

PREVENTIONS AND CONTROL OF MAJOR PATHOGENS IN APPLE

PREVENIREA ȘI COMBATEREA PATOGENILOR LA MĂR

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Abstract. *In the period 2008-2009, the SCDP Iasi were carried out research on chemical control of major pathogens encountered in apple species. In developing complexes considered in determining the effective of fungicides by applying treatment and identify oneself with some appropriate periods of the fenology stages. Were used: Zato 0,01%, Dithane 0,2%, Clarinet 0,1%, Rubigan 0,04%, Antracol 0,15%, Flint plus 0,1% and Shavit F72 0,2%*

Key words: fungicides, pathogens, efficacy

Rezumat. *În perioada 2008-2009, la SCDP Iași s-au efectuat cercetări cu privire la combaterea chimică a principalilor agenți patogeni întâlniți la specia măr. În elaborarea complexelor de combatere s-a avut în vedere determinarea eficacității fungicidelor în funcție de momentul aplicării tratamentelor și încadrării acestora în anumite perioade corespunzătoare fenofazelor de vegetație. S-au folosit: Zato 0,01%, Dithane 0,2%, Clarinet 0,1%, Rubigan 0,04%, Antracol 0,15%, Flint plus 0,1% și Shavit F 72 0,2%.*

Cuvinte cheie: fenofază, fungicide, patogeni, eficacitate

INTRODUCTION

The main pathogens causing significant damage to the species are apple scab (*Venturia inaequalis*) and powdery mildew disease (*Podosphaera leucotricha*). If scab disease occurs on leaves, flowers and fruit, by the appearance of brown spots and to powdery mildew disease, the attack is hereby acknowledged a white gray felt covering leaves, shoots, flowers and fruits (Cârdei E., 1997, Cârdei E., 1986).

Thus, chemical control remains a basic measure in integrated control of pathogens and for maximum efficiency, protection treatment should be carried out in close accordance with the development of bio-pathogens and phenological phases (Cârdei E., 1995, Știrbu M., Agurița Manolache, 2000).

MATERIAL AND METHOD

In 2008-2009, the SCDP Iasi have conducted research on testing of fungicides to control scab and powdery mildew.

The research was conducted in varieties: Golden, Jonagold and Starkrimson which were applied to two control schemes:

- V1 – Zato (0,15kg/ha) + Dithane (2,5 kg/ha); Clarinet (2l/ha) și Rubigan (0,8 l/ha);

- V2 – Zato (0,15 kg/ha) + Antracol (3 kg/ha); Flint plus (1,9 kg/ha) și Shavit F 72 (3,0 kg/ha)

Phytosanitary treatments were carried out to the warning and were in number three, applied in different phases of vegetation. The first treatment was performed in

phase button pink, petals shed early in the second and third treatment was applied in about 10 days since previous, when applying treatments having an important role in determining the effectiveness of fungicides. Pathogen evolution is influenced by climatic conditions (table 1).

Table 1

Evolution of temperature and precipitation in the period from march to september of years 2008 and 2009

| Month | Average temperature°C | | Maximum temperature°C | | Rainfall (precipitations) | | Days with precipitation | |
|-----------|-----------------------|------|-----------------------|------|---------------------------|-------|-------------------------|------|
| | 2008 | 2009 | 2008 | 2009 | 2008 | 2009 | 2008 | 2009 |
| March | 7,3 | 3,7 | 22,4 | 19,5 | 43,4 | 18,8 | 11 | 14 |
| April | 11,4 | 12,1 | 23,5 | 25,8 | 124,0 | 1,2 | 14 | 4 |
| May | 15,9 | 16,0 | 29,0 | 31,8 | 94,4 | 36,6 | 12 | 12 |
| June | 20,6 | 20,2 | 32,2 | 34,1 | 87,8 | 68,6 | 9 | 11 |
| July | 21,4 | 22,4 | 32,2 | 37,5 | 164,2 | 35,6 | 13 | 8 |
| August | 22,2 | 21,1 | 35,7 | 36,7 | 66,0 | 30,8 | 3 | 5 |
| September | 14,1 | 17,3 | 32,5 | 33,1 | 48,6 | 10,2 | 6 | 4 |
| Total | | | | | 628,4 | 201,8 | | |

As can be seen from the table, average monthly temperatures, starting from April were 11.7°C in 2008, reaching 12.1°C in 2009. It is known that primary scab infections occur at temperatures above 5°C of powdery mildew disease and the temperature 18-22°C. Moreover, the maximum temperature was 35,7°C in 2008 and 37,5°C in 2009, thus creating conditions conducive to the development of pathogens. Regarding rainfall, the greatest amount recorded in 2008, by 628.4 mm. But, in addition to significant rainfall is the number of days with precipitation favoring pathogen attack. For example, in 2008, the number of rainy days was 14 in April, 12 in May, 9 in June and 13 in July which favored scab attack.

RESULTS AND DISCUSSIONS

Experimental results on the effectiveness of fungicides against pathogens are presented in table 2.

Thus, in 2008-2009, two pathogen attack (*Venturia inaequalis* and *Podosphaera leucotricha*), recorded in untreated control variant, after flowering, shows that were good conditions for scab and powdery mildew disease. For example, in 2008, the frequency of scab on leaves was 64.7% and 55.0% on fruits, and in 2009, the attack was lower: 42.5% on leaves, 24.7% on fruits. To these values, the variant treated, frequency of scab and powdery mildew was reduced. In 2008, the variety most affected by scab was Starkrimson, where values have been 7.4% on leaves and 4.3% on fruit, and variety for powdery mildew on leaves Golden with a frequency of 4.3% and 3.6% on fruit.

Table 2

Efficacy of fungicides tested in apple plantations – SCDP IASI

| Used products | Variety | Scab F % | | | | Powdery mildew disease F% | | | |
|--|---------------------------------|----------|--------|--------|--------|---------------------------|--------|--------|--------|
| | | 2008 | | 2009 | | 2008 | | 2009 | |
| | | Leaves | Fruits | Leaves | Fruits | Leaves | Shoots | Leaves | Shoots |
| V1 T1- Zato+Dithane T2- Clarinet T3 -Rubigan | Golden | 6,2 | 4,0 | 4,8 | 2,8 | 4,3 | 3,6 | 2,4 | 1,6 |
| | Jonagold | 5,0 | 3,2 | 3,1 | 2,3 | 2,0 | 1,4 | 1,2 | 1,4 |
| | Starkrimson | 7,4 | 4,3 | 5,0 | 3,1 | - | - | - | - |
| | Untreated control - Jonagold | 64,7 | 55,0 | 42,5 | 27,4 | 43,4 | 33,7 | 31,4 | 24,7 |
| V2 T1- Zato+Antracol T2-Flint plus T3-Shavit F72 | Golden | 4,1 | 3,5 | 1,0 | 0,8 | 4,1 | 2,9 | 1,1 | 0,9 |
| | Jonagold | 3,6 | 2,9 | 1,2 | 0,7 | 1,8 | 0,9 | 1,4 | 1,0 |
| | Starkrimson | 5,0 | 3,4 | 1,4 | 0,8 | - | - | - | - |
| | Untreated control - Jonagold | 64,7 | 55,0 | 42,5 | 27,4 | 43,4 | 33,7 | 31,4 | 24,7 |

Also can be seen from table, that fungicides Zato + Antracol, Flint plus and Shavit F 72, were more effective recording a lower attack of 0.8% scab on fruit in 2009, compared to the version Zato + Dithane, Clarinet and Rubigan, scab attack on fruits in the same year was 2.8%. Close values were also applied to powdery mildew.

Analyzing the behavior of the same pathogen, differentiated the two years of experience, is found in 2008 were most favorable for the development of pathogens and the attack was more intense compared to 2009.

For example, the variety Jonagold, variant Zato+Dithane, Clarinet and Rubigan, the frequency of scab on leaves was 3,2% in 2008 from 2.3% in 2009.

CONCLUSIONS

1. Climatic conditions in 2008 – 2009 were conducive to the development of pathogens *Venturia inaequalis* and *Podosphaera leucotricha*.

2. In year 2008, scab and powdery mildew disease attack was more intense than in 2009, proving that by the frequency of pathogens.

3. The best results in combating scab and powdery mildew were obtained in products: Zato 0,01%, Antracol 0,15%, Flint plus 0,1% and Shavit F 72 0,2%

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