

PALM DISEASES IN THE LANDSCAPE

Integrated Pest Management for Home Gardeners and Landscape Professionals

Several major, potentially lethal diseases can attack landscape palms in California. The best strategy for managing these diseases is an integrated pest management approach that combines prevention, exclusion, sanitation, appropriate species selections, and proper care. Selecting the right palm for the right spot then planting and caring for it properly are critical in order to avoid most diseases.

Even if you inherit a poorly adapted or managed palm, providing proper care and culture can significantly reduce the chances for disease development and help reduce disease severity. Prevention is usually better than treating a disease after it develops, and in some instances it is the only option. Use fungicides only as a last resort. Table 1 lists palms common in California and their resistance or susceptibility to the four diseases discussed in this publication.

DIAMOND SCALE

Despite the name, diamond scale is not an insect pest. Instead the fungus *Phaeochoropsis neowashingtoniae* (previously called *Sphaerodothis neowashingtoniae*) causes this common foliar disease, which derives its name from its characteristic diamond-shaped fruiting bodies.

Diamond scale attacks primarily the California fan palm (*Washingtonia filifera*) in coastal regions and the intermediate and interior valleys of California subject to marine influence; it rarely occurs in arid regions such as the Central Valley or the deserts of Southern California. Diamond scale can occur on hybrids of the Mexican fan palm (*Washingtonia robusta*), and the incidence and severity usually are proportionate to the amount of California fan palm in the hybrid. Diamond scale has not been observed on pure Mexican fan palm or any other species in California.

Table 1.

Common Palms of California and Their Relative Disease Susceptibility.

| | Mostly Disease Resistant | Diamond Scale | Fusarium Wilt | Pink Rot | Sudden Crown Drop |
|---|--------------------------|---------------|---------------|----------|-------------------|
| Australian fountain palm (<i>Livistona australis</i>) | X | | | | |
| Bamboo palm (<i>Chamaedorea</i> species) | | | | X | |
| California fan palm (<i>Washingtonia filifera</i>) | | X | | X | |
| Canary Island date palm (<i>Phoenix canariensis</i>) | | | X | X | X |
| Chinese fountain palm (<i>Livistona chinensis</i>) | X | | | | |
| Chinese windmill palm (<i>Trachycarpus fortunei</i>) | | | | X | |
| Date palm (<i>Phoenix dactylifera</i>) | | | | X | X |
| Fishtail palm (<i>Caryota</i> species) | X | | | | |
| Guadalupe palm (<i>Brahea edulis</i>) | X | | | | |
| Kentia palm (<i>Howea forsteriana</i>) | | | | X | |
| King palm (<i>Archontophoenix cunninghamiana</i>) | | | | X | |
| Lady palm (<i>Rhapis</i> species) | X | | | | |
| Majesty palm (<i>Ravenea rivularis</i>) | X | | | | |
| Mediterranean fan palm (<i>Chamaerops humilis</i>) | X | | | | |
| Mexican blue palm (<i>Brahea armata</i>) | X | | | | |
| Mexican fan palm (<i>Washingtonia robusta</i>) | X | | | | |
| Pindo palm (<i>Butia capitata</i>) | X | | | | |
| Pygmy date palm (<i>Phoenix roebelinii</i>) | X | | | | |
| Queen palm (<i>Syagrus romanzoffiana</i>) | | | | X | |
| San Jose hesper palm (<i>Brahea brandegeei</i>) | X | | | | |
| Senegal date palm (<i>Phoenix reclinata</i>) | X | | | | |
| Triangle palm (<i>Dypsis decaryi</i>) | X | | | | |

Identification and Damage

Initial infection sites are dark, water-soaked spots the size of a pinprick that eventually turn black and grow to shiny, diamond-shaped fruiting bodies $\frac{3}{25}$ - to $\frac{3}{10}$ -inch long by $\frac{3}{50}$ - to $\frac{3}{25}$ -inch wide (Fig. 1). The fruiting bodies occur on the upper and lower surfaces of leaf blades and petioles, the stalk connecting the leaf base to the blade.

Diamond scale causes leaves to yellow and brown then die prematurely (Fig. 2), resulting in a reduced crown of leaves and an unattractive landscape subject. Older or lower leaves typically become the most infected, because the longer the leaf remains exposed, the greater the number of infections. Because of their more vigorous growth rate, young palms tend to have less disease and a fuller crown of leaves than older, less vigorously growing plants.

Disease severity often is cyclical. The dry, warm seasons of summer and fall favor California fan palm rather than diamond scale, so palms tend to grow quickly, producing leaves faster than the pathogen can colonize them. In contrast, the moist, cool seasons of winter and spring favor the pathogen over the host, so palms tend to grow more slowly, and the disease advances higher into the crown, resulting in a less-than-full set of leaves.

Heavily infected leaves have a black, sooty dust that rubs off easily when you brush against or handle them during removal, making the plant a nuisance to work around. Although not particularly lethal by itself, diamond scale reduces vigor and stresses the palm, leaving it vulnerable to other diseases such as pink rot.

Management

The best management option in areas where the disease occurs is to substitute the California fan palm with diamond scale-resistant species of similar habit, such as the Mexican blue palm (*Brahea armata*), San Jose hesper palm (*Brahea brandegeei*), Guadalupe palm (*Brahea edulis*), Australian fountain palm (*Livistona australis*), Chinese foun-

tain palm (*Livistona chinensis*), Chinese windmill palm (*Trachycarpus fortunei*), and pure Mexican fan palm.

Keep existing California fan palms as vigorous as possible by irrigating regularly, especially in the summer and during winters with little rainfall. Avoid keeping the soil constantly or excessively wet, and ensure drainage is adequate. Apply a palm-special fertilizer—one high in nitrogen and potassium with half as much magnesium as potassium—following label rates and directions. Keep turfgrass, groundcovers, shrubs, and weeds at least 2 feet away from the trunk, and maintain mulch several inches deep over this area.

Because the fungus spores that cause diamond scale are everywhere and can travel by wind and water, removing and disposing of infected leaves probably is not a viable management strategy. Currently no fungicide treatments exist for diamond scale.

FUSARIUM WILT

The fungus *Fusarium oxysporum* f. sp. *canariensis* causes Fusarium wilt, a lethal, vascular disease of Canary Island date palms (*Phoenix canariensis*). There are different forms of this fungus, and

they typically are host-species specific. The form referred to as *forma specialis canariensis* causes disease only on Ca-



Figure 1. Shiny, black, diamond-shaped fruiting bodies are diagnostic for diamond scale.

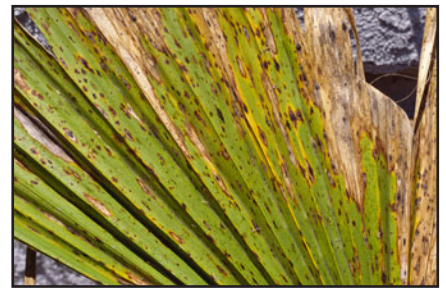


Figure 2. Diamond scale has destroyed chlorophyll in portions of this California fan palm (*Washingtonia filifera*), creating brown, dead areas.



Figure 3. Fusarium wilt usually appears first in older or lower leaves and moves upward to the center or newest leaves.

nary Island date palms. Other forms of this fungus cause wilts on other species in other parts of the world.

Identification and Damage

Symptoms usually appear in older or lower leaves before moving toward the center or newest leaves (Fig. 3), although occasionally this fungus will affect mid-canopy leaves first. Leaves turn yellow then brown but remain hanging on the palm. Initially symptoms might affect the leaflets or pinnae on only one side of the leaf (Fig. 4). Pinnae on the other side remain green, although they eventually also will turn brown and die. This pattern was once thought to be diagnostic for *Fusarium* wilt, but other diseases such as pink rot also can cause one-sided death of leaves. Pinnae death typically occurs first at the base then moves progressively toward the leaf tip, although this pattern sometimes is reversed.

Extensive discoloration along the petiole, the stalk connecting the leaf base to the leaf blade, is another common symptom of *Fusarium* wilt (Fig. 5). External streaking is brown to black while internal, or vascular, discoloration is reddish brown to pinkish (Fig. 6). Although incompletely understood, this pinkish discoloration might be a good diagnostic symptom of the disease.

Infected palms can die within a few months after symptoms appear, or they can linger for several years. Because wilt diseases decrease the ability of the host to take up water, palms with *Fusarium* wilt in cooler, more humid environments, such as near the coast, might show reduced disease severity and survive for many years. Infected palms in hotter, drier interior climates might show severe symptoms and die rapidly.

Because *Fusarium* wilt stresses palms, the opportunistic and mostly secondary disease pink rot frequently is present and can obscure or mask symptoms and hasten death. In fact, pink rot might kill a palm before *Fusarium* wilt runs its course.

In the landscape *Fusarium* wilt spreads frequently on pruning tools, especially chain saws. The pathogen enters cut petioles and, in extreme cases, the cut and exposed vascular tissue of severely pruned or skinned trunks. The pathogen can spread indirectly during pruning, because contaminated sawdust can drift as far as 100 feet.

The pathogen also can spread by entering the palm through its roots. Canary Island date palms tend to form a dense, extensive network of above-ground roots called pneumatophores, especially under excessively damp or wet conditions, which may facilitate pathogen entry.

Fusarium wilt can spread if people dispose of diseased palms or their seeds using a municipal yard-waste program that recycles debris into mulch. The pathogen can survive in the soil for at least 25 years.

Management

Because no cure exists for *Fusarium* wilt and it is nearly 100 percent fatal, prevention and exclusion are critical to disease management. Obtain palms from a reliable source and avoid poorly drained soils and excessive irrigation that can increase the formation of above-ground roots. Keep the area around the base of the trunk free of plants, because they can damage above-ground roots, and avoid using municipal-yard waste as mulch on Canary Island date palms.

Also avoid or minimize pruning if possible. Frequently pruned palms are more likely to suffer from *Fusarium* wilt than those in an unmaintained setting. If you must prune, thoroughly clean all tools by vigorously brushing them to remove sawdust and other particles. Disinfect the equipment for 10 minutes in a 1:3 pine oil to water solution, or heat saw blades for at least 10 seconds per side with a handheld butane torch. Use manual pruning saws rather than chain saws whenever possible, because the latter are difficult if not impossible to clean and disinfect adequately. If you have extremely valu-



Figure 4. *Fusarium* wilt often appears first on only one side of the leaf.



Figure 5. Extensive external and/or internal vascular discoloration or streaking extending along the petiole and rachis is typical of *Fusarium* wilt.



Figure 6. Petioles and rachises with *Fusarium* wilt typically show reddish brown internal vascular discoloration.

able palms, consider using a new saw for each tree, which you either could discard after one use or dedicate for future use on that one palm only. Avoid pruning palms in windy weather to minimize the spread of infected sawdust.

Because a Canary Island date palm with *Fusarium* wilt eventually will die, it is prudent to remove it as soon as feasible. To avoid spreading the

pathogen, excavate the root ball and use a crane to remove the palm with its crown of leaves, trunk, and root ball still attached. Use plastic or wooden barriers to contain any cutting, grinding, digging, or other operations that can spread diseased plant parts. After bagging all debris, prepare removed palms for incineration or removal to a landfill; do not use a waste recycling program.

It is unwise to replant another Canary Island date palm at the same location where a diseased palm once grew, because remnants of infected roots can remain in the soil and transfer the pathogen to the newly planted palm. Removing the soil might not prevent the spread of disease either, because just one small piece of infected root is all that is necessary to infect a newly planted palm. Avoid replanting with any palm species, because host range susceptibility to this disease has not been fully established.

If you must plant a replacement palm, some species to consider include Mexican blue palm, San Jose hesper palm, Guadalupe palm, pindo palm (*Butia capitata*), queen palm (*Syagrus romanzoffiana*), and Mexican fan palm. If you want the *Phoenix* or date palm “look,” consider staminate (male) plants of the date palm (*Phoenix dactylifera*), because they are more robust than the pistillate (female) fruit-bearing plants and more closely imitate the larger, robust habit of Canary Island date palms.

PINK ROT

The fungus *Nalanthamala vermoeseni* (previously called *Penicillium vermoeseni* or *Gliocladium vermoeseni*) causes the disease pink rot. The result of a weak but opportunistic pathogen, pink rot primarily is a secondary disease that affects stressed or weakened palms. While it can attack all parts of a palm, it is most problematic in the growing tips, or apical meristem where new leaves are produced, and in newly emerged leaves.

Pink rot affects nearly all outdoor landscape and indoor palms in California,

including king palm (*Archontophoenix cunninghamiana*), bamboo palms (*Chamaedorea* species), some date palms, Chinese windmill palm, kentia palm (*Howea forsteriana*), queen palm, and California and Mexican fan palms.

Identification and Damage

A variety of symptoms characterizes pink rot, including spotting (Fig. 7) and rotting along rachis and leaves; rotting along leaf tips, leaf bases and trunks; and stunting and distortion of new leaves. Trunk rot is possible in some cases. Pinkish spore masses (Fig. 8), from which the disease derives its name, often are present. A brownish syrupy fluid also might be present. Infected plants weaken and decline and eventually can die.

Cultural or environmental conditions can stress or weaken palms, making them susceptible to pink rot. These conditions include:

- Palms planted too deeply;
- Transplanted palms;
- Excessive irrigation;
- Poor drainage;
- Poorly aerated root zones;
- Improper nutrition;
- Pest infestations and other dis-

eases and disorders;

- Cold weather or freeze damage; and
- Poorly adapted species.



Figure 7. Leaf spots are just one of several symptoms of pink rot on this Canary Island date palm (*Phoenix canariensis*).



Figure 8. Pinkish spore masses, from which the disease derives its name, are often present with pink rot.

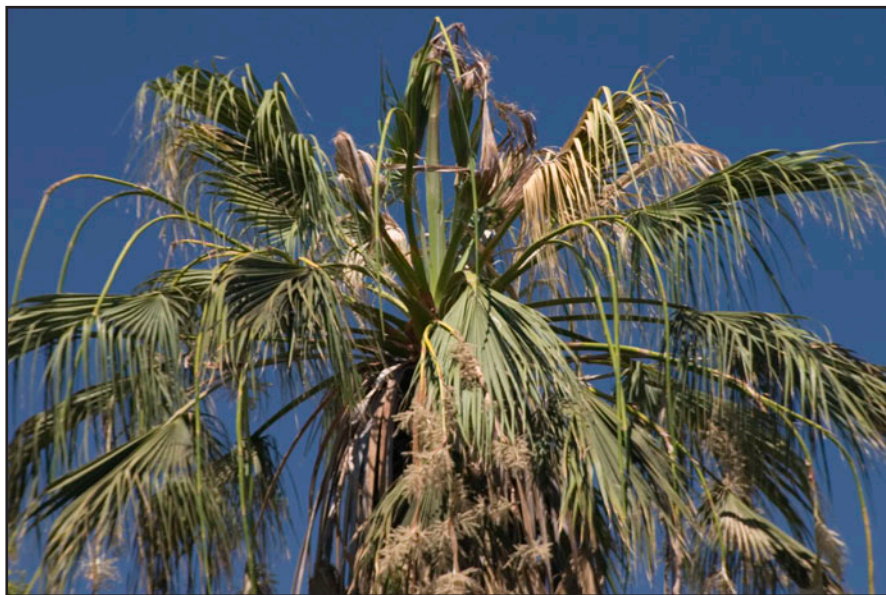


Figure 9. This California fan palm (*Washingtonia filifera*) exhibits symptoms of pink rot disease on newly emerging leaves.

Although not always necessary for disease development, wounds facilitate pathogen entry and increase infection risks. High humidity and temperatures of 65° to 80°F favor the pathogen and disease development.

Like diamond scale, disease severity frequently is cyclical in large, established palms. For example, the pathogen can infect growing tips and spear leaves, the youngest leaves that have not yet unfolded, during the cooler, moist weather of winter and spring when leaf production and growth are slow. This is especially true of the California fan palm. As weather warms in late spring and early summer and the winter-produced spear leaves push out and unfold, you can see the damage even though the disease no longer is active (Fig. 9). The palm then produces an abundance of disease-free leaves during vigorous summer and fall growth. As leaf production and growth slow in the winter, the disease becomes more active again. This cyclical nature and the manner in which palms produce leaves sequentially in the crown often results in a distinctive pattern of a few damaged leaves regularly distributed among otherwise healthy ones.

Pink rot is closely associated with queen palm and California fan palm, especially those growing near the coast, causing spots and rot on leaves and growing tips and sometimes leading to death. It also can cause trunk decay and cavities in king palm, although its role in causing these symptoms on queen palm and other species is unconfirmed. Pink rot is unusually problematic on bamboo palms in nurseries and indoors where it causes leaf and trunk rot, bleeding, wilt, and death.

Management

The best management strategy is to avoid stressed and weakened palms by selecting species well adapted to a particular site and then planting and caring for them properly. Substitute for California fan palm in coastal areas with better adapted species of similar habit, such as Mexican blue palm, San Jose hesper palm, Guadalupe palm,



Figure 10. Sudden crown drop caused the entire crown of leaves and upper part of the trunk, which weigh several tons, to suddenly fall from this Canary Island date palm (*Phoenix canariensis*) and crash to the ground.

Australian and Chinese fountain palms, and Mexican fan palm.

Premature removal of green or even dead leaf bases can result in torn and wounded trunk tissue, making king palm and kentia palm especially susceptible to pink rot. Remove leaf bases only if they fall off easily with little force. Schedule leaf removal or pruning in warm, dry periods before the onset of cooler, moist weather.

The judicious and temporary use of some fungicides, including thiophanate methyl and mancozeb, can be effective in disease suppression until you can correct the cultural problems stressing the palm. Fungicide treatment alone is not a viable management strategy. It can be beneficial to use fungicides after heavy pruning to protect wounds and freshly cut and/or immature tissue.

SUDDEN CROWN DROP

Sudden crown drop is a lethal disease that affects primarily Canary Island date palms and, to a lesser extent, date palms. As the name implies, the entire crown of leaves and upper part of the



Figure 11. These cross sections from a Canary Island date palm (*Phoenix canariensis*) trunk show, from right to left, how infection and decay from sudden crown drop (darkened tissue) progress away from the initial point of infection.

trunk, which can weigh several tons, will fall from the top of the remaining trunk, crashing to the ground with little or no warning (Fig. 10).

Although the fungus *Thielaviopsis paradoxa* has been isolated from Canary Island date palms that have failed due to sudden crown drop, it has not been confirmed that this pathogen is the primary cause of the disease. Other pathogens might be involved, either alone or in tandem with *Thielaviopsis paradoxa*.

Identification and Damage

A particularly troublesome and insidious disease, sudden crown drop results in internal trunk decay (Fig. 11) that you cannot detect visually from the outside. The pseudobark appears unaffected and intact, and sufficient healthy tissue remains inside the trunk to maintain a normal-appearing crown of leaves. However, this amount of healthy tissue is insufficient to maintain the palm's structural stability.

A soft, somewhat yellowish decay that dries and darkens to brown or nearly black is characteristic of this trunk rot. Typically a sharp transition exists between infected and healthy internal tissues. Infection and decay usually begin in the upper part of the trunk, perhaps because tissues there have not fully hardened or because wounding from leaf removal and trunk skinning facilitates entry of the pathogens. The resulting decay pattern has a roughly hourglass shape, with the healthy tissue on the inside and the decayed tissue on the outside still contained within the intact pseudobark. Eventually, the healthy tissue in the "waist" or constricted part of the hourglass is insufficient to support the weight above it, and the crown falls.

Using a heavy mallet to pound and listen for hidden decay in the upper part of the trunk can be a useful diagnostic tool, especially for frequently pruned Canary Island date palms or ones with a current or past history of chain saw pruning.

Although cultural factors, including drought stress, promote disease development and severity in Canary Island date palms, the extensive use of chain saws to prune leaves and to shape and sculpt "pineapples," the ball-like mass of persistent leaf bases just below the leaves, and skin trunks can create gaping wounds that facilitate pathogen entry.

Management

Maintain healthy, vigorous palms through appropriate cultural care.

- Follow adequate fertilizing and irrigation practices.

- Avoid using chain saws and tree spikes, because they can spread inoculum and cause wounds.
- Use straight-edge, manual saws, thoroughly disinfect blades, and prune out and appropriately discard of infected material and palms, as described for Fusarium wilt.
- Don't recycle or chip infected material for use as mulch, because it can contain and spread the pathogen.

Currently no fungicide treatments exist for sudden crown drop.

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