



## Croton scale

# *PHALACROCOCCUS HOWERTONI*



**Figure 1.** Adult females and first instars of croton scale *Phalacrocooccus howertoni* infesting cotton *Codiaeum variegatum* in Nassau, New Providence, Bahamas © Chris Malumphy

### Background

A soft scale (Hemiptera: Coccidae), first recorded in Florida (USA) in 2008 and subsequently becoming a serious pest, was described by Hodges and Hodgson (2010) under the name *Phalacrocooccus howertoni* Hodges & Hodgson. It is commonly known as the croton scale and has spread widely in the Caribbean region.

Within the UK Overseas Territories it was first detected in the Cayman Islands in 2012 where it has since been found on a range of plants, including fruit trees (guava *Psidium guajava*, mango *Mangifera indica*, avocado *Persea americana*, soursop *Annona muricata*, breadfruit *Artocarpus altilis*, June plum *Spondias dulcis*, and Cayman red plum *Spondias purpurea*), ornamental plants (croton *Codiaeum variegatum*, copperleaf *Acalypha wilkesiana*, Florida strangler fig *Ficus aurea*, and West Indian jasmine *Ixora* spp.) and native plants (red birch *Bursera simaruba*). Croton scale poses an economic and environmental plant health risk to all the UKOTs with tropical climates, especially those in the Caribbean where it is currently expanding its geographical range.

## Geographical Distribution

*Phalacrocooccus howertoni* is an invasive species in Florida and the Caribbean but its origin is unknown.

**North America:** USA (Florida, since 2008).

**Central America:** Guatemala (since 1990).

**Caribbean:** Bahamas, Cayman Islands, and Puerto Rico.

## Host Plants

*Phalacrocooccus howertoni* is polyphagous, feeding mostly on woody dicotyledonous plants belonging to at least 36 families. It shows a preference for plants assigned to the families' Euphorbiaceae (especially *Codiaeum*), Rubiaceae and Sapotaceae.

**Acanthaceae:** *Blechnum brownei*.

**Anacardiaceae:** *Mangifera indica*, *Schinus tenebinthifolius*, *Spondias dulci*, *Spondias purpurea*.

**Annonaceae:** *Annona muricata*.

**Araceae:** *Alocasia*, *Calocasia esculentum*.

**Artocarpeae:** *Artocarpus altilis*.

**Asteraceae:** *Bidens alba*, *Eclipta prostrata*.

**Bignoniaceae:** *Tabebuia heterophylla*.

**Burseraceae:** *Bursera simaruba*.

**Capparaceae:** *Capparis cynophallophora*.

**Chrysobalanaceae:** *Chrysobalanus icaco*.

**Combretaceae:** *Conocarpus erectus*.

**Elaeocarpaceae:** *Elaeocarpus*.

**Euphorbiaceae:** *Acalypha wilkensisiana*, *Chamaesyce hirta*, *Codiaeum variegatum*, *Gymnanthes lucida*, *Jatropha integerrina*, *Phyllanthus urinaria*, *Savia bahamensis*.

**Guttiferae:** *Callophyllum*, *Clusia*.

**Lauraceae:** *Licaria triandra*, *Persea americana*.

**Longaniaceae:** *Spigelia anthelmia*.

**Malvaceae:** *Sida*.

**Melastomataceae:** *Tetrazygia bicolor*.

**Moraceae:** *Fatoua villosa*, *Ficus aurea*, *Ficus microcarpum*, *Ficus mysorensis*, *Morus alba*.

**Musaceae:** *Heliconia*.

**Myrsinaceae:** *Ardisia escallanoides*, *Rapanea punctata*.

**Myrtaceae:** *Calyptranthes pallens*, *Eugenia axillaris*, *Myrcianthes fragrans*, *Psidium guajava*.

**Oleaceae:** *Ligustrum japonicum*.

**Oxalidaceae:** *Averrhoa carambola*.

**Piperaceae:** *Piper methisteum*.

**Poaceae:** *Digitaria*.

**Polygonaceae:** *Coccoloba diversifolia*, *Coccoloba uvifera*.

**Rubiaceae:** *Hamelia patens*, *Psychotria ligustrifolia*, *Psychotria nervosa*, *Psychotria sulzneri*, *Randia aculeata*, *Spermacoce verticillata*.

**Rutaceae:** *Clausena lansium*, *Glycosmis pentaphylla*, *Zanthoxylum fagara*, *Zanthoxylum flavum*.

**Sapindaceae:** *Cupania glabra*, *Dimocarpus longan*, *Dodonaea viscosa*, *Filcium decipens*.

**Sapotaceae:** *Chrysophyllum cainito*, *Manilkara jaimiqui*, *Sideroxylon celastrinum*, *Sideroxylon foetidissimum*, *Sideroxylon salicifolium*.

**Verbenaceae:** *Citharexylum spinosum*, *Phyla nodiflora*.

**Zygophyllaceae:** *Guaiacum sanctum*.



**Figure 4** *Phalacrocooccus howertoni* feeding along the main veins on the foliage of *Codiaeum variegatum* © Chris Malumphy



**Figure 5** *Phalacrocooccus howertoni* adult females (green) feeding on the veins and male tests (translucent) on the lamina © Chris Malumphy



**Figure 4** *Phalacrocooccus howertoni* large infestation on the foliage of *Codiaeum variegatum* © Chris Malumphy



**Figure 5** A ladybird feeding on immature *Phalacrocooccus howertoni* © Chris Malumphy

## Description

Adult female scales are approximately 4 mm long by 2 mm wide, green to yellow-green in colour, with dark striations on dorsum (Figs 1-3). The females are common along the main veins on the under surface of the foliage (Figs. 1-3) and on the apical stems (Fig. 7). Male tests often occur in high densities on the foliage lamina (Figs 3-6).

Hodges & Hodges (2010) provide detailed morphological descriptions and illustrations of the adult female and adult male, male and female second-instars, first-instars, and pupa of *Phalacrocooccus howertoni*. The genus *Phalacrocooccus* is monotypic.

Adult female *Phalacrocooccus howertoni* are similar in appearance to adult female *Philephedra tuberculosa* but the latter produce a conspicuous elongate white waxy ovisac whereas *Phalacrocooccus howertoni* does not.

## Biology

*Phalacrocooccus howertoni* exhibits ovoviviparity (eggs hatch immediately), has multiple overlapping generations each year, averaging about one a month in tropical conditions, overwinters as the adult female, and each female can lay about 400 eggs. Females have three immature stages prior to becoming adults, while males have four immature stages (including a 'pre-pupa' and 'pupa'). Natural Enemies in Florida include the predators: *Cryptolaemus montrouzieri* Mulsant (Coleoptera: Coccinellidae) and *Laelilla coccidivora* Comstock (Lepidoptera: Pyralidae).

## Dispersal and Detection

The first instar is the main natural dispersal stage and either crawls over the host plant in search of a suitable feeding site or may be carried in air currents or by other animals. They may also be dispersed over long distances in plant trade. Infestations of *P. howertoni* are usually detected first by their host plants being black with sooty mould. The bright green adult females are usually easy to detect in the field.

## Economic Impact

Large populations of *Phalacrocooccus howertoni* cause premature leaf loss and dieback on woody hosts. Smaller plants may be killed, particularly those of *Codiaeum* (Fig. 7). *Phalacrocooccus howertoni* egests copious quantities of honeydew and this inhibits photosynthesis and encourages the growth of sooty moulds. *Phalacrocooccus howertoni* is potentially a serious pest of tropical and subtropical ornamental and fruit plants and the environment due in part to its polyphagous nature and prodigious reproductive capacity.





**Figure 6** Large infestation of *Phalacrocooccus howertoni* on *Codiaeum variegatum* causing premature leaf loss © C. Malumphy



**Figure 7** Young *Codiaeum variegatum* plant killed by huge infestation of *Phalacrocooccus howertoni* © C. Malumphy

## Advisory Information

Systemic and contact pesticides may be used to control scale insects depending on the crop and growing conditions. Chemical applications should only be targeted at focal points of infestation and widespread applications should be avoided in order to preserve the natural enemies that keep *P. howertoni* under an ecological balance. Before using any pesticide the appropriate government body or plant protection service needs to be contacted to check the current regulation and the label instructions must be followed.

## References

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