EPPO Datasheet: *Lopholeucaspis japonica*

Last updated: 2023-05-12

IDENTITY

Preferred name: *Lopholeucaspis japonica*
Authority: (Cockerell)
Taxonomic position: Animalia: Arthropoda: Hexapoda: Insecta: Hemiptera: Sternorrhyncha: Diaspididae
Other scientific names: *Leucaspis hydrangeae* Takahashi, *Leucaspis japonica darwinensis* Green
Common names: Japanese long scale, Japanese maple scale, Japanese pear white scale
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EPPO Categorization: A2 list
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EU Categorization: Quarantine pest ((EU) 2019/2072 Annex II A)
EPPO Code: LOPLJA



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Notes on taxonomy and nomenclature

Lopholeucaspis japonica was originally described by Cockerell in 1897. It was originally described as *Leucaspis japonicus* and was found on *Cytisus* sp. It was introduced from Japan into the United States.

HOSTS

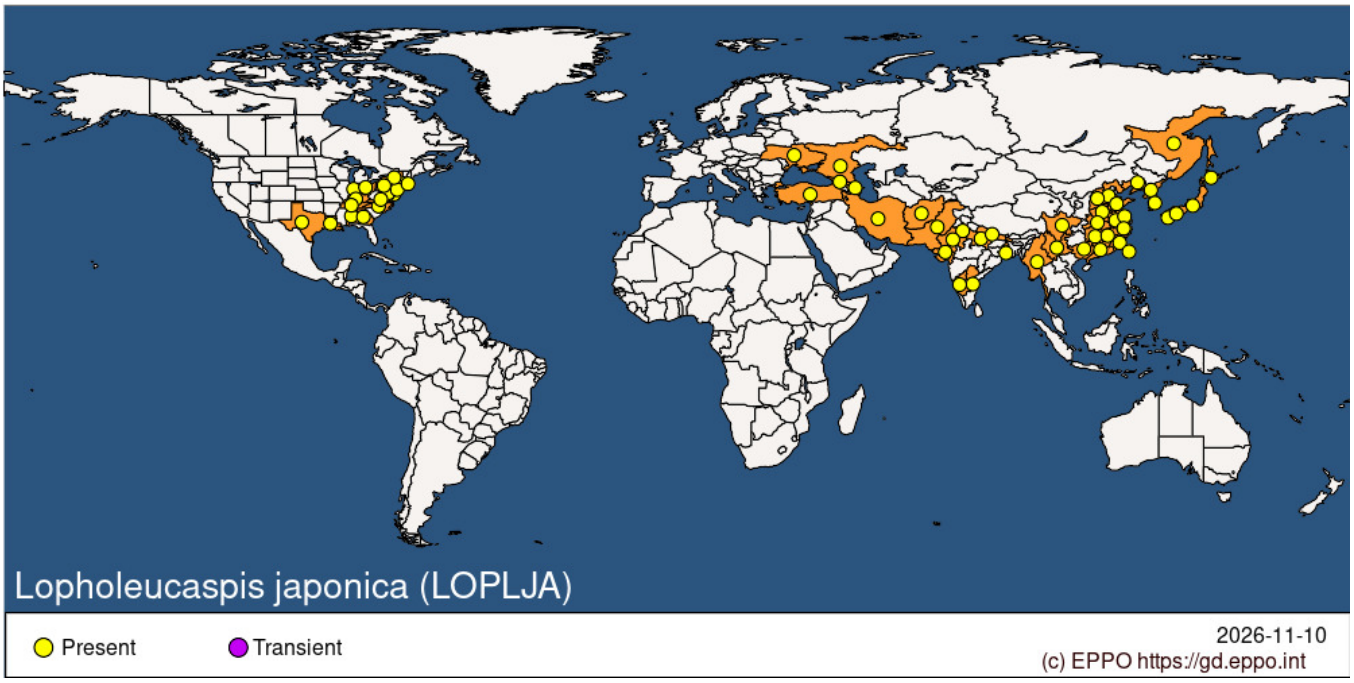
The main hosts of economic importance are *Citrus* spp., although various other fruit trees - apples (*Malus pumila*), cherries (*Prunus avium*), pears (*Pyrus pyrifolia*), persimmons (*Diospyros kaki*), figs (*Ficus* spp.) - and outdoor woody ornamentals (*Acer*, *Betula*, *Cytisus*, *Laurus*, *Magnolia*, *Rosa*, *Syringa*, *Tilia*) are also attacked, as well as some glasshouse ornamentals (*Camellia*). The ScaleNet database (García *et al*., 2016) records the scale on 63 genera in 39 families. The host range could be equally wide in the EPPO region, though *Citrus* spp. would be the main potential host.

Host list: *Acer campestre, Acer caudatum subsp. ukurunduense, Acer griseum, Acer henryi, Acer palmatum, Acer pensylvanicum, Acer pictum, Acer rubrum, Acer saccharum, Acer velutinum, Acer x freemanii, Alnus glutinosa, Alnus sp., Amelanchier sp., Amelanchier x grandiflora, Aronia arbutifolia, Betula papyrifera, Betula utilis, Buxus sempervirens, Buxus sp., Camellia sinensis, Camellia sp., Carpinus betulus, Carpinus caroliniana, Castanea mollissima, Celastrus sp., Cercis canadensis, Chaenomeles sp., Cinnamomum camphora, Cistus laurifolius, Citroncirus, Citrus reticulata, Citrus sp., Citrus trifoliata, Citrus x aurantium var. paradisi, Citrus x aurantium var. sinensis, Citrus x aurantium var. unshiu, Citrus x junos, Citrus x limon, Citrus, Cladrastis kentukea, Cornus controversa, Cornus florida, Cornus kousa, Cornus macrophylla, Cornus mas, Cornus officinalis, Cornus x rutgersensis, Corylus avellana, Cotinus coggygria, Cotoneaster sp., Crataegus laevigata, Crataegus viridis, Cydonia oblonga, Cytisus sp., Diospyros kaki, Diospyros lotus, Diospyros virginiana, Distylium racemosum, Elaeagnus umbellata, Enkianthus sp., Euonymus alatus, Euonymus japonicus, Fagus grandifolia, Ficus benghalensis, Ficus carica, Ficus religiosa, Fortunella, Fraxinus pennsylvanica, Gleditsia japonica, Gleditsia triacanthos, Halesia carolina, Hydrangea paniculata, Ilex crenata, Ilex opaca, Ilex verticillata, Ilex x aquipernyi, Ilex x koehneana, Ilex x meserveae, Juglans regia, Koelreuteria paniculata, Laurus nobilis, Ligustrum sp., Liquidambar styraciflua, Liriodendron tulipifera, Lonicera caprifolium, Magnolia denudata, Magnolia grandiflora, Magnolia kobus, Magnolia macrophylla, Magnolia stellata, Magnolia virginiana, Magnolia x loebneri, Malus domestica, Malus floribunda, Malus sargentii, Malus x zumi, Menyanthes trifoliata, Mespilus germanica, Morus alba, Oxydendrum arboreum, Paeonia lactiflora, Parrotia persica, Paulownia tomentosa, Populus alba, Populus deltoides, Populus sp., Prunus avium, Prunus cerasifera, Prunus domestica, Prunus serrulata, Prunus subhirtella, Prunus x incam, Prunus x yedoensis, Pseudocydonia sinensis, Punica granatum, Pyracantha coccinea, Pyrus calleryana, Pyrus caucasica, Pyrus pyrifolia, Quercus sp., Rhus typhina, Robinia sp., Rosa canina, Rosa chinensis, Rosa sp., Salix alba*

, Stewartia pseudocamellia, Styphnolobium japonicum, Styrax japonicus, Styrax obassia, Syringa reticulata, Syringa vulgaris, Tetradium daniellii, Tilia rubra, Tilia tomentosa, Ulmus americana, Ulmus parvifolia, Vitis vinifera, Wisteria sp., Xanthoceras sorbifolium, Zelkova serrata, Ziziphus jujuba, x Citrofortunella microcarpa

GEOGRAPHICAL DISTRIBUTION

L. japonica originated in the Far East, but has spread to various tropical or semitropical areas throughout the world. In particular, it has spread to a limited extent to different parts of the former USSR (e.g. Georgia) (Konstantinova & Gura, 1986).



EPPO Region: Azerbaijan, Georgia, Russian Federation (Far East, Southern Russia), Türkiye, Ukraine
Asia: Afghanistan, China (Anhui, Fujian, Guangdong, Guangxi, Hebei, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Liaoning, Shandong, Shanxi, Sichuan, Yunnan, Zhejiang), India (Andhra Pradesh, Gujarat, Haryana, Karnataka, Rajasthan, Uttar Pradesh, West Bengal), Iran, Islamic Republic of, Japan (Hokkaido, Honshu, Kyushu, Shikoku), Korea, Democratic People's Republic of, Korea, Republic of, Myanmar, Nepal, Pakistan, Taiwan
North America: United States of America (Alabama, Connecticut, Delaware, District of Columbia, Georgia, Indiana, Kentucky, Louisiana, Maryland, New Jersey, New York, North Carolina, Ohio, Pennsylvania, Rhode Island, Tennessee, Texas, Virginia)

BIOLOGY

Lopholeucaspis japonica is a polyphagous-armoured scale insect which has a feeding preference for smooth barked woody trees and shrubs (EFSA, 2018).

L. japonica hibernates in bark crevices and leaves of trees in its second larval stage. The pest has been reported to also overwinter as fertilized females in Japan (Murakami, 1970) and Pennsylvania (US) (Stimmel, 1995). In the Far East, *L. japonica* can survive overwinter at temperatures of -20 to -25°C.

EFSA (2018) detail that oviposition starts in spring (late March), and it can extend through to early July. Adult females lay 25/35-60 eggs under the scale cover and upon hatching the crawler larvae move up the plant (they can move up to several tens of cm) to affix themselves on the upper surface of the leaves, along the veins and leaf margin. Scales are also found on the bark of branches and sometimes on fruits (Kukhtina, 1970).

Lopholeucaspis japonica can have overlapping generations where the climatic conditions are suitable. Early emerging first instars develop a waxy cover soon after hatching (in approximately 3 days) and can develop to adults

from July onwards and produce a second generation. The pest has a single generation in the Far East of Russia whereas in Georgia two generations have been reported: the first in May-June (425-540 GDD base 10°C) and the second in July-August (1350-1650 GDD base 10°C) Addesso *et al.* (2016).

DETECTION AND IDENTIFICATION

Symptoms

Heavy infestations can give bark a greyish white appearance. Attacks by *L. japonica* can result in dieback and premature leaf fall, due to senescence of all infested branches. Large populations can cause branch dieback and even plant death (EPPO, 2004). In the case of low levels of infestation, the scales may be found in cracks in the bark, and are then difficult to detect on superficial examination.

Morphology

The taxonomy of the Coccoidea is almost entirely based on characters of the adult female and a good slide preparation of a teneral female is required for identification to species level. The EPPO Diagnostic Standard PM 7/54 *Lopholeucaspis japonica* (EPPO, 2005) provides a diagnostic protocol.

Eggs

Oval, 0.25 mm long, light-violet in colour, laid at the rear edge of the female shield.

Larva

Larval stages are also light-violet in colour. Bodies oval in shape, elongated, with five-segmented antennae; the last segment is transversely ridged and as long as the other four together. Twin cephalic glands present. The second larval instar (female) is narrowly pyriform, constricted at both ends, whitish, 0.5-0.6 mm long, covered with a long, dark, mytiliform shield carrying a white secretion of first-instar exuviae projected forwards. The second larval instar (male) is elongate, same colour as female, developing under a linear white shield of the same structure as that of the female, not exceeding 0.8-1 mm in length.

Adult

The female is pyriform, elongate, with maximum width at the anterior of the abdomen. Cephalic and pygidial parts narrowed. Strong cryptogeny: the female, with a fine membranous cuticle, remains enclosed in the exuvia of the second larval instar, which thickens and takes on a horn-like shape. Shield narrow, elongate, straight or slightly curved, dark, but entirely covered in a more or less caducous white secretion 1-1.8 mm long.

Detection and inspection methods

Large infestations of *L. japonica* are easier to identify due to the white speckled appearance of the scale covers on the bark. For inspection, the base of a multi-stem tree or shrub should be examined, from the soil line to approximately 20 cm above the ground looking for oyster-like scale covers (Fulcher *et al*., 2011).

For single stemmed trees, it is important to visually examine the trunk base, branch collar, scaffold branches, bark, and bark ridge. *L. japonica* can be more easily visually detected on deciduous plants during the winter months when foliage is not obstructing the bark. When inspecting plants with dense or evergreen foliage, branches can be moved out of the way in order to inspect the interior branches and the main trunk.

To determine whether *L. japonica* is present, traps can be constructed to monitor for the newly hatched crawler stage. Crawlers can be monitored by wrapping double-sided tape around a branch near a suspected infestation. Traps can also be constructed from vinyl tape coated with a thin layer of petroleum jelly. The edges of the tape should be examined using a minimum of 16x magnification for presence of the characteristic light-violet crawlers.

PATHWAYS FOR MOVEMENT

Like other diaspid scales, *L. japonica* is naturally dispersed by wind and animals at the mobile first instar stage; once fixed in place, the scale is sessile. However, local dispersal can be effective and EFSA (2018) citing Harsur *et al.* (2018) detail in India the pest dispersed from one infested pomegranate tree to 58 within a space of 9-10 months.

Lopholeucaspis japonica can be carried on consignments of plants for planting of host species, including parts of plants such as budwood or cut flowers or branches. Diaspid scales (often unidentified) are frequently intercepted on imported plants. EFSA (2018) detail three records of interceptions of *L. japonica* in the Europhyt database: one in 1995 on various artificially dwarfed plants imported from China and two in 1999 on *Acer* plants imported from China.

PEST SIGNIFICANCE

Economic impact

The pest attacks all citrus with the same severity. It can multiply very rapidly, forming dense colonies that cover the trunk, branches and young shoots of a tree. Individual trees are sometimes killed by heavy infestations, while adjoining trees can be hardly infested. *L. japonica* has caused serious problems on citrus, especially satsumas (*Citrus unshiu*) but also lemons (*C. limon*) and the rootstock *Poncirus trifoliata*, in Azerbaijan and Georgia, and has also shown to be damaging to citrus and *Laurus nobilis* in Southern Russia (Konstantinova, 1992).

Control

In its areas of origin, *L. japonica* is kept under control by its natural enemies, and the literature contains no particular information on the need for any other control measures. In Georgia, biological control agents were introduced from the Far East (*Marlattiella prima* and *Pteroptrix chinensis*) (Yasnosh, 1986), but failed to establish. Indigenous natural enemies exist (*Encarsia citrina* and *E. intermedia*) but are not specific for the pest and do not prevent heavy infestations of individual trees (Orlinskii & Basova, 1993). The usual control programme involves the introduction of organophosphorus insecticides into petroleum oil-based fungicide sprays. In the case of *L. japonica*, it is recommended to concentrate treatments on single infested trees (Orlinskii, 1991).

Phytosanitary risk

In the EPPO region, *L. japonica* could attack citrus and other fruit crops throughout the Mediterranean basin, from the Middle East to Spain (Balachowsky, 1953) and into Asia (for example lemon production in Uzbekistan is considered at risk). *L. japonica* could possibly also damage woody plants in glasshouses throughout Europe. However, it should also be noted that its introduction into various countries (see Geographical distribution) does not seem to have been followed by any rapid spread or very significant damage. In general, little is published about this pest, which circumstantially indicates that it has relatively minor importance in practice. However, it can cause branch dieback and, in some cases, kill infested trees.

PHYTOSANITARY MEASURES

Host plants for planting (excluding seeds), should be inspected, and confirmed to be free from the pest and accompanied by a Phytosanitary Certificate. Additional phytosanitary measures can include that host plants are produced in a pest-free area or a pest-free place of production (including throughout the preceding growing period) or a pest-free production site (including throughout the preceding growing period). The same measures would apply for cut branches of hosts (EPPO, 2017/2021/2022) and cut flowers.

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Datasheet history

This datasheet was first published in 1997 in the second edition of 'Quarantine Pests for Europe' and revised in 2023. It is now maintained in an electronic format in the EPPO Global Database. The sections on 'Identity', ‘Hosts’, and 'Geographical distribution' are automatically updated from the database. For other sections, the date of last revision is indicated on the right.

CABI/EPPO (1997) *Quarantine Pests for Europe (2nd edition)*. CABI, Wallingford (GB).



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