Monochamus galloprovincialis \cdot The vector of the Pine Wilt Nematode

Monochamus galloprovincialis belongs to the family of Cerambycids or Longhorns, and feeds on woody vegetable tissue. In the Iberian Peninsula it lives on practically all species of *Pinus*, and even *Abies* and *Picea*.

The adults gnaw at the bark and the phloem of the growing twigs and the larvae feed on phloem-xylem tissue. None of the species from the *Monochamus* genus reproduce in healthy trees. They only feel attracted to very stressed-out, dying or recently dead trees and also newly chopped down trees, favoured by previous attacks from Ipini beetles (*Orthotomicus* and *Ips*).

The female lays eggs in openings or bite marks, excavated in the bark of dying trees.

The larvae initially feed on phloem and cambium to later enter into the xylem and build a U-shaped gallery that becomes a pupa chamber, where they emerge through a circular hole. Once the young adult has surfaced, it goes through a period of sexual maturity, in which it feeds on brachyblasts, phloem, and tender bark from small branches and pine shoots.



M. galloprovincialis is a non-aggressive insect that contributes important benefits to the function of the forest ecosystem and it would not be of much interest were it not for the fact that *Monochamus galloprovincialis* was identified as the vector for the Pine Wilt Nematode (PWN). The disease was produced by the *Bursaphelenchus xylophilus* (Sousa et al. 2001) and is currently the main vector of the disease on the Iberian Peninsula

Interaction between the two organisms is a relationship of mutual interest, obligatory for the nematode and facultative for the beetle. It is like that because the nematode needs the beetle for its transport and dispersal. The beetle benefits from the death of the forest caused by the nematode because it means an increase in host material where they can lay their eggs.

Therefore, one of the fundamental tools for the control of the disease is the control of its vector, seeing as it is the only method of transmitting the nematode from one tree to another.

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ECONEX MONOCHAMUS

SOLUTIONS OVERVIEW

CODE	TRADE NAME	IMAGE
VA195	ECONEX MONOCHAMUS ATTRACTANT 60 DAYS Kairomone diffusers with a duration of 60 days.	
TA227	CROSSTRAP [®] WITH WET COLLECTION CUP	
TA132	CROSSTRAP [®] WITH DRY COLLECTION CUP	Į
TA147	ECONEX CROSSTRAP [®] SUPPORT	
TA156	CROSSTRAP® WET COLLECTION CUP	- ()-
TA157	CROSSTRAP [®] DRY COLLECTION CUP	U TCOME

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ECONEX MONOCHAMUS ATTRACTANT 60 DAYS

www.monochamusgalloprovincialis.eu

Kairomone diffusers for the attraction of males and females of *Monochamus* galloprovincialis







DESCRIPTION

CODE TRADE NAME

VA195 ECONEX MONOCHAMUS ATTRACTANT 60 DAYS

Kairomone diffusers for the attraction of males and females of *Monochamus galloprovincialis*, with a duration of 60 days + 2 hangers in the form of a clip.

OMDF register number: 134/2014

DETECTION AND MONITORING

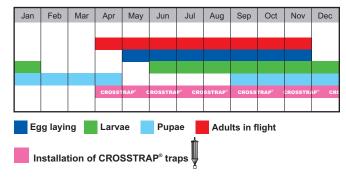
Work carried out in the framework of the REPHRAME European Project have revealed that **the most effective trap in capturing** *Monochamus galloprovincialis* is the CROSSTRAP[®] trap (Álvarez et al, 2014), including the live capture of this insect. Capturing live insects is the best way to evaluate if they carry nematodes, given that when the insect dies, the nematodes abandon the insect.

For the detection and monitoring of *Monochamus galloprovincialis* in areas free of the nematode, **1 CROSSTRAP**[®] **trap will be installed every 20 ha** in forests. They should be separated at least 1000 m from each other. In surfaces less than 20 ha at least 1 **trap should be installed per forest stand.**

In order to protect wood stockpiles, use 3 to 10 traps surrounding the area. The traps should be installed in areas with good visibility, such as forest edges, forest paths or fire-breaks. Especially windy areas should be avoided, as it makes it difficult for the insects to fly and could damage the traps.

A detection trap should cover the environmental changes of the target forest area. In general, the traps should be installed and operative between April and December.

Phenology of Monochamus galloprovincialis



NECESSARY MATERIAL

CROSSTRAP® TRAPS

The CROSSTRAP[®] trap is a state-of-the-art forest trap. This trap has been created through an R + D project (University of Murcia - ECONEX) aimed at developing traps and attractants for forest insects.

The trap consists of a 33 cm diameter polypropylene lid with a central carabiner attached to a steel spring. Two reinforced PVC sheets are held in place by four steel springs in the lid's upper section. They are used as elements of dynamic suspension, serving as shockabsorbers against the force of the wind exerted on the trap, avoiding its breakage in the forest. They PVC sheets are also fixed in the lower part of a 30 cm diameter polypropylene funnel.

The collection cup is fixed to the lower part of the funnel.

The trap is activated by placing the attractant diffusers hung in the holes of one of the PVC sheets with the clips provided.

The height of the installed trap is not of importance, as long as the collection cup does not touch the ground or any other object.

A metal support designed specifically for this purpose is also available: **ECONEX CROSSTRAP® SUPPORT**.



The PVC sheets, funnel and collection cup are treated with a slippery product that increases the amount of captures considerably and prevents the insects from escaping.

COLLECTION CUP

COLLECTION CUP

The trap can be used with two types of collection cup: **collection cup** for wet captures (CROSSTRAP[®] WET COLLECTION CUP) and collection cup for dry (live) captures (CROSSTRAP[®] DRY COLLECTION CUP).

The **CROSSTRAP**[®] **WET COLLECTION CUP** has an approximate capacity of 2 litres and a drain in the upper section to prevent it from filling with rainwater. It measures 12.5 cm diameter x 19 cm high and has a slippery product that stops the captures from escaping.

The **CROSSTRAP**[®] **DRY COLLECTION CUP** has the same capacity and measurements as the CROSSTRAP[®] WET COLLECTION CUP but it has a base made of stainless steel mesh that drains away the rainwater 100% and eases air circulation.





Collection cup for wet captures Collection cup for dry (live) captures

The **CROSSTRAP**[®] trap can last up to 7 years due to its structure and highly resistant components. The unfolded trap measures 33 cm diameter x 146 cm high. Once folded, it is 33 cm diameter x 40 cm high, making its transport easier.

DIFFUSERS ECONEX MONOCHAMUS ATTRACTANT 60 DAYS,

that we will hang in the trap using the holes made for that purpose in one of the PVC sheets.



Kairomone diffusers **ECONEX MONOCHAMUS ATTRACTANT 60 DAYS** and product packaging

The diffusers are in a blister pack, with a duration of 60 days, and individually packaged in an aluminium sachet with labelled specifications.

Once removed from the packaging, **the diffusers need no activation or opening**, just placed correctly in the trap.

STORING THE DIFFUSERS

The diffusers must be stored in its original packaging in the refrigerator at 4 $^{\circ}$ C; or in the freezer at -18 $^{\circ}$ C, in which case it will last between 90 and 150 days respectively.