



## Bacterial Leaf Blight of Fishtail Palm

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**T**welve species of single- and cluster-stemmed fishtail palms in the genus *Caryota* are found from India and Sri Lanka to Southeast Asia, northern Australia, and the Solomon Islands. In Hawai'i, *Caryota mitis* (the Burmese fishtail palm) is widely grown in landscapes and is sometimes exported for use in interiorscapes or as houseplants.

The Burmese fishtail palm is prone to damage caused by various problems including spider mites and scale insects, nutrient deficiencies, and fungal leaf spots. Under high rainfall or overhead irrigation, these palms may also be infected by plant pathogenic bacteria that cause a leaf striping blight of leaves. The major disease symptom is conspicuous, darkly colored stripes along and around leaf veins.

This publication describes bacterial leaf blight of *C. mitis* caused by the plant pathogenic bacterium *Acidovorax avenae* subsp. *avenae* and suggests what can be done to recognize and prevent or minimize the damage caused by the disease.

### The pathogen

The bacterium *Acidovorax avenae* subsp. *avenae* (Manns) Willems et al. has also been named *Pseudomonas avenae* Mann 1905 and *Pseudomonas alboprecipitans* Rosen 1922. A number of strains or subspecies of *Acidovorax avenae* attack other plant hosts but not *C. mitis*. It is gram-negative, rod-shaped, and motile, with a single polar flagellum.

### The host

*Caryota mitis*, the Burmese fishtail palm or clustered fishtail palm, is in the Arecaceae family and occurs naturally from Burma to the Malay Peninsula, Java, and

the Philippines. These palms are grown in greenhouses, nurseries, and outdoors in landscapes within warm regions of the United States, such as Florida and Hawai'i. Fishtail palms are also used as interiorscape plants and houseplants in some locations. Outdoors they can grow in large clusters of plants, from 12 to 40 feet in height.

This is a relatively newly described plant disease, having been first studied by plant pathologists in 1978. The disease has been in Hawai'i since at least 1995, according to the CTAHR Agricultural Diagnostic Service Center in Hilo. We do not know when or how this disease was introduced or first reported in Hawai'i. Relatively little published research has appeared on the pathogen that causes the leaf blight in Hawai'i or elsewhere. The disease is relatively common in wet areas in Hawai'i or in nurseries under overhead irrigation.



Initial symptoms of bacterial leaf blight of fishtail palm (*Caryota mitis*) are small, water-soaked, translucent to light yellow, banded areas running along leaf veins. (Photos by S. Nelson)

Reported hosts of *Acidovorax avenae* subsp. *avenae* include corn (*Zea mays*) and rice (*Oryza sativa*). In Iran, twelve isolates of *A. avenae* subsp. *avenae* isolated from rice were reportedly pathogenic on corn, sorghum, barley, oat, sugarcane, barnyard millet, Italian millet, wheat, barnyard grass, and Johnson grass, indicating a wide host range (Rostami and Taghavi 2001). It is unknown if the pathogen affects these hosts in Hawai'i.

### Symptoms

Initial symptoms are small, water-soaked, and translucent to light yellow to light brown banded areas running along and around leaf veins. Mature lesions develop a brown to black color and may have a chlorotic (yellow) halo; lesions range from a minimum of 1–2 mm wide and extend in length up to the entire length of the affected leaf. Initial infections often occur through hydathodes at leaf tips or margins.

### Disease cycle and epidemiology

The most important environmental factor for infection and disease development on *C. mitis* leaves in Hawai'i is free water resulting from high rainfall, frequent dew, or overhead irrigation. Splashing water disperses the pathogen from leaf to leaf or between plants and enhances its survival. The bacteria can enter wounds or natural openings in palm leaves, probably most frequently through hydathodes at the leaf margins. Infections and disease symptoms appear and move along and near leaf veins, resulting in the black stripe symptoms. Symptoms of this disease can appear about 5–10 days after inoculation in greenhouses with air temperature ranging from 18 to 32°C. The pathogen reproduces and survives primarily within infected *Caryota* leaf tissues.

The disease is relatively common in Hawai'i. It is most likely to occur in palm nurseries where *C. mitis* plants are clustered together and irrigated by overhead sprinklers, or in high-rainfall areas.

### Diagnosis

The symptoms are diagnostic for the disease. The mature symptoms are unique to this disease, and there are no diseases of *C. mitis* causing similar symptoms. For bacterial isolation and identification:

1. Wash the symptomatic leaf tissues in fresh water and excise some young lesions.
2. Crush excised lesions in sterile water (or phosphate buffer).

3. Streak the suspension onto agar (beef-yeast extract agar or yeast extract-dextrose-calcium carbonate agar) and incubate; alternately, place excised lesions directly onto the selected agar.
4. Observe colony growth and morphology characteristics on growth media, or use commercial testing kits.

### Integrated management practices

- Eliminate overhead irrigation.
- Irrigate in the morning instead of the evening.
- Grow plants under cover, protected from frequent rainfall.
- Use preventive sprays of copper-containing or antibiotic pesticides.
- Remove symptomatic leaves and destroy them; remove and destroy entire plants if they are severely affected.
- Provide good air circulation around plants to allow leaf drying after they become wet.
- Do not purchase, sell, or distribute diseased plants.
- Increase spacing among plants in nurseries or greenhouses.
- Intercrop *C. mitis* only with non-susceptible plants (i.e., not with reported hosts of the bacterium).
- Do not transplant symptomatic plants into landscapes.

### References

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Distinctive symptoms of bacterial leaf blight of Burmese fishtail palm (*Caryota mitis*) at a palm nursery in North Kohala on the island of Hawai'i, caused by *Acidovorax avenae* subsp. *avenae*. Adjacent lesions may expand and coalesce under wet conditions. Infections usually start at the jagged leaf edges. Symptoms may include light brown, water-soaked tissues.



Older, coalesced lesions develop tan to light-colored central regions that become colonized by fungi that are not necessarily pathogenic to *C. mitis*, especially under moist conditions. Under dry conditions, the bacterial lesions may stop expanding altogether.

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Mature lesions develop a brown to black color and may have a chlorotic (yellow) halo; lesions initially range from a minimum of 1–2 mm wide and may extend up to the entire length of the affected leaf.