# EMERGING PESTS IN MEDITERRANEAN PERENNIAL CROPS

*Mediterranean perennial crops, such as vines, olives and citrus, are facing an increase in phytosanitary threats due to the emergence of exotic pests or the resurgence of certain pests that were previously not particularly worrying. Some of these pests are direct pests of crops, while others are vectors of viruses or diseases that can cause serious problems for the crops they affect. The introductions of these pests are often facilitated by international trade and climate change, which create favourable conditions for the establishment of these harmful organisms.*

CLIMED FRUIT IFV

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## DIRECT PESTS

### Polyphagous

### *Popillia japonica* (Japanese beetle)

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*Popillia japonica* is an invasive Asian beetle, classified as a priority quarantine pest in Europe. As an adult, it measures around 10 mm, has a metallic green carapace and coppery-brown elytra with ten characteristic tufts of white bristles. It can be confused with other beetles but is distinguished by these tufts. Its life cycle lasts one year. In winter, they remain in the soil as larvae. In spring, the larvae emerge from hibernation, feed on roots and then transform into adults between mid-May and the end of July. Females lay up to 60 eggs in moist soil. Adults live for around 35 days.

Originating in Asia, it has been detected in Europe since 2014, first in Italy, then in Switzerland as far as the French border. Its spread is facilitated by transport (planes, trains, etc.).

This polyphagous beetle attacks over 400 plant species. It causes major damage to vines, devouring the leaves and leaving a lacy appearance, leading to defoliation and under-ripening of the grapes. The larvae damage grass roots, causing wilting and yellowing. Early detection and monitoring are crucial to prevent its establishment in France and the Iberian Peninsula.

Find out more

### *Bactrocera dorsalis* (oriental fruit fly)

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*Bactrocera dorsalis* originated in Southeast Asia, then spread to sub-Saharan Africa in the early 2000s. It was detected in Réunion in 2017 and reported for the first time in Europe in 2018, particularly in southern Italy. In 2018, the first adults were caught in France.

The adult is about 8 mm long, with a dark brown to orange thorax and abdomen with a dark T-shaped band. The wings are transparent with characteristic patterns. Females have a prominent ovipositor.

*B. dorsalis* is extremely polyphagous, attacking the fruit of 539 plants, the major host plants being mango, papaya, grapefruit, mandarin and peach. Secondary host plants include chillies, peppers, cucumbers, apples, pears, tomatoes and grapes. The oriental fruit fly is at high risk of becoming established over the long term in low-lying Mediterranean regions. The larvae develop by feeding on the pulp of the fruit, causing sagging tissue, runs and lesions. Infested fruits ripen more quickly, drop prematurely and become unmarketable. This damage also facilitates the entry of secondary pathogens.

Control of *B. dorsalis* is based on monitoring by trapping, biological control using parasitoids, chemical control and cultivation methods involving collecting and destroying infested fruit to interrupt the development cycle.

Find out more

### *Aleurocanthus spiniferus* (citrus spiny whitefly)

(source : FREDON Occitanie)

*Aleurocanthus spiniferus* on vines

*Aleurocanthus spiniferus* is a hemipteran, belonging to the Aleyrodidae family and originating in Southeast Asia. It is considered a citrus pest and has been present in Italy (since 2008, when it was first detected), Greece, Croatia and Albania, and in France since 2023. It is classified as a quarantine pest by the EU and is subject to compulsory control. Its main hosts are citrus fruits and roses. Highly polyphagous, it attacks over 90 species, including vines, apples, pears, figs and ivy.

Adults measure no more than 1.7 mm and have metallic blue-grey wings with white spots. The larvae are black with a white margin made up of wax filaments. The larvae develop in four stages and gather in immobile colonies on the underside of the leaves. *Aleurocanthus spiniferus* weakens plants by sucking sap. Symptoms include yellowing, deformation of young shoots and premature leaf drops. In addition, *Aleurocanthus spiniferus* excretes honeydew, which leads to the development of fumagine (an ascomycete fungus), preventing photosynthesis and plant respiration.

Control methods are essentially control methods are essentially direct, using insecticides of synthetic origin or mineral, paraffinic or essential orange oils with a physical action that suffocates the larvae (only in cases of low infestation and without the development of fumagine).

## VINE PESTS

### *Jacobiasca lybica* (cotton leafhopper)

This is an invasive species first described in Libya on cotton in the early 20th century, then on grapevines in the vineyards of the Maghreb. It is already present in the vineyards of southern Europe: first spotted in Italy (Sicily and Sardinia, 1962), then in Spain, Greece and Portugal, it has been observed in Corsica (2023) and along the French coast (2024). It is a species that cohabits with *Empoasca vitis* in southern vineyards, and it is very difficult to distinguish the two species with the naked eye. The adults leave the attacked vines in autumn at the end of the vegetative period. They overwinter on a wide range of plants, including alders, fig trees, apples and oaks, before returning to the vines in May of the following year to lay their eggs, giving rise to the first generation. Most of the time, five generations follow one another during the year, partly overlapping.

Damage caused by *J. lybica* on vines. Photo by Guilles Salva (CRVI)

*Jacobiasca lybica* is a sucking-biting insect that feeds on all leaves (young and adult) by puncturing the veins. Attacked leaves quickly become discoloured and dry out as the sap no longer circulates, and curling is sometimes observed at the start of the symptoms. The leaves are no longer functional, slowing down the ripening of the grapes. In the event of a heavy attack, the leaves fall off, exposing the bunches to solar radiations and sunburns.

### *Cryptoblabes gnidiella* (honeydew moth)

is a species of lepidopteran insect in the Pyralidae family, native to the Mediterranean basin. It is a growing pest in vineyards around the Mediterranean. Initially present in coastal areas, it has recently been identified in more continental regions, notably in Greece, where infestations were reported in 2024 in organic vineyards in the Drama region. In France, *Cryptoblabes gnidiella* is well established in many southern coastal departments but has gradually extended its range inland. This polyphagous lepidopteran feeds on a wide variety of species and can produce up to four or five generations a year. It is often associated with other pests such as the citrus mealybug (*Planococcus citri*), citriculus mealybug (*Pseudococcus citriculus*) and grapevine moth (*Lobesia botrana*). The larvae attack sweet fruit that has already been damaged, causing crop losses. These losses have been estimated at 5% a year in French winegrowing. Control methods are based on trapping the insects to determine the need for chemical intervention (on average two per year), or biological control using *trichogramma* or mating disruption. Early detection is difficult, which complicates the management of infestations.

## OLIVE TREE PESTS

### *Melanaspis corticosa* (obscure scale)

*Melanaspis corticosa*, a scale insect originating from South Africa, was first detected in Europe in 2016, infesting olive trees in the Algarve region of Portugal. Its identification was confirmed by morphological and molecular analyses in 2022. Previously, this species had only been known in a few African countries and the Middle East. This scale insect is considered a potential pest of olive trees in Europe, although information on this species is still limited. *M. corticosa* is small, oval-shaped and dark in colour, difficult to distinguish with the naked eye. The host plants are mainly olive trees, but this scale insect can infect other woody species.

*Melanaspis corticosa* infests branches and shoots, causing a general weakening of the tree. Its presence can lead to a decrease in tree vigour and lower production. Implementing a control strategy is difficult, as the insect has proved to be resistant to insecticides, the number of natural predators is limited and there is a lack of knowledge about the insect itself.

### *Dasineura oleae* (olive leaf gall midge)

Symptoms on olive trees (FREDON)

*Dasineura oleae*, a specific olive midge, has historically been considered a secondary pest. However, since 2010, severe infestations have been reported in several Mediterranean regions, particularly in central Italy since 2016. It is a small fly whose larvae cause galls on the leaves, young branches and flower buds of olive trees, disrupting photosynthesis and reducing tree growth and production. Severe infestations can cause significant economic losses. The fight against this pest is based on regular monitoring, the use of traps, targeted insecticide treatments and the encouragement of natural parasitoids to control populations.

## OTHER SECONDARY PESTS

Other pests warrant particular attention because of the risks they represent for certain agricultural sectors.

*Xylotrechus chinensis*, known as the tiger longicorn beetle, is a beetle native to Asia that mainly attacks mulberry trees (*Morus* spp.), although its presence is a threat to other species; it has already been found on apple, pear and grapevine. The adult lays its eggs under the bark, and the larvae dig galleries in the wood, causing the trees to gradually decline or even die. Although still localised, its rapid establishment in several regions of Europe (Spain since 2013, then Greece and France, where it is classified as a quarantine pest) indicates a worrying potential for spread.

*Halyomorpha halys*, the brown marmorated stink bug, is a polyphagous hemipteran native to East Asia. It affects a wide range of crops, including vines, fruit trees and vegetables. It causes fruit deformation, reduced commercial quality and significant yield losses. Its gregarious behaviour and adaptability make it a difficult pest to manage.


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*Pochazia shantungensis* the brown winged cicada, is a leafhopper originating from China and classified as a quarantine pest in Europe. It was detected in France for the first time in 2018 on the Mediterranean coast. It is a pest of many fruit crops (olive trees, peach trees, apple trees, chestnut trees, etc.), forest trees (ash trees) and shrubby ornamental plants (laurel, ornamental pomegranate, camphor trees). Adults can be seen from July to the end of November. They range in size from 7 mm to 17 mm, are dark brown to black and lay eggs in a zigzag pattern covered with white wax filaments. Egg laying takes place on the stems between mid-August and November. There are five larval stages, and larvae are also covered in wax filaments. *Pochazia shantungensis* weakens plants, and in the event of a heavy attack, leads to the death of twigs, branches and trees. *P. shantungensis* also secretes honeydew, where fumagine develops on leaves and stems, reducing photosynthesis.

*Lycorma delicatula*, the spot clothing wax cicada, is a hemipteran in the Fulgoridae family. It originates in China and was introduced into the USA in 2014 (where it is known as the spotted lanternfly), where it has since caused major problems in the agricultural and forestry sectors. Its presence has not yet been detected in Europe. This insect feeds on more than 70 species of ornamental plants, fruit and nut trees and vines. Adults and larvae take sap from leaves and stems. When several specimens feed on the same plant, it dies. When feeding, *Lycorma delicatula* produces a honey-like substance that causes the appearance of fumagine, a mould that prevents photosynthesis. The adults lay their eggs on flat surfaces, which can then be transported and infest new areas. Its spread is facilitated by human activity.

*Phlyctinus callosus*, or garden weevil, a weevil native to South Africa, is a pest of vineyards and fruit trees. It is not present in Europe but is on the alert list. *P. callosus* is a polyphagous species that feeds on a wide range of monocotyledonous and dicotyledonous species. Adults spend the day in the leaf litter on the ground near the host plant and climb on its aerial parts at night to feed and mate. It is considered a major pest of grapevines and fruit trees in South Africa, Australia and New Zealand. It also damages a number of ornamental plants. On vines, the damage mainly affects leaves and stems (as well as the peduncles of bunches or the pedicels of berries). Damage to fruit renders it unfit for sale, and infestations lead to its rejection for export. Young fruit trees can be completely defoliated when adult populations are dense. Larvae cause root damage, which can be severe on root vegetables or young vines and trees.

*Acanalonia conica* the green cone-headed planthopper, is a hemipteran native to North America. It is highly polyphagous and feeds on vines and olive trees. First observed in Italy in 2003, it has also been present in Austria, Hungary and France since 2020. No significant damage has been reported since its introduction. On the other hand, *A. conica* is often accompanied by *Metcalfa pruinosa*, which is recognised as a pest on a large number of host plants.

*Zygina rhamni*, also known as the Italian leafhopper, is native to Europe and can be found in southern Europe (southwest France, Switzerland, Sicily, Slovenia, Cyprus, etc.). The larvae are yellowish-white in colour and closely resemble those of *E. vitis*, but are less mobile. The adult measures 3 mm to 3.5 mm, is yellow-ochre with reddish stripes, more evident in males, and moves in a straight line. *Z. rhamni* feeds on parenchyma cells, producing silvery-white discolourations on the leaf surface which then turn red. *Z. rhamni* colonises vines late in the spring. For the time being, it is not a major problem in vineyards.


(Source : ephytia)

Damage to vine leaf caused by *Z. rhamni*

*Arboridia kakogawana*, or Japanese grape leafhopper, is native to Japan, and then found in Korea, the Russian Far East and China. In 1999, it was identified in southern European Russia, then in Ukraine, Romania, Bulgaria, Serbia and Moldavia. This insect could become established in most French vineyards due to climatic conditions that are favourable to its development. The adults overwinter in deciduous and mixed forests, moving into vineyards in the spring where there can be up to four generations, before returning to the forests in late summer or early autumn to overwinter. It can spread via host plants. Wood with bark may carry the leafhopper, as the insect overwinters under the bark of trees.

*Nysius graminicola* is a species of seed bug already present in Europe in small populations. It likes hot, dry climates and prefers to come out at night, which makes it difficult to observe. In the event of an outbreak, significant damage can be observed, particularly to young vine plants.

*Erasmoneura vulnerata* is a grapevine leafhopper that is widespread in North America. In 2004, it was detected for the first time in Europe, more specifically in northeastern Italy, where it remained a minor pest of vineyards for a long time. In 2016, the first infestations of *E. vulnerata* were reported in several vineyards in the Veneto region. It is gradually colonising other European winegrowing regions (Switzerland, Germany, Hungary). It has not yet been detected in France. *E. vulnerata* feeds on the leaves, causing speckled white lesions on the leaf surface. In the event of severe damage, the lesions may coalesce, and the leaf may fall prematurely. It has been recorded on many other host plants such as horse chestnuts, willows and brambles, although the frequency of collection on these plants is much lower than that observed on species of the Vitis genus.

## VIRUS-CARRYING PESTS

### *Philaenus spumarius* (vector de *x. fastidiosa*)

(source: ANSES recognition sheet, Germain 2015)

*Philaenius spumarus*

*Philaenus spumarius* is an insect belonging to the Aphrophoridae family (cicadas, bugs, aphids and scale insects). The adults are small, between 5.3 mm and 6 mm in size for the males and 5.4 mm to 6.9 mm for the females. This species is polymorphic in colour, making it difficult to identify, with shades of light grey to blackish. The most typical form is yellow-green with indistinct dark lines. Adults are present from April. Not very active, they display saltatory behaviour if disturbed. Egg-laying takes place in late summer, on the stems of plants, and they hatch in spring. The larvae, which are not very mobile, feed on the sap present in the xylem by digging their stylets into the plant. The larvae go through five stages that are difficult to identify. The larvae protect themselves with a foamy secretion called 'cuckoo spit', which can be seen in the leaf axils. *Philaenus spumarius* is native to Europe, where it has a very wide distribution, and it also extends to certain parts of western Asia. It has been accidentally introduced into other parts of the world over the last few centuries, particularly in the temperate regions of North America, South America, Asia, Australia and New Zealand

*Philaenus spumarius* spumarius is known to be one of the vectors of the *Xylella fastidiosa* bacterium (six subspecies) on olive trees. *X. fastidiosa* is a quarantine organism in the European Union and is subject to official surveillance. The bacterium is present on a large number of plant species and can cause diseases such as CoDiRO (rapid desiccation complex of olive trees) on olive trees or Pierce's disease on vines, which has been observed several times in Europe, but has been eradicated or contained to date (Balearic Islands 2016, Portugal 2023, Italy 2024).

More information on the insect;

More information on *Xylella fastidiosa*

### *Trioza erytreae* (African citrus psyllid)

(Cirad)

Damage caused by *Trioza erytreae* on orange leaves (CIRAD)

*Trioza erytreae*, the African citrus psyllid, is the most recent citrus pest to be introduced to mainland Europe. It was detected in northwest Spain in 2014 and has since spread along the Portuguese coast. The adults are light brown; the female is larger than the male and has a very pointed abdomen. It is a biting-sucking insect, preferentially attacking lemon and lime trees. It is sensitive to hot, dry conditions and favours cool, damp areas above 500 m in altitude.

Females lay their eggs on the margins of young leaves, on shoots or the main veins of leaves. They can lay up to 800 eggs. The larvae are sedentary and pupate in open galls at the fifth larval stage. The leaves are left deformed, with galls and often chlorotic spots visible at feeding points. This psyllid transmits citrus greening or huanglongbing (HLB), one of the most devastating citrus diseases in the world. HLB is expressed as a degeneration caused by an endocellular bacterium in the phloem.

Control methods include preventive measures using hedges to encourage beneficial insects, and biological control using *Tamarixia dryi*, which has proven effective as a predator of *Trioza erytreae*.

### Other secondary pests

*Diaphorina citri*, the Asian citrus psyllid, is an insect native to South Asia. It is widespread on the Asian continent and is also present in America and certain African countries. It poses a serious threat to Mediterranean citrus-growing areas. A biting-sucking insect, it attacks citrus fruit as well as various rutaceous plants. The species is mainly found in warm coastal areas. *Diaphornia Citri* is one of the main vectors of citrus greening or huanglongbing (HLB) disease, a serious citrus degeneration disease caused by an endocellular phloem bacterium. At the moment, the species has not yet been detected in Europe.

*Aphis illinoisensis*, the American grapevine aphid, is native to North America. It attacks vines exclusively, weakening plants and reducing production. Its presence in parts of the Mediterranean region, although limited, requires careful monitoring to prevent its spread. It is known in the United States as a vector of the grapevine vein clearing virus, with the potential for this aphid to transmit other problematic viruses, probably constituting the greatest danger if it spreads.

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