EPPO Datasheet: *Pissodes cibriani*

Last updated: 2022-03-09

IDENTITY

Preferred name: *Pissodes cibriani*
Authority: O'Brien
Taxonomic position: Animalia: Arthropoda: Hexapoda: Insecta: Coleoptera: Curculionidae: Molytinae
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EU Categorization: Quarantine pest ((EU) 2019/2072 Annex II A)
EPPO Code: PISOCI

Notes on taxonomy and nomenclature

This species was described in 1989 by O'Brien and there have been no taxonomic or nomenclatural changes since.

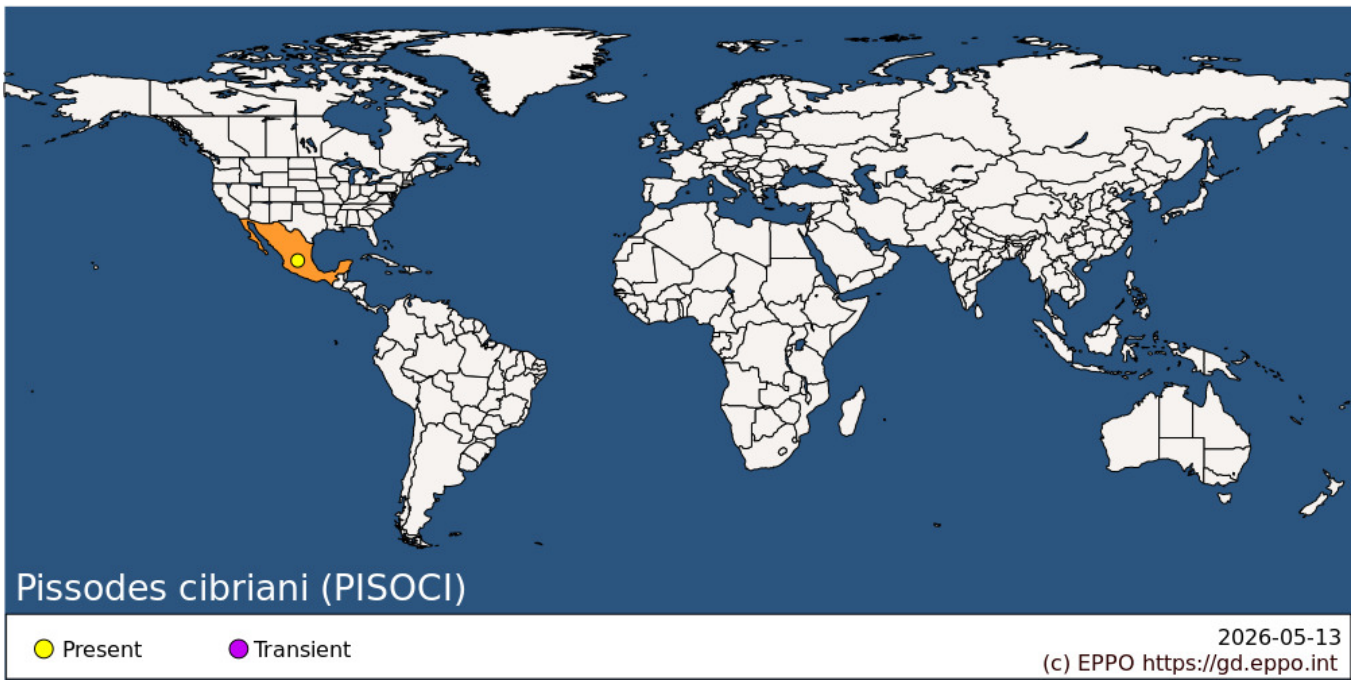
HOSTS

Pinus patula is the only known host of *Pissodes cibriani* (O'Brien, 1989; Cibrián Tovar *et al.*, 1995). Although the distribution of several other native species of pines overlaps with the distribution of *P. patula*, there are no records that they have been infested *by P. cibriani*.

Host list: *Pinus patula*

GEOGRAPHICAL DISTRIBUTION

Pissodes cibriani is currently known only from the state of Hidalgo in Mexico (O'Brien, 1989; Cibrián Tovar *et al.*, 1995). It is possible that the species occurs in other states in Mexico where *Pinus patula* naturally grows: Puebla, Tlaxacala, and Northern Oaxaca.



North America:

Mexico

BIOLOGY

A detailed study of the biology of this species is provided in the unpublished thesis of Pineda Torres & Guerrero Alarcón (1983), and some of this information was included in Cibrián Tovar *et al.* (1995). This species completes two generations per year, one from August to November and another from November to July of the following year. When a new generation of adults emerges, mainly from the lower trunk of the tree, they move to feed on the current year's growth and sometimes on the internodes produced 1-3 years before. Adults have been observed feeding on branches along the full length of the trees. Feeding consists of inserting the snout through the bark to feed on the phloem layer, creating feeding punctures of about 0.4 mm in diameter. Adults feed for more than 40 days during which time many feeding punctures are made in the new shoots. Adults then move to the trunk to mate and oviposit in the bark. Although eggs can be laid along the entire length of the stem, most oviposition occurs in the lower portion of the stem up to about a height of 1 m above the ground. Females chew small oviposition punctures into the bark creating a small cavity in the phloem into which usually one egg is laid, but sometimes two and rarely 3-4. Eggs hatch after about 10 days. Larvae make individual feeding galleries in the phloem, generally descending the trunk, and these widen as the larvae grow. Larvae pass through the first four instars in about 30 days. The duration of the fifth instar varies from about 20 days in the August-to-November generation, where there is no overwintering, to about 120 days in the November-to-July generation during which most time is spent in the non-feeding pre-pupal phase. When the larva reaches maturity, it creates an oval chamber (8 mm x 3 mm) in the xylem and fills the exterior portion with wood fibres (Alarcón, 1983). These chambers are called 'chip cocoons' and are characteristic of most species of *Pissodes* worldwide. Some larvae develop in the base of thicker branches rather than in the trunk. The pupal stage lasts 20-30 days. After the new adult emerges from the pupa, it remains in the chip cocoon for about 7 days while its cuticle hardens. Then the adult chews a round hole of about 2.2 mm diameter through the chip cocoon and bark and emerges to commence feeding.

DETECTION AND IDENTIFICATION

Symptoms

The trees most commonly attacked by *P. cibriani*, and therefore most commonly presenting symptoms, are saplings up to 8 m in height and 8 cm diameter (most frequently those 1-5 m tall and 1-4 cm diameter) that are weakened, often due to competition in dense regenerating stands or by shading of saplings by taller trees (Pineda Torres & Guerrero Alarcón, 1983). Feeding punctures on twigs of new foliage and 1- to 3-year-old internodes sometimes leak resin which is visible from a few metres away. Upon close inspection feeding punctures of about 0.4 mm in diameter can be seen. Sometimes feeding punctures are so abundant that they can cause premature needle fall, shoot deformation, and a decrease in new shoot growth, which is visible from a longer distance. As larvae feed in the phloem and obstruct the conducting tissue by mechanical damage and growth of weevil-vectored fungi, the new foliage begins to droop and turn colour, first developing a yellowish tint and eventually changing to reddish brown at about the time of pupation. The presence of chip cocoons under the bark is also evidence that *Pissodes* are present, although chip cocoons may persist for many years after they are vacated.

Morphology

Eggs*:* Eggs are bright pearly-white, oval, smooth, on average 0.7 mm long and 0.5 mm wide (Cibrián Tovar *et al.*, 1995), and look like the eggs of many other species of *Pissodes.*

Larva*:* Mature larvae are typically 8-9 mm in length (but sometimes smaller), legless, and the abdomen is cylindrical and slightly curved downwards (Cibrián Tovar *et al.*, 1995). The milky-white body contrasts with the light brown head. Superficially, larvae of this species look like larvae of other species of *Pissodes* and there is no detailed description of the larval stage to help distinguish them from larvae of native species in the EPPO region.

Pupa*:* Pupae are about 7 mm in length, have a beak, and are milk-white for a few days before gradually obtaining brown tones as they mature (Cibrián Tovar *et al.*, 1995). Pupae of different *Pissodes* species cannot currently be distinguished.

Adult: Adults have been described in detail (O'Brien, 1989; Cibrián Tovar *et al.*, 1995). Herein, key morphological characteristics to distinguish this species from the nine native *Pissodes* species in the EPPO region are provided based on unpublished taxonomic studies of *Pissodes* by David Langor. Adult *P. cibriani* are typically 6-7 mm long although some may be as small as 4 mm. The base colour of both the dorsal and ventral integument is orange brown, except for the tarsi and flagellum of the antennae, which are distinctly and contrastingly black. The integument colour pattern of *P. cibriani* contrasts with all nine native species in the EPPO region. All native species have a black to brownish black (=piceous) dorsal and ventral integument, and there is no distinct colour contrast along the length of legs and antennae. Although newly emerged and unhardened (i.e., teneral) adults of native European species can resemble *P. cibriani* in integument colour, the colour contrasts within the legs and antennae will not be obvious. The patterns of white and orange tan scales on the elytra also have high diagnostic value (e.g., number of bands, colour patterns, presence/absence of anterior band). Each elytron of *P. cibriani* has one distinct diagonal band of lighter scales at the posterior end, and the band is comprised of white and orange tan scales and extends from interstriae two to eight. The scales extending across interstriae two to five or six are white and form a narrow band, and the scales extending from interstriae five or six to eight are orange tan and this portion of the band is about twice as wide as the white portion. In the anterior part of each elytron is a small posthumeral spot comprised of orange tan scales that covers interstriae four and five. No native *Pissodes* species in the EPPO region has this combination of integument colour and elytron scale pattern.

Detection and inspection methods

Pissodes cibriani most commonly attacks pine saplings ranging from 1-8 m in height and up to 8 cm in diameter (Pineda Torres & Guerrero Alarcón 1983). Saplings that are stressed and weakened are most prone to attack, including those in mature stands that are shaded by overstory trees and those that are weakened by competition in densely stocked regenerating stands. Young pine saplings with resin droplets on the current year's growth and on 1-3 year-old internodes should be investigated for signs of weevil attack such as feeding punctures and presence of adults on the bark. Drooping of recent growth and eventual discoloration of needles to first yellowish and then reddish orange is also a sign of possible infestation, and these saplings should be examined on the lower part of the trunk (especially ground level to about 1 m) for presence of oviposition punctures and adults on the bark surface. Removal of bark on the lower 1-2 m of the trunk of saplings suspected of being infested may reveal larval galleries in the phloem, chip cocoons, pupae, callow adults and/or round adult emergence holes in the bark. There are five native species of *Pissodes* that attack boles of pine trees in the EPPO region and adults of *P. cibriani* can be distinguished from those species using morphological characters as described above. DNA barcodes are not yet available for *P. cibriani*.

PATHWAYS FOR MOVEMENT

Adults disperse by flight and by walking (Pineda Torres & Guerrero Alarcón, 1983), but it is not known how far they can naturally disperse in a season. It is possible that dispersal could be aided by human transport of infested saplings and foliage of *P. patula* however, there are no records of such transport from Hidalgo, Mexico to the EPPO region. Long-distance transport via lumber, roundwood or dunnage is possible, although there is no evidence that Mexico ships such materials to the EPPO region.

PEST SIGNIFICANCE

Economic impact

Pinus patula is an economically important species in Mexico and has been harvested for pulp, lumber, roundwood and manufactured products. The species is actively managed and there are plentiful plantations of regenerating saplings that are suitable for *P. cibriani*. However, *P. cibriani* attacks saplings that are stressed, e.g. by shading and competition, or mechanically damaged by harvesting operations and grazing of cattle. Thus, it functions as a secondary insect rather than as a primary pest. There are no assessments of its economic impact. It may be that *P. cibriani* could these circumstances have a positive economic impact in that it may sometimes benefit management of *P. patula* by killing weakened trees in densely stocked regenerating stands. Furthermore, in at least seven

countries in Africa, as well as New Zealand and the US state of Hawaii, *P. patula* is considered invasive and it may be that *P. cibriani* could have a value as a biocontrol agent.

Control

No tactics have been developed specifically to manage *P. cibriani*. More care with harvesting operations to minimize damage to unharvested saplings may keep them from being attacked by *P. cibriani*. Also, damage caused by grazing cattle in pine stands (e.g., root damage by soil compaction) could be averted through appropriate land management. The foliage of infested trees droops and fades before new adults emerge, so in situations where control is deemed necessary, removing and destroying infested trees could be effective as long as it was done before new adults emerged in July for the first generation and in late October to November for the second. It is also necessary that the entire stem, base of large branches and the root collar area are removed and destroyed as these are suitable for *P. cibriani* breeding.

Phytosanitary risk

If this weevil were to be transported to the EPPO region, it is difficult to predict whether it could establish. It has only one known host in its native range even though several other pine species co-occur with *Pinus patula*. Thus, the apparent monophagous nature of this species likely means it would be more difficult for it to establish without the presence of its native host. The risk of inadvertent introduction of *P. cibriani* from its native range in Mexico to the EPPO region via transportation on pine logs is likely to be very low as these materials are typically not exported from Mexico to Europe. It would require the transportation of untreated dunnage and infested saplings, seedlings or foliage samples to allow spread of this species, and movement of these materials is subject to high levels of regulation. Although any insect may be transported as a 'hitch-hiker', it seems unlikely this could occur for *P. cibriani*. *Pinus patula* has been transplanted to many subtropical areas of the world, e.g., 17 countries in Africa, eight countries in South America, Australia, New Zealand, the United States of America (Hawaii) and six countries in Asia, including EPPO member – Turkey (CABI, 2022). This pine species does not do well in cold climates, and it may be that the distribution of *P. cibriani* is constrained by climate as well as host. There are no known records of *P. cibriani* establishing in *P. patula* plantations in any other country.

PHYTOSANITARY MEASURES

Adherence to International Standards for Phytosanitary Measures No. 15 for solid wood packing material (IPPC, 2019) will greatly decrease the risk of introduction of bark- and wood-boring insects, including *P. cibriani*. Any seedlings, saplings, logs or foliage of *Pinus* introduced into the EPPO region should be quarantined until thoroughly checked for signs and symptoms of non-native species, including *P. cibriani*. Fumigation of tree material suspected of being infested with *P. cibriani* is expected highly effective as has been demonstrated for the related Asian species, *Pissodes nitidus.* Fumigation using methyl isothiocyanate (applied at 20 g/m^3 for 24 h at 15°C), sulfuryl fluoride (30 g/m^3, 24h, 15°C), methyl bromide (10 g/m^3, 24h, 15°C), and methyl iodide (30 g/m^3, 24h, 15°C) cause complete mortality of *P. nitidus* eggs, larvae, and pupae under the bark (Naito *et al.,* 1999, 2003; Soma *et al.,* 1999). In the EU, methyl bromide can only be used in emergency quarantine situations upon receiving special permission from the European Commission.

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EFSA resources used when preparing this datasheet

EFSA Pest survey card *on Pissodes cibriani, P. fasciatus, P. nemorensis, P. nitidus, P. punctatus, P. strobi, P. terminalis, P. yunnanensis* and *P. zitacuarense*. Available at: https://efsa.onlinelibrary.wiley.com/doi/epdf/10.2903/sp.efsa.2020.EN-1910 [Accessed 10 September 2021]

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Datasheet history

This datasheet was first published online in 2022. It is 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.

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