

The influence of climatic conditions on the main vine diseases in terms of chemicals application

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Abstract. This paper presents research results on the influence of climatic conditions on the occurrence and manifestation of main vine diseases. In the Blaj wine center the main grapes diseases are blight (*Plasmopara viticola*), mildew (*Uncinula necator*) and gray rot of grapes (*Botrytis cinerea*). To track the evolution of the main pathogens of vines the main climatic factors were monitored (air temperature, precipitation and relative humidity). Climatic conditions specific for each experimental year influenced differently the attack of main vine pathogens, this is due to climatic conditions which are very favorable to pathogens, leading to their appearance on leaves and bunches. Treatments were applied according to the time when the first infection was pointed out and the evolution of climatic factors.

Key words: vine, pathogenes, climatic conditions, chemicals application.

Rezumat. În această lucrare sunt prezentate rezultatele cercetării privind influența condițiilor climatice asupra apariției și manifestării principalelor boli ale viței de vie. În centrul viticol Blaj, principalele boli ale viței de vie sunt mana (*Plasmopara viticola*), făinarea (*Uncinula necator*) și putregaiul cenușiu al strugurilor (*Botrytis cinerea*). Pentru a urmări evoluția principalilor patogeni ai viței de vie s-au monitorizat principalii factori climatici (temperatura aerului, precipitațiile și umiditatea relativă a aerului). Condițiile climatice specifice fiecărui an experimental au influențat diferit atacul principalilor patogeni ai viței de vie, aceasta se datorează condițiilor climatice care sunt foarte favorabile apariției patogenilor ceea ce a determinat apariția lor pe frunze și ciorchini. Tratamentele au fost aplicate în funcție de momentul semnalării primelor infecții și de evoluția factorilor climatici.

Cuvinte cheie: viță de vie, patogeni, condiții climatice, tratamente chimice.

Introduction. Vine is attacked by a large number of diseases and pests, therefore the measures of plant protection technology play an important role in culture (Florian 2002). In addition to preventive measures (as performing work on time, balanced fertilization), an important role in maintaining health and avoiding loss of harvest in grapevines it has chemical control, that under global climate change remains the basic resort of treating diseases and pests (Oroian 2006). Chemical control is the management of chemicals known as pesticides (Savescu 1978; Malschi 2009). On market there are a multitude of products that contain one or more active substances to ensure effectiveness of the product (Baicu 1996). The basic element of the integrated control of pathogens, giving security to protect culture, is the chemical treatment (Berca 2002). Importantly, however, is that their application should not be abusive, that pesticides are well chosen, that the treatments are alternated, that it is use mixtures and enforcement treatments to be accurate (Tomoiaga 2006).

Material and Method. The experiments were located in Blaj at SCDVV during 2005-2007 on Royal Fetească varieties, Italian Riesling and Muscat Ottonel, varieties with the highest rate in culture (as size) within Blaj Viticultural Center. Climatic conditions have an important role in the installation and evolution of pathogens. Based on optimal conditions for pathogen development of specific phenophase it was track how the eco-climatic conditions have influenced each pathogen. To determine the main pathogens degree of attack (GA% = gravity of attack) from Blaj Viticultural Center, it was followed the

evolution of climatic conditions: monthly average temperature, precipitation and relative humidity. Depending on climatic conditions in each year under study and the months in which pathogens encountered favorable conditions, it was established GA% of each pathogen.

Evolution of *Plasmopara viticola* and *Uncinula necator* pathogens were observed during 1.05-30.08 for each year taken into study, according to climatic conditions. Evolution of *Botrytis cinerea* pathogen was observed during 1.05-31.10 for each year taken into study, according to climatic conditions.

Results and Discussion. *The influence of climatic conditions on the Plasmopara viticola blight attack during 2005-2007.* During 2005-2007 at Blaj Viticultural Center was followed the evolution of *Plasmopara viticola* pathogen on grape varieties for wine Fetească Royal, Italian Riesling and Muscat Ottonel correlated with climatic factors and treatment variants with organic product of synthesis.

Climatic conditions specific for each experimental year have influenced different blight attack. This is due to climatic conditions which are very favorable for the occurrence of the pathogen and its manifestation on leaves and bunches. Treatments were applied according to the moment when the first infection was observed and the evolution of climatic factors.

As you can see 2005 was characterized by very favorable weather conditions for mildew attack, *Plasmopara viticola* in all three varieties studied, due to the large amount of rainfall of 142.5 mm in May and higher relative air humidity 84%, which greatly favored the degree of attack. 2006 and 2007 years are characterized by favorable climatic conditions for mildew attack due in particular, to biological reserve accumulated from the previous year and to 84.2% air humidity, which in Blaj Viticultural Center is greatly influenced by air currents from the two rivers Târnavă.

Climate data and the blight attack degree (in conjunction with climatic factors) are presented graphically in Figure 1.

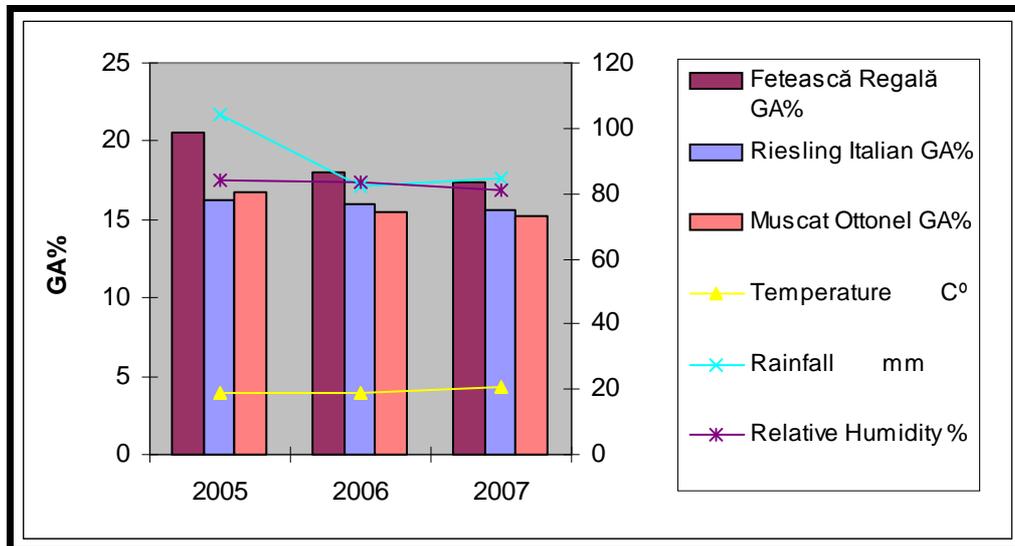


Figure 1. Climatic factors and the degree of attack by the *Plasmopara viticola* fungus 2005-2007.

The influence of climatic conditions on the Uncinula necator mildew attack. Different climatic conditions of the three experimental years have greatly influenced the mildew attack, differences between the degrees of attack for the three years is insignificant. This low level of attack is due to the fact that *Uncinula necator* pathogen not meets favorable conditions to its development at Blaj Viticultural Center.

Average values of climatic factors of experimental years (average temperature of the vegetation period 19.30 C°; 90.38 mm rainfall and relative humidity of 82.91%)

determined the degree of attack below 2% in all three varieties. The influence of climatic elements in each experimental year on the level of mildew attack in the vineyard is shown graphically in Figure 2.

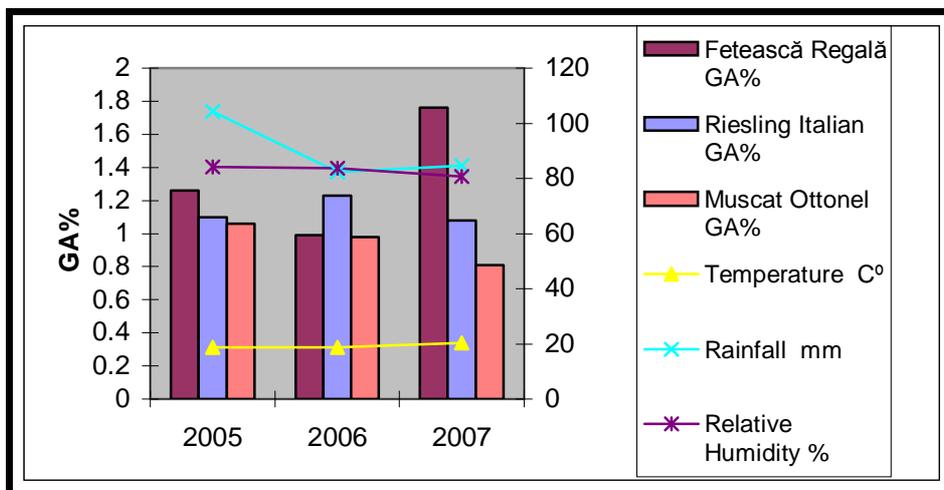


Figure 2. The influence of some climatic factors on the *Uncinula necator* mildew attack at studied varieties, Blaj (2005-2007).

The influence of climatic conditions on the gray rot of grapes attack, Botrytis cinerea. In Blaj Viticultural Center the gray rot of grapes, produced by *Botrytis cinerea* pathogen, cause significant damage each year due to climatic conditions of the region. Pathogen attack occurs with great intensity in rainy autumns. The most common, the attack occurs on grapes frequently in the second part of the growing season when the grapes has accumulated enough sugar, because the pathogen occurs in the presence of carbohydrates.

Experimental years 2005-2006 were characterized by favorable environmental conditions for the development of the biological cycle of *Botrytis cinerea* pathogen because of the large amount of precipitation registered in the second part of the vegetation period (first fruits phenophase), of mist and air relative humidity, which favored a high degree of attack. 2007 due to more uniform distribution of precipitation was characterized by environmental conditions less favorable to *Botrytis cinerea* pathogen attack, registering a lower level of attack than the other experimental years (see Figure 3).

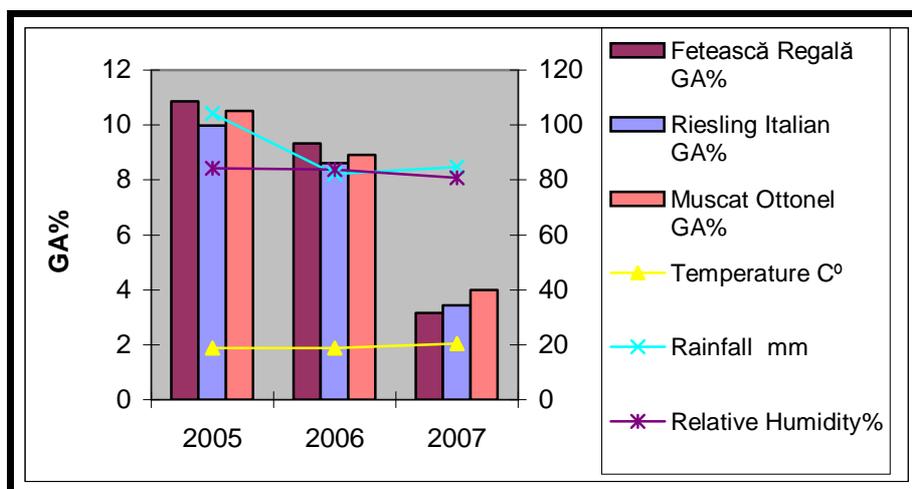


Figure 3. The influence of climatic factors on the attack of *Botrytis cinerea* gray rot of grape at studied varieties (2005-2007).

Conclusions. Varieties taken into study are: Royal Fetească, Italian Riesling and Muscat Ottonel, varieties with the highest weight in Blaj Viticultural Center vineyard. The climatic conditions, in particular precipitation and relative humidity which have an uneven distribution during the growing season, causes fungal diseases in each year of research. Specific climatic conditions for each experimental year have influenced different blight attack; this is due to climatic conditions which are very favorable for the occurrence of the pathogen on leaves and bunches. Those conditions are determined by Târnavă streams, which favors the formation of dew droplets and extend the wetting leaves period. Due to climatic conditions of Blaj Viticultural Center in the three experimental years *Uncinula necator* pathogen recorded a very low degree of attack because of less favorable disease conditions. Gray mold of grapes produced by *Botrytis cinerea* pathogen causes serious damage every year due to climatic conditions specific to the area, especially moderate temperatures and overflow rainfall recorded in the second part of the growing season. The investigations undertaken in the three experimental years shows that the largest share in total degree attack is hold by blight and gray mold of grapes which as mentioned before has favorable conditions in this area.

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