

PRELIMINARY RESULTS ON BEHAVIOR OF APRICOT, PEACH AND PLUM TO *MONILINIA* SPP. IN EXPERIMENTAL FIELD OF USAMV BUCHAREST

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Abstract: The stone fruits occupy an important place in the human diet due to their complex chemical composition such as sugars, free organic acids, pectic substances and vitamins. The main damage of economic importance to the stone fruit species is caused by the monilia disease caused by the fungus *Monilia laxa* (Aderhold et Ruhland). The disease can affect several host tissues these include blossom blight, shoot blight, fruit blight and brown fruit rot. The purpose of this research was to evaluate the attack produced by the pathogen on peach, apricot and plum from the first decade of May until the second decade of August in Experimental Field of Horticulture Faculty, USAMV Bucharest in 2019. Results showed that plums had the highest attack rate (14%) and the lowest was in apricots (0.8%). It should be noted that monilia disease is a major threat for stone fruit trees because of its aggressive manifestation on the fruit, especially in plums and peaches.

Key words: *Monilinia laxa*, apricot, peach, plum trees

INTRODUCTION

The stone fruits occupy an important place in the human diet due to their complex composition and the positive role on the functioning of the body (Cristea et al., 2002). Stone fruit trees are grown on considerable areas approximately 60,000 ha in all regions of Romania, occupying an important place in fruit production (INS, 2017). *Monilinia laxa* (Aderhold and Ruhland) Honey is one of the most important species of *Monilinia* globally associated with the brown rot in stone and pome fruits (Rungjindamai et al., 2014). *Monilia* is a dangerous disease commonly found in apricot, peach and plum orchards in Romania, where, in favorable conditions, it causes damage of economic importance, especially in neglected orchards. The disease is favored by rainy weather associated with high temperatures, as well as by excess nitrogen fertilization, which sensitizes plant tissues. To avoid infections, tolerant or resistant varieties must be chosen and the application of cultural hygiene measures in orchards.

Fruits can be attacked in all stages of development, but usually the disease affects not only fruits, but also blossoms, shoots and twigs. The sensitivity of fruits to brown rot infection increases 2-3 weeks before harvest and is associated with increased sugar content.

The causal agent of brown rot (*Monilinia* spp.) is a polycyclic pathogen (Seem, 1984) involving infection sequence repeated several times throughout the annual growth cycle of the host. The fungus survives the winter in mummified fruits (Casals et al., 2015), in canopy or in the ground (Hrustić et al., 2013) and in fruit peduncles (Ritchie, 2000), in cankers on twigs, in spurs and in branches (Villarino et al., 2013; Melgarejo et al., 1986; Kreidl et al., 2015). These propagules serve as sources of primary inoculum to infect blossoms, buds, and young shoots, establishing a source of secondary inoculum (Gell et al., 2009).

In the literature there is little information available on varietal susceptibility to *M. laxa* during phenological stages (Casalas et al., 2015; Hrustic et al., 2013; Gutermuth & Pedryc, 2009). A better knowledge of fruit susceptibility during phenological stages would permit more careful control of the pathogen and reduction in cost of fruit production and environmental risks.

This paper presents the experimental data on behavior of apricot, peach and plum trees to infection of *Monilinia laxa*.

MATERIAL AND METHODS

The biological material was represented by fruit trees belonging to peach, apricot and plum species (25 trees from each) cultivated in the experimental field of the Faculty of Horticulture - USAMV Bucharest in 2019. Attack of monilia disease per tree was appreciated by recording the frequency of attack (F%), the intensity of attack (I%) and the degree of attack (DA%).

The frequency of attack (F%) was calculated using the formula $F\% = (n/N) \times 100$, where: n represents the number of disease attacked trees and N is number of examined trees. The intensity of attack (I%) was appreciated for every examined tree according to the formula: $I\% = [\sum (i \times f)]/n$, where i = the percentage of covering by symptoms; f = the number of cases with disease symptoms; n = the total number of cases with attack. To appreciate this parameter per tree, the 5-note scale of Vu Huan (1996) was used, where 0 = attacked surface is zero; 1 = 25% of tree surface (1/4 of fruit/tree) is covered by disease; 2 = 50% of tree surface (1/2 of fruit/tree) is covered by disease; 3 = 75% of tree surface (3/4 of fruit/tree) is covered by disease; 4 = over 75% of fruit/tree covered by disease symptoms.

The degree of attack (DA%) expresses the severity of the attack of disease per tree. It was calculated based on data on frequency and intensity, following the formula: $DA\% = (F\% \times I\%)/100$.

The pathogen monitored in our study sampled on the leaves and fruits was analyzed macroscopically and microscopically in the laboratory.

RESULTS AND DISCUSSION

The result of the macroscopic and microscopic investigation on pathogen samples on the observed tree confirmed the *Monilinia laxa* pathogen (Figure 1 and 2).

At the observations in May 2019, the peach monilia was manifested by the presence of brown spots on the fruit near which the tissue softened and on the surface you could see the sporodocidia of the fungus in the form of white-gray mold cushions, arranged concentrically. Apricot monilia was manifested by drying young shoots and the convexity of their top. In the plum the disease was manifested by the mummification of the attacked fruits, on which the sporodocidia were formed before (Figure 1).

Microscopically, the conidia of the fungus *Monilinia laxa* sampled in the plum fruits are ellipsoidal, hyaline and arranged in branched (Figure 2).



Figure 1. Attack of *Monilinia laxa*

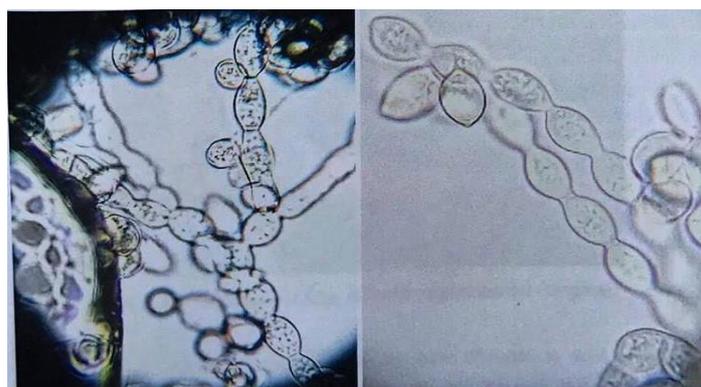


Figure 2. Conidia of *Monilinia laxa* on plum fruit: ellipsoidal, hyaline and arranged in branch (original)

In Table 1 there are presented the frequency, the intensity and the degree of the fungal *M. laxa* attack on the three stone fruit species evaluated in our study, peach, apricot and plum.

Table 1. The frequency, the intensity and the degree of attack of *Monilinia laxa* on apricot, peach and plum trees, USAMV Bucharest 2019

	Peach	Apricot	Plum
F (%)	52.00	32.00	60.00
I (%)	13.84	2.50	24.00
DA (%)	7.20	0.80	14.40

It is observed that all the three species of stone fruit were affected by *M. laxa* with a very high frequency. The highest level of the frequency was on plum (60%), 1.87 times higher than apricot and 1.15 times higher than peach. Data of Villarino et al. (2013) showed that the frequency of occurrence of this pathogen in some peach orchards in Spain increased to a level above *M. fructicola* and became a predominant species of *Monilinia*. Kreidl et al. (2015) found that *M. laxa* caused infection on plums of low incidence or did not cause infection, but a strong infection in peach, nectarine and apricot. Apricot and plum are considered to be more resistant to infection as fruitlets (post-bloom) than ripe fruit, particularly plums, although both were equally susceptible when mature.

The lower susceptibility of plum to *M. laxa* infection has been attributed to many factors, including plums skin forming a more efficient barrier to conidial infection (Fourie & Holz, 2006), host defense reactions such as gum and lignin deposits, (Schlagbauer & Holz, 1989).

The intensity of attack of monilia recorded the greatest values (24%) on plum, 9.6 times higher apricot and 1.73 times higher peach.

Consistent differences in the frequency and the intensity of *M. laxa* attack confirm that the plums the fact that plum is more sensible at the infections with this fungus.

The degree of attack of *M. laxa* in vegetative season was very high in plum, of 14.40% exceeding twice the peach and 18 times the apricot.

CONCLUSIONS

The monilia disease caused by the fungus *Monilia laxa* is a danger disease that infects the stone fruit during vegetative season.

The plum trees showed the most sensibility to the attack of monilia disease, the frequency, the intensity and the degree of attack were very high (60, 24, 14.4%).

The apricot trees behaved as a more resistant species to the attack of monilia disease, the frequency, the intensity and the degree of attack were low (32, 2.5, 0.8%).

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