THE BLACK ROT – A NEW CHALLENGE FOR VINE CROPS

BĂILEŞTIANU NORITA ANISIA[1], MITREA RODI[2]

[1] PhD University of Craiova,Romania, e-mail: noritaanisia@yahoo.com
[2] University of Craiova, Faculty of Horticulture, Romania, e-mail:rodimitrea@yahoo.com

Key words: Black rot, vine, variety, frequency of attack

ABSTRACT

The black-rot represents one of the most serious diseases of the vine, the causative agent being the Guignardia bidwellii micromycetes. In the vineyards of our country, Black rot infections used to be quite rare, but in the recent years due to climate change the attack has amplified, and the severity and incidence of the disease has increased in some vineyards, which could lead to considerable crop losses.

The purpose of this paper is to observe and monitor the attack of the Guignardia bidwellii pathogen on the different varieties of vines grown within the S.C. Vie Vin Vânju Mare S.R.L.

In the studied varieties (Fetească neagră, Fetească regală, Tămâioasă românească, Cabernet Sauvignon, Merlot, Pinot Noir, Sauvignon blanc, Italian Riesling,) the incidence of the attack had different values depending on the location, the most affected ones being Tămâioasă românească, Sauvignon blanc, Italian Riesling.

INTRODUCTION

OLTEANU, 1994 emphasizes that the vine is a plant with great ecological values, which is cultivated on all continents, between the average annual isotherm of 9˚C in the northern hemisphere and that of the average of 10°C in the southern one. The crop is more developed, with quality products, between 9°C and 25°C isotherms, in both hemispheres, being a profitable culture in temperate, subtropical and tropical climates and therefore for vines, multiannual plant with monoculture characteristics, the ecological offer has great importance in obtaining quality products (OLTEANU și colab., 2002).

A difficult problem of contemporary viticulture is represented by the sensitivity of the varieties existing in the crop to the attack of the harmful agents (POPA și DICU, 2010).

TOMOIAGĂ et al., 2006, suggests that although in viticulture there is a relatively small number of diseases and pests that seriously affect crops, the severity of the attack can be intense enough to endanger not only the production of the current year, but the very existence of vineyards.

Manna, powdery mildew and gray rot are considered to be the main diseases of vines, and TOMOIAGĂ, 2011, specifies that Black rot is considered at present one of the most serious diseases of vines worldwide, being an outbreak disease with a characteristic epidemiology and rapid evolution.

WARD and KAISER, 2015, mention that the Black rot produced by the *Guignardia bidwellii* fungus is native to North America, but is nowadays it is also present in Europe, South America and Asia.

MATERIAL AND WORK METHOD

The research was carried out in 2019, within the company S.C. Vie Vin Vânju Mare S.R.L., consisting of 4 own farms, these being: Oreviţa, Bucura, N. Bălcescu and Poroiniţa.

The grape varieties found in the 4 farms are both indigenous (*Fetească neagră, Fetească regală, Tămâioasă românească*) and international varieties (*Cabernet Sauvignon, Merlot, Pinot Noir, Sauvignon blanc, Italian Riesling*).

The estimation of the attack of the *Guignardia bidwellii* pathogen was carried out in the field by means of surveys, which represent the action of observing, counting and analyzing the plants or organs of the targeted plants.

Observations were made for each variety, analyzing all the bunches from each of the 5 stumps. On this occasion it was noted the frequency of the attack (F%), which represents the relative value of the number of plants or organs of the plants attacked compared to the number of plants or organs of plants analyzed.

The value of the frequency or incidence of the attack is calculated according to the relation:

$$\mathbf{F}\ \% = \frac{\mathbf{n\ x\ 100}}{\mathbf{N}}\text{, in which}$$

n = number of plants or organs attacked

N = number of plants or organs analyzed

RESULTS AND DISCUSSIONS

Black rot is one of the serious diseases of the vine, a disease caused by the *Guignardia bidwellii* fungus, and it is manifested on all the green organs of the vine: leaves, young shoots, tendrils, bunches, originating in North America, which has gradually spread and in regions of Europe and South America where it can cause crop losses of up to 80%, under pathogen-friendly environmental conditions.

The disease causes significant damage by the fairly aggressive attack on the leaves and bunches.

The first manifestations usually occur in June on leaves in the form of more or less circular spots (fig. 1), with a diameter between 2-10 mm, brownish-yellow colour with a blackish outline, but the characteristic and serious attack is on the growing grapes (fig. 2,3).

On the grapes the attack evolves rapidly, by increasing the stains that within

48 hours comprise half of the surface of the grape, the centre of the spot deepens, creases, darkens and after a few days the grape becomes charcoal black, hard, mummified and it does not develop anymore (GRECU, 2011; TOMOIAGĂ, 2013; WEIGLE, 2014).

Fig. 1. Attack on the leaves (original)

In order to ensure an efficient and rational control of the attack of the Black rot, it is necessary to know and understand the development cycle of the pathogen agent, under direct influence of the environmental factors: temperature, humidity and rainfall.

Fig. 2. Attack on the grapes (original)

Fig.3. Attack on the leaves and the grapes (original)

It is assumed that the high spring temperatures of the last decades contribute to the presence of the disease (BMELV, 2004).

The ideal conditions for Black rot infection are temperatures between 70°F and 80°F, when only 6-7 hours of leaf moisture is needed for the infection to occur, and the relative humidity of the air must be above 85%, (WEIGLE, 2014), humidity which is an important factor for the maturation of sexed fructifications (ascospores), but also for the dissemination of asexual ones (picnospores) (GRECU, 2011).

Under favourable conditions, such as the summer season, small and black picnides on infected leaves produce secondary infections on bunches and

grapes that occur until the end of July and early August when macroconidia and ascospores turn into resistance organs (TOMOIAGĂ , 2013).

In the research year (2019) there was a strong attack of Black rot in all the 4 farms within the company S.C.Vie Vin Vânju Mare S.R.L., an attack that was manifested on most grape varieties, being reported also in the previous year.

At the N. Bălcescu farm the incidence of the attack (F%) was 100% in the Tămâioasă românească, Sauvignon blanc, Italian Riesling varieties, and in the rest of the varieties it ranged between 30% -40% (table 1).

Table 1.

The incidence of the attack on some varieties of vines grown at S.C. Vie Vin Vânju Mare S.R.L.

F%	Location			
	Bălcescu	Bucura	Oreviţa	Poroinița
Tămâioasă românească	100%	60%	30-40%	30-40%
Cabernet Sauvignom	30-40%	50%	20-25%	20-25%
Riesling Italian	100%	50%	10%	10%
Fetească neagră	30-40%	10-20%	15%	15%
Sauvignon blanc	100%	70%	30-40%	30-40 %
Fetească regală	30-40%	10-20%	10%	10%
Merlot	30-40%	10-20%	10%	10%
Pinot Noir	30-40%	10-20%	10%	10%

At the Bucura farm the attack manifested itself with a lower frequency, the values being between 70% in the Sauvignon blanc variety and 60% in the Tămâioasă românească variety, in the Cabernet Sauvignon and Italian Riesling varieties it was 50% and in the other grape varieties the frequency was between 10% - 20%.

At the Oreviţa and Poroiniţa farms, the incidence of the attack regardless of the variety had the lowest values compared to the N. Bălcesu and Bucura farms.

The strongest attack was observed in the Sauvignon blanc and Tămâioasă românească varieties of 30% -40%, the Cabernet Sauvignon variety manifested between 20% -25%, the Fetească neagră variety 15% and the rest was of 10%.

The most effective way to control Black rot is through a combination of good crop practices with chemical methods. Thus the removal and destruction by burning of the mummified grapes and the infected leaves, the removal of the weeds, the execution of some deep spring ploughs are some of the crop practices that have to be made and that have quite a big impact in reducing the disease of Black rot in the wine centres.

For the success of the Black rot management program, fungicides, applied at the beginning of the growing season, are an important component, in order to control the primary infection that can prevent secondary infections.

The chemical control can be carried out with the help of antiperonosporic (anti-manna) and antioid (anti-powdery mildew) fungicides, with simultaneous effect on the Black rot of the vine.

If in the vineyard there is a precedent of the attack of Black rot on the leaves and grapes, it is recommended to apply preventive treatments in different

phenophases considered extremely sensitive to the attack, such as: 4-8 cm shoots, 15 cm shoots, before blooming and after blooming. After these essential treatments, if the weather is rainy and foggy, the anti-Black-rot treatments continue for 10-14 days until the first fruits phenophase, and the splashes can be discontinued when the weather becomes dry (TOMOIAGĂ, 2011).

Because certain fungicides against manna and powdery mildew also have effects against Black rot, the disease is less problematic in integrated viticulture.

However, severe damage has been recorded in organic viticulture where no synthetic fungicides are applied (HOLZ et al., 2005).

CONCLUSIONS

The Black rot of the vine caused by the *Guignardia bidwellii* fungus represents a provocative disease for basic research and for developing control methods for organic viticulture.

Regarding the frequency of the attack (F%) of the monitored pathogen agent, it can be stated that the varieties, Tămâioasa Românească, Sauvignon Blanc, Italian Riesling are the most sensitive varieties, and the rest of the varieties have a greater resistance to the attack of the pathogen.

All cultivated varieties are susceptible to infections with the *Guignardia bidwellii* fungus.

Because it is a disease of outbreak, in order to combat it, it is recommended to develop a control strategy at plot level, depending on the biological reserve of the previous year but also on the climatic conditions of the current year.

Although Black rot can cause a series of damages to vineyards, it is not so difficult to control, especially if the growers are familiar with the characteristics of the infection conditions and express special care for the vine.

BIBLIOGRAPHY

1. **BMELV,** *2004: Bericht des Bundenministeriums für Verbraucherschutz, Ernahrung und Landwirtschaft zur Schwarzfäule in den deutschen Weinbaugebieten, September 2004. Internet. Online. http:www.bmelv.de*
2. **Grecu V.,** *2011,Atacul de putregai negru în viile pe rod,*Sănătatea Plantelor nr.3, p.42.
3. **Holz B., Hoffmann C., Nachtigall G.,** *2005, Schwarzfäule der Rebe(Black rot). Informationsblatt der BBA, 1-2*
4. **Olteanu Ion**.,*1994,Viticultură (I) baze biologice,* Tipografia Universităţii din Craiova
5. **Olteanu I.,Daniela Cichi, Costea D.C., Mărăcineanu L.C.,** 2002, Viticultura specială – zonare, ampelografie, tehnologii specifice, Editura Universitaria, Craiova
6. **Popa A.,Dicu C.,** *2010, Viticultura și vinurile României, Editura ALMA, Craiova*
7. **Tomoiagă Liliana, Oroian I., Mihai C**., *2006, Managementul integrat de*

combatere a bolilor şi dăunătorilor viţei de vie, Protecţia plantelor, nr. 61-62, ISSN-1453-2271

8. **Tomoiagă Liliana,** *2011, Putregaiul negru, cel mai mare pericol pentru viticultori,* Lumea satului, nr. 14
9. **Tomoiagă Liliana,** *2013, Ghidul fitosanitar al viticultorului,* Ediţia a 2-a revizuită, Academic Pres, Cluj-Napoca
10. **Ward N,A, and Kaiser C.A.,** *2015, Black rot of grape(Guignardia bidwellii (Ellis)), Integrat pest management: University of Illinois Extension, Kentucky Cooperative Extension Service, september 25th, 2015*
11. **Weigle Tim***, 2014, Managing Black rot,* Viticulture and Eonology, Issue17, March 2014