



Fusarium Wilt of Canary Island Date Palm

February 2004

Visual Symptoms, Control and Sampling Techniques for Identification

ISSN 1440-2262

David I. Smith, Ian W. Smith and Paul Clements, Forest Science Centre

Introduction

Since its first isolation in Geelong in December 2002, Fusarium wilt, caused by the fungus *Fusarium oxysporum* f. sp. *canariensis* has become recognised as the most serious threat to the health of *Phoenix canariensis* (Canary Island Date Palms, CIDP) in Victoria. This worldwide disease of CIDP was first isolated in Australia from a park in Sydney in the early 1980's where it has caused the death of hundreds of trees (Priest and Letham 1996). Affected palms exhibit a general decline in health with reduced vigour early in the disease cycle with most of symptoms showing up on the fronds. All infections of CIDP with Fusarium Wilt are fatal (Dr. Brett Summerell, pers. comm.). The pathogen can also cause wilt in *P. reclinata*, *P. dactylifera* and *Washingtonia filifera*.

As a chlamydospore in the soil the *Fusarium* can survive for up to two years or longer whereas in plant tissue it can potentially survive for 5-10 years. The movement of infested soil, infected plants, dirty cutting implements and irrigation water can spread the pathogen. If hygiene and the disinfecting of equipment is not carried out then there is potential to spread the disease between palms. Animals that chew palm fronds; (eg. rats) have also been implicated overseas with disease spread (Robinson 2003).

Symptoms and identification of disease

There are four key symptoms necessary for a field identification of Fusarium wilt disease:

The older fronds on the palm start to decline brown and die in an unusual manner. This usually begins at the trunk moving toward the tip of the frond, usually on one side of the rachis (spine of the palm frond), and then advances back toward the trunk on the other side (Figure 1).

The fronds usually die from the older fronds (lower on the trunk) to newer fronds (higher on the trunk) (Figure 2) but can also occur as a ring of fronds with green fronds below and above them.

A prominent brown stripe will be seen on the rachis of the frond starting at the trunk and extending out a variable distance from the petiole (base of the frond) toward the tip of the frond. This stripe will also be evident on the spines at the base of the frond (Figure 3).



Figure 1. Symptoms of Fusarium Wilt on fronds of *Phoenix canariensis* (image: David Smith).



Figure 2. Frond decline of a *Phoenix canariensis* due to Fusarium Wilt (image: Brett Summerell).



Figure 3. Brown stripe on the rachis of a frond of CIDP due to Fusarium Wilt (image: Simone, G. W. and Cashion G. (2002)).

When a striped frond is removed, discoloured vascular bundles can be seen at the cut end of the petiole (Figure 4). For conclusive identification, laboratory verification of Fusarium wilt of CIDP has to be performed

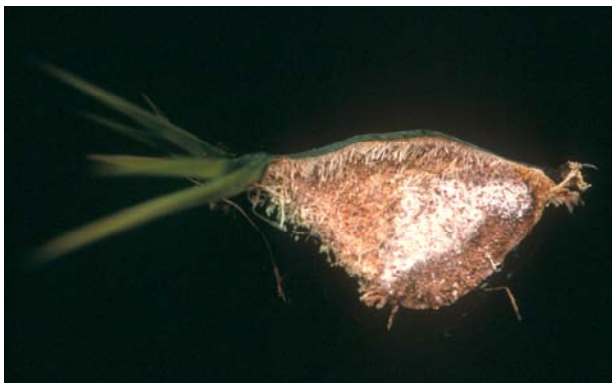


Figure 4. Discoloured vascular bundles of *P. canariensis* due to Fusarium Wilt (image: Brett Summerell).

Control

There is no known means of control of this pathogen once a palm becomes infected (Dr. Brett Summerell, pers. comm.). Therefore control/management of the pathogen relies on surveillance for symptoms, early removal of infected palms and hygiene and quarantine to prevent movement of infected material particularly during palm planting and maintenance. As rats have also been implicated overseas with disease spread (Robinson 2003), a precautionary approach should also be taken towards animals that chew on palm fronds, and therefore barriers should be erected to their movement into palms until this has been clarified.

Further research also needs to be carried out into the possible use of fungicides for control, particularly in the symptomless stage of disease development (eg. adjacent to known infested palms).

Sample Collection for Laboratory Analysis

Collect 3-4 petiole bases from fronds exhibiting either one-sided leaflet death or tip dieback, and the lower brown striping of the rachis and petiole. If only 1-2 fronds have clear symptoms, remove and include symptomless fronds above and below affected fronds for analysis. **Take care in handling fronds, as the spines of CIDP are poisonous.** Remove the lower 30 to 40 cm of each frond and remove the spines before packaging.

For assessing trunk infection, take three cores from the trunk using an increment corer around the base of each palm. Seal holes with silicone. (Trunk cores are a more effective tool for testing symptomless trees prior to transplanting into new areas.)

Pack samples in plastic bags and send to laboratory for testing ASAP. Maintain samples in a cool environment during transportation (eg. insulated container). Label fully with your name, test required, address for results and location of affected tree. Where possible include an image of the affected tree. There are charges for laboratory analysis so check with laboratory for current rates.

To avoid spread of the pathogen following sampling, disinfect equipment (eg. loppers, pruning saws and increment corer) for 5 minutes with either a 50% household bleach or 5% quaternary ammonium disinfectant (eg. Phytoclean, Avis Chemicals) before collecting another sample. Fresh disinfectant needs to be made up regularly (every 2 hrs). Ensure equipment has been rinsed with clean water and/or 70% alcohol to remove disinfectant before taking next sample. Dispose of all other plant material by either burning or deep burial.

Other causes of dieback

It is important that trees with Fusarium Wilt symptoms are confirmed by laboratory testing as there are several other diseases and physiological disorders of palms that can lead to dieback (Broschat, 1991). Animal browsing (including rats and possums), are also known to cause dieback of fronds. Nutrient deficiency has also been noted causing yellowing of fronds and poor growth.

Laboratories available for testing

Forest Pathology Laboratory, Forest Science Centre
Department of Sustainability and Environment
123 Brown Street, Heidelberg
Ph: 9450 8666, Fax: 9450 8644

Postal address:

PO Box 137, Heidelberg, Victoria 3084

Crop Health Services

Primary Industries Research Victoria, Knoxfield
Department of Primary Industries
621 Burwood Hwy, Knoxfield
Ph: 9210 9356

Postal address:

Private Bag 15, Ferntree Gully Delivery Centre,
Victoria 3156

References:

- Anon (2003) Palm Disease Basics, Bullseye Environmental Services.
<http://www.bobkesslercecu.com/Classes/PalmDis.PDF>
- Broschat, T.K. (1991) Diseases and Disorders of Ornamental Palms Edited by A.R. Chase and T. K. Broschat, The American Phytopathological
- Ohr, H. D., (1991) Diseases and Disorders of Ornamental Palms Edited by A.R. Chase and T. K. Broschat, The American Phytopathological Society
- Priest, M.J. and Letham, D.B., 1996. Vascular wilt of *Phoenix canariensis* in New South Wales caused by *Fusarium oxysporum*.
Australasian Plant Pathology 25: 110-113.
- Robertson M, T (2003) Fusarium Wilt of Canary Island Date Palm.
<http://www.sunsetpalms.net/info/9fusarium.html>
- Simone, G. W. and Cashion G. (2002) Fusarium Wilt of Canary Island Date Palms in Florida. Plant Pathology Fact Sheet No 44.
<http://plantpath.ifas.ufl.edu/takextpub/FactSheets/pp0044.pdf>

Acknowledgments:

The authors gratefully acknowledge information and images supplied by Dr. Brett Summerell, Senior Research Scientist, Plant Disease Diagnostic Unit of the Royal Botanic Gardens, Sydney. They would also like to thank Ian Rodgers from the City of Greater Geelong and Ian Shears from Melbourne City Council for their constructive comments to this report.

Further information

If you require any further information please call the Department of Sustainability and Environment Customer Service Centre on 136 186.

Visit DSE's website

<http://www.dse.vic.gov.au>

then select "Forestry".

This publication may be of assistance to you but the State of Victoria and its officers do not guarantee that the publication is without flaw of any kind or is wholly appropriate for your particular purposes and therefore disclaims all liability for any error, loss or other consequence which may arise from you relying on any information in this publication.