

DISEASE NOTE

IDENTIFICATION OF *PEACH LATENT MOSAIC VIROID* IN LEBANON

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Symptoms resembling those caused by *Peach latent mosaic viroid* (PLMVd), family *Asunviroidae*, genus *Pelamoviroid*, i.e., delayed bud break, yellow mottling or blotching of the leaves, discolouration and deformation of the fruits, have been repeatedly observed in peach and nectarine plants in Lebanon (Jawhar *et al.*, 1997), but the causal agent has not been ultimately identified. Samples collected from ten commercial orchards in North Lebanon, Mount Lebanon, and Bekaa Valley, were tested by molecular hybridization and RT-PCR for the presence of PLMVd using a SP6 RNA polymerase-generated full-length digoxigenin-labelled riboprobe and specific primers designed on an Italian PLMVd isolate (Shamloul *et al.*, 1995). PLMVd was identified in 17 out of 50 tested samples belonging to both native ('Chikhani' and 'Bab cock') and imported varieties ('Dixiered' and 'Springtime'). The presence of PLMVd represents an incumbent threat for the Lebanese peach industry as infected trees constitute dangerous inoculum sources.

Jawhar J., Di Terlizzi B., Turturo C., Khoury W., Savino V., 1997. Virus and virus-like diseases of stone fruits in Lebanon. *Sixt Arab Congress of Plant Protection, Beirut* 1997, 214.

Shamloul A.M., Minafra A., Hadidi A., Giunchedi L., Waterworth H.E., Allam E.K., 1995. Peach latent mosaic viroid: nucleic sequencing of an Italian isolate, sensitive detection using RT-PCR and geographic distribution. *Acta Horticulturae* 386: 522-530.

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TOMATO BUSHY STUNT VIRUS
IN *NICOTIANA GLAUCA* IN GREECE

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During the last years, a number of the widely spread weed *Nicotiana glauca* plants showing virus-like symptoms, were observed in different regions of Greece (Epyrus, Attica and Dodecanesus). From infected plants, showing chlorotic spots, deformation of the leaves and enations, a virus was consistently transmitted by sap inoculation to herbaceous hosts. The results of biological and serological assays as well as the outward aspect of virus particles from symptomatic leaves of artificially infected *Nicotiana benthamiana*, suggested that the virus could be an isolate of *Tomato bushy stunt virus* (TBSV; Genus *Tombusvirus*, Family *Tombusviridae*) (Russo *et al.*, 1994). RNA extracted from purified virus preparations were subjected to RT-PCR using specific primers [F (+): 5' TGACGCTCATGAGC-CCAGCATCC 3'; R (-): 5' TCCTGATCCTCCATCC-CAACGTTTC 3'] designed on tombusviruses sequences from EMBL database. The amplification product (1368 nt) was cloned and sequenced (Acc. no. AJ312281). This sequence contained the complete coat protein (CP) gene and the amino acid sequence was 91% identical to the CP of TBSV cherry strain (Acc. no. M31019). TBSV is the cause of severe epidemics in several horticultural crops (Luis-Arteaga *et al.*, 1996). This is the first report of TBSV in *N. glauca*, which appears to be a new host for this virus.

Russo M., Burgyan J., Martelli G.P., 1994. Molecular Biology of Tombusviridae. *Advances in Virus Research* 44: 381-428.

Luis-Arteaga M., Rodriguez-Cerezo E., Fraile A., Sàez E., García-Arenal F., 1996. Different Tomato bushy stunt virus strains that cause disease outbreaks in solanaceous crops in Spain. *Phytopathology* 86: 535-542.

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DISEASE NOTE

**CHARACTERIZATION OF
POPULATIONS OF *PHYTOPHTHORA
INFESTANS* (MONT.) DE BARY
IN MOROCCO USING AGGRESSIVENESS,
MATING TYPE AND METALAXYL
RESISTANCE**

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Late blight of potato and tomato caused by *Phytophthora infestans* (Mont.) de Bary has become a serious problem for these crops during some growing seasons. It first appeared in Africa in 1941 (Sedigui *et al.*, 1997). The population structure of this fungus is reported to have changed since 1980's essentially the occurrence of the A2 mating type outside Mexico (Drenth *et al.*, 1993). Also the new populations of *P. infestans* are more aggressive and genetically diverse from the old populations (Fry *et al.*, 1992; Peters *et al.*, 1999). Until 1997, only A1 mating type of *P. infestans* had been detected in Morocco (El Ismaili, 1994; Sedigui *et al.*, 1997). In this study 99 isolates from different tissues of potato (92 isolates) and tomato (7 isolates): leaves, stems and tubers, originating from several regions of Morocco during 1997-2000, were characterized by using aggressiveness, mating type and metalaxyl resistance. These isolates were tested for aggressiveness on detached leaflets and tubers of four potato cultivars ('Desirée', 'Nicola', 'Spunta' and 'Kondor') which are the most cultivated in Morocco and on detached leaves of 'Daniela tomato' cultivar. The mating type of isolates was determined by pairing them with English tester isolates of mating types A1 and A2. Resistance to metalaxyl of the isolates was tested *in vitro* on pea agar amended with different concentrations of metalaxyl (0, 0.1, 1, 10 and 100 µg ml⁻¹) and *in vivo* by floating potato leaf disks inoculated with *P. infestans* on metalaxyl solutions (0, 0.1, 1, 10, 100, 1000 µg ml⁻¹). This study has revealed that all the isolates from potato were more aggressive on the potato and tomato cultivars tested, but the isolates from tomato were more aggressive only on 'Daniela tomato' cultivar. This may explain the host specificity of the isolates. All the seven tomato isolates were of A2 mating type and metalaxyl sensitive. Pairing and metalaxyl resistance tests for the potato iso-

lates revealed a distribution as follows: 28 isolates were of A1 mating type and metalaxyl sensitive, 9 isolates were of A2 and metalaxyl sensitive, 13 isolates were of A1 and metalaxyl-intermediate, 33 isolates were of A2 and metalaxyl-intermediate, 3 isolates were of A1 and metalaxyl resistant and 6 isolates were of A2 and metalaxyl tolerant. These results confirm the presence of the isolates of A2 mating type with a high degree of metalaxyl resistance which can exceed 100 µg ml⁻¹. In spite of the limited number of samples of isolates tested which are certainly not representative of the whole population present in Morocco, this study suggests that *P. infestans* populations in Morocco are more heterogeneous than thought, at least in terms of both mating type and metalaxyl resistance.

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FIRST RECORD OF PEACH LATENT MOSAIC VIROID AND HOP STUNT VIROID IN SYRIAF. Ismaeil^{1,2}, N. Abou Ghanem-Sabanadzovic¹,
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During a survey for assessing the sanitary status of stone fruits in Syria, 53 samples were collected from 15 commercial peach orchards in the Southern and Central regions of the country and 24 samples from a varietal apricot collection at Douma (southern Syria). All samples were tested for the presence of *Peach latent mosaic viroid* (PLMVd) and *Hop stunt viroid* (HSVd). Total nucleic acids were extracted from about 500 mg leaf tissue of each sample according to Astruc *et al.* (1996), were denatured with 100 mM NaOH containing 5 mM EDTA, spotted onto Hybond N⁺ nylon membranes and hybridized at 55°C with viroid-specific SP6 and T7 RNA polymerase-generated, full-length, digoxigenin-labelled riboprobes (Shamloul *et al.*, 1995). PLMVd was present only in peach and HSVd only in apricot, the relative incidence being 40.0% (PLMVd) and 62.5% (HSVd). Infected trees belonged to both native and foreign varieties. Both viroids were recently reported from Jordan and PLMVd from Lebanon. Their presence represents a serious threat to the stone fruit tree industry of the region.

Astruc N., Marcos J.F., Macquaire G., Candresse T., Pallás V., 1996. Studies on the diagnosis of hop stunt viroid in fruit trees: identification of new hosts and application of a nucleic acid extraction procedure based on non-organic solvents. *European Journal of Plant Pathology* **102**: 837-846.

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DISEASE NOTE

NECROSIS OF WATERMELON CAUSED BY WATERMELON MOSAIC VIRUSA. Crescenzi¹, A. Fanigliulo¹, S. Comes¹,
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A serious disease of watermelon grafted on squash characterized by mosaic, necrotic spots and streaks of leaves and stems, necrotic depressions of the fruit surface and abnormally pale colouring of the fruit flesh, was observed in Basilicata (southern Italy). A virus with filamentous particles *ca* 750 nm long was consistently observed in leaf dips from naturally infected watermelon plants from 20 different plots. This virus was transmitted mechanically and reproduced the necrotic syndrome in inoculated watermelon seedlings. It reacted positively only with an antiserum to *Watermelon mosaic virus* (WMV) in ELISA and decoration tests, when assayed with antisera to different potyviruses. The viral 3' non-coding region was amplified by RT-PCR, cloned and sequenced, showing *ca* 94% identity with the comparable region of other WMV isolates, thus suggesting that the isolate is a new WMV variant (Frenkel *et al.*, 1989), we denote WMV-wm. Mosaic and deformation of the leaves are commonly associated with WMV or *Cucumber mosaic virus* (CMV) in single or mixed infection to watermelon in southern Italy. Necrotic symptoms induced by WMV have not been previously reported in naturally infected watermelon plants.

Frenkel J.M., Ward C., Shukla D.D., 1989. The use of 3' non-coding nucleotide sequences in the taxonomy of Potyviruses: application to watermelon mosaic virus 2 and soybean mosaic virus-N. *Journal of General Virology* **70**: 2775-2783.

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