

Occurrence of powdery mildew in *Prunus cerasifera* caused by *Podosphaera* sp. in Bulgaria

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Introduction

The causal agents of powdery mildews are obligate biotrophic fungal plant pathogens belong to phylum *Ascomycota*, family *Erysiphaceae*, comprising 900 species that infect more than 10 000 dicot and monocot plant species globally (Braun and Cook, 2012). Many species from *Erysiphaceae* cause economically important diseases of cultivated crops, including fruit trees (Glawe, 2008). In fruit trees in Bulgaria the powdery mildews inflict significant injuries on apple (*Malus domestica*) and peach. Although in our country powdery mildew is considered as lesser disease on plum, apricot, sweet and sour cherries, almond, myrobalan etc., after Kiss (2005) and Desprez-Loustau et al. (2010) some powdery mildews can become invasive in different parts of the world posing plant health, biosecurity and biodiversity risks (Jones and Baker, 2007; Brasier, 2008; Desprez-Loustau et al., 2010).

In September 2019 on the leaves of several 'Myrobalan 29C' (*Prunus cerasifera* Ehrh.) rootstocks, grown in a greenhouse, were recorded sporadic white dusty patterns. In the next year, in May 2020, typical signs of powdery mildew in high degree were observed. Our searches in scientific literature on occurrence of powdery mildew in myrobalan in Bulgaria resulted in a short note by Christoff from 1939. The author suggested *Podosphaera oxyacanthae* as a cause agent of powdery mildew in myrobalan but without detailed data on characteristics and pathogenicity of the hypothetical pathogen. Besides the cited short note from the first half of 20th century, no another reports and surveys on powdery mildew in myrobalan in Bulgaria are available.

The aim of the current study is to characterize and if it is possible to identify the pathogen causing damages of powdery mildew to a high degree on Myrobalan 29 C.

Material and methods

Morphological examination

The morphological examination for characterization of powdery mildew causal agent was based on the teleomorph (chasmothecium) and the morphology of anamorph (conidiophores and conidia). Several leaves covered with white coating as well leaves with formed chasmothecia were observed under a stereomicroscope and fungal structures (chasmothecia, conidiophores and conidia) were mounted in a drop of sterile distilled water on a glass slide.

Pathogenicity tests

Two approaches for artificial inoculation were applied. First approach was carried out by scattering of a small part the mycelium from the symptomatic leaves on young healthy apricot leaves. Conidia pieces taken from vigorously growing conidia chains were aseptically transferred onto apricot (*Prunus armeniaca*). The second approach was conducted by putting of leaf discs in diameters 5 mm, cut out of vigorously growing conidia. In that manner were inoculated the last three full developed young leaves of 'Myrobalan 29C' and cherry rootstock (*Prunus avium*) as on each leaf was place one disk.

Results and Discussion

The microscope findings visualized conidia formed in true chains on erect conidiophores which were ellipsoid, hyaline and measured 24.6 to 33.6 x 10.8 to 20.8 µm (average 29.6 x 15.8 µm). Catenescent conidia, ellipsoidal to short subcylindrical, 1-celled, with fibrosin bodies, measuring 24.6 to 33.6 x 10.8 to 20.8 µm (average 29.6 x 15.8 µm), were produced on erect conidiophores, with cylindrical foot cells followed by 1-4 short cells, arising from epiphytic hyphae on the both surface of leaves (fig E-F). Mature chasmothecia were spherical, gregarious or scattered on infected leaves, brown to black brown (fig. A), measuring 83-101µm (average 95 µm). Chasmothecial appendages were 2-4, smooth or slightly curved, brown to paler toward the apex, each 201 to 342 µm (average 271 µm) in length, one to four times long towards the chasmothecial diameter and had two to four dichotomous branches (fig. C). A single ascus of each chasmothetium was broadly ellipsoid-ovoid, 62-92 x 58-73 µm, contained six to eight hyaline, ellipsoid-subglobose ascospores, measuring 18-24 x 14-16.5 µm (fig D).

The symptoms of powdery mildew were detected on single leaves but in the next stages the percentage of infected 'Myrobalan 29C' plants gradually increased and in July the spread of diseases was calculated in degree of 97.5% infected plants.



Symptoms of powdery mildew on artificially inoculated 'Myrobalan 29C' and cherry leaves were observed after eight days post-inoculation period. Disease signs on the inoculated apricot leaves appeared 30 days after the inoculation. White powdery coating, observed on the inoculated leaves of all experimental species was very similar to the powdery coating on natural infected 'Myrobalan 29C'.



Conclusion

The data of morphological characteristics of the pathogen studied are almost identical to the morphological traits of the species *Podosphaera tridactyla*. Samples for molecular assay were selected from symptomatic plants and at this stage molecular analyses are in progress.

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