

Sharka in stone fruit species

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Sharka disease, caused by Plum pox virus (PPV), is the most harmful viral disease of stone fruit species – plum, peach, nectarine and apricot, not only in Bulgaria but worldwide. The first to report sharka on plum, with a proven viral nature, was Prof. Dimitar Atanasov in 1932. Since the symptoms on the fruits resemble the marks on the face of a person who has suffered from smallpox, Prof. Atanasov named the disease “sharka” of plum, and its causal agent – Plum pox virus (PPV). According to the nomenclature of the International Committee on Taxonomy of Viruses (ICTV), Plum pox virus belongs to the family Potyviridae (genus Potyvirus), which includes the largest number of viruses of cultivated plants. The sharka virus is the only member of the family Potyviridae infecting species of the genus Prunus.

Where did plum sharka originate from? This is a question that has not been answered to this day. Since the disease was first identified in Bulgaria, it is assumed that it originates from the Balkan Peninsula. According to some accounts (fruit growers who took part in the First World War),

symptoms were observed on plum in the area of the village of Zemen, near the border with Macedonia, as early as 1915/1916. In 1918, staff of the agronomic service in Kyustendil also detected diseased trees, but since the disease was not recognized due to its nature, measures to contain its spread were not implemented. Among the specialists working at that time, sharka was referred to as “the new disease”. Shortly after the first reports of the occurrence of the disease, within a period of approximately 30 years it spread over almost the entire country and today is widely distributed in all regions.

After the first reports of the disease in Bulgaria, it spread rapidly and by the late 1960s it had already been detected in a number of European countries – Yugoslavia, Romania, Hungary, Czechoslovakia, Poland, Germany, Austria, Albania, Croatia, the Netherlands, Greece, Turkey, England, Switzerland and Russia. From the early 1970s to the late 1980s, sharka was reported in France, Italy, Portugal, Slovenia, Belgium and Denmark. In practice, the disease “settled” in almost all European countries and in the period 1990–2000 it spread to other continents as well, such as North Africa, Asia, South and North America, namely in Egypt, Tunisia, Syria, India, Jordan, Chile, the USA, Canada and Turkey. The disease has also been reported in Kazakhstan, China, Argentina and Japan. To date, the disease has not been reported only in Australia.

The sharka virus has a large number of hosts, with about 100 species established, belonging to different botanical families. Of greatest importance among them are the species of the genus *Prunus*, of which more than 35 are susceptible to PPV. Natural hosts of the virus of economic importance are plum, peach, nectarine, apricot, myrobalan plum, sweet cherry, sour cherry, Japanese plum, *P. insititia* L. and almond.

The use of infected planting material is the basis for the long-distance spread of the virus to other regions, countries and continents. Once introduced into an orchard/area, the virus is transmitted (over short distances) by aphid vectors. As vectors, both species for which plants of the genus *Prunus* are hosts (colonizing species) and species for which plants of the same genus are not hosts (migratory species) are known. To date, more than 27 aphid vector species have been identified. The mode of PPV transmission by the pests is non-persistent, which means that they acquire the virus when sucking sap from infected plants even within 30 seconds, after which they transmit it during the next 1–3 hours. Since aphids make numerous probing punctures in order to find the most suitable tissues for feeding, the viral particles adhering to their stylet pass into the tissues of healthy, uninfected plants. Usually a single tree is visited annually by 50,000 to 300,000 individuals, which is why the probability of virus spread, even in the presence of a single infected tree, is very high. In practice, the spread of the sharka virus in orchards occurs when aphids make the so-called “probing” punctures.

Sharka is an economically important disease not only for Bulgaria but also worldwide, due both to the direct losses from lower yields, poor fruit quality, and the costs of grubbing up diseased orchards, and to the indirect losses associated with the implementation of preventive measures – quarantine control, inspection of orchards, control of nurseries and mother plantations, diagnosis

of the disease, etc. According to recent data, the global losses from sharka, excluding indirect losses, exceed EUR 10,000 million over the last 30 years.

The disease has an extremely adverse impact on the production of stone fruits in a number of European countries, where climatic conditions are favourable not only for their cultivation but also for the mass multiplication of aphid vectors. Depending on the fruit species and the cultivars grown in a given country, the disease may lead to a reduction in fruit production in the range of 10–100%. The losses caused by the disease over a period of 80 years are irreversible and irrecoverable. Due to the non-persistent mode of virus transmission by aphids, spraying with insecticides does not yield positive results – viruliferous individuals arriving from outside infect the plants before even the fastest-acting product can affect them. Successful management of the disease depends primarily on the use of healthy planting material and continuous monitoring of orchards for the destruction of infected trees.