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BEHAVIOUR OF SOME VARIETIES OF PEACHES AND NECTARINES WHEN ATTACKED BY MAIN PATHOGENS

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Abstract

In Romania, the peach is new commercial culture, which is recorded since the period 1958-1960 with planting several hundred acres in Dobrogea, varieties and technology introduced from Italy. In 1889, with the establishment of state nurseries there have been multiplied and spread many foreign varieties. Appearing so the first orchards.With favorable areas of the country, peach culture developed, so is the third in fruit growing species as economic importance and future of culture, after apple and plum. In Romania there are autotohtone and foreign varieties that ensures varietal conveer spanning from 20 June and is up to 25 to 30 September.In Romania there have been created several varieties of peaches (Frumos de Băneasa, Mioriţa, Delicious, Bucureşti, Flacăra,Triumf, Victoria, Superba de Toamnă, Congres, Splendid), and nectarines (Romamer 2, Cora, Delta) and also valuable stocks (T16, Oradea 1, Balc). In the networkof fruit Research Station ICPP Pitesti, breeders are working to create new varieties of peaches, nectarines and pavia, competitive with the international level and so to create new rootstocks for peach. In our country more peach growing counties in the south appear, this is because peach finds the most favorable environmental conditions there .It has been aimed to balance the ratio of early varieties, medium and late season by creating new competitive local varieties and introducing valuable assortment of varieties worldwide.Varieties were introduced in the earlyseason group: Fillette, Springold, Springcrest , Collins , also in mid season: Suncrest, Victoria, Congress and in late , varieties such as: Superbă de toamnă, Rio Oso Gem..There have been approved new varieties of nectarines: Cora, Delta, Romamer2.Disease resistance is one of the most important issue in peach culturr.

Keywords: peach, nectarine, inoculation, fungi, bacteria.

1. INTRODUCTION

The purpose of this study is the analysis of the behavior of varieties of peaches and nectarines at the attack of *Cytospora cincta* Sacc fungi,, *Taphrina deformans*, *Sphaerotheca pannosa* and bacterium *Pseudomonas syringae* van. Hal. The research was conducted in 2008-2010 on the experimental groups of peaches and nectarines from Research and Development Station for Fruit Growing Baneasa Bucharest. Culture of peach and nectarine, where observations were made on the main pathogen attack, is located on reddish-brown forest soil. The climate is temperate Mediterranean shade, with dry summers. In this area we meet the lowest rainfall - between 350-700 mm, with maximum in June and minimum in August-October. The average annual temperature is between 10 to 11.5 º C, with an absolute minimum you reach -35 º C and maximum exceeding 40 º C. C In the culture of peaches and nectarines, were the observations were made is located on reddish-brown forest soil, such as loess, clay-loam texture,light pH. Ray resources are between 125-135Kcal/cmp/an, sunshine time is 2200-2400 hours, the average annual temperature is between 10-11.5 º C, and the overall thermal resources are 4100-4300 ° C.

2. MATERIAL AND METHODS

The research was conducted in the experimental groups of peaches and nectarines from Research and Development Station for Fruit Growing Baneasa Bucharest. The biological material consisted of a total of 33 varieties of peaches and nectarines stored in the national collection.

The experiment was conducted under conditions of natural infection with *Cytospora cincta* Sacc, *Taphrina deformans*, *Sphaerotheca pannosa* and with artificial inoculations *Cytospora cincta* Sacc and *Pseudomonas syringae* van. Hal. The culture in wich there have made observations on the natural infection and artificial inoculation was established in 2005.

Observations and notes of peach and nectarine varieties in study were made to detect resistant or tolerant varieties of fungi.

Frequency and level of attack were expressed as percentage and behavior of peach and nectarine varieties was established by framing into resistance classes. Behaviour of varieties of peaches and nectarines from Taphrina deformans fungus attack was assessed in frequency on leaves and shoots.

Peach and nectarine varieties behavior on the attack by Sphaerotheca pannosa mycosis was established according to the level of attack on leaves. Observations and scoring on blistering and mildew were performed annually in April, May and June. *Cytospora cincta* Sacc attack product has been shown by percentage of branches within a year with symptoms of stroke.

Every year, observations and scoring were carried out during February-March, before applying dry cutting, the observed 50 branches one year old of each tree. Artificial inoculation with *Cytospora cincta* Sacc inside the orchard have been made to the annual branches, in November, on positive temperature.

Inoculations were made in 3 repetitions, each repetition is composed of 10 branches.

Observations consisted in measuring the branches necrosis that occurred following the inoculation. Behaviour of varieties and hybrids of peach and nectarine on *Cytospora cincta* Sacc fungus attack. was determined in relation to their size.

Research on infection with the bacterium *Pseudomonas syringae* van. Hall. were performed on biological material of the Laboratory of Genetics and Improvement of the Agricultural Research and Development Station Baneasa in collaboration with the Laboratory of Bacteriology of CCPP - Bucureşti. They studied 7 nectarine varieties planted in a culture founded in 2005. From each gene there were harvested 12 annual shootsthat were trimmed to a length of 30 cm , paraffinned on top and disinfected with 0.5% sodium hypochlorite for 3 minutes and washed 2 times with sterile water. Bacterial suspension was inoculated with mixed *Pseudomonas syringae* vs. syringae.

After inoculation shoots were placed in sterilized glass tubes.

Branches of inoculated tubes were held within 10 days at 15 º C and 36 hours at - 10 ° C and finally at 15 ° C, after which they noted the development of lesions. Behavior of nectarine varieties to infection with the bacterium *Pseudomonas syringae* pv. syringae was determined by the size of the lesions area.

3. RESULTS AND DISCUSSIONS

1. Results that were recorded on the observations of the fungus *Cytospora cincta* Sacc attack. on peaches and nectarines.

Variable climatic conditions of the 2008-2010 study period favored the emergence of *Cytospora cincta* Sacc, *Taphrina deformans*, *Sphaerotheca pannosa* and *Pseudomonas syringae* attack.

In the collection of peach and nectarine founded in 2005 in Bucharest climatic conditions of the area, on correct and timely substance treatments applied consisted not in *Cytospora cincta* Sacc attack. in the first years after planting. Since 2008, the attack has spread and frequency of attacked branches on both peach and nectarine was recorded.

On the 13 peach varieties studied, with treatments, in the 3 years of observation, the highest percentage of annual branches of *Cytospora cincta* Sacc attack was recorded in 2010 (Fig. 1) in which the frequency of attack on one year old branches was between 1% and 4%. Lowest frequency of attacks was recorded in variety Eugen (1%) and highest in Fayette (4%).

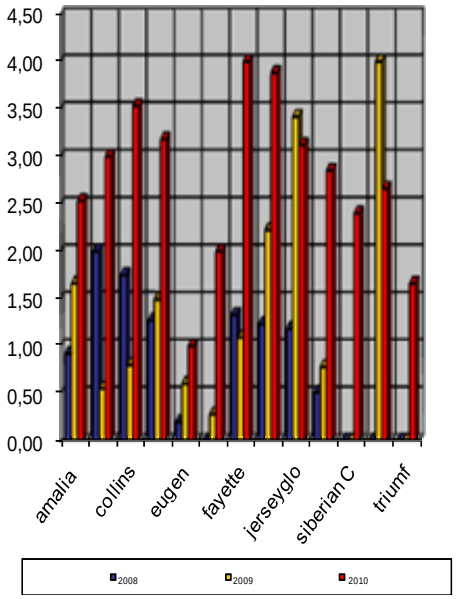

Fig.1. Frequency of attack by *Cytospora cincta* Sacc on one year old branches of peach varieties.

After the average of the three years of study (Fig. 2) the highest percentage of branches with attack had the varieties: Flacara (2.4%), Jerseyglo (2.24%), Splendid (2.22%), Fayette (2.14%) and less than 1 % branches were attacked Triumph (0.55%), Eugen (0.60%), Harbrite (0.76%) and Siberian C (0.80%).

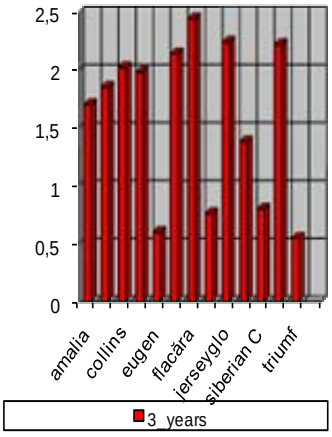

Fig.2. The average frequency of branches with *Cytospora cincta* Sacc attacked during the 3 years of observations of peach varieties.

At the 8 varieties of nectarine, in substance treatment in the 3 years of observation (Fig. 3), the highest percentage of branches with *Cytospora cincta* Sacc attack occurred in February-March 2010. Frequency of attacked one year branches ranged from 3.25 (Fantasia) and 9.25% (Flavortop).

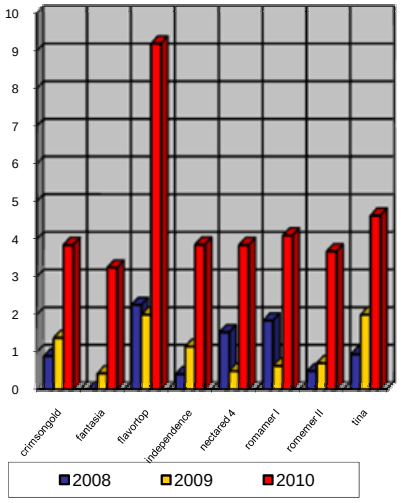

Fig.3. Frequency of attack by *Cytospora cincta* Sacc on one year branches of nectarine.

The average frequency of attacked branches during the 3 years of observations (Figure 4) ranged from 1.21% (Fantasia) and 4.48% (Flavortop), other varieties ranging between these two limits.

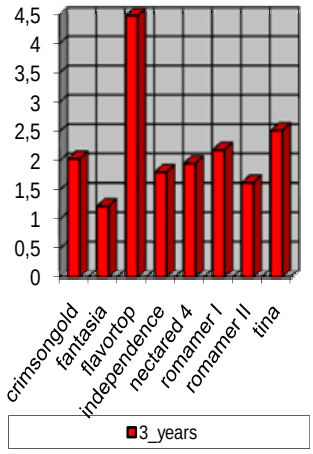

Fig.4. The average frequency of branches with *Cytospora cincta* Sacc attack during the 3 years of observations on nectarine varieties.

Of the 13 varieties of peach artificially inoculated with the fungus *Cytospora cincta* Sacc., Triumph, Eugene and Harbrite varieties , behaved as tolerant if the 3-year average necrosis length was 15.2 mm in the variety Triumph, 16.9 mm in variety Harbrite and 18.1mm on the variety Eugen.
Rest of material was sensitive to attack by this pathogen. At the 8 varieties of nectarine artificially inoculated there had been necrosis ranging from 66.2 mm (Independence) and 93.3 mm (Flavortop), which characterizes them all as sensitive to fungus *Cytospora cincta* Sacc (Fig. 5).

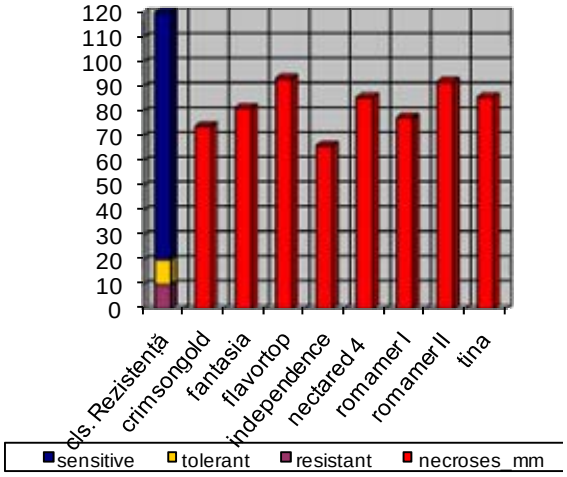

Fig.5. Behavior of nectarine varieties after artificial inoculation with *Cytospora cincta* Sacc and integration into strength classes.

2.Results from observations made on *Taphrina deformans* fungus attack on peaches and nectarines.
Varying climatic conditions of the years of study (temperatures around 10 º C in association with high atmospheric humidity) created favorable conditions for the development of the attack by *Taphrina deformans* on peach and nectarine in waves (March, April, May) leaves and shoots being infected (fig.6).
Attack on leaves occurred with a high frequency (95 - 100% in some varieties) while on shoots there was a lower percentage of attack (some varieties 13-14%). The attack on leaves was considered to integrate varieties of peaches and nectarines in strength classes. ***Monroe, Bucur and Start*** varieties prooved resistant behavior (0% leaf appeal) to fungus attack *Taphrina deformans* followed by weak sensitive varieties: ***Băneasa 2 Golaşe, Criollo, Ford târziu, Redhaven, Siberian C***. ***Maria Delicia and Royal Gold*** varieties have recorded an average frequency of leaves with assault in the 3 years of observation of 50% and 30% falling within moderately susceptible class resistance. The other 3 varieties ***Collins, Independence, Springcrest*** showed a behavior very sensitive to this pathogen attack (85% - 100% attack leaves).

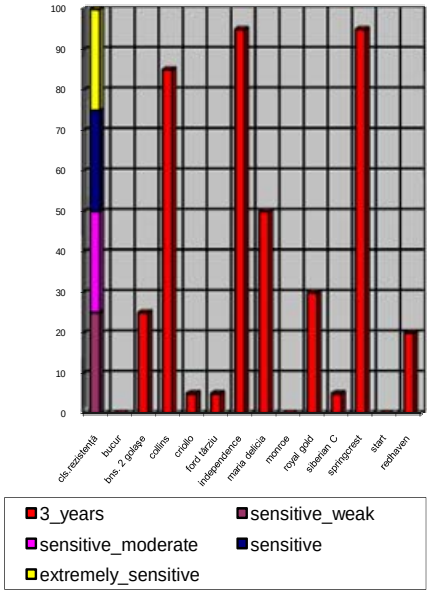

Fig.6. Behaviour of varieties of peaches and nectarines on *Taphrina deformans* fungus attack and integration into strength classes.

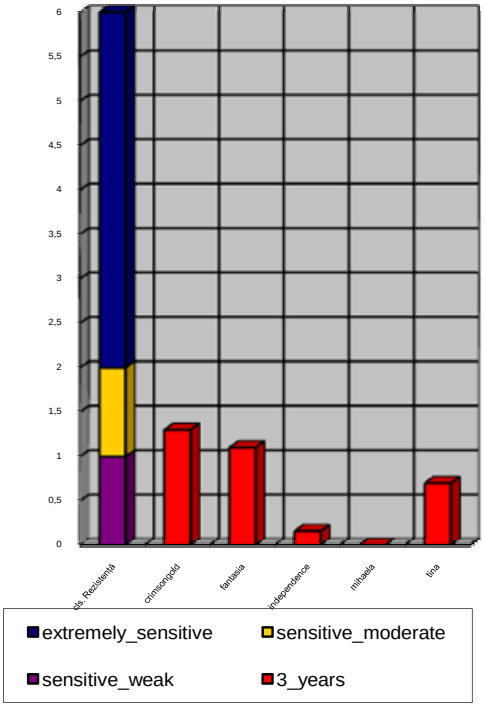

Fig.7. Behavior of nectarine varieties to the attack of the fungus *Sphaerotheca pannosa* and integration into strength classes.

3.Recorded results from observations on the fungus *Sphaerotheca pannosa* attack on peach and nectarine.
Regarding powdery mildew on peach and nectarine caused by the fungus *Sphaerotheca pannosa* on climatic conditions of the months of May, June and July (with long periods of atmospheric drought) had a 3-year average level of attack between 0% and 18.5 %. Of the nine analyzed varieties of peach variety Dida behaved as resistant (0%) and Collins as extremely sensitive variety with a medium level of attack of 18.5%. Other 6 varieties showed a medium level of attack during the 3 years of observation between 0-1% fits them poorly sensitive resistance class: Amalia, Congress Dixired, Eugene, Jerseyglo and Triumph. With an average of 1.8% attack, the variety Cardinal proved moderately sensitive to fungus *Sphaerotheca pannosa*. As shown in Fig.7. of the 5 varieties of nectarine studied one behaved as resistant to attack by the fungus *Sphaerotheca pannosa* - variety Mihaela (0% attack), 2 varieties showed an average level of attack during the 3 years of observation between 0-1% falling into sensitive weak strength class - Tina, Independence; varieties Crimsongold Fantasia and behaved as moderately susceptible (intermediate level of attack between 1-2%).

4.Results recorded the observations on bacteria *Pseudomonas syringae* attack on nectarine.
Studies have established that at higher temperatures -6 ° C, more than 95% of condensation agents of ice present in the plant are of biological origin and consist mainly of strains of *Pseudomonas syringae* van. Hall. It promotes frost damage from ice crystal forming outside organs enabling the vegetative limiting cellular fluids over merging.
Tests conducted on nectarine, for a period of 3 years (2008-2010) revealed progressive debilitating condition of observed trees (Fig. 8).
If in 2008 the average variation within the lesions ranged between 69.07mmp (Independence) and 148.44mmp (Romamer) with only 2 varieties with injuries over 100mmp and any kind of damage over 300mmp in 2009 limits of the variants environments fall between 19.83mmp (Crimsongold) and 248.7mmp (Fantasia), 3 varieties with over 100mmp lesions and no lesions over 300mmp variety. Correlated with colder winter in 2010 the attack is higher than in previous years averages variations within ranks among 89.63mmp (Fantasia) and 306.74mmp (Romamer II), 6 varieties of injuries over 100mmp one with injuries over 300mmp .

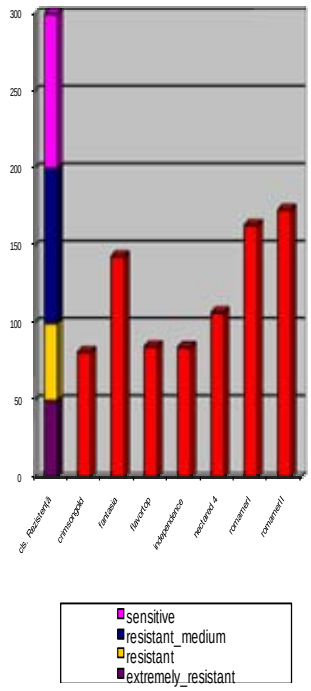

Fig.8. Behavior of nectarine varieties to artificial inoculation with the bacterium *Pseudomonas syringae* pv. *syringae* and integration into strength classes.

Classification of 7 nectarine varieties depending on the attack of bacteria *Pseudomonas syringae* pv. *syringae* after three years of study, is as follows: Resistant varieties: ***Crimsongold, Independence, Flavortop***;
Medium – resistant varieties : ***Fantasia, Nectared 4, Romamer I Romamer II.***
The disease occurs more serious in young trees, especially in cool, damp climates, being more influenced by the temperature after inoculation.

4. CONCLUSIONS

In climatic conditions of the area in Bucharest in 2008-2010 there was recorded attack by *Cytospora cincta* Sacc., *Taphrina deformans, Sphaerotheca pannosa* and *Pseudomonas syringae* pv. *Syringae* on most varieties of peach and nectarine studied.
Peach and nectarine varieties that behaved as resistant to attack by pathogens can be used as genitors. Protection strategy in peach, agro measures, especially cultural hygiene plantations, has a very important role. Tillage, fertilizer management and forming and sterility cuts should be made so as not to lead to debilitation of trees and therefore increase in sensitivity in front of the disease.
Cuts is preferable tobe taken from March to April, so wounds since the cuts do not become gateways to pathogens that develop during this period cycle (*Pseudomomnas syringae* pv. *syringae, Cytospora cincta*).
Pesticide treatments have a role in disease prevention and control . The effectiveness of these treatments depends on their application at the optimum time, the use of the best products and the correct treatment.

5. ACKNOWLEDGMENTS

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6. REFERENCES

[1] Bobeş I., Minoiu N., Beicu T., Ghizdavu I.- Plant Protection, Anul II, Nr. 6, Tipo Agronomia, Cluj-Napoca, 1992;
[2] Bălan V., Oprea M., Tudor V., Chira L. Stănică A.,- Apricot and peach diseases in orchard and storage conditions, Ed. Conphys, Bucureşti, 2005
[3] Chira L., Chereji V., Roman M., - *Apricot and Peach,* Ed.Mast, Bucureşti, 2005;
[4] Coman T., Minoiu N., Suța V., Lefter Gh., Gheorghiu E.,- Protection of trees and shrubs, Ed. Ceres, Bucureşti;
[5] Heiner Schmid, - Fruit trees and shrubs - cutting jobs, Ed. Must, Bucureşti, 1999;
[6] Ivaşcu Antonia, - Catalog of varieties of peach, Ed. Medro, Bucureşti, 2004;
[7] Ivaşcu Antonia,- Diseases and pests on peach and apricot, Ed. Medro, Bucureşti, 2004;
[8] Ivaşcu Antonia, - Peach Culture - Practical Guide, Ed. Medro, Bucureşti, 2005;
[9] Data base of SCDP Băneasa Bucureşti;
http://www.madr.ro;
http://arpmbuc.anpm.ro;
http://rubenbudau.wordpress.com;
http://www.statiuneabaneasa.ro;
http://www.revista-ferma.ro;
http://www.agroromania.ro;
http://pepiniera-emma.ro;
http://pomifructiferi.com;
http://www.bursaagricola.ro;