Occurrence of Plum Pox Virus in Plums, Myrobalans, Blackthorns, Apricots and Peaches in South Moravia along the Austrian Border*

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Abstract

POLÁK J. (1999): **Occurrence of plum pox virus in plums, myrobalans, blackthorns, apricots and peaches in South Moravia along the Austrian border** Pl. Protect. Sci., **35**: 93–95.

A survey on the occurrence of plum pox virus (PPV) in plums, myrobalans, blackthorns, apricots and peaches was carried out in the South Moravian region along the Austrian border. Results of tests by ELISA and evaluation of PPV symptoms showed only scattered or isolated occurrence of PPV. This situation can be used for gradual elimination of PPV in the South Moravian region.

Key words: plum pox virus; distribution; sources of infection; plum; myrobalan; blackthorn; apricot; peach; South Moravia

Sharka disease of plums was first reported from Bulgaria in 1917. The disease has progressively spread from eastern Europe to the European continent, including the Czech region. It is caused by plum pox virus (PPV), and primary sources of PPV infection were most probably infected grafts and rootstocks of fruit trees used in nurseries. The virus was spread by infected trees from nurseries, and its spread continued in orchards, gardens and in natural conditions through aphids as vectors.

Sharka disease of plums was first detected in the Bohemian part of the Czech Republic in 1952 (SMOLÁK & NOVÁK 1956). The disease has spread to the major plum-producing areas of the country, mainly in central, western and eastern Bohemia, and in southwestern and northern Moravia (ACKERMANN 1994). In Austria it was first detected in 1961 (VUKOVITS 1961). PPV causes economic losses in plums, apricots and peaches in both the Czech Republic and Austria. A low incidence of PPV was recorded by the Central Institute for Agricultural Supervision and Testing in the last years from the southern parts of Bohemia and Moravia.

The aim of our study was to find out and verify the low occurrence of PPV in fruit orchards, in stone fruit trees planted along roads, and in blackthorns, myrobalans and wild growing plums (potential sources of spontaneous infection) in the South Moravian region along the Austrian border.

MATERIAL AND METHODS

***Sampling of Plants*:** Samples of flowers or leaves of plums, myrobalans, blackthorns, apricots and peaches were collected in May and June in South Moravia along the Austrian border in a strip approximately 20 km wide in the area Jindřichův Hradec–Dačice–Vranov nad Dyjí–Znojmo–Mikulov–Břeclav. Twelve flowers were usually taken from one tree of plum, myrobalan, apricot or peach, thirty flowers from one shrub of blackthorn. Six leaves from different branches of a tree were sampled in the period after flowering. Only individual samples from orchards were evaluated by ELISA; the occurrence of PPV in orchards was determined by visual evaluation of symptoms.

***Serological Evaluation*:** PPV antiserum was prepared in our laboratory using a procedure published by ALBRECHTOVÁ *et al.* (1986). The DAS-ELISA method (CLARK & ADAMS 1977) was applied for PPV detection in sampled flowers or leaves. Samples for ELISA were prepared by grinding of flowers or 0.2 g of leaf tissue in phosphate buffered saline pH 7.4 with 2% polyvinylpyrrolidone and 0.2% of egg albumin (ratio 1 : 20). Plates were rated using a MR 5000 reader (Dynatech) at 405 nm.

Visual Evaluation: Occurrence of PPV symptoms in leaves of blackthorn, myrobalan, plum apricot and peach trees was checked in late May and June of 1997 and 1998.

*The work was partly supported by grant ME 120 GF of Programme Kontakt – AKTION Česká republika – Rakousko.

RESULTS AND DISCUSSION

Our results are based on the ELISA detection of PPV in trees. Visual determination of symptoms only supports results of objective immunoenzymatic detection. We have observed hundreds of trees without any symptoms. PPV was proved by ELISA only in those trees showing distinct leaf symptoms. We never detected latent PPV in symptomless trees.

Sources of PPV infection proved by ELISA are given in Fig. 1. Our monitoring showed only scattered or isolated occurrence of PPV in the areas of Jindřichův Hradec, Dačice, Vranov nad Dyjí and Znojmo. PPV was never found in blackthorns and only three times in myrobalans in this area. Its occurrence in plums was very sporadic. In the area Mikulov–Břeclav, one contaminated natural locality close to Mikulov and only medium infected orchards of plums at Hlohovec, of apricots at Perná and Bavory, and of peaches at Pasohlávky and Šatov were found. PPV was proved twice in both blackthorns and myrobalans in this area. The number of localities of blackthorns, myrobalans and plums tested by ELISA for the presence of PPV in the southern Czech and Moravian region along the Austrian border, the number of PPV free and infected plants, and the percentage of infected plants are summarized in Table 1. The list of localities where PPV was found is presented in Table 2. In contrast to these data are those from central Bohemia where we have found 100% of plums and 17.6% of ELISA tested blackthorns infected with PPV (POLÁK 1997).

Table 1. Localities of blackthorns, myrobalans and plums tested by ELISA for the presence of PPV in the southern Czech and Moravian region along the Austrian border

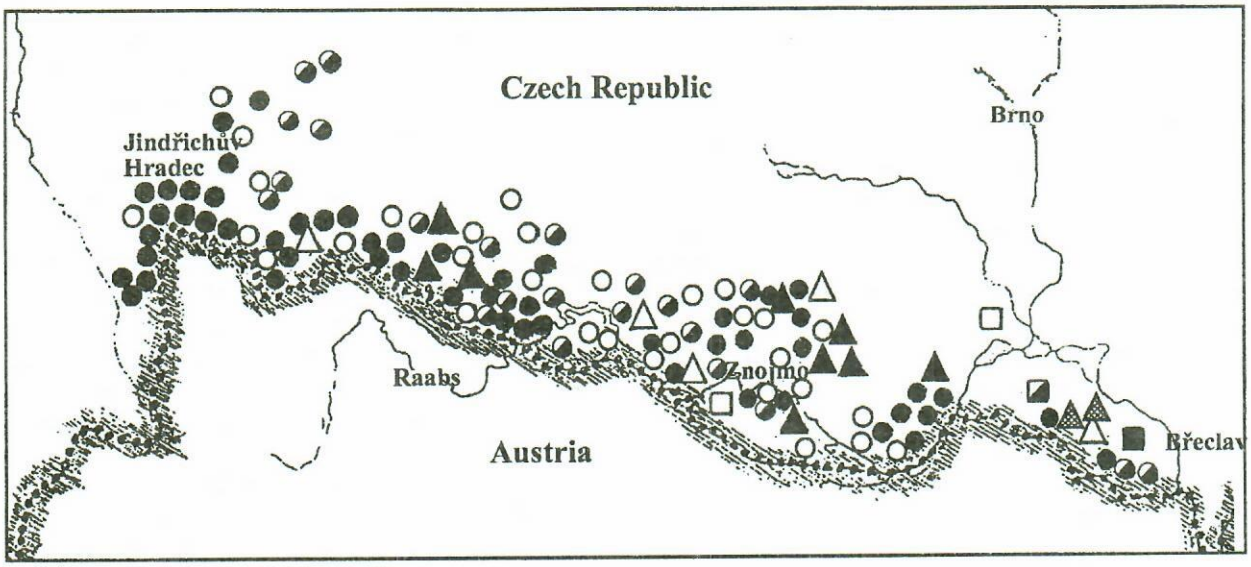
Number	Localities	PPV free plants	PPV infected plants	% of infected plants
Blackthorn	24	22	2	8.33
Myrobalan	36	31	5	13.88
Plum	62	53	9	14.52
Apricot	2	orchards		ca 10
Peach	2	orchards		ca 15

The Breeding Station Valtice and the Horticultural Faculty Lednice with their PPV-free advanced breeding lines and maintenance breeding, graft stoolbeds and graft propagation facilities, seed orchards and the world assortment of apricots and peaches, are situated close to the Austrian border between Mikulov and Břeclav. This situation, together with the limited distribution of plum pox virus in the South Moravian region, can be used to gradually eliminate PPV in the near future.

Our proposal involves two preconditions:

The first is to grow only PPV resistant varieties of plums, apricots and peaches.

The second is to gradually eliminate diseased trees and natural sources of infection. Application of these measures will result in:



Healthy tree: ◔ tested blackthorn; ○ tested myrobalan; ● tested plum
PVV infected tree: ◭ tested blackthorn; △ tested myrobalan; ▲ tested plum
Orchard with the presence of PVV: ■ plums; ◪ apricots; □ peaches

Fig. 1. Distribution of sources of PPV infection in the southern Czech and Moravian regions along the Austrian border

Table 2. List of localities where PPV was found

Host plant	Locality
Blackthorn	Mikulov
	Hlohovec
Myrobalan	Hlohovec
	Horní Břečkov
	Mašovice
	Černín
	Slavonice
Plum	Slavětín
	Kuchařovice
	Kadolec
	Budkov
	Jevišovice
	Bantice (2 localities)
	Derflice
	Hevlín
Apricot	Bavory
	Perná
Peach	Pasohlávky
	Šatov

1. Increased protection of breeding and propagation materials of apricots and peaches in the Lednice–Valtice area.
2. Safe PPV-free production of plums, apricots and peaches in the South Moravian region along the Austrian border.

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Received for publication March 19, 1999
Accepted for publication July 8, 1999

Souhrn

POLÁK J. (1999): **Výskyt viru šarky švestky na švestkách, myrobalánech, trnkách, meruňkách a broskvoních na jižní Moravě podél rakouské hranice.** Pl. Protect. Sci., **35**: 93–95.

V oblasti jižní Moravy podél rakouské hranice byl proveden průzkum výskytu viru šarky švestky na švestkách, myrobalánech, trnkách, meruňkách a broskvoních. Výsledky ELISA a vyhodnocení příznaků viru šarky švestky prokázaly pouze ojedinělý nebo izolovaný výskyt viru. Této situace může být využito k postupné eliminaci viru šarky švestky v jihomoravské oblasti.

Klíčová slova: virus šarky švestky; rozšíření; zdroje infekce; švestka; myrobalán; trnka; meruňka; broskvoň; jižní Morava

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