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Data Sheets on Quarantine Pests

Cherry rasp leaf 'nepovirus'

IDENTITY

Name: Cherry rasp leaf 'nepovirus'
Synonyms: Flat apple virus
Taxonomic position:Viruses: Comoviridae: Possible *Nepovirus*
Common names: CRLV (acronym)
American cherry rasp leaf, flat apple (English)
Feuilles râpeuses (French)
Rauhblättrigkeit (German)
Hoja áspera del cerezo (Spanish)
Notes on taxonomy and nomenclature: The disease caused by cherry rasp leaf nepovirus (CRLV) should not be confused with European cherry rasp leaf (Pfeffinger disease), which is caused by a combination of prune dwarf ilarvirus with raspberry ringspot nepovirus or arabis mosaic nepovirus.
EPPO computer code: CRRLXX
EPPO A1 list: No. 127
EU Annex designation: I/A1

HOSTS

The principal hosts are cherries and peaches, and also apples. The rootstock species *Prunus mahaleb* is also susceptible. Raspberries are also attacked (Jones *et al.*, 1985).

Weeds have also been found naturally infected, but without symptoms (e.g. species of *Taraxacum*, *Plantago* and *Balsamorhiza*). A wide range of herbaceous test plants has been successfully inoculated in the laboratory, including *Chenopodium* spp., cucumbers, *Nicotiana* spp., *Phaseolus vulgaris* and cowpeas.

In the EPPO region, the main potential hosts would be cherries, peaches and apples.

GEOGRAPHICAL DISTRIBUTION

CRLV is native to western North America: Canada (British Columbia, Ontario, Quebec), USA (California, Colorado, Idaho, Montana, New Mexico, Oregon, Utah, Washington).
EPPO region: Absent.
Africa: South Africa (unconfirmed).
North America: Canada, USA.
Oceania: New Zealand.
EU: Absent.
Distribution map: See CMI (1969, No. 303).

BIOLOGY

CRLV is a nepovirus, transmitted by the nematode vector *Xiphinema americanum* (EPPO/CABI, 1996). Since the form of *X. americanum sensu lato* found in western USA is now known as *X. californicum*, this is the vector in practice. CRLV is readily transmitted

by sap inoculation. Seed transmission has been shown to occur in some herbaceous hosts. Virus has been detected in pollen from infected cherry trees, but transmission by pollen has not been confirmed. Spread of the virus in the field is generally slow due to the slow movement of the nematode vector.

For more information, see also Bodine & Newton (1942), Hansen *et al.* (1974), Nyland (1974), Stace-Smith & Hansen (1976), Dunez (1981), Jones & Badenoch (1982).

DETECTION AND IDENTIFICATION

Symptoms

On peaches and cherries

Large enations (leafy outgrowths or protuberances) are found on the lower surface of narrow deformed leaves from affected parts of trees. The enations differ from those caused by other diseases in cherry in that they are formed between the lateral veins. The symptoms are frequently restricted to the lower part of the tree and are often, in recent infections, restricted to one or two limbs.

On apples

The leaf symptom consists of a rolling of the leaf margins toward the midrib. The leaves also tend to point toward the terminus of the spur or shoot. The resulting appearance is one of water stress or drought. The fruit is flattened along the longitudinal axis, but has a normal seed count. The calyx basin is more prominent and the stem cavity is shallow.

On *Rubus*

Infection is symptomless (Jones, 1987).

Morphology

CRLV is an RNA-virus with isometric particles about 30 nm in diameter.

Detection and inspection methods

Infection can be confirmed by sap inoculation to herbaceous indicators (ISHS, 1980). *Chenopodium quinoa* and *C. murale* are the most reliable indicator species. This can be followed by ELISA or confirmatory gel double-diffusion serology, although gel tests do not react at certain times of year (such as late spring and summer, probably due to low virus concentrations).

MEANS OF MOVEMENT AND DISPERSAL

CRLV is spread only slowly by its nematode vector, and the most likely means of international movement is in infected propagating material. It could possibly be carried by the nematode vector in soil accompanying plants. The virus has been intercepted several times in imported plant material from North America (Jones *et al.*, 1985).

PEST SIGNIFICANCE

Economic impact

In North America, CRLV causes serious stunting in peaches, and fruit yield and quality reductions in cherries and apples. Young trees and seedling rootstocks are sometimes killed. Because of its slow spread, the disease is mainly a nuisance in nuclear stock propagation. However, it can reach high levels of infection in older orchards. Trees planted on previously infected sites often become infected.

CRLV could be troublesome in nuclear stock propagation, probably throughout the EPPO region. Rootstocks and some scion cultivars may not show obvious symptoms. None were seen on raspberries known to be infected.

Control
Use healthy planting material.

Phytosanitary risk
CRLV is considered to be an A1 quarantine organism for EPPO (OEPP/EPPO, 1984) and of quarantine significance for IAPSC. The potential of CRLV in the EPPO region depends on the introduction of its nematode vector *Xiphinema americanum* or on the possibility of its transmission by related nematode species. The A2 listing of *X. americanum* by EPPO is to a large extent based on the virus risk, rather than on any direct risk from the nematode.

PHYTOSANITARY MEASURES

According to the EPPO specific quarantine requirements (OEPP/EPPO, 1990), imported propagating material of host plants should have been subject to a visual growing-season inspection. If such material is imported from countries where the virus occurs, it should originate from a certification scheme giving appropriate guarantees. EPPO recommends such a certification scheme, for use within the region, but it could readily be extended to other regions (OEPP/EPPO, 1991/1992). Measures should also be taken against the nematode vector *X. americanum* (EPPO/CABI, 1996).

BIBLIOGRAPHY

Bodine, E.W.; Newton, J.H. (1942) The rasp leaf of cherry. *Phytopathology* **32**, 333-335.

CMI (1969) *Distribution Maps of Plant Diseases* No. 303 (edition 3). CAB International, Wallingford, UK.

Dunez, J. (1981) Exotic virus and virus-like diseases of fruit trees. *Bulletin OEPP/EPPO Bulletin* **11**, 251-258.

EPPO/CABI (1996) *Xiphinema americanum sensu lato*. In: *Quarantine pests for Europe*. 2nd edition (Ed. by Smith, I.M.; McNamara, D.G.; Scott, P.R.; Holderness, M.). CAB INTERNATIONAL, Wallingford, UK.

Hansen, A.J.; Nylland, G.; McElroy, F.D.; Stace-Smith, R. (1974) Origin, cause, host range and spread of cherry rasp leaf disease in North America. *Phytopathology* **64**, 721-727.

ISHS (1980) Detection of viruses and other graft-transmissible virus-like diseases of fruit trees. *Acta Phytopathologica Academiae Scientiarum Hungaricae* **15**, 407-413.

Jones, A.T. (1987) Cherry rasp leaf virus in *Rubus*. In:
Virus diseases of small fruits (Ed. by Converse, R.H.). *Agriculture Handbook* No. 631, pp. 241-242. US Department of Agriculture, USA.

Jones, A.T.; Badenoch, S. (1982) Recent studies on virus and virus-like diseases of *Rubus* in Scotland. *Acta Horticulturae* No. 129, pp. 49-58.

Jones, A.T.; Mayo, M.A.; Henderson, S.J. (1985) Biological and biochemical properties of an isolate of cherry rasp leaf virus from red raspberry. *Annals of Applied Biology* **106**, 101-110.

Nyland, G. (1974) Cherry rasp leaf. In: *Virus diseases and non-infectious disorders of stone fruits in North America*. *Agriculture Handbook* No. 437, pp. 219-221. US Department of Agriculture, USA.

OEPP/EPPO (1984) Data sheets on quarantine organisms No. 127, Cherry rasp leaf virus. *Bulletin OEPP/EPPO Bulletin* **14**, 5-7.

OEPP/EPPO (1990) Specific quarantine requirements. *EPPO Technical Documents* No. 1008.

OEPP/EPPO (1991/1992) Certification schemes. Virus-free and virus-tested fruit trees and rootstocks. *Bulletin OEPP/EPPO Bulletin* **21**, 267-278; **22**, 253-284.

Stace-Smith, R.; Hansen, A.J. (1976) Cherry rasp leaf virus. *CMI/AAB Descriptions of Plant Viruses* No. 159. Association of Applied Biologists, Wellesbourne, UK.