

biosecurity threats

SA is the second largest exporter of fresh citrus fruit in the world. By CRI Biosecurity Division

With 3 444 232 tonnes produced in 2022, and 99 697 ha under citrus production, SA is currently the 10th largest producer of fresh citrus fruit in the world. In 2022, the country exported 2 391 749 tonnes of citrus – approximately 80% of its total citrus production. And today, the South African citrus industry is worth more than R 30 billion and employs more than 120 000 people.

Currently, the citrus industry is free from many of the citrus pests and diseases that have caused devastation in other citrus growing countries. The global increase in movement of people and products, coupled with limited capacity for border control, means that the South African citrus industry faces many potential threats of exotic pest incursions.

Biosecurity is at the core of the Citrus Research International (CRI) mission to maximise the long-term global competitiveness of the Southern African citrus growers. The mission statement for the CRI Biosecurity Division reads: "Protecting the southern African citrus industry through timely identification of biosecurity threats, the development of preparedness, awareness, early detection, rapid response and impact mitigation plans, and ensuring effective application of the associated actions." The strategic objectives aimed at ensuring implementation of the CRI biosecurity mission are summarised under four pillars: preparedness, operations, awareness (incl. networking and stakeholder engagement), and the Citrus Improvement Scheme.

Under the preparedness pillar, the top 10 pests and diseases that pose the greatest biosecurity threat to the South African citrus industry were identified, and mini pest risk analyses were compiled for each. From these, appropriate preparedness actions and rapid response plans will be developed. Fact sheets containing all the relevant information are available on the CRI website (<https://www.citrusres.com/public-downloads/>).



HLB symptoms: small leaves, yellow veins, asymmetrical mottle



Psyllid Immatures

Huanglongbing or Asian Greening



Trioza erytreae

The disease

- Huanglongbing (HLB) or Asian Greening, associated with the bacterium 'Candidatus Liberibacter asiaticus' (CLAs), is the most destructive citrus disease worldwide.
- Tree growth, health and fruit production are severely impacted.
- Infected trees die, and symptomatic fruit are unsuitable for fresh fruit or juice markets.
- There is no cure once trees become infected. And infected trees need to be eradicated.

Possible misidentification

Leaves may show symptoms resembling those of zinc, copper, or manganese deficiencies. However, the asymmetrical blotchy mottle, typical of HLB, is in contrast with symptoms of nutrient deficiencies, which are symmetrical. Symptoms of mineral deficiency such as yellowing, are distributed uniformly throughout the canopy. But HLB symptoms may be more scattered. HLB may also be confused with other diseases, such as citrus stubborn disease, phytoplasma infections, dieback, citrus tristeza virus, Phytophthora root rot and citrus blight.

Method of spread

Insect vectors

Asian citrus psyllid (ACP) (*Diaphorina citri*) and

African citrus trioza (ACT) (*Trioza erytreae*):

They feed from the phloem sap of infected hosts. Once acquired, the bacteria can persist in the vector for up to three months and transmit the HLB bacteria when feeding.

Infected plant material

Citrus propagation material (trees, cuttings, grafts, budwood) and propagation material of other hosts.

Not transmitted via fruit or seed.

Symptoms

The first symptom of HLB on a tree is usually a branch or twig with yellow leaves. The most characteristic leaf symptom is asymmetrical blotchy mottling. The veins are often prominent and yellow. Abundant leaf drop is also common.

Chronically infected trees show sparse yellow foliage, extensive twig dieback, stunted growth, corky veins, and root decline. Fruit is poorly coloured (greening) and shows colour inversion when maturing: the peduncular (twig) end of the fruit turns orange, while the stylar end is still green. Some fruit on infected trees is reduced in size, lopsided (inside the columella is curved), low in soluble solids, high in acids, and can have a sour, bitter or salty taste. Unseasonal and heavy flowering on diseased branches and out-of-phase flushing can also be seen.

The tree can remain symptomless for months or years after the initial infection.

Symptom development is slow and

infected trees decline gradually in vigour and yield, and remain stunted, or eventually die. The disease develops irregularly, so individual trees may show a combination of normal and diseased sectors.

Host range

Mainly plants in the family Rutaceae, including:

- all *Citrus* spp.
- orange jasmine (*Murraya paniculata*)
- curry leaf (*Berberis koenigii*).

Current distribution

- Ethiopia • Kenya • Mauritius • Réunion
- Asia • Papua New Guinea
- America (North, Central and South).

Preventative actions

- quarantine procedures for importation of citrus propagation material and other hosts
- plant certified, disease-free citrus trees
- awareness and surveillance to ensure early detection and rapid implementation of control measures
- prevent incursion and spread of ACP, including effective control of ACT
- do not bring illegal plant material into SA and onto your farm.



Poor colouring (HLB)

Similar fact sheets will appear in future editions to increase awareness around these perilous threats.

Asian Citrus Psyllid



Adult Asian
Citrus Psyllid

The insect

Asian Citrus Psyllid (ACP) is the most efficient vector of the most destructive citrus disease in the world, Huanglongbing (HLB), associated with the bacterium 'Candidatus Liberibacter africanus'.

ACP can also transmit African greening 'Ca. Liberibacter africanus' (Claf), as well as 'Ca. Liberibacter americanus'. The combined presence of ACP and HLB poses the greatest threat to citrus production worldwide.

Description

ACP adults are about 3–4 mm long and 1 mm wide, with a light-brown head, yellow-brown, mottled body, green-brown or pink-brown abdomen, and grey-brown legs. The wings are transparent, mottled with white and light-brown spots and a broad dark-brown band extending around the periphery of the outer half of the wing, slightly interrupted near the apex. The terminal segments of the antennae are black, with two darker segments in the middle of the antennae.

Possible misidentification

ACP can easily be confused with indigenous *Diaphorina* species that are morphologically

similar. Distinction of ACP amongst these lookalikes requires expert identification. Adult psyllids could also be confused with aphids. However, they are highly active and jump at the slightest disturbance, compared to aphids that are less active. Psyllid immatures can be confused with soft scale insects (such as soft brown scale), but the psyllid immatures have clear body parts, compared with scales, and can excrete waxy filaments.

Method of spread

Natural flight

ACP has substantial flight capacity, being able to disperse over distances of at least 2 km within 12 days, when suitable young host material for feeding and oviposition is scarce.

Infested plant material

Eggs and immatures can be transported over long distances on citrus plant material (budwood, trees, rootstock seedlings) and branches and foliage of other host plants, particularly orange jasmine (*M. paniculata*) and curry leaf (*B. koenigii*).

Fruit

Spreading via fruit without leaves, after the packing process, is highly unlikely.

Signs of presence

Eggs are laid on tips of young, tender twigs and flush, and on or between unfurling leaves in buds and leaf axils. Immature stages and eggs are bright yellow/orange in colour. Immatures feed on young tender leaf growth and cause the new leaf tips to die back. Affected shoots can become stunted and twisted, causing the growing tips to appear rosetted.

Infestation causes curling of leaves, notching and premature leaf drop. Adults and immatures produce honeydew, causing black sooty mould to grow. Heavy infestations can cause blossom and fruitlet drop. However, their main danger is the spread of HLB.

Host range

Hosts are mainly plants in the family *Rutaceae*, including:

- all *Citrus spp.*
- orange jasmine (*Murraya paniculata*)
- curry leaf (*Bergera koenigii*).

Current distribution

- Benin • Ethiopia • Kenya • Nigeria
- Tanzania • Zanzibar • Mauritius • Réunion
- Middle East • Cyprus (under eradication)
- Israel (under eradication) | • Asia • Oceania
- America (North, Central and South).

Preventative actions

- quarantine procedures for importation of citrus propagation material and other hosts
- surveillance at borders and on-farm, with yellow or lime-green sticky traps
- plant certified, disease-free citrus trees
- awareness and surveillance to ensure early detection and rapid implementation of control measures
- do not bring illegal plant material into SA and onto your farm. 🍌

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For more information on these diseases, or if you find anything unusual, contact

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GELBHORN 140



GELBHORN 150



RIGI 300



PILATUS 200



WEISSHORN 260



WEISSHORN 280



BERNINA 6350



BERNINA 6195



BEVERIN 10



WILDHORN 32



TAMBO 901



TAMBO 910



TAMBO 950



TAMBO 990