

## **Fusarium Wilt of Canary Island Date Palms 5-15-12**

It is very important to understand this fungal disease in order to keep Canary Island Date palms free from infection.

It should be noted here that the question of whether or not the Desert Date palm (*Phoenix dactylifera*) is susceptible to the Fusarium Wilt disease has not been settled. It is clear from my experience that the Canary Island Date palm (*Phoenix canariensis*) and the Reclinata palm (*Phoenix reclinata*) do get this fatal fungal infection. In addition hybrid crosses of these 2 palms appear to be susceptible. Also the California Fan palm (*Washingtonia filifera*) is susceptible.

From reading and studying Dr. Feather's doctoral dissertation on the Fusarium Wilt disease and by reading other scientific papers on the Wilt disease from around the world it has been proven that Desert Date palm seedlings can be infected by either injecting the palm stems or by drenching the root systems with the Fusarium Wilt pathogen. It is important to note though that it has not been demonstrated that adult Desert Date palms can be infected this way. Also it has not been proven that the adult Desert Date palms can be infected by pruning with contaminated saws. Furthermore of the thousands of Desert Date palms that I have inspected over the years I have never seen Fusarium Wilt symptoms in an adult Desert Date palm. With all that in mind, I think that it is still a sound horticultural practice to use sanitary pruning practices when trimming the Desert Date palms until more research is done.

### **History of the Disease**

During the late 1970's, at U.C. Riverside, a graduate student named Tolbert V. Feather, studying under a plant pathologist named Dr. Howard Ohr, began to investigate the slow death of Canary Island Date palms in southern areas of the state. Dr. Feather published his dissertation in 1982 and received his doctoral degree for his work. He noticed that this disease seemed to occur in clusters where palms were in close proximity to one another; also he noticed that after pruning occurred in these clusters, the disease seemed to spread from tree to tree. He isolated and cultured a fungus from the palms called *Fusarium oxysporum*.

### **Diagnosis/Symptoms**

Attempting to isolate this disease in the laboratory can sometimes yield inconclusive results. With this disease, in normal landscape settings, field diagnosis is very possible through the presence of visual symptoms in the crown of the palm and is fairly obvious to an experienced palm specialist but the presence of visual symptoms does not always mean that the palm has the disease. If there is time and money available to do tissue testing utilizing a reputable laboratory then it is always an option to do this in an attempt to confirm the presence of the disease. I have seen many cases of 'false-positives' where the symptoms were there but with time it became apparent that the palm did not have the disease. Frequently, these symptoms can be caused by water stress and shock associated with transplanting these palms. Also, this disease is often found in association with Pink Rot caused by *Gliocladium vermoseni*, which attacks the tree when it is stressed by the primary aggressive pathogen- *Fusarium oxysporum*. It is important to note that Pink Rot is a weak secondary pathogen and alone is not significantly pathogenic towards Canary palms and does not kill Canary palms - Canary palms do not need to be treated or sprayed for Pink Rot.

Dr. Ohr did document one unusual symptom associated with this pathogen. The *Fusarium oxysporum* fungus causes a one-sided dieback of the fronds. In other words the leaflets on one side of the frond die and turn brown, while the leaflets on the other side are green and appear healthy. This can happen on fronds on one side of the tree, evenly around the tree or can show up in the upper whorls, skipping a row or two of leaves.

It is a good idea to have all Canary Island Date palms inspected by a palm specialist before moving them from homeowner's yards. Inspection along with aseptic pruning practices, are the keys in controlling the spread of this disease. There is a chance that a tree can pass visual inspection and be infected with Fusarium wilt because of the indeterminate incubation period of the wilt disease. There is a period of time between initial infection and first visual symptoms appearing when the disease is in its incubation period. During this period there are no symptoms. The incubation period is usually 6-18 months but this period can be much longer. After there are visual symptoms, the tree can take several months or even up to 5 years or more to enter the 'rapid-decline' stage and die. Currently this disease is always fatal- there is no cure or chemical treatment and no one knows what triggers the 'rapid-decline' stage. Fortunately, because of the way this disease is transmitted, it can be controlled in the landscape.

### **Spread of the Disease / Infection through Roots / Rat Activity**

Personally in my almost two decades of working with Canary palms full time I have seen many instances where the palms can become infected even when all the proper sanitary pruning procedures are followed. After reading Dr. Feathers doctoral dissertation on the Fusarium Wilt disease in Canary palms I do now understand that this disease is soil bourn and can infect Canary palms through the roots of the palms. It can move by wind and water also. I do not however believe that these are the most common ways this fungal disease enters the palms. I think the main culprit is the contaminated chainsaw. Now once the disease has entered the palm and started to cause symptoms then the site scenario can change. Often when the palm becomes symptomatic the infected fronds are trimmed off either with a chainsaw or a handsaw. This cutting generates sawdust that is inoculum filled with fungal mycelium and spores. This sawdust then falls to the ground where it enters the soil and can also be tracked over a wide area by shoes. Once the fungus enters the soil it will grow and reproduce and spread. The rate of movement in the soil can be influenced by soil type and the geography of the site. The fungus can move more quickly through sandy soils as opposed to clay soils. After the fungus enters the soil any other Canary palms in the area are at risk of infection. I have seen this scenario play out many times at many different locations. This is the main reason I advise that once a Canary palms has been diagnosed as positive for the Fusarium Wilt by an experienced and qualified palm specialist that it be removed in one piece quickly and that infected fronds not be removed by using a saw – they can be removed by using a machete so that no contaminated sawdust is produced.

Concerning spread of the disease by rats I know of instances where trees that had not been trimmed on for many years suddenly begin to show symptoms of the Fusarium Wilt disease. In some of these cases there was a lot of rat activity in these trees, i.e. chewing and eating of the frond tissue. It is very difficult to say whether or not there is a connection but it is possible. There is no scientific basis or work been done to prove or disprove this theory. The lack of research combined with the indeterminate incubation period of the Fusarium Wilt disease makes this hypothesis unclear. I would suggest that an aggressive program of rat control be undertaken if Canary Island Date palms are located on your property.

### **Sanitary Pruning/Controlling the Disease**

The Fusarium Wilt disease is usually spread from diseased trees to healthy trees by contaminated pruning equipment such as handsaws, hand pruners and chainsaws. These tools should be cleaned before and after working on each tree by soaking each tool in a 50/50% solution of bleach and water for a minimum of 5 minutes. Tools should then be rinsed in a bucket of clean water before use. Bleach has a short half-life so remember to change solutions every 2 hours or after trimming 8-10 trees. Any rust or other substances should be wire brushed off before soaking to insure proper sanitation. Chainsaws should be taken apart, cleaned of any loose debris and the bar and chain soaked in the bleach and water solution. Once the saw has been reassembled, I would suggest that the saw bar and chain be dipped into the bleach solution and run briefly to try and insure that no microscopic pieces of the fungal mycelium or spores are left alive. Another option would be to purchase a new chainsaw just for use on a specific property. This would eliminate the possibility of the disease coming from another property. If this were done, I would still recommend that the chainsaw be sanitized between trees.

Once new trees are shaped and 'pineappled', I would recommend that as fronds naturally dieback, they be removed using a clean handsaw. Handsaws are much easier to sanitize. Fruit stalks should be removed in the same manner using a sanitized pole saw or lopper.

The best idea is to only remove dead fronds with a handsaw -that way you are never cutting into live vascular tissue. I would strongly suggest that chainsaws not be used for this maintenance task.

The fronds should be cut flush with the existing 'pineapple'. Do not leave any stubs. After a Canary palm has been 'pineappled', this operation should not need to be done again for approximately 4-5 years depending on cultural conditions. If dead fronds are not removed as they die back, I recommend that Canary Island Date palms be trimmed on an annual basis with the best time being in the spring after the fruit/flower stalks have emerged sufficiently to be cut off.

I would also recommend that after the pruning of the fronds and removal of the fruit and flower stalks, all the stubs are sprayed with a solution of 50% bleach and 50% water to try and insure that no fungal infections can get started. You can also use pure Lysol solution but never mix bleach and Lysol as this will form a toxic gas which can be deadly to humans.

It is also possible but not proven that other tools such as hand trowels, shovels, etc. could by severing roots on an infected tree become contaminated. It would be a good practice to sanitize these tools also when working around Canary palms.

My personal recommendation again is that after the palms are initially trimmed and set the use of chainsaws should be eliminated completely to avoid this fatal disease. Use handsaws! A great idea is to buy a new handsaw for each tree, number them and then use them on that tree only – I still would recommend that these saws be sterilized before they are used again.

### **Disposal of the Bleach solution**

Do not pour the sanitation solution of bleach and water down a storm drain. It will eventually find its way into the ocean, which is highly undesirable. Pour the solution into a toilet, sink or shower, which will send it to a water treatment plant. This is very important!

### **Removal Procedure**

When a Canary palm has died of Fusarium Wilt disease I do not generally recommend replanting with any Phoenix species because of the possibility of the new palm becoming infected due to site contamination.

The key issue here is that the old, infected palm needs to be removed in one piece using a crane whenever possible.

Where this is not possible due to access problems the palm should be cut up in as few pieces as possible. These pieces should be handled the same way as a whole tree. Take them to the landfill and dispose of them there. Do not feed the pieces through a chipper truck anywhere on site or anywhere in the community. Also a strong effort should be made to clean up any sawdust that is generated by the cutting process. I would also strongly suggest that the removal operation be done when the wind is not blowing strongly – i.e. in the morning.

When a whole tree is removed lay the palm on a flatbed truck or put it in a large dumpster and dispose of off-site at the landfill.

Under no circumstances should the palm be sawed up on-site or any infected fronds trimmed off on site - any sawdust from the infected fronds that is generated should be considered inoculum and highly infectious. Sometimes fronds do have to be removed to facilitate transport of the palm – in this case frond removal should be done using a sharp machete to avoid sawdust generation. Lastly any tools, rigging or heavy equipment that comes in contact with the infected tree or tree parts should be sterilized using the bleach solution.

If the decision is made to replant using a Canary palm then dig a 6 foot by 6 foot wide by 4 foot deep rootball and then over-excavate the hole to 10' x 10' x 10'. Remember to remove the excavated soil to an off-site location. The digging equipment used i.e. backhoes; shovels, etc. should be sanitized using a bleach solution of 50% bleach and 50% water. New fresh washed plaster sand backfill should be brought in and new observation/aeration tubes used.

It is important to remember that even with these remedial actions, there is a possibility that the new, replacement palm will become infected itself and die. The removal of Fusarium Wilt infected Canary Island Date palms and the planting of new Canary Island Date palms are operations best left to professional palm companies that are experienced in these difficult operations.

### **Other Susceptible Species / Protect Your Palms**

Other species that are known to be susceptible to this disease include Phoenix dactylifera, Phoenix reclinata and Washingtonia filifera. Whenever any palms belonging to the Phoenix genera or other susceptible species are trimmed, I would strongly suggest that a professional, palm tree trimming company be used.

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