



## Bacterial Leaf Blight of Panax (*Polyscias guilfoylei*)

Scot Nelson

Department of Plant and Environmental Protection Sciences

*Polyscias guilfoylei* (Bull ex Cogn. & E. March.) Bailey, commonly called panax, is planted throughout Hawai'i as an ornamental and as a living fence that provides privacy and reduces noise and odors (Figure 1). Its leaves tend to have white or pale yellow borders but may be a uniform dark green in color. Landscapers typically propagate panax from cuttings: Unrooted cuttings 1" diameter x 18" long are put directly into the soil in rows with 1 to 2 ft. of spacing between plants (Duvauchelle 2010). Farmers use panax as windbreaks within and between crop fields. This columnar shrub with its erect branches can reach 24 ft. in height.

Few pests of importance attack the hardy panax in Hawai'i. Pests that cause minor damage include scale insects that colonize the leaves and an algae, *Cephaluros virescens*, that causes leaf spots. One disease that noticeably damages panax foliage is bacterial leaf blight caused by *Xanthomonas campestris* pv. *hederae*. Here we discuss the pathogen, the disease it causes in Hawai'i, and integrated management practices.

### Pathogen and hosts

The pathogen *X. c.* pv. *hederae* is a gram-negative bacterium. More than 12 species and pathovars (pv. = patho-



**Figure 1. A panax (*Polyscias guilfoylei*) hedge serves as a living fence at the University of Hawai'i-Mānoa campus. Symptoms of bacterial leaf blight have been visible on these plants for more than 20 years. Although the disease is not fatal, the lesions are unsightly, cause defoliation, and reduce plant vigor.**

genic variety) of *Xanthomonas* infect plants in Hawai'i (Raabe et al. 1981). This bacterial pathogen produces leaf spot and blight diseases of English ivy (*Hedera helix*) and *Polyscias fruticosa* as well as panax (Crop Knowledge Master 1994).

### Symptoms

Lesions on young leaves often have a water-soaked appearance (Figure 2). The lesions often form amber-colored droplets of exudate on the lower leaf surface (Figure 3). Mature lesions have dried brown centers and dark-colored or black margins. Infections may progress along veins, giving an irregular shape to the lesions (Figure 4, Figure 5). These infections may cause tissue at the end of the leaf to dry out and die (Figure 6). Lesions are sometimes surrounded by diffuse purplish or reddish halos, and blighted leaves may curl (Figure 7) and drop prematurely. When small

veins are infected they become purplish or maroon in color (Figure 8). Only the plant leaves are susceptible to infection by this bacterium.

### Disease cycle and epidemiology

Bacteria on the surface of lesions are spread primarily by splashing water or windblown rain. The pathogen enters plants through wounds and natural openings



**Figure 2.** The darkly colored, water-soaked, and irregularly shaped lesions often exude droplets of an amber-colored exudate from the lower leaf surface.



**Figure 3.** The translucent, medium to light brown center of the lesion may have droplets of amber-colored exudate appearing on the lower leaf surface. Note: this leaf is also infested with a colony of scale insects feeding along the leaf midrib and main veins.



**Figure 4.** The irregularly shaped lesions created by *Xanthomonas* on panax often expand along leaf veins.



**Figure 5.** Although the bacteria move rapidly within leaf veins, the disease also spreads between veins to blight, or damage, large portions of the leaf.



**Figure 6.** Severe blight causes leaves to curl, turn yellow, and fall prematurely. A purplish-red tinge surrounds the lesions as the infection expands within the leaf tissues.

such as leaf stomata, hydathodes, broken trichomes, and cracks in the leaf cuticle. After penetration, the bacteria multiply between plant cells and destroy cell walls with their enzymes. The cellular contents serve as food for the bacterial population. The pathogen can survive for a period of time on fallen leaves.

### Disease management

Employ a variety of integrated management practices to reduce the probability of new infections and minimize disease development and severity. These practices include the following:

#### Starting new plants

Make cuttings from pathogen-free plant material. If the disease is not present on your property, be careful not to introduce it on diseased plants.

#### Location

Do not plant panax in moderate- to high-rainfall areas where the disease is present.

#### Sanitation

Prune heavily diseased branches periodically and destroy the pruned material. Pick up and destroy fallen leaves.

#### Bactericides

Foliar sprays of bactericides will probably not control this disease effectively in high-rainfall areas and are



**Figure 7.** The tips of leaves may assume a dried, parchment texture as tissues desiccate when infected leaf veins are unable to transport water.

expensive. Contact your local Cooperative Extension Service office for current product recommendations and always check a pesticide to be sure it is labeled for panax and for instructions on its use.

#### Leaf wetness and relative humidity

Long periods of leaf wetness and high relative humidity favor infection and disease development. Use the following practices to reduce disease severity by minimizing leaf wetness and relative humidity in the plant canopy.

#### Irrigation

Avoid overhead sprinkler irrigation. Reduce leaf wetness by using drip irrigation. Limit water applications.

#### Soil drainage

Ensure that soils in which panax grows drain adequately.

#### Weed control

Trim weeds and other plant growth around panax plants.



**Figure 8. Progress of this bacterial infection can be measured by the rapid purplish-red discoloration of leaf veins.**

### **Plant spacing, intercropping**

Increasing the space between panax plants, or planting non-host plants between panax, can reduce the spread of infection by water splash and windblown rain.

### **Shade**

Avoid planting panax in heavy shade. Plant panax in a sunny area.

### **Row orientation**

If planting a new row of panax, orient the row perpendicular to the direction of prevailing trade winds. This will help dry the plant foliage and reduce spread of the pathogen within the row.

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### **References**

Crop Knowledge Master. <http://www.extento.hawaii.edu/kbase/crop/type/xanthomo.htm>

Duvauchelle, D. 2010. Panax plant fact sheet. United States Department of Agriculture, Natural Resources Conservation Service, USDA NRCS Hawaii Plant Materials Center, Ho'olehua, Hawai'i.

Raabe, R.A. 1981. Checklist of Plant Diseases in Hawaii. University of Hawai'i, Honolulu.