

SOME DISEASES OF HOT PEPPER IN THE CARIBBEAN COMMUNITY COUNTRIES

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Hot pepper has been grown extensively in the Caribbean. Over the past 5 years trading in this commodity has intensified both intra-regionally and extra-regionally to niche markets in the UK and Canada. 'Scotch Bonnet', an introduced cultivar, is apparently very susceptible to two or more virus diseases endemic in the Caribbean — Tobacco/Tomato Mosaic/Cucumber Mosaic Virus complexes. These virus diseases have been identified in Dominica, Guyana, Jamaica, St Lucia, St Vincent and the Grenadines and Trinidad & Tobago.

However there are also other important diseases reported in hot pepper in the Caribbean which are caused by bacteria, fungi and nematodes.

The causal agents, symptoms, and control measures for some common diseases of hot pepper are briefly described below.

VIRUS DISEASES

Tomato/Tobacco Mosaic Virus (TMV)

Tomato and Tobacco Mosaic Viruses infect pepper, tomato, tobacco and other species of the Solanaceae and are also found in other host plants such as spinach, zinnia, beet and mustard as well as several weed species.



Fig. 1. Pepper plant infected with Tomato/Tobacco Mosaic Virus.

Symptoms

The disease affects the manufacture of plant food and causes generally unthrifty growth. Infected plants are usually stunted and produce small malformed fruits. The young leaves appear chlorotic and curl downwards. Later, as the leaves enlarge irregular blister-like spots develop forming a mosaic of yellow and dark-green patches. The virus also causes varying degrees of leaf distortion (Fig. 1).

Cucumber Mosaic Virus (CMV)

Cucumber mosaic is another important disease on pepper. This virus is less prevalent on pepper than Tomato/Tobacco Mosaic Viruses but (when it occurs) can affect 60-80 % of the crop.

Symptoms

The symptoms resemble those caused by Tomato or Tobacco Mosaic virus and it is difficult to distinguish between the two diseases in the field. With CMV, the normal formation of the leaf blade may be inhibited even more markedly than in TMV virus infections resulting in more extreme malformation and causing the leaves to appear like shoe strings. Significant dwarfing of plants also may occur.

CMV in combination with other viruses can incite necrotic streak and fruit distortion.

Transmission of Virus Diseases

Viral diseases can be spread by:

- infected seed
- insects (such as aphids, white flies and leaf-hoppers)
- man (mechanical transmission).

Control of Virus Diseases

- use clean "certified" seed — this is mandatory
- control insect vectors (aphids, white flies, leaf hoppers) with a good systemic insecticide such as fenitrothion or dimethoate (Roger® 40) at 1.5L/ha. The more expensive but less hazardous pyrethroids (Decis®, Karate®, etc) should be used at flowering and thereafter at 1ml/L. A sticker should be added to the insecticide mixture at a rate of 0.5ml/L.
- rogue plants with virus symptoms
- fertilize adequately, especially with phosphate fertilizer

- practise good field sanitation by controlling weeds
- avoid planting peppers in the same spot for more than 2 years.

BACTERIAL DISEASES

Bacterial Wilt (*Pseudomonas solanacearum* Race I)

Bacterial Wilt is prevalent on hot pepper as well as on tomato and egg plant. It occurs mostly in the wet season. Losses due to this disease are much higher in tomato, though serious economic losses can occur with pepper under favourable conditions.

Symptoms

The lower leaves droop and, later, the entire plant dies. Affected plants wilt rapidly and soon die. Wilt and death are seldom accompanied by chlorosis of leaves. Slimy bacterial material may exude from the bundles when the stem is cross-sectioned. Brown decay of the pith may develop as the infection becomes advanced.

Disease spread

The causal bacteria spread from diseased to healthy plants in the field during rains.

Control

- ensure good soil drainage
- rogue out infected plants
- avoid transplanting in the wet season
- lime to pH 5.0

Bacterial Leaf Spot (*Xanthomonas campestris* pv *vesicatoria*)

Bacterial Leaf Spot occurs sporadically in the Caribbean. However, when the disease does occur it causes economic losses. This disease is found in the wet season and in plots where farmers have used seeds from previous crops. Fruits are also infected and badly spotted resulting in fruits of no value.

Symptoms

Bacterial Leaf Spot appears on leaves, stems and fruit. On leaves the spots are first raised and wart-like (Fig. 2). The raised lesions dry up quickly to form small, dark brown lesion. Affected leaves turn yellow and soon drop. Spots on the fruit are blister-like becoming rough and cankerous.

Disease spread

The disease organism is seed transmitted but the bacteria can also spread from plant to plant during heavy rains.

Control

- use clean "certified" seeds or treat seeds with hot water (52°C for 30 mins) and apply a protectant (e.g. Captan® or Thiram®).
- practice crop rotation for at least 3 years. Do not include tomato or eggplant in the rotation.
- give 2-3 applications of Kocide® (cupric hydroxide) or other copper fungicide at 3g/L once every 2 weeks to reduce leaf infection.

FUNGAL DISEASES

Fusarium Wilt (Fusarium oxysporum)

Symptoms

In contrast to bacterial wilt, Fusarium wilt occurs mostly in hot, dry weather. The underground stems of the plant become dry and brown because of cortical decay while roots may have a soft water-soaked appearance. The above ground symptoms are drooping and yellowing of older leaves, stunting of plants, defoliation and eventually death. A cross-section of the stem of infected plants near the soil line would show browning of vascular bundles.

Disease spread

Fusarium Wilt is a soil-borne disease that enters the plant through the roots. Seedlings grown in infested soil may transfer the fungus from seed beds or boxes to the field.

Control

- plant varieties resistant to the fungus.
- practice a 2-3 year crop rotation but do not include tomato or egg-plant
- avoid planting in heavy soils.

Sclerotinia Rot (Sclerotinia sclerotiorum)

Sclerotinia Rot occurs at high relative humidity and in warm soil temperatures (28-30°C). This disease attacks all parts of vegetable and field crops and is difficult to control.

Symptoms

Growing pepper plants are attacked at any time from the seedling stage to maturity. The fungus attacks

the main stem at the soil line and invades the cortical tissue causing a sudden collapse of plants. Superficial white, cottony growth (mycelium) – characteristic of this fungus – is usually found fairly abundantly and fruiting bodies may be found on the stem at the soil line or on the surrounding soil surface. These are small, hard structures (sclerotia) which turn black with age.

Disease spread

The fruiting bodies (sclerotia) survive in the soil and can be distributed on crop residues, and with seed. When conditions are favourable, they germinate and cause new infections.

Control

- use Captan® (28g/L water) if the disease is observed early on seedlings
- treatment seeds with PCNB®

Anthracnose (Glomerella cingulata (Ston.) Spauld & Schrenk)

Symptoms

The symptoms occur on young or mature fruit as round, slightly sunken, spots. On green-fruit, the fungus causes round, lightly sunken, water-soaked spots which later become elongate and deeply sunken with brown-black centres (Fig. 3).



Fig. 2. Anthracnose on pepper fruit.

Disease spread

The fungus is able to survive in the field mainly on trash from diseased plants and, in addition, can be spread in infected seed.

Control

- practice crop rotation but do not include tomato or eggplant
- destroy remains of previous crops.
- use clean seed treated with a protectant (e.g. Captan® or Thiram®).

NEMATODE DISEASES

Root-knot Nematode (*Meloidogyne* spp.)

There are three species of root-knot nematodes reported to cause damage on economic crops in the Caribbean. By far the most important is *Meloidogyne incognita*, the root-knot nematode (RKN).



Fig. 3. Root galls on mature pepper plant caused by Root-Knot Nematodes (*M. incognita*).

Symptoms

The most prominent symptom is root-galling i.e. enlargements of the roots caused by feeding by the nematodes (Fig. 4). These galls affect the roots ability to absorb water and nutrients and, as a result, infected plants tend to wilt. The older leaves become chlorotic and plant growth is generally unthrifty. Yield and quality of fruit are greatly reduced.

Disease spread

The nematode lives in the soil and feeds on plant roots. It is disseminated in soil and in infected roots.

Control

- practice crop following or crop rotation with chives, onion, or eschallot for 2-3 years.
- Use a nematocide (e.g. Vydate® L) as a soil treatment reduce soil infestation.

It should be recognized that it is generally difficult and uneconomic to eradicate the nematode.

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