Eradication

This method of control is applicable after immediate introduction and establishment of the pathogen in a country. The strategy is to control spread of the pathogen by eliminating infected trees as quickly as possible. Sampling of trees is difficult because PPV is not distributed evenly and some plant parts may have undetectable concentrations of the virus. For this reason, multiple samples must be obtained for laboratory testing from suspected trees and trees in the surrounding areas. Infected trees can be bulldozed or cut, using tree removal equipment. It is important to also eradicate sucker shoots developing from stumps because these are known to be a good source. In Europe, growers are advised to wait for 3 years after eradication before replanting an orchard with stone fruit trees.

Insect control

Application of insecticides may reduce the population of aphids but total aphid control is practically impossible. A single aphid may spread the virus to a new host within a few seconds. Recommended and registered insecticides must be applied.

Use of resistant varieties

If preventative measures cannot exclude PPV from a growing area, then plant resistance to the virus may be the only feasible control strategy. However, it is important to know that sources of resistance exist in stone trees (*Prunus*) but are not abundant.

References

http://plantclinic.cornell.edu/factsheets/plumpoxvirus/plumpox.htm
http://www.apsnet.org/online/feature/PlumPox
http://www.ars.usda.gov/is/graphics/photos/sep01/k9602-1.jpg
http://www.eickelmann.de/Bilder/PS/aphid.jpg
http://www.rothamsted.ac.uk/insect-survey/STBrachycaudus_helichrysi.php
SCORZA, R., *et al.* (1994). *Plant Cell Reports.* 14:18–22.

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2009 Printed and published by Department of Agriculture, Forestry and Fisheries

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Chlorotic ring patterns on leaves and distortion of apricot fruit infected with PPV (J.B. Quiot, INRA, France)

Plum pox

– virus of stone fruit –

Introduction

Plum pox or Sharka is the most destructive and most feared viral disease of stone fruit trees (genus *Prunus*) such as plums, peaches, apricots, nectarines, almonds and cherries. Sharka means “pox of plum”. At present four races of the pathogen have been identified. Plum pox virus (PPV) is considered an important quarantine disease for South Africa. It has potential economic importance and does not occur in South Africa. PPV is therefore officially controlled and all efforts must be made to prevent the introduction of the pathogen in the country.

Distribution

Plum pox has been known as a serious disease on stone fruit since the early 1900s. The symptoms of the disease were first observed in plums by plum growers in Bulgaria between 1915 and 1918. Some reports indicate that symptoms were observed in Macedonia as early as 1910. Between 1932 and 1960 the disease spread to the north and east from Bulgaria

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into Yugoslavia, Hungary, Romania, Albania, Czechoslovakia, Germany and Russia. By the mid 1960s the disease had reached The Netherlands, Switzerland, Greece, England and Turkey.

The disease was observed in France, Italy and Belgium by the early 1970s and in Portugal by the early 1980s. It was detected in Chile in 1992 and in Argentina and India in 1994. Thereafter it was also detected in the USA in 1999 and Canada in 2000.

Symptoms

Plum pox symptoms may vary according to cultivars, age and nutritional status as well as the temperature of the surrounding environment of the host. The severity of symptoms may differ according to the strain of the virus. PPV reduces the quality of stone fruit and, over a period of time, renders the tree useless for fruit production. Often symptoms of the virus occur sporadically. Symptoms of PPV often appear 3 years following the initial infection. However, serological tests performed in the laboratory can detect the virus before symptoms occur. Diagnostic symptoms occur on the leaves and fruit of most stone fruit trees and on flowers of certain varieties of peaches. Symptoms appear as yellowish veins/or yellow to light green rings on the surface of the leaf. The skin of the fruit may develop lightly pigmented rings. Necrotic or brown areas may appear and the fruit could become deformed and irregular. Some fruit, such as apricots have rings that appear on the surface of the seed, however, these rings are not visible on the external skin of the fruit. Plums are good indicator species of PPV because they tend to develop severe, visible symptoms.

Transmission of the disease

PPV is spread over short distances by aphids. Aphids transmit the virus through their piercing-sucking mouthparts (stylets) that probe into the vascular tissue of the plants while feeding. The virus sticks on the lining of the food canal and is injected back into a healthy plant cell as the aphids move from plant to plant. In order for the virus to spread successfully to a new host the aphids must:

- Feed on an infected plant
- Acquire a sufficient quantity of the virus
- Fly immediately to a new host plant for transmission

The virus does not persist or increase inside the aphid's circulatory system. The virus carried by an aphid is lost in the next plant cell on which the insect feeds. Also, the efficiency of transmission may vary if the host plant from which the aphid acquired the virus is different from the newly infected host.

Physical movement of the infected plants or plant parts causes long distance spread of PPV, which was introduced into several European countries *via* infected nursery stock or infected buds grafted onto healthy trees. This is the only known method of long-distance transmission. Long-distance spread of the virus *via* aphids is not likely as the lifespan of the virus within an aphid is usually less than an hour. The most important aphid vectors reported are *Brachycaudus cardi*, *B. helichrysi*, *Myzus persicae*, and *Phorodon humuli*.

Host ranges

Stone fruit trees (genus *Prunus*) such as plums (*Prunus domestica* and *P. salicina*), peach (*Prunus persica* var. nectarine), almond (*Prunus amygdalus*) and cherry (*Prunus avium* and *P. cerasus*) are the natural hosts of PPV.

Disease management strategies

Exclusion and quarantine

The best method for controlling PPV is by preventing the introduction of the virus into the country by carefully regulating and inspecting imported plant material. All imported plant material should be tested for plant pathogens, especially exotic pathogens not known to occur in South Africa. All growers and nursery propagators should purchase only certified virus free planting stock that has been tested for PPV and other relevant viruses.

FIG. 1 Chlorotic rings and blotches on plum fruit caused by PPV (P. Gentit, Ctifl, France)

FIG. 2 Chlorotic ring symptoms caused by PPV in plum leaves. (R. Scorza, USDA-ARS, WV, USA)

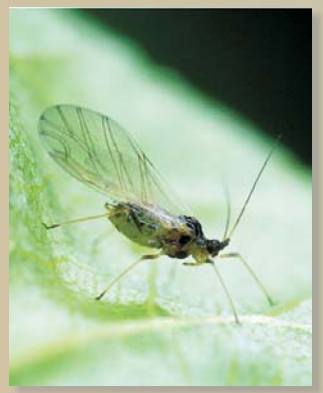

FIG. 3 *Myzus persicae*

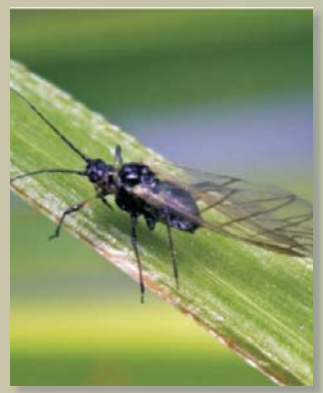

FIG. 4 *Brachycaudus helichrysi*

FIG. 5 *Phorodon humuli*