

2.8 Citrus canker :

A. OCCURRENCE AND IMPORTANCE—Citrus canker is a widespread disease throughout the citrus-growing countries of the world. This disease now-a-days occurs in a serious condition in India, China, Java and Japan. It is stated to have originated somewhere in south-eastern Asia (China) and has spread to Europe and the U.S.A.

Exact losses are difficult to assess because of serious damage to trees as well reduction of yields. The disease affects trees by causing cankers on branches and stem, killing young trees and reducing the yield or killing older ones. In young orchards, tree-losses from 10-75% have been observed.

B. SYMPTOMS—Leaves, twigs, young and older branches, fruits etc. are readily attacked. On the leaves lesions appear as small watery, translucent spots, usually of a darker green colour than the surrounding tissue and with a raised convex margins—such type of depressed spots with raised margins are called *cankers*. As a rule the spots first develop on the lower surface of the leaf and then on both the surfaces. With the advancement of the disease, the spots turn white or greyish and finally rupture exposing a light brown spongy mass with a crater-like depression in the centre. The lesions gradually turn brown, scabby and are surrounded by dark brown margins and yellow haloes. Lesions on the twigs are common on the more susceptible types of citrus—on young twigs lesions are like those on the leaves and fruits, but on older twigs they are

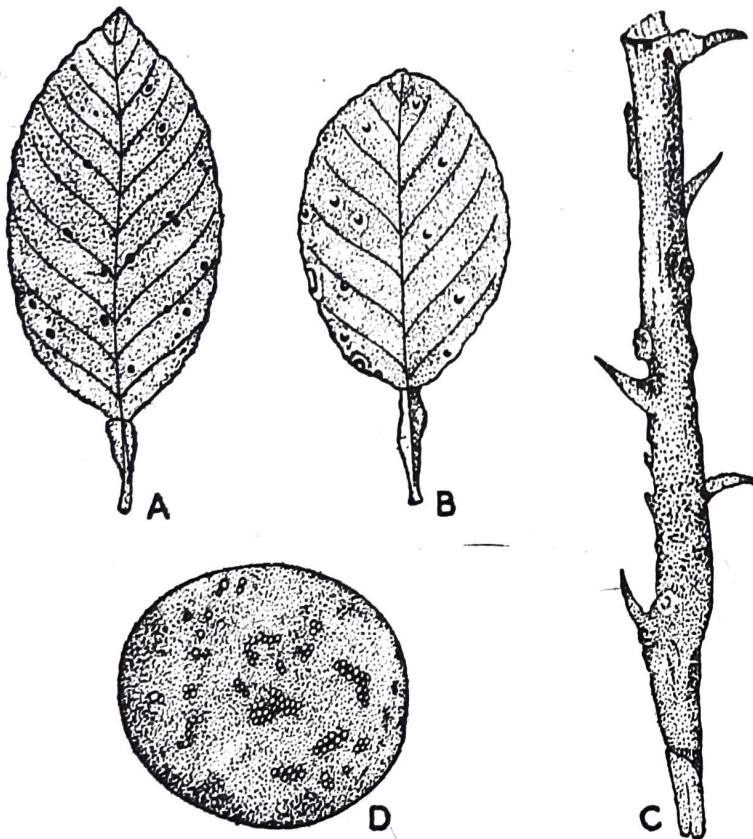


Fig. 2.9—Citrus canker. A, B—Symptoms on leaves, C—Symptoms on stem, D—Symptoms on fruit.

more or less elongated or irregular in shape, especially in case of the old spots—the spots show the same spongy tissue as those found on the leaves but the surface membrane disappears completely and acquire a cankerous appearance. Heavily infected twigs start drying from the tip and severe defoliation occurs. The canker lesions on the fruits have the same appearance as on the leaves except that the yellow halo is absent and the crater-like depression is more noticeable.

C. THE CAUSAL ORGANISM—*Xanthomonas citri* (Hasse) Dowson. [Syn. *Phytoplasma citri* (Hasse) Bergey et al, *Pseudomonas citri* Hasse].

D. ETIOLOGY OF THE PATHOGEN—This pathogen is a Gram-negative, aerobic, rod-shaped bacterium, $1.5-2.0 \times 0.5-0.75 \mu$ in size. It is motile by one polar flagellum; it may occur singly, in pairs, sometimes in short

chains. The bacterium remains enclosed in a capsule and strictly aerobic. A green fluorescent pigment is produced by the bacterium in culture medium.

E. DISEASE CYCLE—The bacterium enters the host through stomata and wounds caused by insects, movement of thorns etc. After penetration the pathogen multiplies rapidly in the intercellular spaces, dissolves the middle lamella and establishes in the cortical region. Mild temperature (between 20°C and 30°C) and good evenly distributed rain are most suitable for the disease. Presence of free moisture (in the form of a film of water) on the host surface for at least 20 minutes is essential for successful infection.

Infected twigs bearing old lesions on the host-plant are the main source of perennation of the pathogen. The pathogen does not survive in the soil or in infected plant parts fallen on the ground. However, the main agent of dissemination of the pathogen and introduction of the disease into new localities is man himself who transfers the disease through infected nursery stock.

F. CONTROL—The following methods are generally recommended to check the disease :—

(1) Use of healthy and disease-free nursery stock for planting in new orchards.

(2) Spraying the nursery stocks (i.e. plants) with 1% Bordeaux mixture before planting in new orchards.

(3) In old orchards, pruning off the affected twigs and spraying with 1% Bordeaux mixture at regular intervals, especially during monsoon.

(4) The dropped off diseased leaves and twigs on the ground should be collected and burnt.

(5) Proper irrigation facilities, application of fertilizers etc. are essential to maintain the growth and vigour of the plant. Care should be taken to reduce the attack of leaf miners. Plant quarantine rules must be followed rigidly so that the movement of diseased plant is prohibited.

(6) Spraying with some antibiotics such as streptomycin (in concentration of 500–1,000 p. p. m.), phytomycin (2500 p. p. m.), agrimycin 100 etc. at 10–15 day's interval is more effective in reducing the disease. Spraying of neem-cake at the rate of about 68 kg. per acre is highly effective in checking citrus canker as well as leaf miner (Vaheedudin *et al* 1959). 22.5 kg. of neem-cake is soaked in 90 litre of water and allowed to decompose for a week—then the mixture is sprayed without filtration ; several sprayings are required to obtain good results.