Viruses of stone fruit trees in Lebanon

Choueiri E., Abou Ghanem-Sabanadzovic N., El Zammar S., Jreijiri F.

in

Myrta A. (ed.), Di Terlizzi B. (ed.), Savino V. (ed.).
Virus and virus-like diseases of stone fruits, with particular reference to the Mediterranean region

Bari : CIHEAM
Options Méditerranéennes : Série B. Etudes et Recherches; n. 45

2003
pages 25-27

VIRUSES OF STONE FRUIT TREES IN LEBANON

Choueiri E[1], N. Abou Ghanem-Sabanadzovic[2], S. El Zammar[1] and F. Jreijiri[1]
[1]Agricultural Research Institute of Lebanon, Tal Amara, Rayak, PO Box 287 Zahlé (Lebanon)
[2]Istituto Agronomico Mediterraneo, Via Ceglie 9, 70010 Valenzano (BA) (Italy)

SUMMARY - The sanitary status of Lebanese stone fruit industry was evaluated in the frame of several surveys. The overall average virus incidence was ca. 30%, ranging from 24% in peach to 36% in cherry. The most common viruses were *Prunus necrotic ringspot virus* (PNRSV), *Prune dwarf virus* (PDV) and *Apple chlorotic leaf spot* (ACLSV). Virus distribution differed greatly according to the location of orchards. PNRSV was dominant in peach (61%) but it was also relevant in cherry (42%). The presence of PDV was consistently high (42%) in cherry and less (22%) in peach. ACLSV was 38% in cherry and 27% in peach. *Apple mosaic virus* (ApMV), only in peach, was the least represented virus (2%). In two species, infections by two or more viruses (13% in peach and 19% in cherry) were also found. *Plum pox virus* (PPV) and three nepoviruses tested for (*Tomato ringspot virus*, ToRSV; Strawberry latent ringspot virus, SLRV; and *Cherry leaf roll virus*, CLRV) were not encountered.

Key words: Lebanon, stone fruits, plant viruses, ELISA

RESUME *- Au Liban, l'état sanitaire des espèces fruitières à noyau a fait l'objet d'une évaluation réalisée par de nombreuses enquêtes. L'incidence moyenne totale des virus a été estimée égale à 30%, allant de 24% pour le pêcher à 36% pour le cerisier. Les virus rencontrés le plus fréquemment étaient le Prunus necrotic ringspot virus (PNRSV), le Prune dwarf virus (PDV) et l'Apple chlorotic leaf spot virus (ACLSV). La distribution des virus était très variable selon la localisation des vergers. Le PNRSV était prédominant chez le pêcher (61%), mais il était également important chez le cerisier (42%). La présence du PDV était plus significative (42%) chez le cerisier que chez le pêcher (22%). L'ACLSV atteignait 38 % sur cerisier et 27% sur pêcher. L'Apple mosaic virus (ApMV), détecté seulement sur pêcher, était le virus le moins représenté (2%). Chez les deux espèces, on a également mis en évidence des infections mixtes, causées par deux ou plusieurs virus (13% chez le pêcher et 19% chez le cerisier). Le Plum pox virus (PPV) et trois nepovirus pour lesquels on avait effectué des tests (Tomato ringspot virus, ToRSV, Strawberry latent ringspot virus, SRLV et Cherry leaf roll virus, CLRV) n'ont pas été mis en évidence.*

Mots-clés: *Liban, espèces fruitières à noyau, virus végétaux, ELISA*

INTRODUCTION

Stone fruits are of utmost importance in the Lebanese agriculture. According to recent statistics (Anonymous, 2000) the Lebanese stone fruit industry accounts for an area of about 23,000 ha. Peach (*Prunus persicae*) and cherry (*P. avium*), two of the main stone fruit crops, are planted in many regions of the country, distributed on a surface of about 9,000 ha.

Recently, stone fruit species have drawn the attention of the growers, in particular peach, that within few years has occupied a large surface area, especially in the Bekaa Valley. This has favored the introduction of a number of foreign varieties as an alternative to the traditional ones. Sweet cherry has also been subjected to a great expansion in the last decade in the western part of Mount Lebanon and in the Central Bekaa plain. However, the recent introduction in Lebanon from abroad of peach and cherry cultivars with unknown sanitary status have increased the incidence and severity of disease problems.

SANITARY SURVEYS

The sanitary status of peach and sweet cherry in Lebanon, especially the viral infections, received attention except in a preliminary survey in 1996 (Jawhar *et al.,* 1996). Hence

a country-wide survey of peach and cherry orchards was undertaken in 1999-2001 to assess the presence of viruses in Lebanon.

Field inspections were carried out in commercial peach and cherry orchards in both traditional and new cropping areas of the country. Two large surveys were done, the first in spring and summer 2000 for peach, and a second in spring 2001 for cherry.

More than 35,000 trees of peach and 25,000 trees of cherry were inspected. Samples were collected from 950 trees in 95 commercial orchards of peach and from 1,000 trees covering 153 commercial orchards of cherry. Samples were taken randomly from three different regions (Mount Lebanon, Bekaa Valley and North Lebanon) taking into consideration the surface area planted and the relative distribution of peach and cherry in these areas.

Samples were tested by ELISA for *Prunus necrotic ringspot virus* (PNRSV), *Apple mosaic virus* (ApMV), *Prune dwarf virus* (PDV), *Apple chlorotic leaf spot virus* (ACLSV), and *Plum pox virus* (PPV).In addition, 30% of peach samples were tested for *Tomato ringspot virus* (ToRSV) and Strawberry latent ringspot virus (SLRSV) and 100% of cherry samples for *Cherry leafroll virus* (CLRV).

The overall average incidence of infection with viruses was ca. 30% ranging from 24% in peach to 36% in cherry. The most abundant viruses were PNRSV, PDV, ACLSV and ApMV. Virus distribution differed greatly according to the location of orchards. PNRSV was the dominant virus in peach (61% of infection) but it was also relevant in cherry (42%). The presence of PDV was consistently high (41.6%) in cherry and less (22%) in peach. ACLSV was 38% in cherry and 27% in peach (Choueiri *et al.,* 2001; Choueiri, 2001). ApMV, only in peach, was the least represented virus (2.1% incidence). In both species, infections by two or more viruses (13% in peach and 19.4% in cherry) were also reported with PNRSV+ACLSV being the most common mixture followed by PDV+ACLSV and PNRSV+PDV. PPV was not detected despite its reports in the neighboring countries (Al-Chaabi *et al.,* 2000; Al Rwahnih *et al.,* 2001). Likewise, none of the three nepoviruses tested for (ToRSV, SLRSV and CLRV) were encountered.

Associating defined syndromes with infection by specific viruses was made difficult by the great variability of species (peach and cherry) and varietal responses, which ranged from lack of visible symptoms (i.e. high tolerance) to clear-cut reactions.

On peach, the presence of PNRSV was occassionally characterized by necrotic spots and tattering of the leaves and small cankers on twigs, although in most cases PNRSV infections were symptomless, as those by ACLSV (Giunchedi and Poggi Pollini, 1984; Desvignes and Boyé, 1989). In few cases, however dark green spots developed on some leaves infected with ACLSV. Various patterns of chlorotic mottling, shortening of the internodes and reduced growth were observed in plants infected by PDV. ApMV was detected only in plants without apparent symptoms.

On cherry, various symptoms on the leaves consisting of foliar perforation, yellow lines, and chlorotic ring spots were associated with PNRSV and PDV separately or in combination. Other leaf symptoms of mild/severe line patterns, discoloration and fruit deformation were also reported on trees that showed, however, no positive reaction to the antibodies used during the survey.

CONCLUSIONS

The present survey provides a better assessment of the virological condition of peach and cherry. The laboratory tests complemented by field inspections revealed that most of the major viruses of *Prunus* spp. occur in Lebanese peach and cherry orchards, confirming the previous reports from other Mediterranean countries (Llàcer *et al.,* 1986; Choueiri *et al.,* 1993). ApMV was recorded for the first time in Lebanon. In terms of virus infection level, the overall of the Lebanese peach and cherry industry seems to be relatively less infected than other Mediterranean countries (Choueiri *et al.,* 1993; Grayaa *et al.,* 1993).

Even so, of a certification program is very much needed to prevent the further introduction of viruses, especially PPV and the production and distribution of certified material.

REFERENCES

Al Chaabi, S., Darwech, A.R., Esmael, F., Mando, J., Numan, S., Matrod, L., Al-Saleh, A. and Aswad, F. (2000). Assessment of the phytosanitary status of stone fruit trees and grapevine in Syria. *Arab J. Plant Prot.*18: 17-23.

Al Rwahnih, M., Myrta, A., Abou Ghanem, N., Di Terlizzi, B. and Savino, V. (2001). Viruses and viroids of stone fruits in Jordan. *EPPO Bull.* 31: 95-98.

Anonymous, (2000). *L'agriculture au Liban 1998-1999*. Projet de recensement agricole. Projet FAO. Rome.

Choueiri, E. (2001). *Rapport annuel du Département de Protection des Plantes* - Institut de Recherches Agronomiques Libanais, Tal Amara.

Choueiri, E., Digiaro, M., Minafra, A. and Savino, V. (1993). A survey of peach viruses in Apulia. *Adv. Hort. Sci.* 7: 61-64.

Choueiri, E., Haddad, C., Abou Ghanem-Sabanadzovic, N., Jreijiri, F., Issa, S., Saad, A.T., Di Terlizzi, B, and Savino, V. (2001). A survey of peach viruses in Lebanon. *EPPO Bull.* 31: 493-498.

Desvignes, J.C. and Boyé, R. (1989). Different diseases caused by the chlorotic leaf spot virus on the fruit trees. *Acta Hort.* 235: 31-38.

Giunchedi, L. and Poggi Pollini, C. (1984). Principali malattie da virus e virus-simili delle drupacee in Italia. *Informatore Fitopatologico* 34 (3): 75-90.

Grayaa J., Digiaro M., Savino, V. and Martelli, G.P. (1993). A survey of sweet cherry viruses in Apulia. *Adv. Hort. Sci.* 7: 27-31.

Jawhar, J., Di Terlizzi, B., Khoury, W. and Savino, V. (1996). Preliminary account of the phytosanitary status of stone-fruit trees in Lebanon. *EPPO Bull.* 26: 161-166.

Llàcer, G., Cambra, M., Lavina, A. and Aramburu, J. (1986). Viruses infecting stone fruit trees in Spain. *Acta Hort.* 193: 95-99.