

‘SPASENA’ – A NEW BULGARIAN PEACH CULTVAR RESISTANT TO PLUM POX VIRUS

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INTRODUCTION

Plum pox virus (PPV, *Potyvirus plumpoxi, Potyviridae*), the causative agent of Sharka disease, is one of the most divesting viral pathogen on stone fruits (*Prunus* sp.) world-wide. The virus was discovered for the first time on plum in Bulgaria by Atanasoff (1933). Nowadays the progressive increase of PPV infection rate in peach grown in our country has been observed (Kamenova & Borisova, 2019, Milusheva et al., 2023). In this situation the growing cultivars, resistant or tolerant to PPV, is the most beneficial approach to minimizing the losses of the disease. Efforts to find PPV-resistant *Prunus* genotypes began in the 1930s, immediately after the virus was discovered. So far some success has been achieved in the breeding of plum and apricot varieties resistant to the virus, but it is believed that there are no natural sources of resistance to PPV within the genotypes belong to *P. persica*.

In this report, we present the results of a long-term study on the response of the peach cultivar ‘Spasena’ to PPV under high PPV natural infection pressure.

MATERIAL AND METHODS

The cultivar ‘Spasena’ is a clingstone peach cultivar, result of the breeding program aiming the establishment of peach cultivars resistant to biotic and abiotic stress factors. The research was conducted during 2013 – 2025, in an experimental orchard of Fruit Growing Institute – Plovdiv. Trees from the parental cultivars ‘J.H. Hale’ and ‘Dupnishka’ were also included in the research. The observations for presence/absence of Sharka symptoms on the leaves and fruits were assessed annually. All trees counted in the study were analyzed for PPV by enzyme-linked immunosorbent assay (ELISA) and reverse transcription – polymerase chain reaction (RT-PCR).

ELISA was performed with commercial antiserums against PPV, following the protocol of manufacturer (Agritest Srl, Italy).

RT-PCR was carried out in two steps. Total RNA was extracted by Total RNA Purification Kit (Jena Bioscience, Germany). RT step for obtaining of a complementary DNA (cDNA) was performed with random hexamer primer using Script reverse transcriptase (Jena Bioscience, Germany). PCR step was conducted with P1/P2 primer pair (Wetzel et al., 1991) corresponding to CP gene. The PCR products were separated by gel electrophoresis and visualized under UV light.

RESULTS AND DISCUSSION

During the period of the survey very mild visual symptoms – vein clearing were registered on the leaves of singular scions in the years 2017 (first observation on a single tree), 2021, 2025 (Table 1), and no symptoms were detected on the fruits.

Table 1. Data from visual observations, ELISA and RT-PCR in the years 2017, 2021, 2025.

Years of registration of symptoms	Symptoms n/N	Accession	Degree of symptoms	ELISA n/N	RT-PCR n/N
2017	1/23	S 3019	Very mild symptoms	1/23	1/23
2021	1/29	S 3019	Very mild symptoms	1/29	1/29
2025	3/29	S 307, S 2013, S 3019	Very mild symptoms	3/29	3/29

N –a total number of tested samples; number of positive samples

The survey on the reaction of the parental cultivars showed that very slight symptoms were observed on single leaves of ‘Dupnishka’ and medium symptoms were observed on the leaves of ‘J.H. Hale’. Mild Sharka symptoms were observed on the fruits of the last parental cultivar. All symptomatic trees were ELISA and RT-PCR positive and latent PPV infection was not detected in asymptomatic trees of both parental cultivars.

In the growing seasons in which no visual Sharka symptoms were observed on the leaves of the studied ‘Spasena’ trees, ELISA failed to detect the virus and it was only identified by RT-PCR. That suggests a low titer of the virus in the PPV-positive peach trees and its replication and distribution in plant tissues are hindered by plant defense mechanisms.



CONCLUSION

According to Cooper and Jones (1983), defined the terms concerning the response of the plants to virus invasion, and based on the results obtained, the new Bulgarian peach cultivar ‘Spassena’ can be determined as resistant to PPV under field conditions.