

RESEARCH ON SOME PATHOGENIC FUNGI INVOLVED IN THE BIOLOGICAL DECLINE OF THE GRAPEVINE AT THE BLAJ VITICULTURAL CENTRE

CERCETĂRI PRIVIND CIUPERCILE PATOGENE IMPLICATE ÎN PROCESUL DE DECLIN BIOLOGIC AL VIȚEI DE VIE, ÎN CENTRUL VITICOL BLAJ

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Abstract: *This paper presents aspects related to the action of pathogenic lignicole fungi that play a major role in the decline of the grape vine. The experiments were performed in the vineyards of the Research and Development Station for Viticulture and Vinification Blaj, between 2009 and 2011. The viticultural plantations in which the pathogenic fungi *Eutypa lata*, *Phomopsis viticola* and *Stereum hirsutum* were frequently present were monitored. These are wound fungi that enter the plant through wounds of the arms and trunk. Generally, vines infected with these fungi vegetate poorly. In spring, portions of the trunk do not begin their vegetation period, they have dead arms, bud break is delayed, sometimes there is a strong proliferation of shoots, with an abnormal evolution during the growing season.*

Key words: decline, the *Eutypa* dieback, the cane and leaf spot, Esca

Rezumat: *În această lucrare sunt prezentate aspecte legate de acțiunea ciupercilor patogene lignicole cu rol major în procesul de declin al viței de vie. Experimentele s-au efectuat în plantațiile viticole ale Stațiunii de Cercetare Dezvoltare pentru Viticultură și Vinificație Blaj, în perioada 2009 - 2011. Au fost urmărite plantațiile viticole în care se manifestă frecvent micoze cunoscute ca patogene: *Eutypa lata*, *Phomopsis viticola* și *Stereum hirsutum*. Acestea sunt ciuperci de rană, care pătrund în plantă prin rănilor existente pe butuc și coarde. În general butucii infectați cu aceste micoze vegetează slab. Primăvara, porțiuni ale butucului nu mai pornesc în vegetație, prezintă brațe moarte, dezmușuritul este întârziat, iar uneori se produce o proliferare puternică a lăstarilor, cu o evoluție anormală pe parcursul perioadei de vegetație.*

Cuvinte cheie: declin, eutipoză, excorioza, esca

INTRODUCTION

The biological decline of the grape vine was first reported a long time ago in the vineyards of Romania. Given the importance of damage caused to the vine by wood diseases, they have been continuously studied by Romanian experts in the field (Tomoiaga, 2006). Epidemiological studies revealed that the lignicole fungi *Eutypa lata*, *Phomopsis viticola*, *Stereum hirsutum*, associated with biological decline in correlation with climate conditions and some disease control

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measures. Due to technology and environmental changes, the grape vine stocks have become susceptible to lignicole pathogen infestations. Once inside the wood, the lignicole pathogens have negative effects on plant metabolism, resulting in premature wilting of grape vines (Oprea and Dumitru, 1989).

MATERIAL AND METHOD

Research on pathogenic fungi involved in the decline of the grape vine was carried out at the Viticultural Centre Blaj, from 2009 to 2011. The land parcels with symptoms of premature death were identified and located. Observations were conducted on varieties representative for the Târnavă vineyard: Fetească regală, Muscat Ottonel, Italian Riesling and Sauvignon Blanc. From each variety, 1,000 block vines were monitored. The frequency and intensity of the phenomenon caused by the main lignicole pathogenic fungi *Eutypa lata*, *Phomopsis viticola* and *Stereum hirsutum* was monitored.

Samples were gathered in order to run laboratory tests, which consisted of diseased tendrils, wilted or wilting stocks. The labelled biological material was transported to the laboratory to identify fungi involved in the decline. It was held in a moisture room for 18 to 21 days until the fructifications emerged. They were then studied under binocular magnifier and microscope to reveal the biological fungi involved in the grape vine decline.

Climatic factors were evaluated and their role in the evolution of the vine lignicole fungi.

RESULTS AND DISCUSSIONS

The first signs of the biological decline can be noticed in spring, when the grape vine begins to grow. The block vines that presented a decline syndrome were infested with three fungi, and namely *Eutypa lata*, *Phomopsis viticola* and *Stereum hirsutum*. An important role in the evolution of these diseases is played by weather conditions, namely rainfall (fig. 1) and temperature (fig. 2).

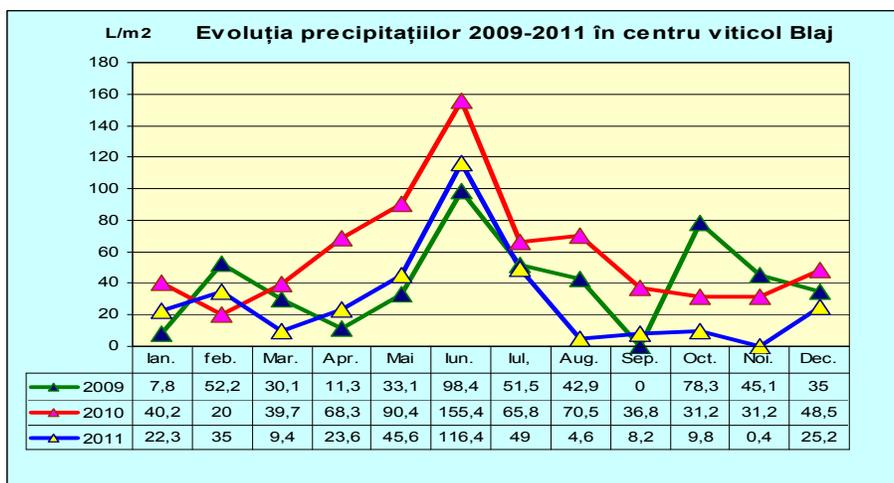


Fig. 1 - The evolution of rainfall in 2009 – 2011 at the viticultural centre Blaj

Frosty winters and rainy springs favourably influence the development of lignicole pathogens. The year 2009 was characterized as a normal year in terms of

weather. Year 2010 was a particularly challenging year for viticulture. Winter temperatures exceeded the vines' resistance to frost. In spring, after the grape vine started to grow, heavy rain and cold weather was recorded. This favoured the development of the vine fungi. Year 2011 was characterized as a dry year, and the grape vines were affected by this phenomenon.

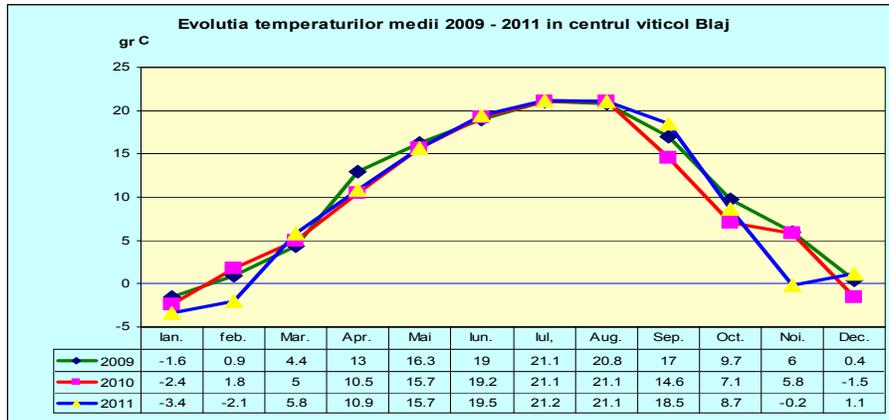


Fig. 2 - The evolution of average monthly temperatures in 2009 – 2011 in the viticultural centre Blaj

Following observations on site and in the laboratory, the *Eutypa* dieback is quite frequent. The disease is caused by an infection with the fungus *Eutypa lata*, which leads to stunted development of grape vines. The wood shows V-shaped necrosis (fig. 3).



Fig. 3 - *Eutypa lata*

The leaves remain small, undergoing chlorosis, deformed with ragged margins. The disease mainly spreads due to the ascospores formed in the perithecia on dry wood. They can remain fertile for up to five years and that is

why the stocks infected with *Eutypa* become a source of infection for a long time. Infections occur in late autumn and early spring, favourably influenced by rain fall. In the spring of 2010, amid bad weather, the number of block vines affected by the *Eutypa* dieback was higher than in 2009 and 2011 (fig. 4).

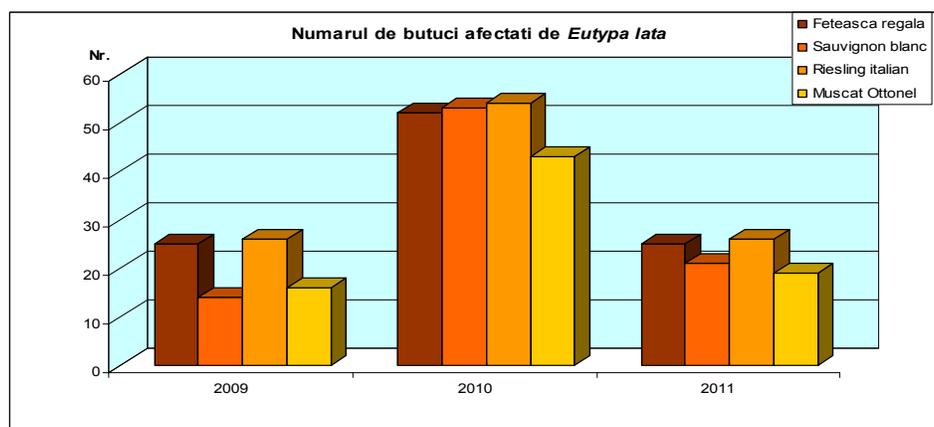


Fig. 4 - Number of stocks affected by *Eutypa lata* in the period 2009 - 2011

The cane and leaf spot is the second major pathogenic fungus involved in the biological decline of grape vine plantations. The infection is caused by the fungus *Phomopsis viticola* (fig. 5).



Fig. 5 - *Phomopsis viticola*

The first symptoms appear in early spring with the growing season, when bud break is delayed. The buds located on the cordons do not start to grow, causing denudation of canes. Black small round or linear, more or less deep lesions appear in the shoots. Round spots, up to 1.5 cm in

diameter, blackish brown with a yellow-orange halo emerge on the leaves. After the grapes enter veraison, the berries rot and are covered by fungi fructifications. The infections are favoured by cold and wet weather.

In the studied period, *Phomopsis viticola* had a higher intensity in the vineyard in 2010 (fig. 7). This allowed us to establish correlations between disease intensity and weather conditions.

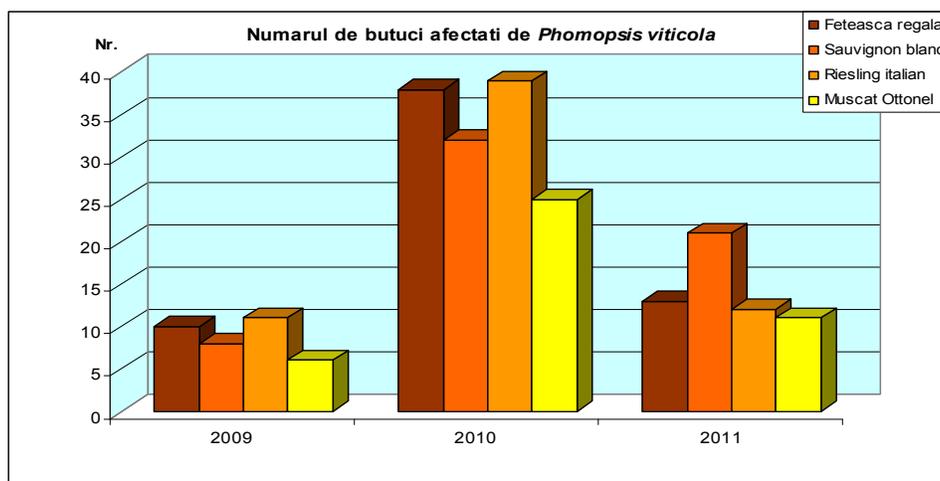


Fig. 6 - Number of stocks affected by *Phomopsis viticola*, in the period 2009-2011

Another fungus present in the analysed grape vines is *Stereum hirsutum* (fig. 5)



Fig. 7 - Esca symptoms on vine leaves

The symptoms present different aspects because the death of the trunk can be slow, over several years, or sudden. The infected stocks grow slowly, the leaves have a yellowish tint, and the tissues become necrotic

between the veins. Plants are fed less sap, portions of the trunk do not start to grow, and finally the plant dies. The fast type of the disease, also called apoplexy, usually occurs in the hot summer months, right after heavy rainfall. The pathogen enters the plant through wounds arising from pruning or other accidents. Dead tissue is invaded by the fungus mycelium, conidia and sclerotia, essential elements for the spread of the disease. Due to heavy rains and extreme temperatures during summer, a more extensive attack of the Esca disease took place in 2010 (fig. 8).

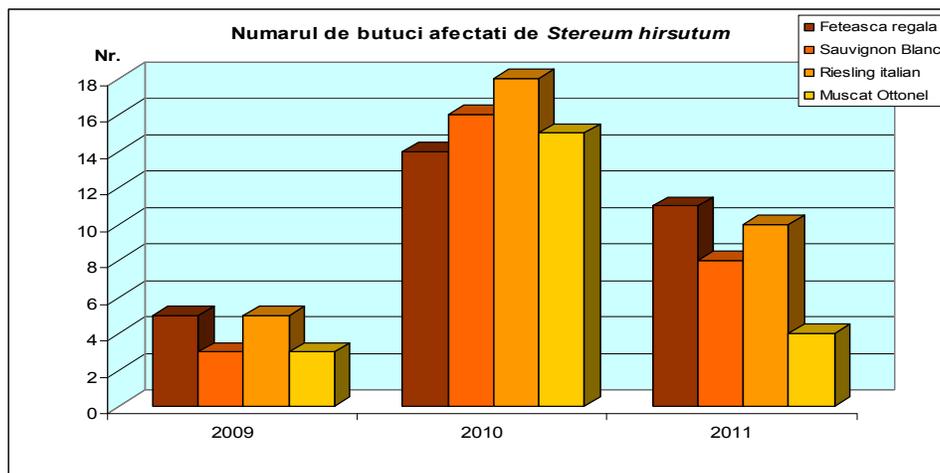


Fig. 8 - Number of block vines affected by *Stereum hirsutum*, in the period 2009 - 2011

CONCLUSIONS

1. Lignicole pathogens occurred with higher frequency and intensity in the vine growing year 2010, which allowed a strong correlation between the decline phenomenon and weather conditions.

2. The varieties Fetească regală, Italian Riesling and Sauvignon Blanc are susceptible to the attack of lignicole pathogens. Muscat Ottonel proved to be a quite disease-resistant variety.

3. *Eutypa lata*, *Phomopsis viticola* and *Stereum hirsutum* are wound fungi, as they invade the plant through existing wounds on the stock; infections spread the most in autumn and spring.

REFERENCES

1. **Oprea Maria, Dumitru Constantina, 1989** - *Cercetări privind ciupercile patogene implicate în pieirea prematură a viței de vie*. Yearbook of the Research Institute for Plant Protection, vol. 22, p. 11 – 23.
2. **Tomoiașă Liliana, 2006** - *Bolile și dăunătorii viței de vie*. Mediamira Publishing house, Cluj Napoca.
3. **Tomoiașă Liliana, 2007** - *Declinul biologic al viței de vie*. ISBN 978-973-0-06077-5