

***EUTYPA LATA* – A FUNGUS INVOLVED IN THE BIOLOGICAL DECLINE OF THE VINE**

***EUTYPA LATA* – CIUPERCĂ IMPLICATĂ ÎN DECLINUL BIOLOGIC AL VIȚEI DE VIE**

STOICA MIHAIELA CARMEN

Research and Development Station for Winegrowing and Winemaking Iasi

Abstract. *A vine debilitating phenomenon has been pointed out in our country's vineyards, followed by a mass-drying process. The mycological analysis done on the vine's wood affected by necrosis have distinguished the presence of fungi specialized in bark and wood degradation, most significant being Eutypa lata (Pers.), Tul., Phomopsis viticola Sacc., Stereum hirsutum (Wild), Fr., Phellinus igniarius (L. ex Fr.) Quel., Valsa vitis (Schwein.) Fuck. Following the losses caused by these pathogens, several researches have been initiated in order to study more thoroughly the ligneous fungi on vine. Thus, the symptoms and biology of Eutypa lata fungus have been studied, in the north-eastern regions of Moldavia's ecological background, through research on the Iasi and Cotnari vineyards.*

Rezumat. *În plantațiile viticole din țara noastră a fost semnalat un fenomen de debilitare a butucilor de viță de vie, urmat de uscarea în masă a acestora. Analizele micologice, efectuate pe lemnul necrozat al acestor butuci, au pus în evidență prezența unor ciuperci specializate în degradarea scoarței și a lemnului, cele mai importante fiind: Eutypa lata (Pers.) Tul., Phomopsis viticola Sacc., Stereum hirsutum (Wild) Fr., Phellinus igniarius (L. Ex Fr.) Quel., Valsa vitis (Schwein) Fuck. Ca urmare, a pagubelor produse de acești patogeni, s-au inițiat cercetări care să aprofundeze studiul ciupercilor lignicole la vița de vie. Astfel, în condițiile ecologice din N-E Moldovei, s-a urmărit în plantațiile viticole din podgoriile Iași și Cotnari, studiul simptomelor și biologia ciupercii Eutypa lata.*

The decline of the grape vine is a slow phenomenon caused by the wood and bark fungi, strongly influenced by the crop conditions, by the stress the plants are submitted to, because of the modification of the leading forms and the large scale mechanization in viticulture, and not last, by the climatic changes.

Thanks to the great number of phytosanitary treatments made during the last decades, especially for the prevention and combating of the main pathogen agents of the grape vine, there have intervened major modifications of the microflora at the level of the injuries provoked by the cuttings and the disappearance of the specific antagonists.

Therefore, in viticulture, all these aspects assert the elimination or limitation of the action of the favoring and release factors and the good knowledge of the wood and bark pathogenetic agents, as well as their acting mode, for and efficient combating.

In our country, the researches regarding the decline of the win-growing

plantations have been fragmentary, and the prevention and combating of the pathogenetic agents that attack the grape vine wood are seldom correctly applied in production, because of the insufficient knowledge of their biology and semeiology.

MATERIAL AND METHODS

The observations have been made on 7 representative genera for the North Eastern Moldavian area, meaning: Aligoté, Muscat Ottonel, Feteasca regala, Feteasca alba, Merlot, Grasa de Cotnari and Francusa.

The assay of the material samples meant to relieve the *Eutypa lata* fungus was made after a prior terrain examination with the manual eyeglass, in order to underline the fructifications.

The gathered material was detached in convenient fragments; it was introduced into bags together with a label containing more data regarding: the sampling place, the plant (species, genus, stock), eventually, data regarding the fungus.

In the laboratory, it was first made a preliminary exam with the naked eye, then with the binocular eyeglass, in order to observe certain superficial features, like the symptoms produced on the attacked organ, the form, color, type of fructification etc. The section was hand made, using grape vine razors and scissors. The section thickness was realized according to the material, because most of the fructifications are extremely brittle and they do not endure fine sections.

From each necrosis area there have been scraped 5 wood fragments under the form of little cubes with a side of 1 cm. These have been disinfected by tubbing for 20 minutes in a solution of baclor 60g/l. Then, the wood fragments were passed on sterile Petri dishes, coated with filter paper, in order to absorb the solution surplus.

In the end, the wood portions have been introduced into Petri dishes, and the methods used for the isolation and identification of the endophyte fungi, from the multi-annual wood of the grape vine are the current ones in the laboratory technique (Grosclaude, 1975): from the affected wood there have been detached tissue fragments from under the bark, with a length of 0,3 – 0,5 cm and a thickness of 0,5 mm, that have been placed on a culture ambient (CGA). From the numerous colonies formed on the ambient, those that are specific to the searched fungus have been purified.

If the fungi colonies are present but weakly developed, the material is introduced into the damp chamber, for 24 or 48 hours, at room temperature. The material samples that the fructifications represented by pycnidia or perithecia are not completely mature, they are kept in biological cages and periodically analyzed.

RESULTS AND DISCUSSIONS

The diseases that lead to the death of the grape vines are insidious diseases, and the parasites that generate them are mostly swamp fungi that penetrate the plants through the lesions provoked by the cuttings and that slowly develop during more years. The attack frequently appears through the appearance of some foliar symptoms or through the drying of a ramification, then, for a while, the situation seems to stabilize itself, but this is only an apparent come-back.

The death of the entire plant always intervenes when the quantity of toxins issued by the parasite fungus reaches such a level that the metabolism of the plant is completely disturbed. The resistance opposed by the host plant does not seem

to be related to the presence of the resistance genes; it is more about its tolerance, manifested or not, according to the characteristics of the genus and to the cultural and climatic conditions. These particularities explain the great variability regarding the answer of the grape vines from the same parcel and the behavior differences of the same genus in different culture conditions.

In order to determine the characteristic symptoms of the *Eutypa lata* attack periodical observations have been made in natural conditions, in different production win-growing plantations from three units: S.C.D.V.V. Iasi, S.C. Vinia S.A. and S.C. Cotnari S.A. Therefore, multiple grape vines have been relieved and marked, in order to keep the disease manifestation mode under observation during the year.

We should also specify that on the plantations the grape vines have been selected from, the program of the phytosanitary interventions did not include special treatments of combating of the *Eutypa lata* pathogen agent.

On the other hand, after the laboratory analyses, on the vegetal material that was sampled with characteristic symptoms for the attack of this pathogen, it was possible to make a direct connection between its presence and the disease symptoms. Even from the spring beginning, in the case of the marked grape vines, which were suspected of the attack of the *Eutypa lata* fungus, there have been noticed a delay of the vegetal departure with 5 – 10 days in comparison with the healthy grape vines. The diseased grape vines presented an abundant shooting which did not evolve normally, remaining short and with close internodes.

The observations made in Cozmesti – SC Vinia SA, on the Feteasca regala genus, the shoots had a limited growth of 15-20 cm, with 3-5 cm internodes, in comparison with a healthy grape vine, whose shoot reached 60-80 cm with internodes of 10-12 cm. (Photo 1,2,).



Photo. 1



Photo. 2

In the case of the unfit shoots the leaves remained small, with a diameter of 3-5 cm, in comparison with the diameter of the leaves on the healthy shoots, which have a diameter of 8-10 cm. (Photo 3).



Photo 3.



Photo. 4



Photo. 5.

As the attack is more advanced, the leaves acquire a green stick aspect; they look deformed or slightly inturned, with marginal necrosis of the limb. (Photo 4, 5).

The inflorescences develop normally until the blossom, and sometimes after fecundation, the flowers abort. After the blossom there was noticed a phenomenon of millerandage, the grape has an unequal development and reduced sugar content.

In the case of the strong attacks, on the stalks and on the limbs there appear longitudinal, deep cracks, with ulcerations around the big injuries resulted from the cuttings.

The symptom can easily be confounded with the effect of the extended droughts during the summer period.

In a longitudinal section, there have been noticed necroses in the xylem, which is the spot of the primary infections. The borders of the infected areas became from reddish-brown to violaceous. The affected wood comprised well defined areas (Photo 6, 7).



Photo. 6



Photo. 7

The *Eutypa lata* produces a selective destruction of the cellulose, because the lignin is not transformed, which confers a dark color to the wood. The wood cracks in three rectangular plans, which also explains the slight break of the attacked branches, when the bending resistance is tested, and this is called the “carrot test”. Sometimes, the described symptoms can be met only on one of the limbs, but subsequently the attack progresses comprising the entire grape vine that begins to decline, and in a few years it dies.

The biology of the pathogen agent. The *Eutypa lata* (Pers.) Tul. (Syn.: *Eutypa armeniaca* (Hansf.) Carter), fam. Diaporthaceae, ord. Sphaeriales, cl. Pyrenomycetes, subkingdom Ascomycotina, f.c. Cytosporina sp.

The *Eutypa lata* fungus was hard to isolate and purify from the diseased vegetal material, because it cohabits with other micromycetes that have concomitantly developed on the culture ambient (Phoma, Melanospora).

On the CGA ambient, the fungus has formed white, felt colonies, whose limits rose on the sides of the Petri dish (Photo no. 8).



Photo. 8

The fragments from the grape vines affected by this fungus have been examined

in laboratory conditions. After 3-4 weeks, the fructifications of the fungus formed on the wood that was kept in the humid room, with temperatures above 20° C.

The perithecia formed only on the multi-annual wood and they are partially sunk in the substratum: they have a globular form, black color, and each of them has 8 ascospores.

The ascospores, which are placed in one row, have a light yellow color and they have been eliminated through the perithecia neck in a grey gelatinous mass.

On the chords that are infected with *Eutypa lata*, kept in laboratory conditions, at a high humidity of 95%, there were formed black spherical pycnidiae, which are easily visible with the naked eye.

After 20 days, a great number of pycnospsors formed, eliminated from an orange gelatinous mass, under the form of cordons called cirrus.

The inoculum main source is represented by the fungus ascospores and the optimum moment of the infection is the spring, on february-april and the autumn, on september-december. The germination temperature of the ascospores is between +1° C and 32° C, with an optimum between 22° C – 25° C and a germination period of 11-12 hours. The most favorable conditions for the infection are met during the cutting periods, when there are created open lesions, especially in the multi-annual wood that scars hardly, representing real entry gates for the pathogen agent.

CONCLUSIONS

1. *Eutypa lata* represents one of the main pathogens that determine the shortening of the exploitation period of the grape vines;
2. The periodical analysis of the win-growing plantations for the tracing of the attack pest hole and the clearance of the symptomatic and sere grape vines and their burning;
3. The complete elimination of the sere wood from the grape vines during the cutting and the limitation of the number and surface of the cut lesions;
4. The disposal of the biological material with obvious attack symptoms from multiplication.

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