

BEHAVIOUR OF SOME NECTARINE VARIETIES TO MYCOTIC DISEASES

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Abstract.

Resistance of 20 nectarine varieties were studied during three years in an orchard on Prahova region. The diseases observations have carried out on *Sphaerotheca pannosa* var. *Taphrina deformans persicae*, *Stigmina carpophila*, *Monilinia laxa*, *Cytospora cincta* under treatments. Resistance of varieties and correlations of nectarifers glands with the resistance have been observed.

Key words: mycotic diseases, nectarine, *Prunus persica*, resistance

Introduction

Nectarine tree, like peach tree is affected every year by a number of phytopathogen agents as: *Sphaerotheca pannosa* var. *Taphrina deformans persicae*, *Stigmina carpophila*, *Monilinia laxa*, *Cytospora cincta*, a.s.o. for which to be treated farmers need a significant expenditure materials require the defendant to application of 13-15 treatments [1]. Treatments, though, besides the beneficial effect that consists in saving production, presents a number of drawbacks such as: environmental pollution, toxic residues in fruit, increasing production costs, etc. Due to these considerations the introduction in culture of nectarine varieties resistant to disease, is likely to diminish partial mentioned inconveniences.

Material and Method

The observations for the main diseases on nectarine were carried out during the period 2012-2014 on 20 varieties with 3 trees on 3 repetitions. The varieties have different origins (Romanian creations, American, Italian, French), under the application of phytosanitary treatments in a demonstrative plot in Prahova county. The differences noted are due exclusively to varieties and their reaction to pathogens.

For the detection of the attack caused by Mycosis in the orchard, under treatments observations have been made at: *Cytospora cincta* Sacc. (the percentage of tree branches to each subject, the average tree and variety).

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Taphrina deformans (Berk.) *Monilinia laxa* Tul. and *Sphaerotheca pannosa* var. *persicae* Woron. (noted F%, I% and GA% on 100 leaves, for every tree, then the average variety).

We used the grading system in the scale 0-6:

- 0-no attack;
- 1-attack is up to 3% of the body surface observed;
- 2-the attack between 5-10% of the body surface observed;
- 3-attack between 11 and 35% of the body surface observed;
- 4-attack of between 26 and 50% of the observed body;
- 5-attack between 51 and 75% of the observed body;
- 6-the attack between 75 and 100% of the observed body.

Mathematic formula for calculation is:

$$GA\% = \frac{F \times I}{100}$$

In order to detect resistance varieties of nectarine for *Stigmia carpophila* (Lev.) M.B.Ellis, *Monilinia laxa*, *Cytospora*, *cincta*, the length of the lesions produced by mycosis were analyzed and it was made a classification of varieties: 0-3 mm variety highly resistant (FR); 4-10 mm variety resistant (R); 11-25 mm medium variety resistant (MR); 26-50 mm sensitive variety (S); > 51 mm very sensitive variety (FS).

Results

A. *The behaviour of natural infections in terms of treatments.*

Assessment of the resistance to the main diseases of the nectarine was made in the conditions for carrying out plant-health treatments (8-10 per year).

a) In 2012 *Sphaerotheca pannosa* appears and has developed especially in the latter part of the period of vegetation, with a degree of attack between 0.71- 7, 61%. More sensitive proved to be American varieties, with a degree of attack greater than 5%. Climatic conditions of the year 2012 were not favourable to the development of the fungus *Sphaerotheca pannosa* product (Wallr) Lev. var. *persicae* Woron, so the varieties Fantasia, Tina and Mihaela, have shown traces of the attack. Maximum 2% attack registered Morton variety (Fig.1).



Fig.1 Symptoms of *Sphaerotheca pannosa var persicae* on leaves and fruit

In 2013, the attack was more intense, on the leaves and shoots and also on fruits, in percentages ranging between 1% Harko) and 30, 0 % (Romamer I). Did not show symptoms: Hardyred, Regina, Tina.

Did not show symptoms of attack during the year 2014: Pocahontas, Morton, Harko, Nectared 7. A very good reaction (degree of attack under 1%) shown Morton, Harko and Armking.

b) Treatments applied to the fall of the foliage as well as the swelling buds, with copper-based products, have stopped the appearance with big intensity of the fungus *Taphrina deformans* (Berk.) Tulle.

In 2012 the fungus had good conditions of development, since the last decade of March until early June. In this context, on an untreated plot it was recorded a degree attack of 33% at Harko. Also in 2013, climatic conditions were favourable to the development of the fungus *Taphrina deformans*. On the treated plot, the attack has oscillated between 0 -1, 32%, (Fantasia, Flavortop and Nectared 7). In 2014, the attack was very low, being between: 0- 1, 13% (Tina, Mihaela, Pocahontas) and 5, 24% (Romamer I).

Degrees of attack, on the merits of treatments orchard over 1% had the varieties: Crimsongold, Independence, Morton. Did not show traces of the attack: Hardyred, Regina, Tina, Mihaela and Nectared 10.

Virtually no variety is not completely immune to *Taphrina deformans*, but some resistance can be observed on the varieties Hardyred, Regina, Nectared 10, Fairlane.

c) The first symptoms of attack of *Cytospora cincta* Sacc. were observed on the annual branches in 2012, in the fourth year after planting. The largest percentage of branches with symptoms of attack, of 3 %, had Flavortop variety.

His wounds produced by cuts, as well as wounds as a result of frosts, are input gates for the *Cytospora cincta* fungus.

Proof lies in the fact that in 2013, after the pruning time all the varieties have presented attack, the frequency oscillated between 5,0 %

(Romamer I, Fairlane) and 1,0 % (Armking). An attack under 2% was only to Mayred and Weinberger varieties.

Winter period of the years 2013-2014 was not too freezing and didn't favoured the appearance and evolution of *Cytospora cincta*, so the frequency of the attacked branches has not exceeded 2,4 % (Firebrite), and on some varieties the attack has not occurred at all: Tina, Mihaela, Weinberger and Nectared 10.

After three years of study we notice that have not been attacked or had along this period less than 3% attacks in terms of natural infection on the merits of treatments, the following varieties: Crimsongold, Romamer II, Independence, Mayred, Morton, Weinberger, Armking.

d) *Stigmina carpophila* (Lev.) M.B. Ellis appeared in 2012 on the branches, with frequent who oscillated between 0,30% (Armking) and 2,90% (Fairlane). In 2103, the degree of the attack increased to decisively swing between 1.8% and 8.3%. Following the attack of the two-year note, a better behaviour (the frequency below 9%) had the varieties: Romamer II, Nectared 4, Firebrite, Nectared Flavortop, Fairlane, Fantasia.

In the climatic conditions of the area of the South aerea of Prahova (long winters with minimal up to -19 ° C, large temperature fluctuations in the spring, drought), detection of resistant varieties to the attack of the disease presents a wide meaning.

e) The fungus *Monilinia laxa* (Aderh. et Ruhl), Honey has not caused serious natural infections in the field, during the three years of observations. *Monilinia laxa* may cause infections on nectarine branches throughout the year.

Optimal conditions for the development of the agent are in spring and autumn, when there is maximum of infected branches, with necrotic spots, 20-30 mm long.

In the summer, when air temperature exceeds 20 ° C the virulence of the pathogen agent decreases, and as a result is reduced the percentage of damaged branches. Necrotic lesions evolve slowly and in most cases the scars. Drying branches takes place after 5-6 months from the date of registration of the attack, in most cases fall.

In 2012 the length of necrosis, oscillated between 1,1 mm and 43,8 mm (Nectared 10). Serious injuries have submitted varieties: Pocahontas, Morton, Nectared 7, Crimsongold. In 2013 the dimensions oscillated between 7,5 mm and 100,5 mm.

It was observed that the most sensitive varieties are those with very late ripening (Nectared 7, Fantasia, Nectared 10).

Classifying the varieties after their resistance at *Monilinia laxa* the results are:

- resistant varieties: Hardyred;
- medium resistant varieties: Crimsongold, Romamer I, Tina, Romamer II, Mihaela, Independence, Pocahontas, Nectared 4, Firebrite, Flavortop, Fairlane, H, Weinberger (so about 75% of the varieties have an average resistance to attack by Monilia);
- sensitive varieties: Morton, Regina;
- highly sensitive varieties: Fantasia, Nectared 7, Nectared 10.

B. Presence of attack on fruit

The fruit's attacks were carried out observations on the fruit maturity harvest, known as the nectarine area extension is limited by the sensitivity of the fruit to diseases. With the intense virosis attacks on fruits, and also of various other attacks diminishes their capacity (spots of the epidermis, powdery mildew disease) made them virtually non commercial.

Observations on the behavior of fruit from *Monilinia laxa* and *Sphaerotheca pannosa* var. *persicae* has a special importance for detection of resistan: +++ very sensitive; ++ average sensitivity; -tolerant; 0-resistant.

a) *Monilinia laxa* expands after the infection very quickly, within 2-3 days and can affect the entire fruit. Observations made, for three years, show that most varieties are susceptible. Medium sensitivity had Flavortop and a good behavior: Hardyred, Regina, Tina, Mihaela and Armking. The resistant variety was Nectared 10.

b) *Sphaerotheca pannosa* var. *persicae* affects very often fruit and leaves, progressing rapidly and reducing in the end the quality of the fruit, making it non comercial. Good powdery mildew behaviour on the fruit presented: Armking, Nectared 10, Tina, Mihaela. Medium sensivity was observed on: Crimsongold, Hardyred, Morton, Flavortop, Nectared 7.

Greater sensitivity showed: Romamer II, Independence.

DISCUSSION

Before ripening fruits of some cultivars crashes on the seed through these opening and favouring the penetration of various pathogens in fruit. This flaw gathers in the varieties: Romamer I, Romamer II.

In the literature [3] (Simeone, A. M.1983), it mentions the fact that the varieties of nectarine with nectarifere kidney-shaped glands are very resistant to powdery mildew disease, those devoid of glands are very sensitive, and varieties with globular glands have a medium sensitivity.

Study of nectarifere glands at nectarine trees was conducted specifically for the detection of a positive correlation between the shape, size, number of nectarifere glands and resistance to disease [2].

The observations undertaken came as the number of nectarifere placed on the petiole glands at the base of the leaves, was not greater than 3, rule of 2, both of which are the same size. The form has varied depending on the variety.

Most of the varieties have nectarifere kidney-shaped glands placed 2 by 2 face to face. He attempted a classification of nectarifere foliar glands, as follows:

- free varieties of glands nectarifere: none;
- globular nectarifere: Flavortop;
- glands kidney-shaped nectarifere: shows most varieties, which is supposed to be correlated with a good resistance to *Sphaerotheca pannosa* var. *persicae*.

We believe that, although some varieties have been extensively damaged in natural conditions, but data are not completely conclusive, since phytosanitary treatments were applied, the reason for which, in order to discover resistant artificial inoculations must be carried out.

CONCLUSIONS

(1) Processing of data for a period of three years, allows submission of some nectarine varieties with a high degree of higher resistance compared to the main diseases:

1. *Taphrina deformans*: Hardyred, Regina, 10, Nectared Fairlane;
- 2 *Sphaerotheca pannosa*. var. *persicae*: Tina, Mihaela;
3. *Cytospora cincta*: Romamer II, Hardyred, Tina, Independence, Regina, Harko, Nectared, 10, Nectared 7, Crimsongold, Mihaela;
4. *Stigmina carpophila*: Romamer II, Tina, Fairlane, Mihaela;
5. *Monilinia laxa*: Hardyred, Nectared 10, Armking, Regina.

(2) Symptoms manifested by tuber rots, cancers, leakage gomes and finally drying partial or total, all components airline of the nectarine. They appear in particular as a result of low temperatures during winter period and of their fluctuation in the blooming period.

(3) Most of the fungus species are interference of wounds, forties in host tissues by injuries caused by frost, cuts, or physiological fall of the leaves (blind petioles).

(4) Diseases studied constitute only a link in the chain of those responsible factors for the development and the flow of the process of the decline of nectarine tree, together with the non parasitic factors (climatic factors, edaphic factors, biological agents), they physiologically weak trees, being more sensitive to the attack by various parasites, as well as to frost and drought.

(5) Preventive treatments have proved to have a high efficiency curative, and for this reason, we recommend to pay a particular attention to carrying out their time and with recommended products.

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