

Data Sheets on Quarantine Pests

Parasaissetia nigra

IDENTITY

Name: *Parasaissetia nigra* (Nietner)

Synonyms: *Lecanium nigrum* Nietner
Lecanium depressum Targioni
Tozzetti *Lecanium begoniae* Douglas
Saissetia nigrella Newstead *Saissetia nigra* (Nietner)

Taxonomic position: Insecta: Hemiptera: Homoptera: Coccidae

Common names: Nigra scale, black scale, hibiscus scale, hibiscus shield scale, Florida black scale, pomegranate scale (English)
Schwarze Napfschildlaus (German)
Escama negra, queresas negra del cheremoyo (Spanish)

Bayer computer code: SAISNI

EU Annex designation: II/A1 - as *Saissetia nigra*

HOSTS

P. nigra is polyphagous, feeding on hosts from 77 plant families, especially on ornamental plants of tropical origin e.g. *Ficus* and *Hibiscus*; *Hederas* a favoured host in California. Several agricultural crops are attacked, including avocados, *Annona cherimola*, citrus, coffee, cotton, *Croton tiglium*, guavas, *Hevea brasiliensis*, mangoes, pawpaws and *Santalum album* trees. There is some evidence to suggest that several strains may exist, each with differing host preferences (Smith, 1944). In the EPPO region, ornamental woody plants would be the hosts mainly at risk.

GEOGRAPHICAL DISTRIBUTION

P. nigra probably originated in Africa, but has since spread to many countries around the world. Geographical races of this species may occur (De Lotto, 1967). The pest has been found in the past in Taiwan, but is not established there.

EPPO region: Belgium, Egypt, France, Germany (unconfirmed), Israel, Italy, Portugal (Azores, Madeira), UK (England, under glass).

Asia: Bangladesh (unconfirmed), Bhutan, China, Hong Kong, India, Indonesia (Java), Israel, Japan, Lao, Malaysia (peninsular Malaysia, Sabah, Sarawak), Nepal, Pakistan, Saudi Arabia, Singapore, Sri Lanka, Thailand, Yemen.

Africa: Angola, Benin, Burkina Faso, Cape Verde, Chad, Comoros, Côte d'Ivoire, Egypt, Ghana, Kenya, Madagascar, Mauritius, Mozambique, Nigeria, St. Helena, São Tome and Príncipe, Seychelles (including Aldabra Island), Sierra Leone, South Africa, Sudan, Tanzania (including Mafia Island and Zanzibar), Uganda, Zaire, Zambia, Zimbabwe (unconfirmed).

North America: Bermuda, Canada (intercepted only), Mexico, USA (Alabama, California, District of Columbia, Florida, Hawaii, Louisiana, New York, New Mexico, Ohio, Pennsylvania, Texas).

Central America and Caribbean: Antigua and Barbuda, Barbados, British Virgin Islands, Costa Rica, Cuba, Dominican Republic, El Salvador, Grenada, Guatemala, Honduras, Jamaica, Martinique (unconfirmed), Nicaragua, Panama, Puerto Rico, St. Vincent and the Grenadines, Trinidad and Tobago (unconfirmed).

South America: Bolivia, Brazil, Colombia, Ecuador, Guyana, Peru, Venezuela.

Oceania: American Samoa, Australia (New South Wales, Queensland), Cook Islands, Fiji, French Polynesia (Gambier Island, Marquesas Islands, Society Islands, Tuamotu Archipelago), Guam, Kiribati, Nauru, New Caledonia, New Zealand, Niue, Palau, Papua New Guinea, Samoa, Solomon Islands, Tonga, Tuvalu, Vanuatu, Wallis and Futuna Islands.

EU: Present.

BIOLOGY

One generation, and a partial second, occurs per year outdoors in California and Florida, where females overwinter as first and second instars (Gill, 1988). In greenhouses in Israel, Ben-Dov (1978) recorded up to six generations per year, with cultures on *Cucurbita pepo* cv. Butternut completing a generation in 45-60 days at 24°C. Reproduction is entirely by parthenogenesis (Ben-Dov, 1978), and oviposition may occur over a long period in cooler climates (4-10 months in North America). Eight hundred or more eggs are laid under the body of the female and are protected there for 1-3 weeks until hatching (Smith, 1944). On hatching, the first nymphal instars ('crawlers') move away from the female to another part of the plant, where they fix themselves and start feeding. There are three immature instars altogether. Honeydew production is at a maximum during periods of rapid growth and oviposition (Smith, 1944). Occasionally ants may be attracted to colonies by the honeydew produced (Williams & Watson, 1990); these may deter natural enemies from attacking the scales. There is some evidence to suggest that several strains of *P. nigra* may exist, each with differing host preferences (Smith, 1944), or there may be several geographical races (De Lotto, 1967).

Major factors restricting the distribution of *P. nigra* appear to be temperature extremes, particularly extreme heat, and low humidity; but the species can tolerate a wide range of conditions. The ambient conditions influence the distribution of scales on the host, as they do not settle in exposed situations if climatic conditions are less than ideal (Smith, 1944).

DETECTION AND IDENTIFICATION

Symptoms

P. nigra infests leaves, twigs, branches and fruits (Hamon & Williams, 1984). The scales produce copious, sticky honeydew on which sooty moulds develop, coating the plant and nearby surfaces; new growth is sometimes stunted and defoliation may be evident. The honeydew produced sometimes attracts ants (Williams & Watson, 1990).

Morphology

Early stages of *P. nigra* can be difficult to separate from those of several other soft scale species. Immature and newly adult specimens of *P. nigra* are translucent-yellow and occasionally mottled. Crawlers are 0.35 mm long, with two black eyes placed anterolaterally; the adults are up to 5.5 mm long and 4 mm wide, yellow initially, often becoming shiny, dark brown to purple-black with age (Gill, 1988). The adult female is elongate-oval, slightly narrowed anteriorly and 3-4 mm long. The shape varies according to

the substrate, being broad and only slightly convex on leaves, but much more convex and elongate on stems or leaf mid-ribs. Males are not known.

P. nigra lacks the raised dorsal "H" pattern that is common in most species of *Saissetia*, at least in the nymphs and early adult stages. It is more elongate and has a smoother dorsal surface than any species of *Saissetia* (Hamon & Williams, 1984; Gill, 1988).

Thorough descriptions and comments on morphological variation in adult *P. nigra* are given by De Lotto (1967) and Ben-Dov (1978). Distinctive characters of slide-mounted females are the presence of dorsal reticulations and cylindrical or capitate dorsal setae, and the absence of tibio-tarsal scleroses and free tarsal articulation, and of large discal setae on the anal plates. In contrast, specimens of the coccid genus *Saissetia* lack dorsal reticulations and have tapering or conical dorsal setae and well-developed discal setae on the anal plates (Hamon & Williams, 1984).

MEANS OF MOVEMENT AND DISPERSAL

Natural movement is very limited and usually confined to dispersal on the same plant. The first instar crawlers are the main dispersal phase, but individuals remain capable of movement until oviposition occurs (Smith, 1944). All stages can be transported on infested fruit, ornamental plants or propagation material.

PEST SIGNIFICANCE

Economic impact

A heavy infestation of *P. nigra* may devitalize the host directly by sap depletion and by injecting toxins. The scales also produce copious honeydew on which sooty moulds develop, coating the plant and nearby surfaces. This restricts photosynthesis, weakening the plant and sometimes stunting new growth and causing defoliation (Smith, 1944). The honeydew produced may attract ants that deter natural enemies from attacking the scales.

P. nigra is a moderate pest of ornamental plants, particularly in tropical countries. Containerized plants often suffer from water stress, which speeds up defoliation due to infestation and, together with unsightly sooty mould growth, renders the stock unsaleable (Smith, 1944). The scale is also a minor pest of citrus and of many agricultural crops and has, at times, been an important pest of *Annona cherimola*, coffee, cotton, *Croton tiglia*, guavas, *Hevea brasiliensis*, mangoes and pawpaws (Smith, 1944). In India, *P. nigra* damages pomegranates (Jadhav & Ajri, 1984) and, together with the coccid *Saissetia coffeae*, is a pest of *Santalum album* trees, causing severe leaf and fruit fall in successive years until the tree dies (Sivaramakrishnan *et al.*, 1987).

Control

The insecticides commonly used against scale insects include diazinon, dimethoate, formothion, malathion and nicotine, but the intermittent feeding and waxy surfaces of the insects make them difficult to control chemically (Copland & Ibrahim, 1985). Malathion at 0.1% has been used to control *P. nigra* chemically on pomegranates in India (Jadhav & Ajri, 1985), but use of the insecticide would probably kill any parasitoids and make biological control impossible. In addition, ornamental plants may be adversely affected by insecticides (Copland & Ibrahim, 1985). Its long oviposition period in less than ideal conditions makes *P. nigra* resistant to chemical control but ideally suited to biological control (Flanders, 1959).

In many countries where it was once a pest, *P. nigra* is now successfully controlled by natural enemies originally introduced to control the coccid *Saissetia oleae* (Bartlett, 1978). However, the honeydew produced may attract ants that deter natural enemies from attacking the scales. The most effective control agent of *P. nigra* in California, *Metaphycus*

helvolus (Hymenoptera: Encyrtidae), was introduced with several other enemies to control *S. oleae*, but was more effective against *P. nigra* (Ebeling, 1959) and reduced the population to commercially unimportant levels, eradicating the scale in many areas (Flanders, 1959). Parasites of *P. nigra* in Hawaii are listed by Zimmerman (1948). There is no record of whether biological control of *P. nigra* has been achieved under glass.

Phytosanitary risk

P. nigra is not listed as a quarantine pest by any regional plant protection organization. It is not likely to become a serious outdoor pest within the EPPO region because of the limited distribution and minor economic importance of host plants, and because of further climatic constraints such as temperature and humidity. It could become a glasshouse pest but it appears to be well controlled by natural enemies.

PHYTOSANITARY MEASURES

Consignments of planting material or fruits of host plant species should be free from *P. nigra*.

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