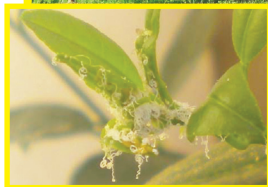


Field Identification Guide for Citrus Greening and Its Insect Vector in Jamaica



Ministry of
Agriculture &
Fisheries



Food and Agriculture
Organization
of the United Nations

Citrus Greening

Huanglongbing (HLB) also known as citrus greening is one of the most serious diseases of citrus worldwide. The disease reduces production and the quality of fruits. There is currently no known cure for citrus greening and the infected trees eventually die.

The disease was first identified in Jamaica in 2009 and is now found through out the island.

Citrus greening is caused by a bacterium which affects the food conducting vessels (phloem) of the plant. The symptoms are seen on the leaves and fruits. The disease is first observed on one section of the plant which later spreads to the entire plant.

The bacterium is transmitted by an insect known as the Asian citrus psyllid (ACP). All present varieties are susceptible to the disease. Control is centred around the management of ACP and planting of certified citrus seedlings.

SYMPTOMS

- The diagnostic symptom for citrus greening is a blotchy mottling pattern on the leaves. Other symptoms associated with the disease are

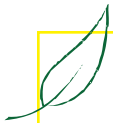
Leaf symptoms (page 2)

- pronounced or prominent 'corky' mid-veins
- interveinal chlorosis
- bright yellow shoots amongst a green canopy
- erect, yellow new leaves commonly called "rabbit-ears"
- premature leaf drop

Fruit symptoms (page 3)

- reduced size in fruits, bitter tasting and poorly coloured
- inversion of colour formation on fruit (stays green on the bottom)
most visible on orange colour varieties of citrus
- fruits with aborted seeds
- premature fruit drop

When the plant is affected by citrus greening nutrient deficiencies and disorders also occur (page 5). If nutrient deficiency and disorder symptoms are not caused by citrus greening it will be seen on several sections of the tree at once.



Leaf Symptoms



Bright yellow shoots amongst a green canopy



Blotchy mottle with light and dark green patches, no symmetry

Yellowing of veins



Corky raised veins



Premature leaf drop

Fruit Symptoms



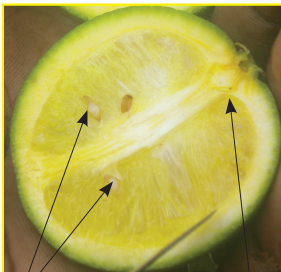
Inversion of colour on orange-coloured variety



Poorly coloured fruit

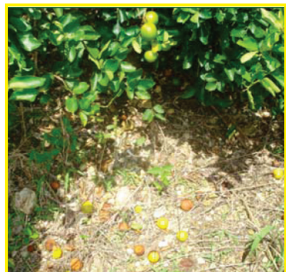


Lopsided fruit with curved columella



Aborted seeds

Yellow stain at base of fruit button



- Excessive fruit drop
- Reduced size in fruits

Insect Vector - Asian Citrus Psyllid



- The disease is spread by the Asian Citrus Psyllid.
- The adult is mottled brown in colour and 3 – 4 mm (0.1 to 0.2 inch) in length.
- The psyllids are set at an angle of 45° to the plant leaf or stem during feeding.
- They are often found on new flush, upper or lower leaf surface or along the plant stem.



- Severely damaged flush may lead to the shedding of leaves and shoots.
- Young trees shed more leaves than mature trees.
- Notching and twisting of leaves caused by feeding of psyllid

- Eggs are oval in shape and 0.3 mm (0.01 inch) long.
- Eggs are orange/yellow.
- Eggs are laid generally in clusters mainly on the tips of growing shoots, in the crevices of unfolded flush and in small cracks on stems or leaves damaged by adult feeding.



- Nymphs do not have wings, however external wing pads are visible on the later (3rd –5th) instar stages.
- Nymphs are yellow/orange or sometimes green in colour and lay flat on the plant surface.
- They possess a straw-like mouth part which is used to pierce the plant to feed on sap resulting in the transmission of the disease agent.
- Nymphs excrete from the anus a large quantity of sugary liquid (honey dew) in a white waxy curly tube. This is typical of the ACP nymph and can be used for its identification.

- Ants may also be present as they are attracted by sugary sweet honey dew.
- Psyllids also feed on the ornamental *Murraya paniculata* (Orange Jasmine or Myrtle).



Not Citrus Greening

Nutritional deficiency symptoms when observed have the same pattern on both sides of the leaf



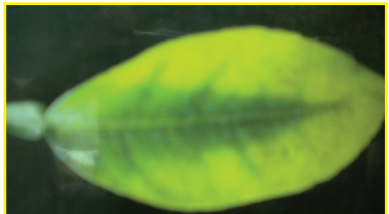
Manganese deficiency



Zinc deficiency
(also occurs with citrus greening)



Iron deficiency



Magnesium deficiency



Greasy spot on both sides of leaves (disease)



Chimera (genetic disorder)



Management

In Jamaica, the management of this disease will require cooperation of all stakeholders in the citrus industry and the public to implement an Area Wide Integrated Management System (A.I.M.S). The components of the AIMS involve

- Establishment of management clusters comprised of citrus growers and neighbouring residential communities in all major growing areas
- Implementation of AIMS tactics within management clusters guided by a network involving personnel from Ministry of Agriculture & Fisheries and other key agencies
- Source clean citrus plants from certified nurseries

Commercial Programme

- Inspect orchards regularly for signs of ACP and symptoms of citrus greening
- Monitor ACP populations weekly, using tap sampling and yellow sticky traps
- Implement scheduled biological and chemical control programme for ACP on farms
- Use recommended nutritional programme
- Practice safe and effective pest control strategies
- Practice good field sanitation
- Maintain accurate records
- Release bio-control agents of ACP in abandoned citrus fields

Residential Programme

- Drench citrus on residential properties with approved systemic insecticides once/twice per year
- Allow the release of bio-control agents on murraya plants

**WITH A.I.M.S, A BETTER CITRUS INDUSTRY!
NO A.I.M.S, NO CITRUS INDUSTRY!
PLEASE JOIN THE EFFORT TODAY!**



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