

Unaspis yanonensis

Scientific Name

Unaspis yanonensis Kuwana

Common Name(s)

Japanese citrus scale, Oriental citrus scale, citrus snow scale, arrowhead scale.

Type of Pest

Scale insect

Taxonomic Position

Class: Insecta, **Order:** Homoptera, **Family:** Diaspididae

Reason for inclusion in manual

National pest list

Pest Description

Adult female scale covers are oyster-shell shaped, 2.5 to 3.6 mm, blackish-brown with a paler margin (CABI, 2004). Exuviae terminal are brownish-yellow. Immature male scale covers are elongate, 1.3 to 1.6 mm, felted white, with two or three longitudinal ridges (see USDA, 1984 - which also gives full diagnostic characters) (Fig. 1)

Pest Importance

Unaspis yanonensis feeds almost exclusively on *Citrus spp.* In Japan, it is found on all types of citrus except on the Japanese hybrids known as Natsudaidi and on *Citrus junos* (Ohkubo, 1980). It affects fruits, leaves, stems—the whole plant—and can cause serious damage to orchards due to leaf drop and rapid dieback.



Figure 1. Arrowhead scales on branches and leaves. Photo courtesy of <http://perso.wanadoo.fr/scanice/cochenille.htm>

Fruits, leaves and small branches are attacked, whereas large branches and trunks are not. Only the second and third generations are found on fruits (Ohkubo, 1980). Attacked fruits lose their commercial value because of the feeding punctures of the pest. Relatively low numbers of scales can cause damage. Leaves and branches begin to die back at a density of 1.1 females per leaf (Ohkubo, 1980), while, in the spring, a density of 8 females per leaf is likely to lead to complete dieback of the tree within the year (Ohgushi and Nishino, 1968). The cause of the dieback is not yet understood, but it has been suggested that the scale may inject toxic saliva into the tissues.

Symptoms

Attacked plants show inhibited growth, yellow blotches and necrosis of leaves, leaf fall, shortened or dead branches, and small deformed fruits. Large masses of male white scales may be seen on twigs with darker curved female scales. In cases of severe attacks, tree mortality has been observed (CABI, 2004).

Known Hosts

Unaspis yanonensis feeds almost exclusively on *Citrus spp.* Primary hosts include *Citrus deliciosa* (Mediterranean mandarin), *Citrus limon* (lemon), *Citrus reticulata* (mandarin), *Citrus sinensis* (navel orange), *Citrus unshiu* (satsuma), and *Citrus x paradisi* (grapefruit). It has been reported on *Damnacanthus* in Rubiaceae, *Fortunella* (kumquat) and *Poncirus* in Rutaceae (USDA, 1984).

Known Distribution

Unaspis yanonensis originates from Southeast Asia, and has been accidentally introduced into limited areas in southern France and northern Italy (Liguria). *Unaspis citri* is present in China, Japan, Korea, France, Italy, and Fiji (CABI, 2004).

Potential Distribution within the US

This predominately Asian species prefers the warm temperate Mediterranean and tropical climates; citrus is its host species. There is potential for the scale insect, *U. yanonensis*, to become established in particular areas of the US where citrus production and warm temperatures co-exist.

Survey

In Japan, plants damaged by this scale typically have leaves, withered green twigs, and whole branches that are dead. Feeding by this scale seems to cause inordinate amounts of damage; very lightly infested leaves will wilt and die.

Heavily infested trees are conspicuous and easily recognized by large masses of white male scale covers on the twigs, leaves, and fruit. The small size, dark color, and sessile nature of the female scales make them difficult to detect unless present in large numbers. On citrus fruit, the female scales can be confused with the common *Lepidosaphes spp.* or easily overlooked as dirt particles.

Individual leaves, stems, and fruit should be examined for various stages of the scale insect. If scale insects are present, material should be forwarded to a laboratory for microscopic examination and positive identification. When forwarding material for

identification, scales should be attached to the host material. Adult females are important for the identification and speciation, should be included in the material if possible. Because the pathogen is exotic, be sure the specimens are dead. The easiest way to accomplish this is to freeze the leaf, twig, and fruit for up to 24 hours (USDA, 1984).

Key Diagnostics

Identification of armored scales is performed by studying the shape, dimension, and color of the cover. For this reason, the infested parts of the plant have to be examined under a stereomicroscope. For an exact identification to species, the body of adult females should be studied, as there are no adequate keys for the separation of species based on nymphs or adult males. Covers of specimens are moved with a needle to collect scale bodies. Specimens removed from under the cover have to be prepared for morphological study under the microscope.

The arrowhead scale is similar to the citrus snow scale, *Unaspis citri*, but can be distinguished from it by microscopic examination of the adult females. *Unaspis citri* is present in California, Florida, Georgia, and Louisiana. Adult female *U. citri* have relatively few pygidial dorsal ducts, do not have marked divisions between the thoracic segments, and have subjacent median lobes. Adult female *U. yanonensis* have numerous pygidial dorsal ducts, usually marked divisions between the thoracic segments and distinct median lobes (USDA, 1984; CABI, 2004).