



Pacific Pests, Pathogens & Weeds - Fact Sheets

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Cassava bacterial blight (173)



Photo 1. Leaves with angular spots caused by cassava bacterial blight, *Xanthosoma axonopodis* pv. *manihotis*, at first limited by the veins, later joining together to form large brown areas of decay, especially at the leaf tips.



Photo 2. Leaves wilting and falling down caused by cassava bacterial blight, *Xanthosoma axonopodis* pv. *manihotis*.



Photo 3. "Candle" appearance of cassava stems, caused by cassava bacterial blight, *Xanthosoma axonopodis* pv. *manihotis*. Leaves infected by the disease have fallen from the stems, the terminal shoot has blackened, and new leaves have developed lower down the stem.

Common Name

Cassava bacterial blight

Scientific Name

Xanthomonas axonopodis pv. *manihotis*. Previously, it was known as *Xanthomonas campestris* pv. *manihotis*, and in Palau is it recorded as *Bacterium robici*, a much older name.

Distribution

Worldwide. It is recorded extensively in South and Southeast Asia, throughout Africa, South and Central America, the Caribbean, Oceania. It has been recorded from Guam, Federated States of Micronesia, Palau, and there is an unconfirmed report of its presence in Solomon Islands. The CABI *Crop Protection Compendium* records cassava bacterial blight from Fiji, but this is likely incorrect.

Hosts

Cassava and wild *Manihot* species.

Symptoms & Life Cycle

At first, angular, water-soaked spots occur on the leaves which are restricted by the veins; the spots are more clearly seen on the lower leaf surface. The spots expand rapidly, join together, especially along the margins of the leaves, and turn brown with yellow borders (Photo 1). Droplets of a creamy-white ooze occur at the centre of the spots; later, they turn yellow. The bacteria travel in the vascular system - the tubes which carry water and food in the plant - from the leaf blades to the leaf stalks, and from there to the stems.

Stem infections block the flow of water and food and the leaves above wilt, die and fall, and branches die back (Photo 2). The tips of the stems blacken resulting in a 'candle' appearance, and new shoots and leaves develop below (Photo 3). These, too, become infected, wilt and die.

Roots are rarely affected, although rots around dead vascular tissue occasionally occur on susceptible varieties.

Spread of the disease occurs over short distances in wind-blown rain, and on tools - bush knives and hoes - and also by people and animals passing through plantations moving the sticky droplets containing the bacteria from infected to healthy leaves. The stems are also infected through wounds, often made when leaves are removed for eating, and by insects.

Long distance spread is in cuttings used for propagation, which sprout to produce leaves with spots and stems that die back. Seeds also become infected via the vascular tissues.

Leaf infection requires 12 hours at 90-100% humidity, with temperatures of 22-26°C. In addition to rainfall, wide fluctuations between night and day temperatures in the range of 15-30°C increase disease severity.

The bacteria survive for many months on stems and gum from the spots and wounds, renewing activity when the rains come. Apart from wounds, the bacteria also enter the plants through the stomata, the natural holes where gases enter and exit the leaves and green stems.

Impact

A major bacterial disease of cassava. There have been a number of epidemics caused by this disease in Africa. In the 1970s they were especially severe in Nigeria, Uganda and Zaire (now the Democratic Republic of Congo) where crop losses were more than 75%. In Zaire, starvation was reported. In Colombia, losses in the 1970s were estimated to be about 7%, even after the most susceptible varieties had been discarded by farmers.

Detection & inspection

Look to see if leaves are drying and dying early. Look for angular spots on the leaves, and cut out small pieces of the leaf from the edge of the spots and place them in a drop of water. Look for bacterial streaming - the streaming appears as white streaks in the water. Look for dark brown to black streaks on the green part of the stem, and for the presence of sticky liquid. Look for browning in the vascular tissues, i.e., the water conducting tubes, after peeling the bark and splitting the stem.

Management

QUARANTINE

Whenever cassava varieties are moved between countries they should be as pathogen-tested plantlets growing in sterile media according to the FAO/IBPGR *Technical Guidelines for the Safe Movement of Cassava Germplasm* - <https://www.google.com.au/webhp?sourceid=chrome-instant&ion=1&espv=2&ie=UTF-8#q=international%20guidelines%20for%20cassava>. Seed should also be treated as stated in the Guidelines. Upon arrival in the receiving country, the plantlets and seed should be grown in containment and kept under observation.

CULTURAL CONTROL

Before planting:

- Carefully, choose cuttings for planting. Do not take them from diseased plantations as the plants may look healthy but have internal infections. If that is not possible, try and obtain cuttings from a trusted source. If neither is possible, look for plants without leaf and stem symptoms, and take from the oldest part of the stems up to 1 m above soil level. Check that there is no browning of the vascular tissues; if there is, discard the cuttings.
- Do not plant new plots of cassava next to those that are infected by the disease. And do not plant downwind as bacteria could be spread in wind-driven rain to the new planting.
- Do not plant crops of cassava one after another on the same land, especially if the last crop had the disease; leave a gap of 1-2 years.

During growth:

- Cut out infected plants if only a few plants show symptoms; only do this during dry times, otherwise the disease may be spread in water droplets.

- Always clean the tools used in cassava plantations, and do not allow people into the plantings unless they are authorised; and also prevent animals from straying inside.

After harvest:

- Collect all the stems and other debris after harvest and burn or bury them, except for the cuttings carefully chosen for planting the next crop.

RESISTANT VARIETIES

Check with government agricultural authorities for varieties that are tolerant to the disease. Many have been bred at international research stations in Africa (IITA) and South America (CIAT). The Secretariat of the Pacific Community (CePaCT lab) carries stocks of these varieties for countries to test. Check what is available.

CHEMICAL CONTROL

This is not an option for the control of this disease.

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Information (and Photo 3) CABI (2013) *Xanthomonas axonopodis* pv. *manihotis* Crop Protection Compendium. (<http://www.cabi.org/cpc>).

Produced with support from the Australian Centre for International Agricultural Research under project PC2010/090: *Strengthening integrated crop management research in the Pacific Islands in support of sustainable intensification of high-value crop production*, implemented by the University of Queensland and the Secretariat of the Pacific Community.

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