

STUDY CONCERNING THE PHYTOSANITARY STATUS OF APPLE, PEAR AND PLUM TREE PLANTATIONS WITHIN TEMPERATURE CONDITIONS OF THE COUNTY OF CLUJ

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Abstract

The paper emphasize a study developed during two successive years (2008 and 2009) concerning the occurrence of specific pathogens of apple, pear and plum trees from plantations located in the county of Cluj, Romania. The average year temperature was taken into consideration in analyze, when the same phytosanitary treatments were applied during both years in all tree cultures. In all cases the affected area increased in 2009, which was warmer compared to 2008 (the average temperature was with 0.5°C bigger), in conditions of the same maintenance conditions and same phytosanitary treatments. Further research is needed in next successive years in order to establish a correlation between climatic factors, mainly represented by temperature, and pathogens attack degree. This will enable us to elaborate and develop appropriate strategies for integrated tree protection.

Key words: tree plantations, pathogen, temperature,

INTRODUCTION

The specific climatic conditions from Central part of Romania (Transylvania - the county of Cluj), that recorded an increase of 0.5°C compared to previous decade (1991 - 2000) have different potential influence on health status of main tree plantations (Odagiu Antonia et al., 2007; Oroian I., 2008; Rusu T. et al., 2009) from the area (apple, pear and plum trees).

During last decade, the most often encountered pathogens can be divided in common pathogens for apple and pear trees, as *Erwinia amylovora*, *Monilinia fructigena* or specific for each one, as: *Podosphaera leucotricha*, *Venturia inaequalis*, and *Nectria galigena* (for apple tree), *Fabraea maculata*, *Venturia pirina* (for pear tree), *Corineum beijerinckii*, *Podosphaera trydactyla*, *Plum-pox potyvirus*, *Venturia carpophila*, *Monilinia laxa*, *Polystigma rubrum*, *Taphrina pruni* (Calvin Linda and B. Krissoff, 1998; Jawhar J. et al., 1996; Salem N. et al., 2005; Oroian I. et al., 2009; Zagrai I. et al., 2002, 2003).

The aim of our study is to emphasize the type and occurrence of the main pathogens of apple, pear and plum trees of plantations from the county of Cluj (Transylvania), and quantification of infested area, in order to take the most appropriate measures for reducing, and even eliminate where possible, their presence and harmful effects, and develop programmes of integrated plant protection.

MATERIAL AND METHODS

The study was performed during 2008 and 2009 in the apple, pear and plum plantations from the county of Cluj. The data were obtained from plots of different size belonging to agricultural associations, private farms, or state plantations.

They were compared and corroborated with data from official database of the General Phytosanitary Department of the Ministry of Agriculture (Oroian I. et al., 2009).

The recordings aimed to obtain the intensity and frequency of the attack in order to process them for developing an accurate picture of the attack degree (AD).

$$AD = \frac{F \cdot I}{100}$$

where:

F - frequency of the attack

I - intensity of the attack

RESULTS AND DISCUSSION (TNR 10,B)

The studied area of apple tree plantations was of 551 Ha. In 2008, infestation of monitored area was of 100% for *Monilia fructigena* while other pathogen occurrence recorded shares between 91.63 - 99.91% (*Podosphaera leucotricha*, *Nectria galigena*, *Venturia inaequalis*), with lowest value (35.47%) for *Erwinia amylovora* (Fig. 1).

During 2009 (when the average temperature by year was of 10.2°C, with 0.5°C smallest compared to 2008) the share of the infested area was smaller, in conditions of the same phytosanitary treatment of the studied plantations. The attack of *Monilia fructigena* was not recorded in 2009 (Fig. 1), because of the special treatments applied.

The degree of attack in pear trees was studied on a total area of 120 Ha. In 2008, infestation of monitored area was of 100% for *Monilia fructigena*, *Fabraea maculata*, and *Venturia pirina* while *Erwinia amylovora* attacked only 63.64% of the studied area.

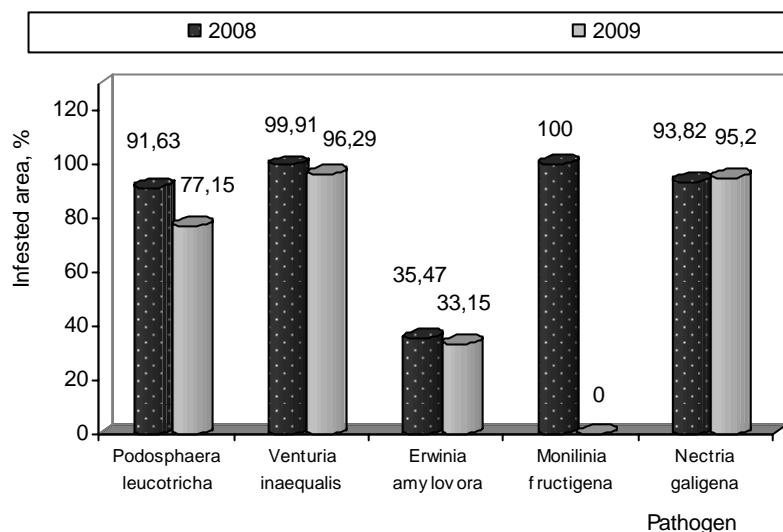


Fig. 1. The infested area (%) with pathogens in apple trees plantations from the county of Cluj, during two successive years 2008 and 2009

In 2009 the attack of *Monilia fructigena*, and *Venturia pirina* was not recorded because of the intensity of the phytosanitary treatment applied,

while 100% occurrence of *Fabraea maculata* was identified in the area, while the attack of *Erwinia amylovora* decreased to 21.43% of the total pear tree cultivated area in the county of Cluj (Fig. 2).

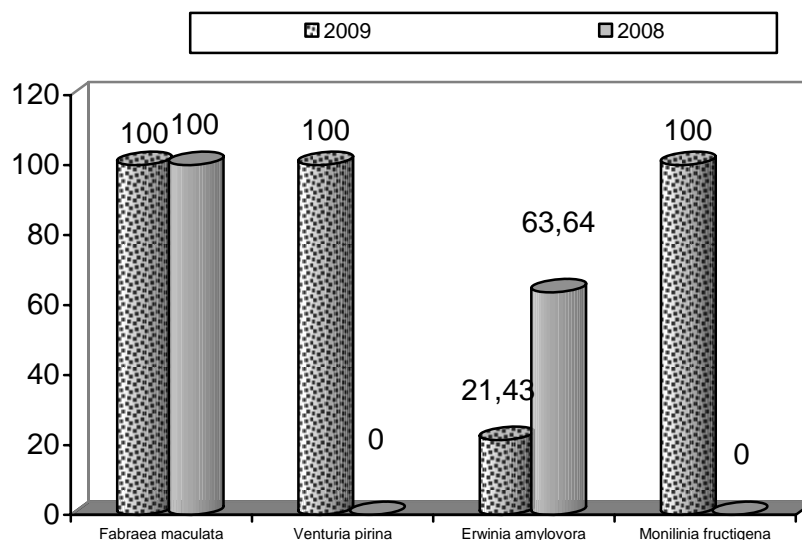


Fig. 2. The infested area (%) with pathogens in pear trees plantations from the county of Cluj, during two successive years 2008 and 2009

The infested area monitored for plum trees recorded a total of 551 Ha. In 2008, infestation of monitored area was of 100% for *Venturia inaequalis*, *Monilinia laxa*, *Polystigma rubrum*, and *Taphrina pruni*, while the affected area was only 97.03% for *Corineum beijerinckii*, 90.28% for *Plum-pox potyvirus* and 98.07% for *Venturia*. In 2009 the attack of *Corineum beijerinckii* increased to 98.3% of plantation areas, while for the other pathogens the affected areas decreased (*Plum-pox potyvirus* – 38.15% of the plantation areas, *Monilinia laxa* – 99.09% of the plantation areas, *Polystigma rubrum* – 90.62% of the plantation areas, *Taphrina pruni* – 82.35% of the plantation areas) and *Venturia carpophila* did not affected the plum trees plantations (Fig. 3).

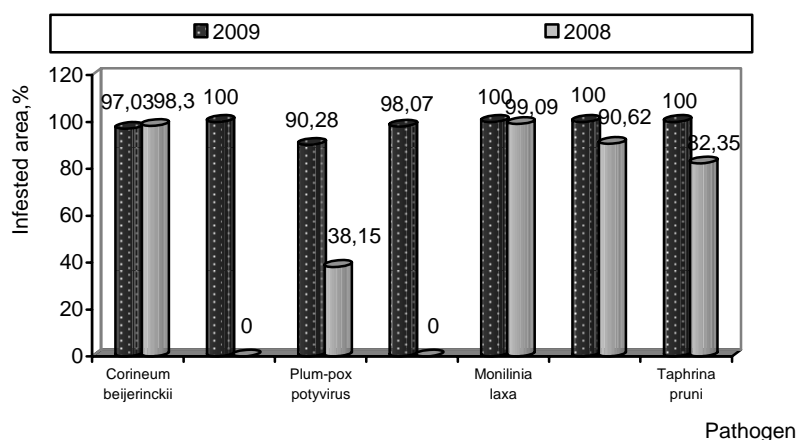


Fig.3. The infested area (%) with pathogens in plum trees plantations from the county of Cluj, during two successive years 2008 and 2009

CONCLUSIONS

The studied areas of tree plantations had different sizes function of specie (apple - 551 Ha; pear - 120 Ha; plum – 551 Ha), but in all cases the infestation of monitored areas was bigger in 2009 compared to 2008, in conditions of the same phytosanitary treatment of the studied plantations. The attack of *Monilia fructigena* was not recorded in 2009 (fig. 1), because of the special treatments applied.

The average year temperature in the county of Cluj had potential influence on health status of apple, pear and plum tree plantations, but research must develop during next successive years in order to establish a correlation between average year temperature, and pathogens attack degree. This will enable us to elaborate and develop appropriate strategies for integrated tree protection.

REFERENCES

1. Calvin Linda and B. Krissoff, 1998, Technical Barriers to Trade: A Case Study of Phytosanitary Barriers and U.S. - Japanese Apple Trade Journal of Agricultural and Resource Economics 23 (2), 351 - 366
2. Jawhar J., B. Di Terlizzi, W. Khourym, V. Savino, 1996, Preliminary account of the phytosanitary status of stone-fruit trees in Lebanon, EPPO Bulletin, Volume 26, Issue 1, 161-166
3. Odagiu Antonia, I. Oroian, I. Brasovean, C. Iederan, P. Burduhos, 2007, Mycotic Pollution Emphasizing Methods – Zearalenone Determination in Maize Samples, ProEnvironment/ProMediu, Număr Pilot, 21 – 25 (48 – 52)
4. Oroian I., I. Oltean, Antonia Odagiu, Laura Paulette, C. Iederan, I. Braşovean, 2009, The control and monitoring of the orchard pests in Transylvania, Research Journal of Agricultural Science, 41 (1), 277 – 283
5. Oroian, I., 2008, Protecția plantelor și a mediului: - aspecte practice, Editura Mediamira Cluj-Napoca
6. Oroian I., 2008, Protecția plantelor și mediul Editura Todesco, Cluj-Napoca
7. Rusu T., P. Guș, Ileana Bogdan, Paula Ioana Moraru, A.I. Pop, Doina Clapa, D.I. Marin, I. Oroian, Lavinia Ioana Pop, 2009, Implications of minimum tillage systems on sustainability of agricultural production and soil conservation, Journal of Food, Agriculture & Environment, WFL Publisher-Science and Technology, Finland, vol. 7 (2), 335 - 338
8. Salem N., A. Mansour and A. Al-Musa, 2005, Viruses of Pome Fruit Trees in Jordan, Journal of Plant Pathology, 87 (2), 123 - 126
9. Zagrai I., A. Maxim, I. Oroian, Luminișă Zagrai, Natalia Țigănaș, 2003, Rezultate experimentale privind variabilitatea reacției prunului la infecțiile naturale cu virusul Plum pox, Revista de Protecția Plantelor a SNPP, XIII, no. 52, 46-52
10. Zagrai I., I. Oroian, 2002, Diagnosticarea virusurilor la pomii fructiferi, Revista de Protecția Plantelor a SNPP, nr. 46, 52-58