# EPPO Datasheet: *Phoracantha semipunctata*

Last updated: 2017-08-07

## IDENTITY

**Preferred name:** *Phoracantha semipunctata*
**Authority:** (Fabricius)
**Taxonomic position:** Animalia: Arthropoda: Hexapoda: Insecta: Coleoptera: Cerambycidae
**Common names:** blue gum borer, common eucalypt longicorn, common eucalyptus longhorn, eucalyptus borer, firewood beetle
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**EPPO Categorization:** A1/A2 (formerly)
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**EPPO Code:** PHOASE



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## HOSTS

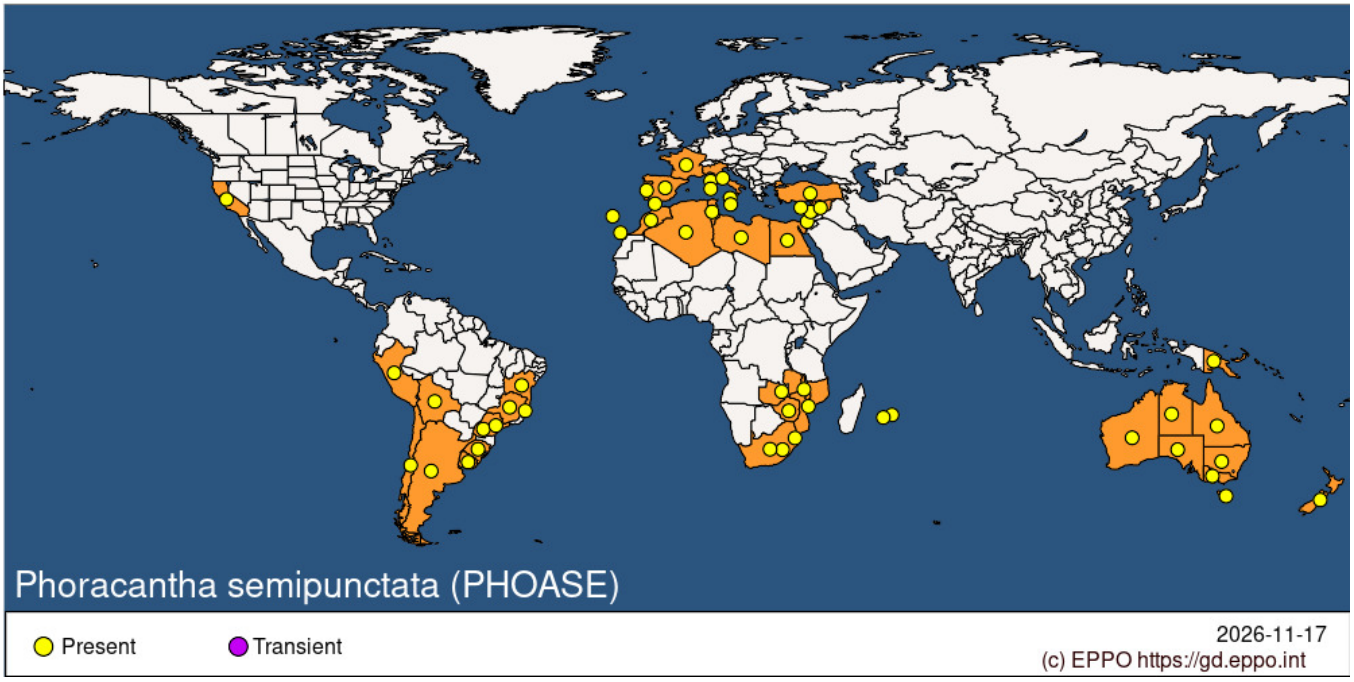
*Eucalyptus* species vary in susceptibility to attack under comparable drought conditions, such as those observed in Tunisia by Chararas (1969). Massive beetle attacks quickly kill *Eucalyptus globulus* and *E. viminalis* when their gum defences decline. In contrast, the gum defences of *E. blakelyi* continue to cause high mortality of larvae entering the bark, but some larvae survive, producing long, narrow lesions. Occasionally, a single larva girdles the trunk and kills the tree. *E. cladocalyx* has substantial gum defences, even during severe drought, but some larvae penetrate the bark of certain trees and produce large oval-shaped lesions exposing bare wood (Scriven *et al.*, 1986). El-Yousfi (1989) classified dominant tree species of *Eucalyptus* in Morocco according to their susceptibility to the pest. The industrial species, such as *E. globulus* and *E. gomphocephala*, were included in the most susceptible group. *E. camaldulensis*, *E. cladocalyx* and certain hybrids showed some resistance to *P. semipunctata*, with more than 40% of the trees of the plantations being attacked; these species were included in the moderately susceptible group. Xerophytic species, such as *E. torquata*, *E. salmonophloia* and *E. brockwayi*, were included in the resistant group; in these cases only scattered trees suffering light damage may be found.

**Host list:** *Eucalyptus blakelyi*, *Eucalyptus brockwayi*, *Eucalyptus camaldulensis*, *Eucalyptus cladocalyx*, *Eucalyptus globulus*, *Eucalyptus gomphocephala*, *Eucalyptus salmonophloia*, *Eucalyptus torquata*, *Eucalyptus viminalis*, *Eucalyptus*

## GEOGRAPHICAL DISTRIBUTION

A native of Australia, *P. semipunctata* has now spread to many parts of the world, including practically all countries where tree species of *Eucalyptus* have been introduced. Its presence in the EPPO region was registered for the first time in Israel in 1945 when it caused damage to the *Eucalyptus* reforestation areas in the coastal zone. It was found on isolated trees in Egypt in 1950 and in southern Turkey in 1959. In 1963 it was discovered in Tunisia, and within 4 years had spread throughout the country. In 1972 *P. semipunctata* was discovered in Algeria in an area near Tunisia. In 1969 *P. semipunctata* was recorded in Sardinia where it had been introduced 5 or 6 years earlier. In 1975 it was found in Sicily and in 1976 it was detected in mainland Italy. At present, the infestation extends to central and southern Italy, including the islands (Cavalcaselle, 1986).

At the end of 1980, *P. semipunctata* was observed for the first time in Setubal, Portugal. Starting from this site it spread to almost all *Eucalyptus* plantations to the south of the river Tajo. In 1981 a small focus of *P. semipunctata* was detected in south-west Spain where a large volume of *Eucalyptus* logs had been imported from Portugal. By 1983, practically all the *Eucalyptus* plantations in the provinces of Huelva, Sevilla and Badajoz were infested. Spread was favoured by the intense droughts of those years. The pest was first recorded in northern Spain (Cantabria) in 1990 (Reporting Service 95/158).




**EPPO Region:** Algeria, Cyprus, France (mainland, Corse), Gibraltar, Israel, Italy (mainland, Sardegna, Sicilia), Malta, Morocco, Portugal (mainland, Madeira), Spain (mainland, Islas Canárias), Tunisia, Türkiye
**Africa:** Algeria, Egypt, Eswatini, Lesotho, Libya, Malawi, Mauritius, Morocco, Mozambique, Reunion, South Africa, Tunisia, Zambia, Zimbabwe
**Asia:** Israel, Lebanon, Syrian Arab Republic
**North America:** United States of America (California)
**South America:** Argentina, Bolivia, Brazil (Bahia, Espirito Santo, Minas Gerais, Parana, Rio Grande do Sul, Sao Paulo), Chile, Peru, Uruguay
**Oceania:** Australia (New South Wales, Northern Territory, Queensland, South Australia, Tasmania, Victoria, Western Australia), New Zealand, Papua New Guinea

## BIOLOGY

Upon emergence, the adult male is ready to mate; the female, however, must wait 48 h. After mating, the female begins to lay eggs after an additional period of 2-4 days. The sex ratio is one to one, and unmated females lay no eggs. Females feeding on the flowers of *Eucalyptus* and other plants usually lay eggs on diseased or moisture-stressed trees or on freshly cut logs. Adult females may live for 40 days in summer and 180 days in winter and lay up to 300 eggs. Oviposition occurs at night. The eggs are laid under loose bark in groups of 3-30 eggs, which incubate in 10-14 days. When the eggs hatch, the larvae may feed along the bark surface for a short distance, forming a conspicuous dark trail. They then turn into the bark and proceed towards the cambium. They feed between the inner bark and cambium until they are almost mature. As the larva matures, the gallery widens, increasing to more than three times the head width. A single larval gallery can extend for more than 1 m and can girdle a tree. When the larva is near maturity, it forms a short tunnel in the direction of the bark surface and then bores several centimetres into the wood to form a pupal chamber. The tunnel near the bark surface provides the exit for the emerging adult beetle (Scriven *et al.*, 1986).

Egg masses are usually found during the warm season but also in small numbers during the winter. Larvae that hatch during the cold season usually die due to the accelerated drying of the bark. In Israel (Mendel, 1985), the mean minimum length of the developmental period from oviposition to the beginning of adult emergence was about 100 days for individuals that began to develop between March and July, about 215 days for the later summer brood in August-September, and about 195 days for the autumn brood in October-November. The spring developmental period of larvae averaged 80 days in fresh logs and 118 days in old, partially dried ones. The pupal period lasts 32-40 days when it begins during early spring to late summer and about 110 days when it begins in autumn. When adult emergence starts in spring or mid-summer, it is usually completed within 2-3 months, whereas when it starts from

late summer onwards it lasts up to 9 months. Emergence is arrested during the winter and resumed when temperatures increase in spring (Mendel, 1985).

Considering 11.5°C as the minimum threshold temperature, Gonzalez Tirado (1987) estimated the thermic integral needed to complete one generation as 1510 degree-days. One, two or three generations per year may occur in Mediterranean climates.

## DETECTION AND IDENTIFICATION

### Symptoms

The attacked trees show some dead branches and, in some cases, the whole crown is dead, with yellowing and wilting leaves, depending upon the intensity of the attack. The bark is easily removed, revealing the larval tunnels which lead into the inner bark and cambium and are filled with compressed frass. These galleries are numerous and start from the same point. Usually, the larvae bore their galleries along the stem. The larvae grow as they feed and the gallery size increases correspondingly. Larvae can be seen at the end of their galleries or, if adults have already emerged, elliptical grub holes about 8-10 x 4-5 mm are evident on the bark surface.

Frequently, the gum defences of the tree cause high mortality of larvae as they enter the bark, but some larvae survive, producing characteristically long, narrow lesions with dark exudation.

In logs and felled trees the galleries and grub holes are obvious symptoms of P. semipunctata infestation.

### Morphology

*Eggs*

Elongate-oval, spindle-shaped, yellowish, 2.5-3.0 mm long, laid in groups of 30-40 in a single layer.

*Larva*

Sub-cylindrical, somewhat flattened, typical of round-headed borers, yellowish-white, about 3 mm long at hatching and 30-40 mm long at maturity.

*Pupa*

Exarate (i.e. the legs, wings, etc., are not secondarily attached to the body), yellowish-white.

*Adult*

About 22-28 mm in length. The body is shiny dark reddish-brown, and a yellowish band extends across the upper half of the elytra (the hardened forewings) with one yellow spot and a prominent spine at the end. The antennae of the females are approximately the same length as the body; those of the males are somewhat longer and heavier, with spines on segments 3-8.

## PATHWAYS FOR MOVEMENT

The exceptional flying capacity and survival of the adult *P. semipunctata* are the basis of local dispersal. However, the main cause of its rapid spread throughout the world has been the transport of *Eucalyptus* wood (Cadahía, 1980; 1983; 1986).

## PEST SIGNIFICANCE

### Economic impact

In its native country, Australia, P. semipunctata occurs throughout Eucalyptus forests, but its damage is usually restricted to dead and dying trees. During severe droughts, beetle outbreaks may occur, but the populations normally appear to be limited by a complex of natural enemies, including predators and parasitoids. In the majority of other regions where P. semipunctata is found, however, tree death occurs in woodlot plantings, especially when subjected to periodic moisture stress, and includes apparently healthy trees.

In the Mediterranean basin, rapid spread of P. semipunctata was favoured by the poor state of many plantations, mainly due to drought and poor soils along with the great dispersal capacity of the beetle (Cadahía, 1986). The pest caused very serious damage to plantations in Tunisia in the years following its introduction in 1963. The first focus in Morocco was eradicated, but a later outbreak in 1981 caused an estimated loss of 2 million trees, approximately 1.18-1.47% of the area of Eucalyptus plantations (about 170 000 ha) (El-Yousfi, 1982). The average tree mortality rate in the province of Huelva in Spain, since P. semipunctata was first detected in 1981 until the end of 1983, was estimated to be between 2.23% and 3.88%, equivalent to a loss of 6207 ha, despite the high economic and labour cost of control measures (Gonzalez Tirado, 1986).

**Control**

Living Eucalyptus trees are not easily protected by pesticides, since the beetles' behaviour limits their exposure to the chemicals; the beetles hide during the day under loose bark and do not feed on leaves or bark.

It does not appear likely that chemical control in the forest could be achieved. The adults are active during the greater part of the year and it would, therefore, be necessary to use pesticides with long residual effects or to make frequent applications to kill beetles landing on the tree. Also, viable eggs can be laid on sprayed areas before the pesticide can kill the female beetles. Eggs are usually protected from exposure to pesticides, because they are laid under layers of loose bark. Once the larvae are inside the bark, they escape pesticide applications.

In Spain and Morocco silvicultural measures are used as the most effective and ecologically sound methods of control. Curative measures include clearance and felling of all attacked and dead trees, followed by their removal from the forest. Freshly cut trap logs, treated with 2% lindane, are placed in woodlots to attract adult beetles. Female beetles lay their eggs on the sprayed logs which are replaced every 2 weeks with fresh ones. The old logs are destroyed within 2 months to prevent beetle emergence. Recommended preventive measures are concerned with managing the forest in such a way that trees are kept in good health. Weak and declining trees should be removed. Selection of the appropriate tree species for each zone is the main preventive measure (Gonzalez Tirado, 1986; El-Yousfi, 1989).

Several predators and parasitoids appear to cause significant mortality to beetles, larvae and eggs of P. semipunctata in Australian Eucalyptus forests. Moore (1963) observed the activity of three braconid parasitoids (Syngaster lepidus, Bracon capitator and Doryctes sp.), two predatory beetles, the clerid Trogodendron fasciculatum and a bothriderid (previously part of Colydiidae), Aeschyntelus vittatus. All of them may cause substantial mortality in P. semipunctata larvae. Also, the braconid parasitoids Iphiaulax rubriceps, Trichiohelcon phoracanthae and Acanthodoryctes morleyi were cited (Tooke, 1928). Recently the parasitoid Platystasius transversus (Platygasteridae) was obtained from eggs of P. semipunctata in Morocco (Fraval & Haddan, 1988).

**Phytosanitary risk**

P. semipunctata is an A2 quarantine pest for EPPO (OEPP/EPPO, 1983) and is also of quarantine significance for JUNAC. However, in the Mediterranean area it is a relevant quarantine pest only in countries where it has not yet been detected, e.g. Greece, Spain (northern provinces) and Yugoslavia. It is also a quarantine pest for IAPSC.

## PHYTOSANITARY MEASURES

EPPO recommends that only debarked wood of *Eucalyptus* should be traded. It recommends also that wood of *Eucalyptus* (including wood chips larger than 4 x 0.5 cm) should be kept in storage under supervision for at least 6 months after debarking or must have been fumigated by an appropriate method (OEPP/EPPO, 1990). In general, dry logs older than 9 months can be considered free from larvae and pupae.

Methyl bromide (MB) fumigation at the rate of 125 g/$m^3$ for 48 h was established by the Spanish Department of Agriculture as the quarantine treatment of wood against *P. semipunctata*. Mean internal temperatures of the wood piles in the affected areas are, in general, higher than 10-12°C, which are the effective temperatures for MB.

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