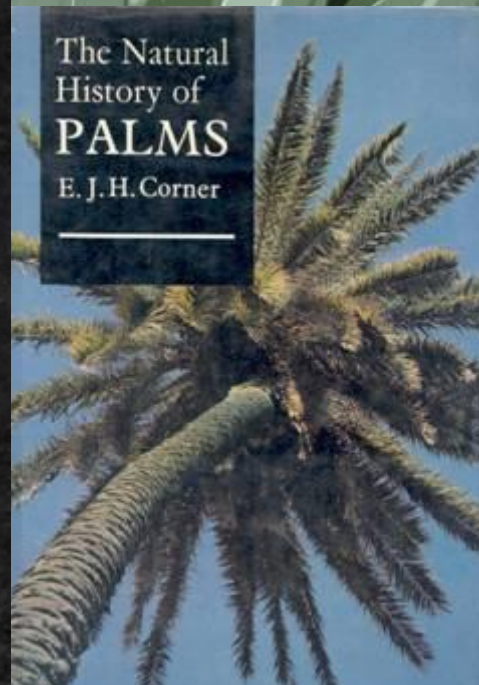
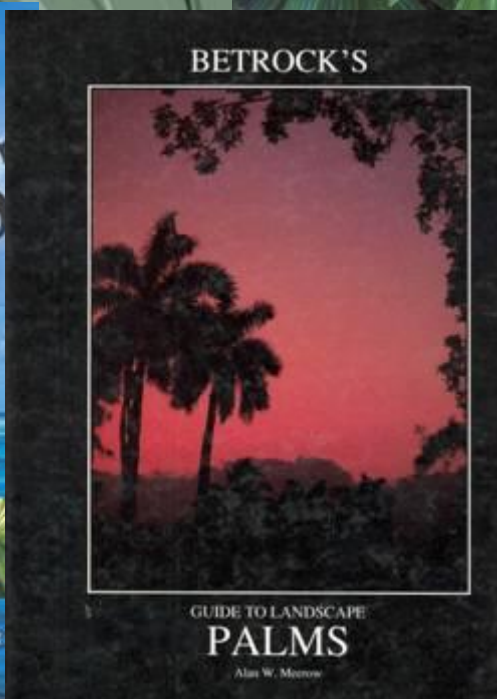
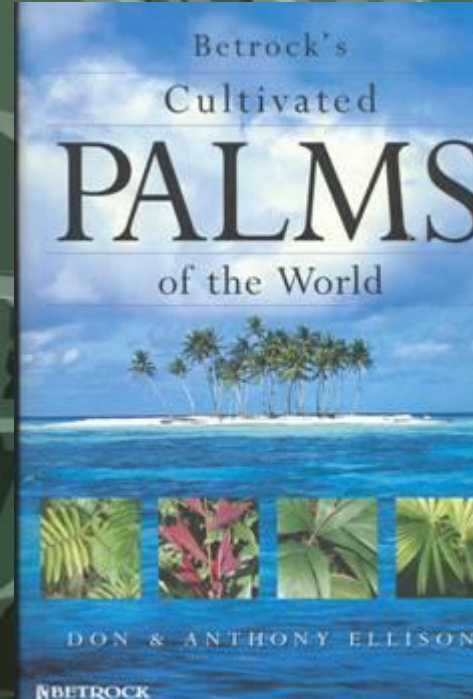
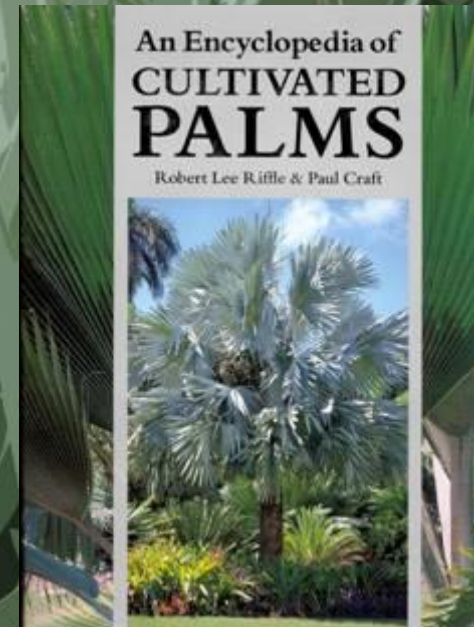
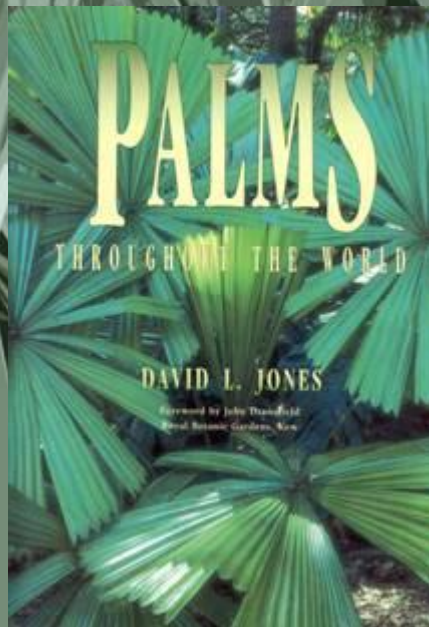
WHERE CAN YOU FIND MORE INFORMATION?



PALM BOOKS



New



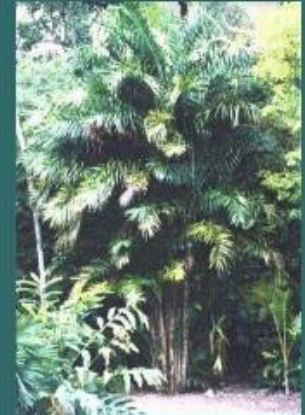
BOOKS

Betrock's
COLD HARDY PALMS



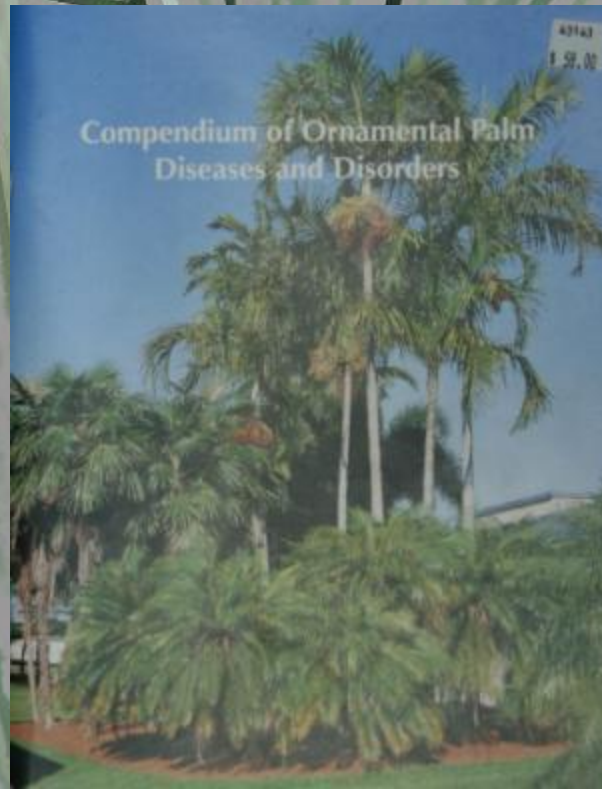
Alan W. Meerow

Virtual
Palm Encyclopedia

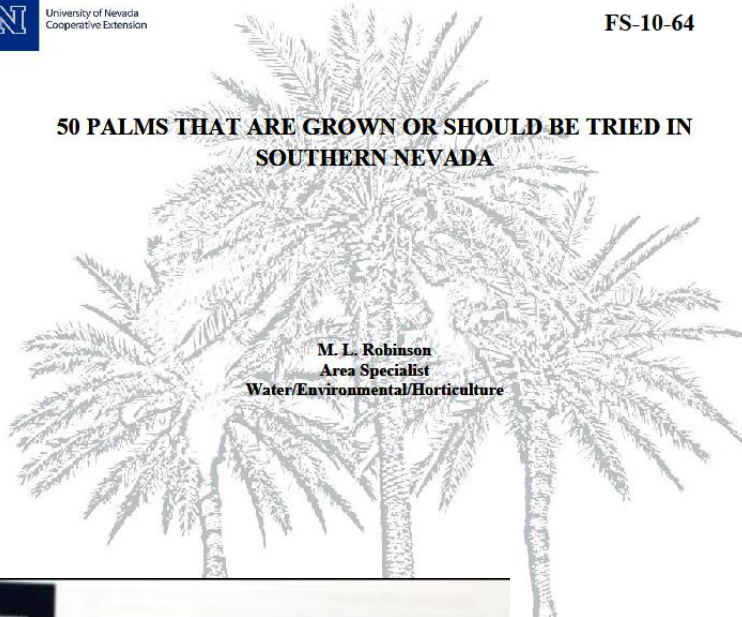


Edited by Jody L. Haynes

49143
\$ 29.00
Compendium of Ornamental Palm
Diseases and Disorders



50 PALMS THAT ARE GROWN OR SHOULD BE TRIED IN SOUTHERN NEVADA



M. L. Robinson
Area Specialist
Water/Environmental/Horticulture

PALM PROBLEMS THAT AREN'T

M. L. Robinson, Area Extension Specialist, Environmental Horticulture
Angela O'Callaghan, Area Extension Specialist, Social Horticulture

When trying to diagnose problems in any plant, know the growing conditions as well as the species of the plant. This is especially true with palms. At different times of their lives, many palms have what look like insect, disease, nutrient or other problems.

This guide will help identify conditions that look like true problems but are not.

LEAVES

Spotting on palm leaves (fronds) might be a concern. It could be a variety of problems, depending on the palm's species. These leaves are very similar and could be those of the windmill palm (*Trachycarpus fortunei*) or the Mediterranean palm (*Chamaerops humilis*). If these were the fronds of the windmill palm, the spotting would indicate a problem, but this waxy coating is normal on the Mediterranean palm (Figures 1, 2, 3). It is more prominent on the blue *Chamaerops humilis* var. *argentea* (Caryfera) form. The spotting may be more noticeable on newer or younger leaves. On some palms this will disappear with age.



Figure 1



Figure 2



Figure 3



Figure 4

Although this leaf (Figure 4) looks like it is covered in mealy bugs or scale, it is a *Washingtonia* frond with a fuzzy substance called scurf on its leaves, a normal condition for this palm.

UNCE PALM PUBLICATIONS WWW.UNCE.UNR.EDU

PRUNING PALM TREES

SP-04-16

M. L. Robinson
Area Extension Specialist
Environmental/Water



Prune only dead or dying fronds (brown or yellow)

Pruning is one of the most misunderstood aspects of palm culture. Correctly pruning any plant or tree can benefit the growth and health of the plant. Maintained correctly, palms are low maintenance trees. For some reason, some people believe that they can indiscriminately hack at palms, including the periodic removal of most or nearly all of the fronds (leaves), several times each year, and not harm the tree. Palms are not an exception to good pruning rules. Poor pruning techniques will harm any plants or trees, including palms. There is a misconception that the more a palm is pruned, the faster it will grow. **This is not true.** Many palm specialists discourage over-pruning except when transplanting certain species. Others simply

recommend avoiding pruning as much as possible (www.broward.org/ds05200.html).



Minimum Pruning

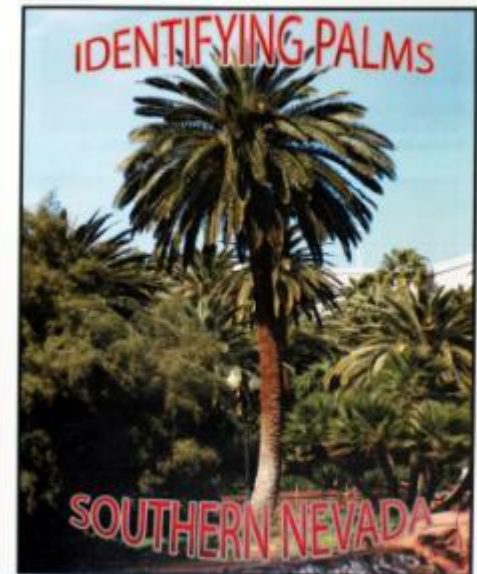
All green fronds produce the food needed to grow properly, producing a healthy palm. The reduction of the green leaf area reduces food production and in turn, the health and growth of the palm is placed in jeopardy. The more green leaves any plant has the more growth that will be produced. The only true plant food is that which the plant makes. What is purchased at stores is not plant, tree or palm food, even if the package says "plant food." It is fertilizer (nutrients), used by the plants with water and sunlight to make plant, tree or palm food.

Under ideal growing conditions it has been found that date palms (*Phoenix dactylifera*) can have between 120 to 180 fronds, each growing up to 15 feet long. Fronds are known to live from 5 to 8 years. This includes leaf primordia in the bud according to the article cited (Ken Platzgraf 2005). Many experts report *Washingtonia* palms have an average of 30 green fronds. A correctly pruned palm should have an oval or circular silhouette.



SP-08-24

IDENTIFYING PALMS



GROWING THE DATE PALM AT HOME IN SOUTHERN NEVADA

M. L. ROBINSON, UNIVERSITY OF NEVADA, AREA EXTENSION SPECIALIST, ENVIRONMENTAL HORTICULTURE
ANGELA O'CALLAGHAN, AREA EXTENSION SPECIALIST, SOCIAL HORTICULTURE

CYCADS

OF THE WORLD

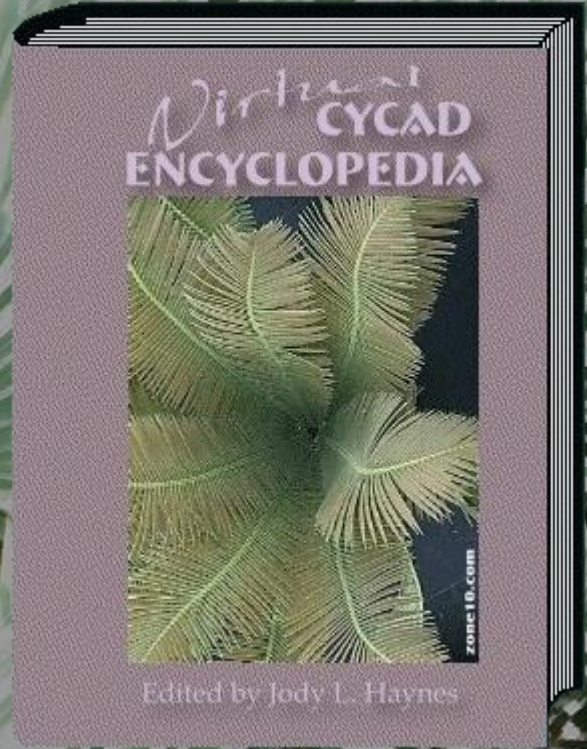
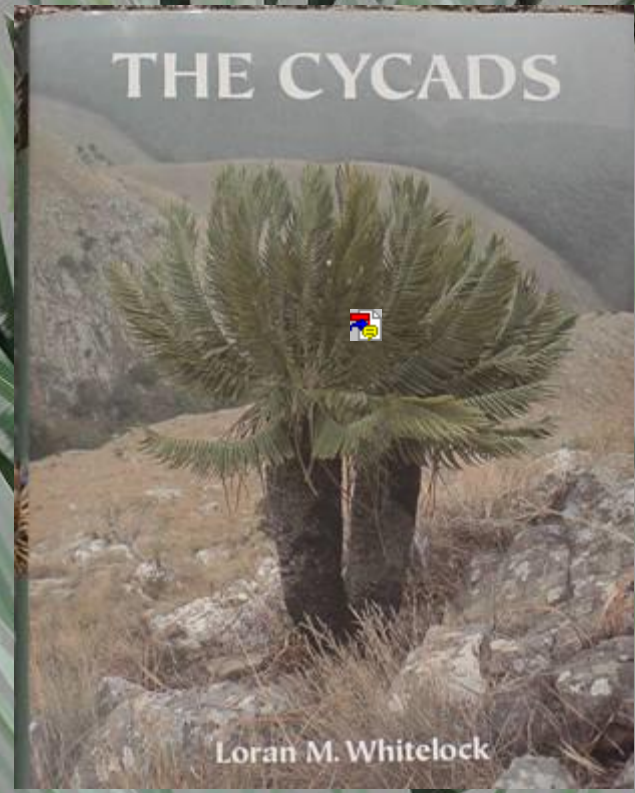
ANCIENT PLANTS IN TODAY'S LANDSCAPE

David L. Jones



Foreword by Dennis Wm. Stevenson
The New York Botanical Gardens

BOOKS



ON THE INTERNET

- **INTERNATIONAL PALM SOCIETY**
WWW.PALMS.ORG
- **CHAMAEROPS THE EUROPEAN PALM SOCIETY**
WWW.PALMSOCIETY.ORG
- **PACIFIC NORTHWEST PALM AND EXOTIC PLANT SOCIETY** WWW.HARDYPALM.COM
- **PALM AND CYCAD SOCIETIES OF AUSTRALIA**
WWW.PACSOA.ORG/AU/PALMS/
- **THE PALM SOCIETY OF S. C.**
WWW.PALMSSC.ORG

ON THE INTERNET SEEDS AND PLANTS

- UNIVERSITY OF NEVADA COOPERATIVE
EXTENSION WWW.UNCE.UNR.EDU
- JD ANDERSEN NURSERY WWW.JDANDERSEN.COM
- JUNGLE MUSIC PALMS & CYCADS
[HTTP://WWW.JUNGLEMUSIC.NET](http://WWW.JUNGLEMUSIC.NET)
- RARE PALM SEEDS (RETAIL AND WHOLESALE)
WWW.RAREPALMSEEDS.COM
- SOUTH COAST PALMS
WWW.PLANTSIGNS.COM/PALMLIST.HTML

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ON THE INTERNET

- **PACSOFT THE PALM AND CYCAD SOCIETIES OF FLORIDA AND THE VIRTUAL PALM ENCYCLOPEDIA**
WWW.PLANTAPALM.COM
- **POLAR PALMS OF BULGARIA** WWW.POLARPALM.NET
- **COLD HARDY PALM ARTICLES**
[HTTP://CT.4T.COM/TROPICS./COLDSELECT.HTML](http://CT.4T.COM/TROPICS./COLDSELECT.HTML)
- **THE PALM READER UNIVERSITY OF GEORGIA COOPERATIVE EXT.**
WWW.CES.UGA.EDU/AGRICULTURE/HORTICULTURE/PALMREADER.HTML
- **HARDIEST PALMS** WWW.HARDIESTPALMS.COM

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Palm Problems KEY

Entire Canopy (most or all leaves):

Wilting

Most or all leaves necrotic, but still erect in canopy

Leaves reduced in size

Canopy growth at sharp angle to trunk axis

Canopy topples from the trunk, usually without warning; rotted, black fibers evident

Collapse of almost all leaves in canopy (more than wilting)

Leaves tattered

Leaflets missing or partially missing from leaf tips

Chlorosis or necrosis of distal portion of leaves close to high voltage power lines

Leaves uniformly light green

“Spotting” on leaves

Leaf bases (and often dead leaf blades) covered with light salmon-pink spores

Most severe on oldest (lowest) leaves:

Chlorosis (shades of yellow)

Leaves discolored, but not necessarily chlorotic; usually shades of red to dark brown or gray

Leaflets have translucent yellow/orange or necrotic spotting or yellow-orange discoloration

Leaflets of oldest living leaves are necrotic on one side of rachis only (or only some leaf segments necrotic if it is a fan palm) and petiole/rachis has reddish-brown to brown or black streak and vascular discoloration evident in cross-section of petiole

Tip or marginal leaf or leaflet necrosis

Chlorotic and/or necrotic gray, brown, or black “spotting”

Gummy exudates (“bleeding”) from multiple small 5 to 8 mm (1/5 to 1/3 inch) wounds in palm leaf bases; galleries in leaf petioles

Old to middle-aged leaves have necrotic “skeletonized” patches with only veins and surface layers of leaf intact; underside of leaf necrotic patches typically covered in tubes of insect frass

Leaf kinks and hangs parallel to trunk

More lower leaves dead than normal; upper canopy leaves may be wilted

http://flrec.ifas.ufl.edu/palm_prod/palm_problems_key.shtml

**SOMETIMES
THEY JUST
GIVE UP**



THE FUTURE LOOKS GOOD FOR PALMS



10/24/2017

316



THE DOUBLE COCONUT

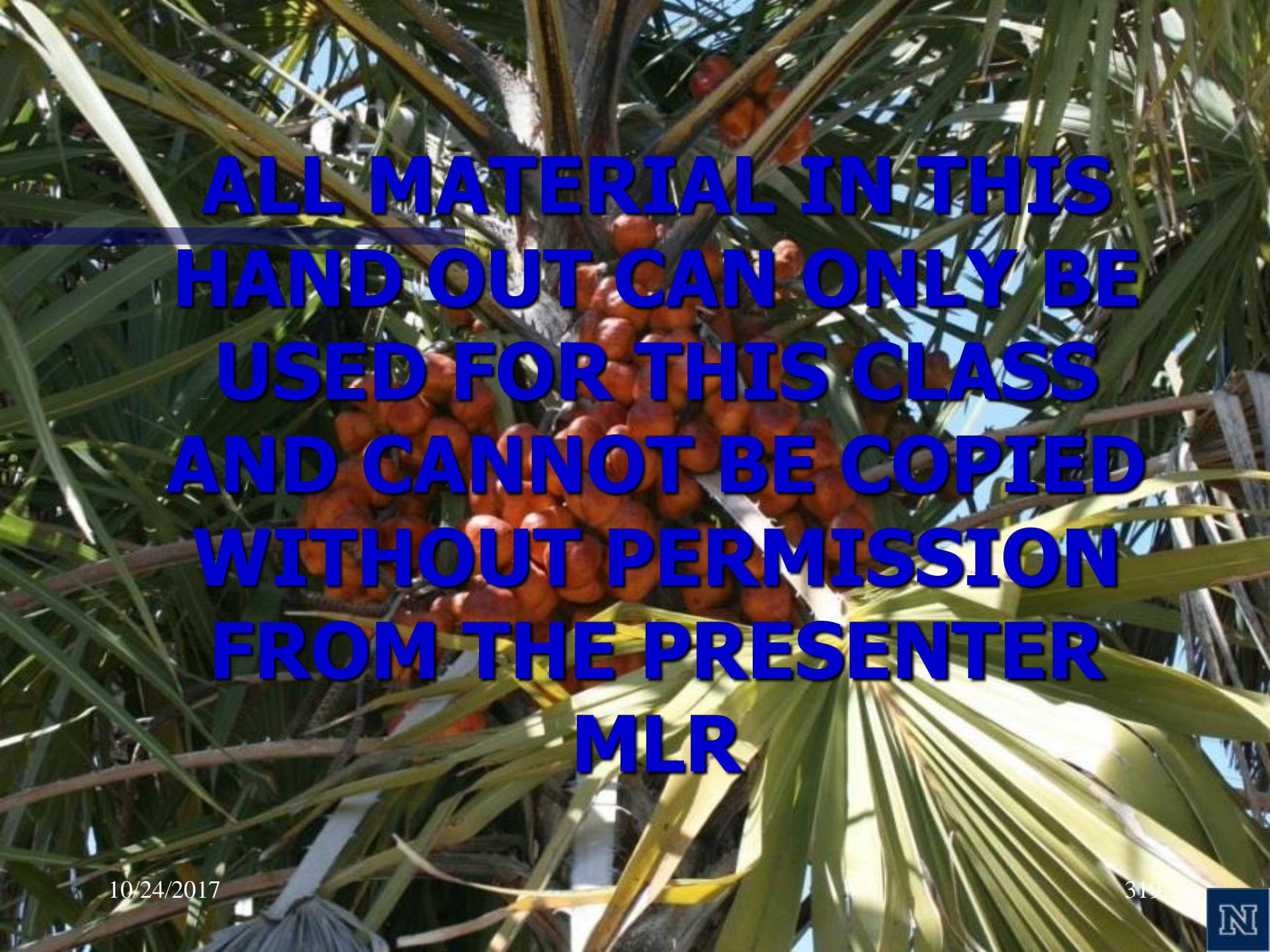


THE WORLDS
LARGEST SEED




THE END





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 - **Dr. Monica Elliott UF Extension**
 - **PALMS OF SOUTH FLORIDA by GEORGE STEVENSON**
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- **THE IPM PRACTITIONER , NEW INVASIVES THREATEN CALIFORNIA CROPS AND ORNAMENTALS, VOLUME XXXII, NUMBER 7/8, JULY/AUGUST 2010, PGS. 2,& 5**

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