

Citrus Canker

XANTHOMONAS AXONOPODIS PV CITRI

BACTERIA – GAMMA PROTEOBACTERIA - XANTHOMONADACEAE

INTRODUCTION

Xanthomonas axonopodis pv *citri* is a bacterial pathogen that causes citrus canker. The disease results in significant economic losses to the citrus industry worldwide, due either to reduced fruit production, reduced access to export markets, or the costs of its prevention and control. In general, citrus canker causes leaf-spots and fruit blemishes. However, during favorable conditions, infections can cause defoliation, shoot dieback, and fruit drop.

DESCRIPTION

The characteristic symptom of citrus canker is the formation of lesions on above-ground parts of citrus such as the fruits, stems, thorns and leaves. Leaf tissue offers more opportunity for infection and as such typically displays the most numerous lesions over time. The lesions are initially tiny pin-point blemishes that are tan in colour. They gradually increase in size to 5 mm - 10 mm in diameter and become thick, spongy and brown or grey. Lesion margins have a watery or oily appearance, and on leaves and fruit, are surrounded by a yellow ring or halo (Fig. 1).

The Asian citrus leaf miner (*Phyllocnistis citrella*) can infest leaves, stems, and fruit and greatly increase the number of individual lesions which quickly coalesce and form large irregular shaped lesions that follow the outlines of the feeding galleries (Fig. 2).

BIOLOGY

Citrus canker thrives in warm regions with high humidity and heavy rainfall. Bacteria ooze from the lesions and are spread



Figure 1: Citrus canker on leaves. Photo by Masao Goto from www.cabi.org/isc/datasheet/56921



Figure 2: Citrus canker in leaf miner gallery. Photo from Gottwald 2000



Figure 3: Citrus canker on fruit. Photo by Elizabeth Asteraki/CABI SEARC

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BIOLOGY cont'd

predominantly by rain splash. In rain storms, bacteria can be carried between trees over distances up to 100 m. The bacteria enter the plant through stomata or through wounds caused by wind driven rain, mechanical wounds caused by equipment, and wounds caused by insects such as citrus leaf miner. The disease can become less active (latent) when the weather is dry for long periods, and then become active again in periods of high rainfall and warm weather.

Lesions become visible about 7 to 10 days after infection on the underside of leaves followed by the upper surface. Citrus canker lesions on fruits extend 1 mm deep and are similar visually to lesions on the leaves (Fig. 3). They can vary in size as the rind remains susceptible for a longer time than for leaves and more than one infection cycle can occur. Individual lesions sometimes penetrate the rind deeply enough to expose the interior of the fruit to secondary infection. On stems, lesions can remain viable for several seasons (Figure 4). Thus, stem lesions can support long-term survival of the bacteria.

DAMAGE

Infection of fruit may cause premature fruit drop but if the fruit remains on the tree until maturity such fruit have reduced fresh fruit marketability. Usually the internal quality of fruit is not affected, but occasionally individual lesions penetrate the rind deeply enough to expose the interior of the fruit to secondary infection by decay organisms.

ENTRY PATHWAYS

The canker lesions ooze bacteria when wet. Over short distances, wind-driven rain, air currents, insects, birds, human movement and equipment such as overhead or spray irrigation systems can spread the bacteria.

Citrus canker can be moved and spread over longer distances on equipment (vehicles, tools, mechanical hedgers, sprayers, gardening equipment) and people (hands, shoes and clothing). Movement of infected plant material, or airborne movement of bacteria as an aerosol or debris during severe weather events (where strong winds and rain are present), can also spread the disease further.



Figure 4: Citrus canker on citrus stem. Photo from Gottwald 2002

REGULATORY STATUS

Citrus canker is a CARICOM A1 regulated pest. Within Central America and the Caribbean, it has been reported from British Virgin Islands. It is also present in Brazil, Bolivia, and Paraguay in South America

REFERENCE(S)

Citrus Canker CABI datasheet. Accessed on September 25, 2018 at <https://www.cabi.org/isc/datasheet/56921>

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