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RECENT ADVANCES ON STONE FRUIT VIRUSES IN TURKEY

K. Ça layan and Ç. Uluba

Plant Protection Department, Mustafa Kemal University, Antakya (Turkey)

SUMMARY - Most common viruses of stone fruit trees in Turkey were: *Prunus necrotic ring spot* (PNRSV), *Prune dwarf* (PDV), and *Apple mosaic* (ApMV) ilarviruses, *Apple chlorotic leaf spot trichovirus* (ACLSV) and *Plum pox potyvirus* (PPV). PPV occurred in some locations, close to the European border. In the Eastern Mediterranean area, ApMV was the more frequent virus detected (22%), followed by PNRSV (17%), PDV (15%) and ACLSV (13%). In addition to ELISA, molecular assays (RT-PCR) were implemented. The preliminary results of these studies are briefly discussed.

Key words: Turkey, stone fruits, plant viruses, ELISA, PCR

RESUME - En Turquie, les virus les plus communs qui affectent les espèces fruitières à noyau sont les suivants: les ilarvirus *Prunus necrotic ringspot virus* (PNRSV), *Prune dwarf virus* (PDV) et *Apple mosaic virus* (ApMV), le trichovirus *Apple chlorotic leaf spot virus* (ACLSV) et le potyvirus *Plum pox virus* (PPV). Le PPV est limité seulement à certains endroits, à proximité de la frontière avec l'Europe. En revanche, les autres virus sont largement répandus dans tout le pays. Les prospections réalisées dans la région de la Méditerranée orientale ont mis en évidence que l'ApMV est le virus le plus commun, avec un taux d'infection moyen de 22%, suivi du PNRSV, du PDV et de l'ACLSV avec une incidence de 17%, 15% et 13%, respectivement. Tout récemment, des études moléculaires (RT-PCR) ont aussi été entamées en vue de détecter les virus des espèces fruitières à noyau dans les différentes régions turques. Les résultats préliminaires de telles études sont brièvement passés en revue.

Mots-clés: Turquie, espèces fruitières à noyau, virus végétaux, ELISA, PCR.

INTRODUCTION

Turkey produces a wide range of fruits and nuts of which many are indigenous to the area. The most important stone fruit crops include: apricot (500,000 tons), peach and nectarines (400,000 tons), cherry (200,000 tons) and plum (180,000 tons) (FAO, 2002).

Nearly all *Prunus* species have been grown in Anatolia, with popularity given to sweet cherries and apricots. Peach is mainly grown in Marmara Region, but also extended to the Aegean and Mediterranean regions, with especially low chilling requiring cultivars. Very late peach cultivars, ripening in mid-October from the highlands of Marmara and Mediterranean Regions are being exported. Malatya province in East Anatolia is well known with the best quality of dry apricots. On the other hand, Mut area in the Eastern Mediterranean district has a great importance with the earliest and high quality table apricots. European plums are in Marmara, North and Central Anatolia and on the highlands of the Country. Japanese plums are in the Mediterranean and Aegean Regions. Turkey is also famous for the high quality sour cherry juice. The best cultivar is named after the home province, Kütahya. Ankara and Afyon provinces are the other main sour cherry producers.

STONE FRUIT VIRUSES

ELISA tests

Common viruses in Turkey include: *Prunus necrotic ring spot* (PNRSV), *Prune dwarf* (PDV), and *Apple mosaic* (ApMV) ilarviruses, *Apple chlorotic leaf spot trichovirus* (ACLSV) and *Plum pox potyvirus* (PPV). PPV is only common in some locations, close to the European border, the others were common all over Turkey. Based on surveys in Eastern Mediterranean area, the most common virus was ApMV, with mean infection rate of 22%. It was followed by PNRSV, PDV and ACLSV, with mean infection rates of 17%, 15%, and 13%, respectively. PPV was not detected in our surveys (Ça layan and Gazel, 1998).

Recently, the east part of Turkey esp. Malatya, which is the most important apricot production area, was surveyed. A total of 1,019 samples were tested by ELISA (representing 75 different cultivars). The sanitary status of apricot was found satisfactory with an infection level of 0.3% whereas 21 and 33% occurred in cherry and almond, respectively (Sipahio lu, 1999). In another work in the same area, ACLSV was found on apricot varieties of Pre'cose de Boulbon and Kuru Kabuk, and PNRSV on local apricot varieties like Çölo lu, Hasan Bey, Tekeler and am. All varieties were found free from PPV (Yorganc *et al.*, 2001).

RT-PCR

Recently, molecular studies were used in our assays for PNRSV, PDV, PPV and ApMV. Total RNA was extracted by using lithium-chloride method (Spiegel and Martin, 1993). The sequence of PNRSV reverse complementary primer I used for viral RNA synthesis corresponded to nucleotides 1775 to 1794 (Fig. 1a) and the sense primer II corresponded to nucleotides 1178 to 1198 (Spiegel *et al.*, 1999). Primers for PDV testing were complementary to nucleotides 1988-2010 and homologous to nucleotides 1838-1860 (Parakh *et al.*, 1995). Primers for PPV detection were designed according to Nemchinov *et al.* (1995). Primers were specific 3' non-coding region of PPV RNA amplifying 220 bp fragment (Fig. 1b).

According to the results of molecular aasay the most widespread virus was estimated to be PDV, especially in İzmir and Ankara provinces. So far, mixed infections of PNRSV and PDV were only found in Çanakkale germplasm. For ApMV, primers were designed in our laboratory and worked quite well by amplifying 317 bp fragment. For further studies, samples will be retested by RT-PCR and characterized by RFLP.

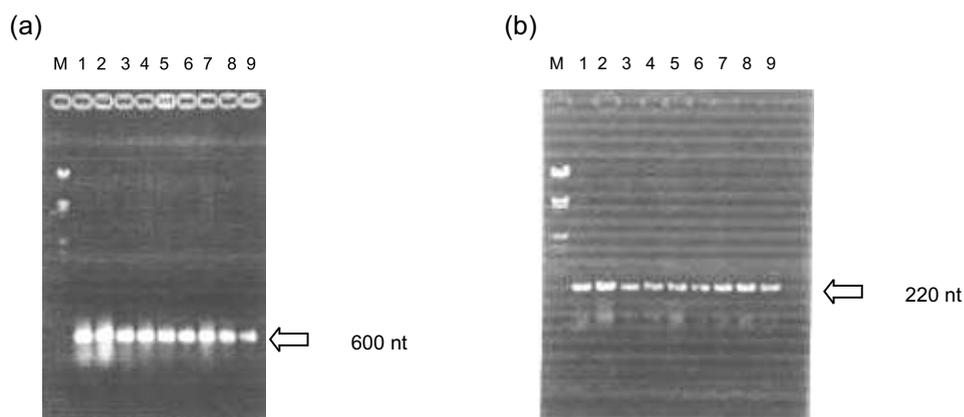


Fig. 1. (a) Agarose gel electrophoresis analysis of RT-PCR amplified PNRSV cDNA products. Lane M, DNA markers; arrow indicates 600bp; lane 2, positive control RNA; lanes 2-9, RNA samples. (b) Attempt to set up RT-PCR method by PPV infected tissue. cDNA products were obtained in different primer and RNA concentrations. Lane 1, marker; arrow indicates 220 bp.

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