

FUSARIUM WILT OF DATE PALMS IN SOUTH FLORIDA.

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Palms in Florida are important nursery crops & landscape plants, so there is concern when they start dying. In late 1994, plant specimens were received at U.F. in Gainesville from nursery & landscape sites where Canary Island date palms (*Phoenix canariensis*) had declined & died.

In the lab, the fungus *Fusarium oxysporum* (*F.o.*) was isolated. Since that time, the fungus has been positively identified as *F.o.f.sp. canariensis* -- a strain that is particularly aggressive on the Canary Island date. This was the 1st report of this new disease in Florida and only the 2nd report in this hemisphere (1st in California).

Evidence accumulated over the last 5 yrs in Miami-Dade Co. strongly suggests that we are now seeing Fusarium wilt in true date, *P. dactylifera*, and possibly in Senegal date, *P. reclinata*.

A TRUE WILT DISEASE.

Fusarium wilt is a true wilt disease. It does not, however, produce the wilt symptoms seen in tomato & other herbaceous species, including many ornamentals. Wilt diseases affecting woody plants do not produce "droopy" plants but cause leaf desiccation, irregular dieback of branches or entire stems, and death. Fusarium wilt of *P. canariensis* is just this type of disease and symptoms are similar to Fusarium wilt of mimosa, *Albizia julibrissin*, and wax-myrtle, *Myrica cerifera*. Palm decline symptoms are a direct result of water-conducting tissues becoming clogged.

HISTORY.

Canary Island date wilt is one of 3 wilt diseases that affect specific palm genera worldwide. (1.)

The most important of these is "Bayoud" disease of the true date palm, first described in the late 1800s in north Africa. This disease is caused by the fungus *F.o.f.sp. albedinis* and has killed more than ten million dates in that region. It now appears to be in Florida. The same pathogen can infect other *Phoenix* spp, but is less lethal on them.

(2.) The 2nd wilt disease of palms was described in 1946 in west central Africa on African oil palm (*Elaeis guineensis*), caused by *F.o.f.sp. elaeidis*. The oil palm *Fusarium* is specific to that genus.

(3.) Canary Island date wilt was first described in 1973 and named *F.o.f.sp. canariensis*. By 1977, it had been reported from Italy, France, Japan, the Canary Islands and California. First reports in California were from 30-50-yr-old Canary Island dates in landscapes. In 1978, it was reported from palm nurseries as well.

The *f.sp. canariensis* can infect *P. reclinata* & *P. dactylifera*, but not *P. roebelenii*; it normally only damages the offshoots on true date. It also will invade *Washingtonia filifera*, but not *W. robusta* or *Archontophoenix cunninghamiana*. The susceptibility of *P. sylvestris* or the many other palm species grown in Florida is unknown. Presently this disease is in both central and southern California. Distribution in Florida includes central and southern counties in both nurseries and landscapes, but complete survey information for Florida does not exist.

SYMPTOMS.

Palms affected by *F.oxysporum* exhibit decline symptoms like those caused by other root or stem diseases: loss of vigor and general decline. Primary symptoms are foliar:(1.) fronds desiccate and die from the lower trunk toward

the bud. Occasionally, the 1st symptomatic leaf may be in mid-canopy (a "flag-leaf"). The decline may affect only one side of the tree. (2.) Affected fronds die in a one-sided manner, from the lower leaflets out to the tip, then from the tip to the base on the other side of the rachis. Some leaves may die from the tip back to the base on both sides of the rachis simultaneously. (3.) A brown stripe develops on the lower surface of the rachis. Some leaflets and spines may be streaked as well. (4.) Vascular discoloration is evident in both cross and longitudinal sections of the rachis/petiole.

Some variation in symptoms is to be expected. Symptoms will be most pronounced as temperature and water demand increase in Summer. Other diseases can cause similar symptoms, but do not lead to plant death. Clear symptoms of Fusarium wilt can be masked if two different diseases are present on the same plant. Palm weevils may invade wilt-stressed palms, speeding death and obscuring the symptoms of Fusarium wilt.

THE PATHOGEN.

The *Fusarium* genus is a large group that includes both saprophytes and pathogens. More than 20 species of *Fusarium* of economic importance in Florida occur in various crops. One of these species is *F.o.*, which has two dozen+ plant-specific strains. These are called "forma specialis" (*f.sp.*) or strains. They all look the same in the lab, but differ in their ability to infect particular hosts. Clinical recovery of a *Fusarium* from a plant does not mean that Fusarium wilt disease is present. "*Fusarium*" is a very nonspecific diagnosis.

Similarly, isolation of *F.o.* does not confirm Fusarium wilt either, but recovery of *F.o.* from palms, coupled with the key symptoms, does

suggest Fusarium wilt. The fungus must still be identified as the 'canariensis' or 'albedinis' strain. At the Univ. of Florida, DNA finger-prints are compared to known isolates of the fungus. Results take 2-3 weeks.

DISEASE SPREAD.

Spread of this disease into new areas depends on the movement of infected trees or infested soil. The pathogen does not have a widely-spreading, airborne spore stage, and its ability to infect seed is unknown. An infected plant and/or infested soil must be introduced into a landscape or nursery for subsequent infection. If a *Phoenix* planting is now disease-free, future development of Fusarium wilt is highly unlikely without the direct introduction of the pathogen.

Local spread is directly tied to maintenance activities. The fungus is well distributed within the tree, especially in the water-conducting tissues. Pruning can introduce the fungus or fungus-infested sawdust among pruning saw teeth (including chain-saw teeth), and on lopper blades. Pruning activities can spread the fungus among trees within a landscape or nursery or between landscapes.

DISEASE MANAGEMENT.

Management of Fusarium wilt is dependent on rapid and accurate diagnosis. Failure to identify this disease can result in spread and mis-identification can result in the unnecessary destruction of an expensive palm. Management begins with prevention. Prior to purchase carefully inspect nursery stock or plants for landscapes. Look for the key symptoms; if these are present, find another supplier. If you buy palms from a supplier and they later die of Fusarium wilt, don't buy any more from that supplier.

Within a nursery, palms need to be examined bi-weekly for symptoms, especially during the warm season. Sample symptomatic palms for lab verification, then remove and destroy infected palms. Avoid scattering infested soil within or among rows of palms. Clean tools used in palm removal with undiluted rubbing alcohol or bleach diluted 1:1 with water. Leave the infested site fallow or replant with a non-palm species. Since the host range of the pathogen is unknown in Florida, replanting with a palm is risky. Use of soil fumigants like methyl bromide/chloropicrin or metam sodium (Vapam) may help, but is not likely to eradicate the fungus. In other words, we have no effective chemicals to control this fungus.

The practice of severe pruning of lower fronds to form a “pineapple” shape just below the crown, or to achieve greater height of clear trunk can result in effective, rapid spread of the wilt fungus. Where this disease is known to exist in a nursery, limit pruning to once a year and remove only dead lower fronds. Use several pruning saws, chains, and loppers when you prune. Use one tool on each tree while others disinfest in bleach or alcohol. Choose the next pruning saw from the disinfestant solution to prune the next palm.

In landscapes, Fusarium wilt can be spread rapidly by crews who go from one property to another. Maintenance companies should prune only once a year, removing only dead fronds. Canary Island date & true date are severely pruned at planting time to enhance establishment; discontinue such pruning after planting, and do not prune to form the popular “pineapple” shape.

Maintenance personnel should watch for the key symptoms of Fusarium wilt. Suspect palms should be sampled and tested. Infected palms should be carefully removed and taken to a landfill rather than being chipped for recycling. Infested sites should be replanted to non-palms.

DIAGNOSIS.

Based on experience with this disease in Florida, there are four key symptoms necessary for a field diagnosis of Fusarium wilt:

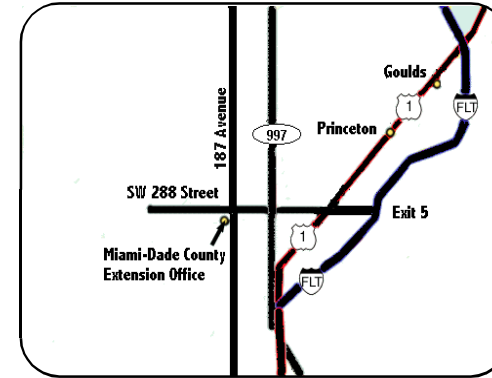
1. Progressive leaf death from oldest to youngest (from the bottom up).
2. One-sided leaflet death on declining leaves.
3. A prominent brown stripe on the base of the petiole or rachis.
4. Discolored vascular tissue in "striped" fronds.

If these symptoms are present, a diagnosis of Fusarium wilt is likely but not absolute due to the presence of other rachis blights in Florida.

For lab verification of Fusarium wilt, collect 3-4 petiole bases from fronds exhibiting either one-sided leaflet death or tip dieback, and the brown striping of the lower rachis/petiole. If only 1-2 fronds have clear symptoms, remove a symptomless lower and upper frond as well. Remove the lower 12-18 inches of each frond and remove the spines before packaging. If several trees are symptomatic, disinfest tools between trees and submit specimens separately.

The Gainesville lab is the only diagnostic facility in the US that can identify this pathogen to the strains that kill Canary Island date and true date.

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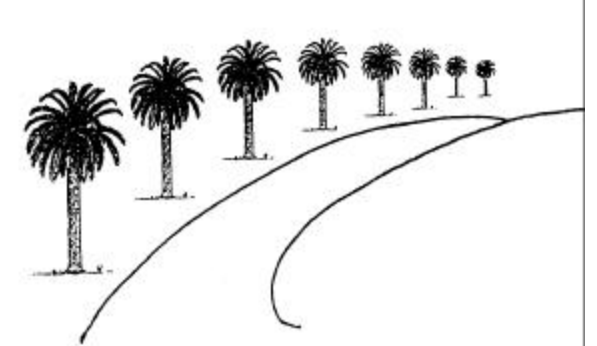


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In Writing

Publications for the horticulture professionals of Miami-Dade County. Fact-sheet No. 87.

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