

High Priority Organism: *Metcalfa pruinosa* (Metcalfa)



This highly polyphagous insect feeds on a wide variety of woody and herbaceous plants. Mainly found in North America and Europe it has dispersed easily and establishes readily in new habitats.

Assessment of risk

Establishment in NZ	Economic impact	Market Access
Entry pathway	Host range (incl. kiwifruit)	Treatment required
Ease of establishment	Plant health	Area freedom required
Ease of detection	Crop productivity	Movement control
Ease of eradication	Crop protection	Quarantine requirements

Key: ■ High risk ■ Moderate/unknown risk (?) ■ Low risk

Description & Life cycle

The preferred common name for *Metcalfa pruinosa* is planthopper or frosted moth-bug. It is also known as citrus flatid plant hopper, Citrus planthopper, frosted lightning hopper (USA), mealy lantern fly (USA) and moth bug. Adults of *Metcalfa* are rather robust with large moth-like wings sometimes described as leaflike.



Adult planthopper

They are 5.5 to 8mm in length and 2 to 3 mm in width at the widest point. This species, along with certain other flatids, might be mistaken for a moth at first glance. The entire body except the eyes and legs is covered with waxy substance, which together with the bluish black colour of the dorsum gives a purple colour.

Metcalfa have broadly triangular front wings that are held close to the body in a vertical position and give the insects a wedge-shaped, laterally compressed appearance from above. A characteristic pair of dark spots is located in the basal half of each forewing.



The crown of the head is very short, and flat, both on upper and front surfaces. The hind legs are 1.5 times as long as in other legs, bearing a few scattered black-tipped spines along the lateral ridge, and 5-7 comb-like spines at the tip.

The nymphs are ivory white and strongly flattened. The head is half as wide as the thorax across wing pads in mature nymphs and the abdomen is short and barrel-shaped.



Metcalfa nymph

The planthopper has one generation per year and during the late summer and early autumn the females insert eggs into pre-existing openings in the bark of twigs or can excavate openings in soft corky bark. The eggs overwinter in the twigs and hatch in late spring. Development of the five nymphal instars takes place throughout the summer with the first adults found by early July in the US and Italy.

Distribution

This North American species was accidentally introduced into Italy in 1979 and rapidly spread throughout the country. It has subsequently caused economic damage to orchards and vineyards in some South-European countries. In 2003, a mass occurrence of *Metcalfa* was discovered in Vienna, followed by new infestations of several sites.

Possibly its presence in the southwestern USA is a result of human activities. It is apparently not very common in the northeast of the U.S. and has not been recorded from the Pacific Northwest or the northern prairies. It has been reported as widely distributed in Cuba and CABI also lists it as present in the Republic of Korea.



● = Present, no further details ● = Localised ● = Occasional or few reports

Host & Climatic Range

This highly polyphagous insect feeds on a wide variety of woody and herbaceous plants with over 200 species of hosts recorded from Italy including citrus, grapevines, apple, peach, hazel, fig, pear, plum, wisteria, hops, kiwifruit, olive, persimmon and hibiscus. In North America, it feeds on 34 genera of native plants representing 20 families, has been found on dahlias, salvias and privet, and has also been reared on green beans and walnut leaves.

Metcalfa are shown to seek habitats that are temperate and moist but are also shown to successfully colonize areas that are both hot and dry. Because of this it is thought that harsh climatic conditions are unlikely to serve as a barrier to the spread of the insect.

Control

Chemical control against dense nymphal populations might be justified, but controlling the development of sooty mould is usually more useful. Chemical control of adults is difficult owing to their mobility and long life.

The control strategy would be very similar to that of Passionvine hopper (PVH) in New Zealand. For chemical control, timing is of the utmost importance, and at the very first signs of infestation, a suitable insecticide should be applied at the edges of the orchards.

Insecticide applications should be kept to a minimum; one application should be made on the crop and wild plants at the beginning of summer to eliminate immature nymphs and newly-emerged adults, and a second application should be made on wild plants two/three weeks later to prevent the adults from reinvading the crop.

The most effective insecticides were fenitrothion and quinalphos. Deltamethrin gave good control while dimethoate gave better control on the leaves than on the fruit. Chlorpyrifos-methyl needed to be sprayed directly onto the adults to achieve maximum efficacy. The problem with many of these sprays is the lack of suitability in a New Zealand context and represents the same challenges of finding appropriate PVH sprays facing New Zealand growers.

Soap solutions cause almost all of the young stages of the pest to fall to the ground. In the absence of insecticide treatments, the colonies reform 8-10 days later. The treatment is also highly effective in washing away from the plants wax secretions and honeydew produced by the flatid.

A dryinid wasp parasite, *Psilodryinus typhlocybae* (Ashmead), has been reported as common on nymphs of the citrus flatid planthopper and its relatives.

Impacts

The impact of the planthopper is its potential to reach high population densities on a large number of host plant species. Of primary concern are grapevines and fruit trees such as fig, lemon, apple, pear, plum and peach where the fruit may be unsalable due to mould and markings. Serious damage has also been recorded on soyabean in northern Italy.

It is also of note that Sooty-mold fungus commonly develops in the honeydew excreted by *Metcalfa*.

The unsightly white, flocculent, waxy material made by the nymphs impairs the sales quality of affected plants, partly because buyers sometimes mistake these deposits for those of mealybugs or the cottony-cushion scale.



Waxy material of Metcalfa nymphs

Metcalfa establishment information

Dispersal ability

Planthopper is known to disperse over short distances by flight and over longer distances by horticulture and human intervention. They are quick to establish and are also extremely attracted to light.

Ease of detection

Both adults and nymphs are plainly seen when resting or feeding on stems and twigs.

In the U.S. adults have been taken repeatedly in Steiner traps and in black-light traps. The presence of *Metcalfa* is revealed by the waxy exudate on the undersides of succulent leaves or on the terminals of branches. This woolly material often obscures the nymph producing it.

The whitish, comparatively flat *Metcalfa* can be separated easily from sedate mealybugs and cottony-cushion scales by placing a pencil point at the rear end; *Metcalfa* will jump like a leafhopper nymph.

Ease of Eradication

As discussed in the control section, chemical control of adults is difficult owing to their mobility and long life. For chemical control, timing is of the utmost importance, and at the very first signs of infestation. The management of alternate host species on the borders of orchards would be a key to gain overall control longer term.

Eradication attempts in new areas would need to be undertaken very soon after they are first identified. *Metcalfas'* ability to adapt, quickly establish a population and the challenge to control it means stringent measures would need to be taken to successfully eradicate them.

