

INCIDENCE OF MAJOR GRAPEVINE FUNGAL DISEASES DURING 2012 IN AMPELOGRAPHIC COLLECTION OF USAMV IAȘI

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Abstract

Downy mildew (*Plasmopara viticola* Berk. & Curt.), powdery mildew (*Uncinula necator* Schw.) and gray mould (*Botrytis cinerea* Pers.) are the most ubiquitously damaging disease of grapevines worldwide, reducing yield, vine growth and fruit quality. The mildew and powdery mildew attack all aerial parts of grapevine plants, while grape gray mould is frequently encountered on the mature berries, close to harvest. Incidence of the most important vineyard diseases was investigated in ampelographic collection belonging to Agricultural Sciences and Veterinary Medicine University (USAMV) from Iași (SE Romania) in 2012. Biological material was represented by different grapevine varieties, both table and wine grapes varieties. The field observations were correlated with yearly phenological and ecological elements which lead to prognoses and control of main fungal pathogen. Depending on degree of attack recorded for each cultivar the resistance or sensibility of analyzed cultivars (by OIV 1983) was established. The grape varieties taken in study showed different reactions under the same environmental conditions, materialized by different attack degrees of grapevine mildew, powdery mildew and grape gray mould. The aim of this study was to determine the presence and distribution of the most important vineyard diseases across the ampelographic collection of USAMV Iași (SE Romania) in 2012.

Key words: grapevine, fungal pathogens, ampelographic collection

Grapevine (*Vitis vinifera* L.) is one of the oldest and economically most important cultivated plants of the world. Vineyards are covering 7.2 million hectares worldwide, and 52.2% from this area is in Europe (FAOSTAT, 2012). Grapevines are threatened by biotic (viruses, bacteria, fungi, phytoplasmas and insects) and abiotic stresses (drought, winter cold, etc.).

Downy mildew (*Plasmopara viticola* Berk. & Curt.), powdery mildew (*Uncinula necator* Schw.) and gray mould (*Botrytis cinerea* Pers.) are the most ubiquitously damaging disease of grapevines worldwide, reducing yield, vine growth and fruit quality. The mildew and powdery mildew attack all aerial parts of grapevine plants, while grape gray mould is frequently encountered on the mature berries, close to harvest.

Downy mildew symptoms appear as yellowish, oily lesions on leaf surface and causes leaf abscission, resulting in overall vigor reduction, winter injury or even death of susceptible vines (Wan et al., 2007). Symptoms of powdery mildew appear as irregular chlorosis of gray-white with white powder on the leaf surface, and as black net

lines with white powder on berry, stalk and tendril surface. Powdery mildew retards the development of berries and causes berry crack, resulting in loss of berry quality and grape production (Wan et al., 2007). Gray mould can attack berries, shoots and leaves. It causes pre- and postharvest decay of grapes during cold storage. It is the most economically important postharvest disease of table grapes (Cappellini et al., 1986). Fungal pathogens damage fruit and wine quality, so that phytochemicals are used commonly in vineyards to prevent and limit pathogen infections. The aim of this study was to determine the presence and distribution of the most important vineyard diseases across the ampelographic collection of USAMV Iași (SE Romania) in 2012.

MATERIAL AND METHOD

Incidence of the most important vineyard diseases (powdery mildew, downy mildew and gray mold) was investigated in ampelographic collection (154 grapevine varieties) belonging to Agricultural Sciences and Veterinary Medicine University (USAMV) from Iași (SE Romania) during

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2012. Frequency (F%), intensity (I%) and attack level (GA%) for existing grapevine varieties were determined. In case of downy mildew and powdery mildew observations were pursued on both, leaves and grapes. Fungal diseases were scored repeatedly during growing seasons according to criteria of the "Office International de la Vigne et du Vin" (OIV, 1983). Susceptibility or resistance to *P. viticola*, *U. necator* and *B. cinerea* were evaluated separately on leaves (not for *B. cinerea*) and berries and classified according to the OIV Scale (1 = high sensitivity; 9 = high resistance).

RESULTS AND DISCUSSIONS

Registered climatic conditions showed, that 2012 can be characterized as a very dried year, with high temperature and very low precipitation quantities. Observations have showed that incidence of each pathogen was influenced by climatic conditions and their biological reserve. Following the occurrence and evolution of

pathogens, it is noted that in 2012 were present: downy mildew – *Plasmopara viticola*, powdery mildew – *Uncinula necator* and grape gray mould – *Botrytis cinerea*. Also, the presence of *Grapevine fanleaf virus* and *Flavescence dorée phytoplasma* was confirmed by serological method ELISA (Enzyme-Linked Immunosorbent Assay).

In figure 1 the fungal pathogen *Plasmopara viticola* because of climatic condition registered lower frequency values in 2012 on table and wine grape varieties at leaves level. Varieties Afuz Ali, Agostenga, Cetățuia and Princess showed appropriate values, with a frequency above 20%. In 2012 all other grape varieties from ampelographic collection showed no downy mildew symptoms on leaves. From wine varieties Riesling italian and Blauerzweigelt were the most affected cultivars. Riesling italian detached from others varieties and registered 19% attack level in 2012.

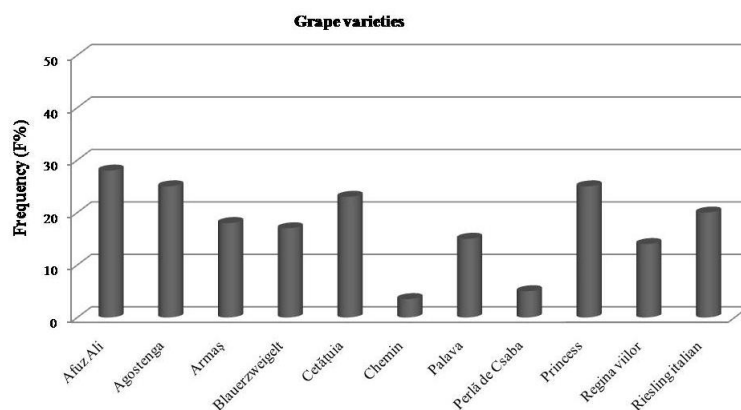


Figure 1 Incidence of downy mildew on leaves from table and wine grape varieties in 2012.

Regarding the attack frequency on berries, table grape genotypes showed different frequency values, with maximum degree of attack 37% in case of Ceauș genotype (Figure 2). In wine

varieties situation of fungal presence was almost the same. Blauerzweigelt, Armaș, and Riesling Italian showed the higher values of pathogen attack.

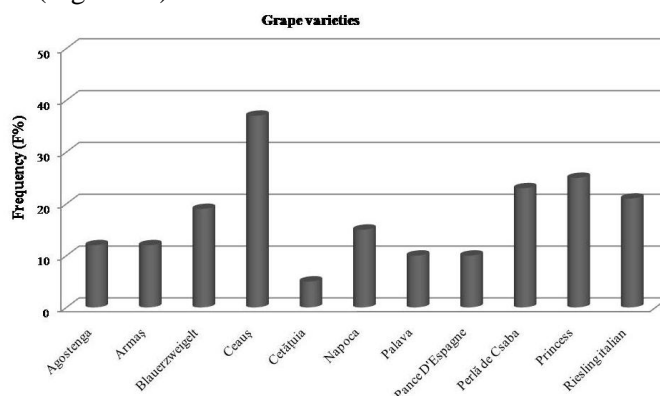


Figure 2 Incidence of downy mildew on berries from table and wine grape varieties in 2012.

In 2012 fungal pathogen *Uncinula necator* on leaves and berries was observed with higher frequency on both, table and wine grapes varieties (Figure 3). These high frequency values can be explained with climatic data: high temperature and

low precipitation quantities. In 2012 incidence of powdery mildew with values above 50% were registered in case of Cetățuia, Chasselas roz Napoca, Silvania, Timpuriu de Cluj and Transilvania from table and wine grapes varieties

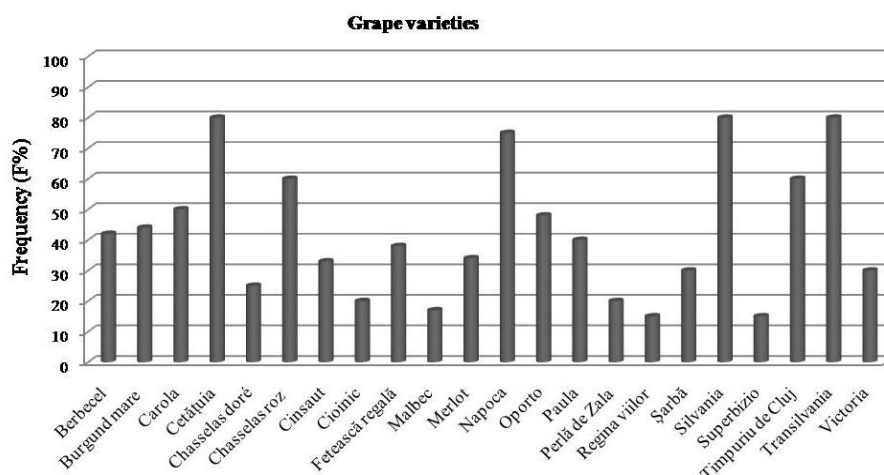


Figure 3 Incidence of powdery mildew on leaves from table and wine grape varieties in 2012.

Berries attack on table grape varieties as Cetățuia, Napoca, Silvania and Transilvania recorded frequency values exceeding 60% in 2012 and will be registered as very sensitive on this fungal pathogen. In 2012 all other grape varieties

from ampelographic collection showed no powdery mildew symptoms. In case of wine varieties Fetească regală recorded the highest attack values (Figure 4).

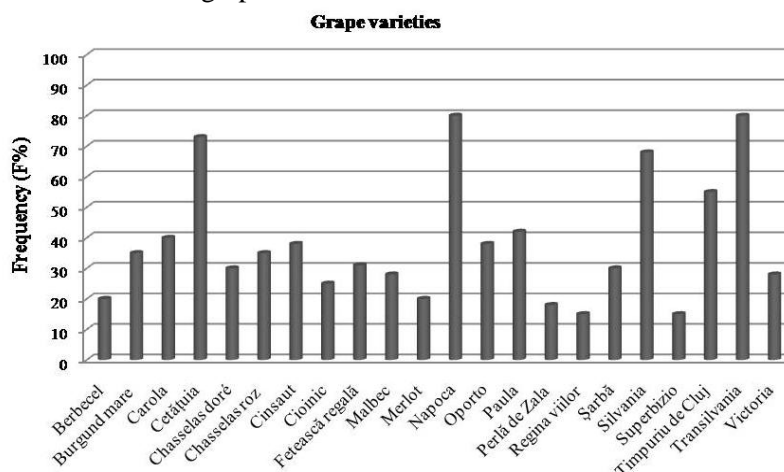


Figure 4 Incidence of powdery mildew on berries from table and wine grape varieties in 2012.

Figure 5 present the frequency of fungal pathogen *Botrytis cinerea* on grapevine berries, in 2012. Chasselas doreé, Perlă de Csaba and Cinsaut varieties recorded higher frequency values in 2012.

Regarding wine varieties the most sensitive cultivars are Galbenă de Odobești, Fetească regală, Chardonnay and Armaș.

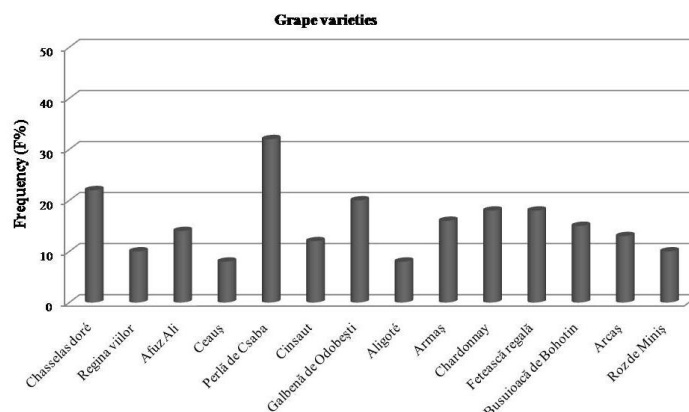


Figure 5 Incidence of gray mould on berries from table and wine grape varieties in 2012.

CONCLUSIONS

Obtained results have showed that incidence of each pathogen was influenced by climatic conditions and their biological reserve.

Plasmopara viticola registered lower frequency values in 2012 compared to other years on table and wine grape varieties at leaves level. Sensitive varieties were Afuz Ali, Agostenga, Cetățuia and Princess, with expression 4 and 5 according to the OIV code 455. Regarding the attack frequency on berries, table grape genotypes with very low resistance were Ceauș and Princess with expression 2 according to OIV code 456.

Uncinula necator attack on bunches showed very low resistance for both type of varieties, with expression 2 according to the OIV code 456 on Cetățuia, Napoca, Silvania and Transilvania.

In case of fungal pathogen *Botrytis cinerea* the most sensitive cultivars are Perlă de Csaba and Chasselas doreé.

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