



## Monitoring Fusarium Wilt of Canary Island Date Palm A Guideline for State Inspectors and Nursery/Landscape Professionals

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### Introduction

Ornamental palms are among the most common species in the urban forest of Clark County. In Las Vegas, palms have been widely planted in both residential areas and commercial landscapes. Their exceptional high value and unique ornamental characteristics make palms an important asset for property owners and the city tourism industry. Like other plants palms are susceptible to certain diseases. There are dozens of infectious diseases and physiological disorders that have been reported worldwide (Elliott et al., 2004). Depending on the pathogen type some diseases may not be curable. Therefore, prevention strategies are increasingly important in today's palm health management.

Fusarium wilt of Canary Island date palm (hereafter 'Fusarium wilt') is caused by *Fusarium oxysporum* f. sp. *canariensis* (hereafter 'the pathogen'). It is one of the most devastating infectious diseases of palm. In 2006, it aroused concerns of the Nevada nursery industry and Las Vegas residents as well when stories of a "new" palm-killing disease appeared in media reports from California. However, this disease was not new and was reported from California and Florida a decade ago. The attention from news media may reflect the

increasing incidence of the disease and of course the high value of palms.



**Figure 1.** Death of older fronds of a Canary Island date palm caused by *Fusarium oxysporum* f. sp. *canariensis*. Note that palm does not show real wilt symptom except frond death generally starting from older ones to newer ones. (Image by Brett Summerell and cited from Smith et al., 2004).

It is not conclusively known if Fusarium wilt occurs in the Las Vegas area. However, Canary Island date palms from states known

to be infected with this disease have for many years been shipped to southern Nevada for sale or direct installation so it is reasonable to assume that the disease may have been established in Nevada. One of the primary ways *Fusarium* wilt is transmitted to healthy palms is on pruning saws that are not disinfected after being used on diseased palms. Considering that diseased palms may go undiagnosed and their decline attributed to other factors, the risk of transmission of the disease to healthy palms during routine maintenance is high. This fact sheet is designed to help state inspectors and nursery/landscape professionals to recognize this disease during inspection and to adopt correct sampling techniques for laboratory analysis. Careful examination of newly arrived palms for symptoms with accurate sampling and laboratory analysis will prevent introduction and spread of *Fusarium* wilt disease in our landscapes.



**Figure 2.** Fronds die on one side or both sides starting from tips. Fronds with this symptom should be sampled. (Image by David Smith and cited from Smith et al., 2004)

## Diagnostic Symptoms

Familiarization with symptoms caused by *Fusarium* wilt is the first step to the correct diagnosis of this disease in palms. However,

symptom development is a complicated process and it may vary significantly from case to case. Fortunately, palm wilt has some symptoms that can be considered as diagnostic signatures. There are four key symptoms to look for during an inspection. **First**, the overall pattern of frond death is from oldest to newest (Figure 1). **Second**, the frond turns brown or dies mostly on one side of the rachis (one-sided) but may also be on both sides (Figure 2). **Third**, a brown strip can generally be seen on the surface of the petiole or rachis (Figure 3). **Finally**, a longitudinal section of frond that has a brown strip externally will show internal vascular streaking or discoloration when compared to a healthy frond (Figure 4). If a palm shows these four key symptoms, samples should be taken for laboratory analysis.

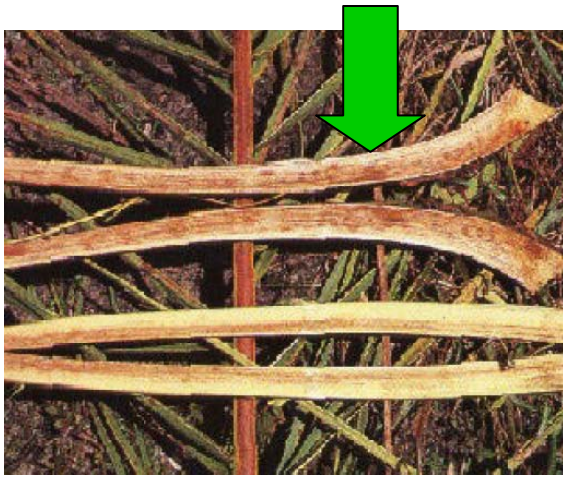


**Figure 3.** Infected fronds show external brown strip on the rachis (arrow). This portion should be cut to see internal vascular bundle discoloration and should be sampled for laboratory analysis. (Image by G. W. Simone and cited from Smith et al., 2004).

## Sampling and Submission

Sampling of diseased tissue is just one part of the diagnostic process; the general background of the problem and the elimination of possible environmental causes must also be considered. Samples must be taken from areas of the diseased palm that have the best chance of gathering identifiable stages of the pathogen. *Fusarium* wilt is a vascular wilt disease and the

pathogen is predominately present in the discolored vascular bundles. Samples containing this part of tissue will guarantee accurate diagnosis.



**Figure 4.** Infected fronds show internal vascular streaking or discoloration and should be sampled for laboratory analysis. (Cited from Simone et al., 2000).

A correct sample from each suspected palm should include pieces of the petiole base or rachis from 3-4 fronds showing tip dieback or one/two-sided leaflet death. The frond base showing external brown strip (the third key symptom) is the most reliable part to be sampled. The samples should be packed in a new sealable plastic bag to which an official plant diagnostic form has been attached. Indicate on the form that the sample is to be tested for palm wilt so that samples can be immediately processed for Fusarium wilt analysis. To assist diagnosis, photographs of suspected palms can be attached or directly emailed to [shwang@agri.state.nv.us](mailto:shwang@agri.state.nv.us). Maintain samples on ice or at 4°C (39 °F) before shipping (Ship Friday's samples the next Monday).

To prevent spread of Fusarium wilt disease, tools used for sampling, such as loppers, saws and corer, etc, must be disinfected for at least five minutes with 70% alcohol, household bleach containing approximately 5.25% sodium hypochlorite, or an equivalent disinfectant.

State inspectors submit samples by overnight mail to:

Plant Pathology Laboratory  
Nevada State Department of Agriculture  
350 Capitol Hill Avenue  
Reno, NV 89502  
(775) 688-1180 x 275

Nursery personnel and landscape maintenance professionals in Las Vegas area drop samples in NDOA Las Vegas Office:

Nevada State Department of Agriculture  
2300 McLeod Street  
Las Vegas, NV 89104-4314  
(702)486-4690

## Laboratory Analysis

The Plant Pathology Laboratory will use standard procedures to isolate Fusarium species from samples. To identify a Fusarium isolate to be the pathogen, namely, *F. oxysporum* f. sp. *canariensis*, the laboratory will conduct a DNA-based test that can verify its identity at DNA sequence level.

## Management

An effective therapeutic method for Fusarium wilt is not available. Therefore, prevention is the best approach to combat this disease. Nursery and entry of point inspections prevent or at least slow down the introduction of the disease from other states. In nurseries and landscapes, professionals should frequently examine any symptomatic palms for key symptoms as described above, and submit samples to the state plant pathology laboratory for analysis. Make sure pruning tools are disinfected before moving into another palm. With collaborative efforts from regulatory agency and business entities, the impact of this disease on palms can be minimized.