APHID SPECIES – VECTORS OF PLUM POX VIRUS

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Summary. – Plum pox virus (PPV) is widely spread by natural vectors present in plum orchards. The efficiency of transmission is dependent on the frequency of the occurrence of vectors and the cultivar susceptibility to this pathogen. Having in view that PPV has a wide range of annual and multiannual host plants and vectors, there is great concern for obtaining PPV-resistant cultivars. This report deals with the following vectors: *Hyalopterus pruni*, *Brachycaudus cardui*, *Brachycaudus helichrysi*, *Myzus persicae* and *Phorodon humuli* aphids, and *Aculus fockeni* mite. Seven different cultivars of *Prunus domestica* were utilized. To assess the virus transmission rate, 50 – 100 individual vectors per tree were used. The treatment of the trees was performed every four weeks and then the disease symptoms were observed. PPV was transmitted by all vectors studied, the rate ranging in dependence on the susceptibility of cultivars used. Thus, in cvs. Centenar, Pescarus, d'Agen, Stanley and Tuleu Gras, the transmission rate ranged from 20% to 60%, while in susceptible cvs. Vanat romanesc and Vanat de Italia – from 40% to 80%

Key words: plum pox virus; plum cultivars; vectors

Introduction

PPV is a pathogenic agent which has been originally classified according to symptoms observed following its inoculation on herbaceous plants into 3 strain types: necrotic, intermediate and yellow. PPV infects many species of *Prunus* genus, which are the major hosts: *P. persica, P. domestica, P. salicina, P. armeniaca,* and *P. amygdalus*. They can be infected but the symptoms are not always obvious. Recently, the virus has been identified on cultivars of *P. avium, P. cerasus* and *P. mahaleb* species. Also, a great deal of annual plants is a continuous source of infection for the abovementioned fruit species. It is spread by aphids and mites. PPV is considered the most hazardous disease for *Prunus* species. Therefore, the investigation has been focused on its ways of spreading with the aim to control and reduce the economic damage (Kunze and Krzal, 1971; Krzal and Kunze, 1972; Massonie and Maison, 1976).

Our results show that in an orchard, the number of the infected trees is straightly related to number of the vectors present during the vegetative season and to the cultivar susceptibility as well.

Materials and Methods

To identify the virus vectors for *Prunus* species present in the area of concern, the inventary of aphids and mites was done. The highest frequency was recorded for *H. pruni, B. cardui, B. helichrysi, P. humuli, M. persicae* and *A. fockeni*. Seven plum cultivars with various susceptibility level to PPV were studied. Five trees per cultivar per vector (30 trees per cultivar) were used. In 1995, they were planted in an isolated space. In 1996, the treatment of the trees with vectors (50 – 100 individual vectors per tree) collected from 90% of an infected plum orchard has been launched. Monthly observation on the occurrence of first disease symptoms and their development was recorded.

Results and Discussion

It was obvious that infection had a various effectiveness in relation to the cultivar susceptibility and the vector utilized (Fig. 1). The most susceptible cultivars (Vanat romanesc, Vanat de Italia) showed 80% of infested trees when the virus was transmitted by *P. humuli, M. persicae, H. pruni* and *A. fockeni*. In all 3 years, cv. Vanat romanesc was 100% infected by *P. humuli*.

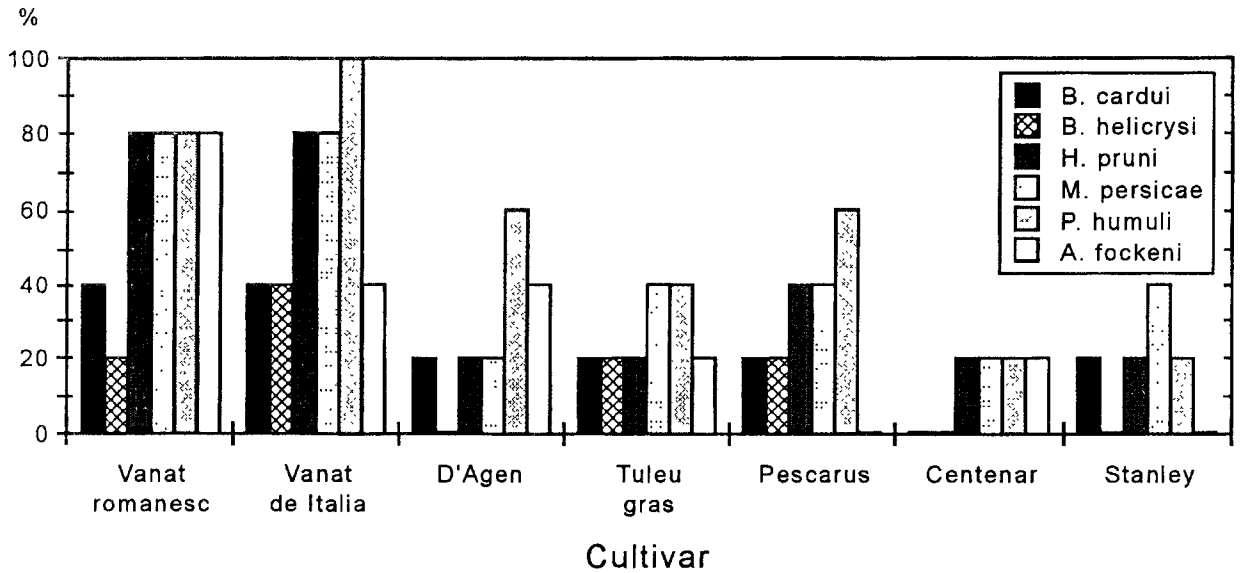

Fig. 1
Response of some plum cultivars to PPV infection by various vectors
Ordinate: percentage of diseased trees.

The cultivars known as less susceptible in natural conditions showed a similar behaviour after infection in isolation conditions. Thus, cvs. Pescarus, Centenar, and Stanley showed low disease symptoms (score 1) in the 3rd year after the vector release. Cvs. D'Agen and Tuleu Gras showed a medium infection in the 2nd and 3rd years after the vector release. When *P. humuli* vector was employed, the symptoms occured in the 1st year.

During the vegetative season, the highest infection level was recorded in May–June. The occurrence of the disease symptoms is known to be related to the vector species released (Basky *et al.*, 1997; Slováková, 1997). Therefore, the most effective vector in PPV spread regardless of the cultivar was *P. humuli* followed by *M. persicae* and *H. pruni* aphids. A similar effectiveness was observed with *A. fockeni* mite which had the highest frequency in the nursery and plum plantings in natural conditions. It is obvious that all 6 vectors involved in our experiment enabled an efficient spread of PPV among plum trees.

Keeping in mind that PPV can be found in numerous annual plants (*Campanula, Lamium, Lupinus, Meolicaya, Melilotus,* and *Pisum*) which may serve as inoculum to *Prunus* genus, the high frequency and spread of this pathogen in fruit plantings can be easily understood (Basky *et al.*, 1997; Dosba *et al.*, 1987).

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