

Detection of Some Viruses of Stone Fruits in Purple Leaf Plum (*Prunus cerasifera*) as Ornamental Plant in the Eastern Mediterranean Region of Turkey

G. Sertkaya
Department of Plant Protection
Faculty of Agriculture
University of Mustafa Kemal
31034 Antakya/Hatay
Turkey

Keywords: ELISA, ornamental plants, plum, prunus, virus

Abstract

Field inspection and sample collection were carried out in purple leaf plum (*Prunus cerasifera*) which is planted as an ornamental tree in Adana, Hatay and Mersin provinces in the eastern Mediterranean Region of Turkey during early spring and early autumn in 2004. A total of 57 samples (shoots and leaves) having different symptoms such as reduced growth, few and small leaves with green ring mottle, vein clearing, yellow or necrotic spots, chlorosis or discoloration were collected and tested for the presence of *Apple chlorotic leaf spot trichovirus* (ACLSV), *Apple mosaic ilarvirus* (ApMV), *Cherry leaf roll nepovirus* (CLRV), *Prune dwarf ilarvirus* (PDV), *Prunus necrotic ringspot ilarvirus* (PNRSV) and *Plum pox potyvirus* (PPV) by using DAS-ELISA. According to serological assays, the most common virus was PDV with the rate of 4/57. It was followed by PNRSV (3/57) and ACLSV (1/57). Mixed or single infections with ApMV and PPV were not detected in the samples. Although, *P. cerasifera* trees infected with different important viruses were far from commercial pome and stone fruit orchards, they seemed to be unhealthy as ornamental plants in the cities, and they must be as reservoirs of these viruses for susceptible ornamental or fruit species in the region. Further studies are necessary to investigate other common ornamental species (mother plants or production materials, especially) for the presence of the main viruses by sensitive methods.

INTRODUCTION

Purple leaf plum (*Prunus cerasifera*) tree, with dark purple-red leaves and pale pink flowers fading to white in early spring, is a very pretty ornamental plant. *Prunus cerasifera* is mainly produced by rooting of cuttings obtained from the same mother plants. Vegetative propagation of plants is a useful method for providing genetically uniform and cost-effective planting material, but it may cause increase of infected plants and spread many pests and diseases to susceptible cultivars and/or to new areas.

Although there have been many studies on occurrence and detection of virus and virus-like diseases of many commercial *Prunus* spp. in Turkey (Alay et al., 1973; Çıtır, 1987; Çağlayan and Gazel, 1999; Ulubas and Ertunç, 2003; Sertkaya et al., 2003), the particular information about the virus diseases occurring in ornamental *Prunus* spp. was any study in Turkey.

This study reports the results of serological detection (ELISA) of the main important stone fruit viruses (OEPP/EPPO, 1993) in purple leaf plum (*Prunus cerasifera*) as ornamental plants in the eastern Mediterranean region in Turkey.

MATERIALS AND METHODS

Field inspections and sample collections were carried out from purple leaf plum trees planted on the side walks of the main avenue in city centers of Adana, Hatay and Mersin provinces in the eastern Mediterranean region of Turkey in early spring and early autumn in 2004.

Shoots and leaves samples, which were collected from *P. cerasifera* plants,

exhibited symptoms associated with viruses such as reduced growth, few and small leaves with green ring mottle, vein clearing, yellow or necrotic spots, chlorosis or discoloration (Fig. 1).

A total of 57 samples were investigated for *Apple chlorotic leaf spot trichovirus* (ACLSV), *Apple mosaic ilarvirus* (ApMV), *Cherry leaf roll nepovirus* (CLRV), *Prune dwarf ilarvirus* (PDV), *Prunus necrotic ringspot ilarvirus* (PNRSV) and *Plum pox potyvirus* (PPV) by using double-antibody sandwich enzyme-linked immunosorbent assay (DAS-ELISA) method described by Clark and Adams (1977). The ELISA kits were supplied by Bioreba AG-Switzerland. The samples were prepared from leaves by homogenizing 1.0 g of tissues in extraction buffer (phosphate-buffered saline, pH 7.2 with 0.05% Tween-20, 2% polyvinylpyrrolidone and 0.2% ovalbumin) in ratio of 1:10 and further diluted if necessary. The absorbance values were read on Sirio S colorimeter at 405 nm. The samples were tested by DAS-ELISA in duplicate. Sensitivities were deduced from a detection threshold equal to twice the mean value of healthy control. Leaves of healthy GF 305 peach seedlings were also used as negative control.

RESULTS AND DISCUSSION

Prunus cerasifera plants exhibited symptoms associated with viruses such as reduced growth, few and small leaves with green ring mottle, vein clearing, yellow or necrotic spots, chlorosis or discoloration were accepted as susceptible plants. Discoloration (light-green), few and small leaves and necrotic spots were observed as the main symptoms on susceptible trees.

According to results of ELISA, one out of 57 samples were found to be infected with ACLSV. PDV and PNRSV were positively detected in the samples by the rates of 4/57 and 3/57, respectively. No ApMV- and PPV- or mix-infected sample was detected among the investigated plants (Table 1).

The results suggest that infected plants' rates were found higher in Adana and Mersin due to population of purple leaf plum trees and numbers of sampled plants are higher in both provinces than Hatay. The using of quarantine measures effectively is essential to prevent the distribution of the main stone fruit viruses to the new areas or commercial stone fruit plantations. Selection of healthy-trees according to a certification programme for ornamental species and detection of the mother plants of ornamental *Prunus* spp. periodically by using sensitive methods are necessary to prevent spreading of the important viruses from their main reservoirs and for the improvement of healthy ornamental plant production in Turkey.

Literature Cited

- Alay, K., Ismen, H., Altınay, N., Hancıoğlu, Ö., Dündar, F. and Blodgett, L.C. 1973. Studies on Amasya cherry disease which is important on the cherry in Amasya-Turkey. Bull. Of Plant Protec. 13(3):163–171.
- Clark, M.F. and Adams, A.N. 1977. Characteristics of the microplate method of enzyme linked immuno sorbent assay for the detection of plant viruses. J. Gen. Virol. 34:475–483.
- Çıtır, A. 1987. Preliminary investigations about identity of the causal agent of Amasya cherry disease in Turkey. J. Turkish Phytopathol. 2516(1):23–35.
- Caglayan, K. and Gazel, M. 1999. Primary studies for viroids and phytoplasma problems of stone fruits in eastern Mediterranean area of Turkey. XIVth Int. Plant Protec. Cong (IPPC, Jarusalem-Israel July 25–30), Abst. p.16.
- OEPP/EPPO, 1993. Recommendations made by EPPO Council in 1992: scheme for the production of classified vegetatively propagated ornamental plants to satisfy health standards. Bulletin OEPP/EPPO Bulletin 23:735–736.
- Ulubas, C. and Ertunç, F. 2003. The occurrence and molecular characterization of PNRSV isolates in Turkey. Acta Hort. 657:115–120.
- Sertkaya, G., Caglayan K. and Culubas, C. 2003. Detection of some viruses of stone fruits in mother plant blocks in the eastern Mediterranean region of Turkey. Acta Hort.

Tables

Table 1. Viruses detected by DAS-ELISA in purple leaf plum (*Prunus cerasifera*) trees planted at the border of the main avenue in city centers of Adana, Hatay and Mersin provinces in the eastern Mediterranean region of Turkey.

Provinces	No. of tested samples	Single infections ^a					Mixed infection
		ACLSV	ApMV	CLRSV	PNRSV	PPV	
Adana	26	1	0	0	1	0	0
Hatay	9	0	0	0	0	0	0
Mersin	22	0	0	0	2	0	0
Total	57	1	0	0	3	0	0

^a ACLSV: *Apple chlorotic leaf spot trichovirus*; ApMV: *Apple mosaic ilarvirus*; CLRV: *Cherry leaf roll nepovirus*; PDV: *Prune dwarf ilarvirus*; PNRSV: *Prunus necrotic ringspot ilarvirus*; PPV: *Plum pox potyvirus*.

Figures



Fig. 1. Different symptoms associated with stone fruit viruses on purple leaf plum (*Prunus cerasifera*).

