

Incidence of *Prune dwarf virus* and *Prunus necrotic ring spot virus* in orchards of sweet and sour cherry in the Czech Republic – Short communication

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Abstract

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During 2006–2008 field surveys were carried out in the important cherry growing areas of the Czech Republic to assess the incidence of *Prune dwarf virus* and *Prunus necrotic ring spot virus* in commercial orchards and nurseries. A total of 1,438 samples from 1,198 sweet cherry trees and from 240 sour cherry trees were tested by ELISA for the presence of *Prune dwarf virus* and *Prunus necrotic ring spot virus*. The overall average infection level was 17.7%. The most infected species were sour cherry trees (22.5%). The most frequently detected virus was *Prune dwarf virus* (10.9%). *Prunus necrotic ring spot virus* occurred in 6.3% of samples. Our study provided an indication of a sanitary status of sweet and sour cherry in commercial orchards and nurseries in the Czech Republic.

Keywords: sweet cherry; sour cherry; *Prune dwarf virus*; *Prunus necrotic ring spot virus*; incidence; ELISA

The cherry fruit industry is important in the Czech Republic because of its high income value in horticultural production with the annual production of 10.5 t of sweet cherries and 9.5 t of sour cherries. The first report of *Prune dwarf virus* (PDV) on sour cherry is from 1961 (GILMER 1961a). *Prunus necrotic ring spot virus* (PNRSV) was first described on sweet and sour cherry in 1939 (THOMAS, RAWLINS 1939). These viruses are spread in nature predominantly by pollen and seed and they reduce both growth and productivity of infected trees (CAMERON 1977; NÉMETH 1986; DESVIGNES 1999). The first results of ELISA tests for presence of PNRSV in sweet and sour cherries grown in the Czech Republic were published in 1986 (KAREŠOVÁ et al. 1986). Our study describes the incidence of these viruses in 2006–2008 and provides a picture

of the sanitary status of sweet and sour cherry orchards in the Czech Republic.

MATERIAL AND METHODS

Sample collections and field inspections were carried out in the fruit regions of southern and eastern Bohemia and in southern Moravia. Collections were taken from 22 commercial orchards and 2 nurseries. A total of 1,438 dormant bud wood and leaf samples were collected during 2006–2008, from March to September. Samples were collected from orchards of sweet cherry containing the cultivars: Burlat, Kordia, Stark Hardy Giant, Summit, Van, Napoleonova, Sweetheart, Early Korvik, Fabiola, Justýna, Regina, Tamara, Těchlovan, Vanda, Kasan-

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Table 1. Virus infection detected by ELISA

Orchards	Tested samples	Infected samples		PDV		PNRSV		Mixed infections	
		No.	%	No.	%	No.	%	No.	%
Nurseries	393	48	12.2	40	10.2	7	1.8	1	0.3
Young commercial orchards	160	9	5.6	6	3.8	3	1.9	0	0
Mature commercial orchards	885	197	22.3	110	12.4	81	9.2	6	0.7

dra, Horka, Vilma, Korvik, Sandra, Helga, Sam, and another unidentified sweet cherry cultivar. The cultivars of sour cherry surveyed were: Morela pozdní, Újfehertoi Fürtös, and Gerema. All samples were tested with DAS-ELISA (CLARK, ADAMS 1977). Commercial antiserum (Bioreba, Switzerland) was used. Leaves (0.2 g) were homogenized in 4 ml of extraction buffer. The ELISA procedure was carried out according to the recommendation of the company. Absorbance readings were recorded using a Sunrise photometer at 405 nm.

RESULTS AND DISCUSSION

During field surveys more than 14,000 trees from 2 nurseries (1 of sweet cherry and 1 of sour cherry), from 4 young commercial orchards (up to 5 years old): 1 of sour cherry and 3 of sweet cherry, and from 18 mature orchards (4 of sour cherry and 14 of sweet cherry) were inspected. Virus infections occurred at all sites. The overall average infection level was 17.7%. The overall infections rates ranged from 12.2% in nurseries to 19.7% in commercial orchards (Table 1). Virus infection was detected most frequently in sour cherry (22.5%). The most frequently detected virus was PDV. It was detected in 10.9% of the total samples, 12.6% in sweet cherries and 2.1% in sour cherries. Single infections of PNRSV were found in 6.3% of the samples, 3.6% in sweet cherries and 20.0% in sour cherries. Mixed infections of both viruses were detected in very few

(0.01%) of the samples (Table 2). In USA, Canada, Great Britain, Poland, and Bulgaria, PNRSV spread more readily than PDV in cherry trees (POSNETTE 1954; GILMER 1961b; KEGLER 1963; GERGINOVÁ 1980; MICHELUTTI et al. 2005). These studies do not agree with our results; as reported in Italy (TERLIZZI 1998), France (BOYÉ, GENTIT 1998), and Bosnia and Herzegovina (MATIĆ et al. 2008), the incidence of infection with PDV was higher than the incidence of infection with PNRSV. However, the occurrence of PDV (10.9%) we observed in sour and sweet cherries was lower than in France (30.0%), Italy (70.0%), and Bosnia and Herzegovina (83.0%) but higher than in Canada (8.2%). PAPRŠTEIN et al. (1995) detected PNRSV infections in sweet cherry trees in the Czech Republic in 12.0% and compared to 57.4% in sour cherry trees. Our results showed a higher occurrence of virus in sour cherry (20.0%) than in sweet cherry trees (3.6%).

CONCLUSIONS

The overall average infection level was 17.7%. PDV was detected in 10.9% and PNRSV was detected in 6.3% of all the samples tested. Virus infection was detected most frequently in sour cherry (22.5%). PDV was detected most frequently (12.6%) in samples from sweet cherry whereas PNRSV was detected most frequently in samples from sour cherry (20%). Our study revealed the sanitary status of commercial orchards and nurseries in the

Table 2. Relative incidence of PDV and PNRSV by single and mixed infections

Species	Tested samples	Infected samples		PDV		PNRSV		Mixed infections	
		No.	%	No.	%	No.	%	No.	%
Sweet cherry	1198	200	16.7	151	12.6	43	3.6	6	0.5
Sour cherry	240	54	22.5	5	2.1	48	20.0	1	0.4
Total	1438	254	17.7	156	10.9	91	6.3	7	0.01

Czech Republic. Both PDV and PNRSV were detected most frequently in older commercial orchards (12.4% and 9.2%, respectively.) In young (< 5 year old) orchards overall infection was 5.6% (PDV 3.8%, PNRSV 1.9%). Samples from nurseries showed an overall infection rate of 12.2% with infection by PDV (10.2%) being much greater than infection by PNRSV (1.8%).

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