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THE INFLUENCE OF THE TREATMENT AGAINST THE ATTACK OF THE MICROMYCETES *Polystigma rubrum* and *Stigmina carpophila* ON THE PLUM, SOIMARI LOCATION, PRAHOVA COUNTY

Alexandru IOAN

University of Agronomic Sciences and Veterinary Medicine of Bucharest, 59 Marasti Blvd., District 1, 011464, Bucharest, Romania

Corresponding author email: ioanalexandru88@yahoo.com

Abstract

The purpose of the paper was to monitor the attack of pathogens Polystigma rubrum and Stigmina carpophila and making observations regarding the phytosanitary intervention on their attack on the plum in the research area in 2019. The biological material it was represented of cultivars: Stanley, Anna Spath and Romanian Gras. To the cultivar Romanian Gras it was noted that the attack of the micromicetes has diminished in the treated variants at 6.2% the attack of Polystigma rubrum and 8.2% of the attack of Stigmina carpophila fungus. Highest efficiency value has been registered at Romanian Gras cultivar with E = 69.75% in protection against Polistigma rubrum, and 71,1% against Stigmina carpophila followed by Stanley cultivar with effectivenes around 69% against the attack of micromicetes monitored.

Key words*: plum, micromicetes, cultivar, degree of attack, effectiveness.*

INTRODUCTION

The plum culture is recognized for the Prahova county area ensuring the Romanian market with fresh fruits and for industrialization (Alexandru et al., 2018). The health of the plum orchards is a continuous concern of the cultivators of this species (Alexandru et al., 2019; Popa et al., 2012; Vacaroiu et al., 2009). Plum-specific pathogens such as *Polystigma rubrum* and *Stigmina carpophila* are common in natural infection conditions in plum orchards in northwestern Romania (Miter et al., 2005), but also from the research area (Alexandru et al., 2019). *Polystigma rubrum* is the specific micromycete and frequency on *Prunus* species (Cannon, 1996; Roberts et al., 2918; Douglas, 2018), which causes plum-leaf blister considered a common disease in plum orchards (Iliev and Stoev, 2011). The pathogen *Stigmina carpophila* is known for its annual incidence on plum leaf (Alexandru et al., 2019; Gheorghieş and Geamăn, 2003) and causes significant losses in plum production (Yousefi and Shahri, 2014). Shot-hole disease of plum remains one of the most important foliar diseases of the Prunus species, and in particular shot-hole fungal disease produced by *Wilsonomyces carpophilus* (syn. Stigmina carpophila) (Adaskaveg et al., 1990).

MATERIALS AND METHODS

The research followed the influence of the treatment applied in the vegetation on the attack of plum-leaf blister caused by micromicet *Polystigma rubrum* and shot-hole desease of plum produced by the phatogen *Stigmina carpophila* in 2019, Soimari location, Prahova county.

Observations were made regarding the attack of the two pathogens before and after the treatments were applied.

The frequency and intensity of the attack were calculated according to the formulas: F = n x 100/N, in which n = the number of attacked plants/ organs, N = total plant/organ analysis, attack intensity was calculated using formula I = Σ (i x f) where: i = the percentage of the attack, f = the number of organs/plants with the respective attack percentage, n = the total number of attacked organs/plants analyzed. Based on these, the degree of attack was calculated according to the formula: = F x I/100, where: DA degree attack F = attack frequency, I = attack intensity.

The biological material was represented by the cultivars: Stanley, Anna Spath and Romanian Gras. The efficacy of the treatments was calculated according to Abbott's formula: E (%) = [(DAC-DAV)/DAC] x 100, where DAC =

attack degree control variant; DAV = attack degree in the treated variant.

RESULTS AND DISCUSSIONS

In 2019, a treatment scheme was applied in which recommended products were included in the control of the spectrum of plum pathogens, especially of the micromycetes *Polystigma rubrum* and *Stigmina carpophila* and of some specific pests of this culture. The data in table 1 indicates the products and concentrations used, the administration phenophase and the period of application of the tested products in the applied scheme. The application periods cover the vegetation period of the plum from rest to fruit development (Table 1).

Table 1. Treatment scheme applied to control *Polystigma rubrum* and *Stigmina carpophila* pathogens on plum in Şoimari location, Prahova County, 2019

The product	Concentration (%); dose (l,kg/ha)	Phenophase	Date of adminis-tration
			2019
Zeama bordeleza	2%	Vegetative retention	02.03
Confidor oil	1.5%	Vegetative retention	10.03
Topsin WDG (+ Calypso 480SC)	0.2% (+0.02%)	Green button	01.04
Luna experience 400 SC (+ Mospilan 20SG)	0.05% (+0.045%)	White button	14.04
Signum FG (+ Calypso 480SC)	0.5% (+0.02%)	Flowering corolla10-15%	29.04
Luna experience 400 SC (+ Novadim Progress EC)	0.05% (+0.075%)	Shake of the petals 10-15%	15.05
Signum FG (+ Mospilan 20SG)	0.5% (+0.045%)	Fruit development	07.06

In 2019, the micromycetes *Polystigma rubrum* and *Stigmina carpophila* registered a maximum frequency in all the cultivars studied, F = 100%. The intensity of the attack made the difference in the cultivars reaction to the attack of the two pathogens.

Regarding the intensity of the attack of the micromycete *Polystigma rubrum,* the small value was registered at the Romanian Gras cultivar with I = 20.5% followed by the Anna Spath cultivar with I = 25. 2%. The highest value of the degree of attack of the pathogen *Polystigma rubrum* was calculated in the Stanley cultivar where GA = 30%. The attack of shot hole disease was higher recording a value of attack rate 37% in Stanley cultivar. The lowest value of the attack degree was calculated at the Romanian Gras cultivar with a value of 30.1% (Table 2).

Table 2. Fungus attack *Polystigma rubrum* and *Stigmina carpophila* on plum in Şoimari location, Prahova County, 2019

Cultivar	Pathogen / disease					
	Polystigma rubrum/ plum-leaf blister			*Stigmina carpophila*/ shot-hole disease of plum		
	F (%)	I (%)	DA (%)	F (%)	I (%)	DA (%)
Stanley	100	30	30	100	37	37
Anna Spath	100	25.2	25.2	100	32.7	32.7
Romanian Gras	100	20.5	20.5	100	30.1	30.1

Following the application of the treatments presented in table 1 it is observed that the value of the attack fell after the significant decrease of the intensity of the attack, the symptoms of the diseases being present in the trees analyzed (F = 100%). Thus, in the case of the observations regarding the attack of the micromycete *Polystigma rubrum* in the Stanley cultivar, the degree of attack was reduced to 9.2%. In the Anna Spath cultivar, the degree of attack was reduced to 8%, compared to the untreated variant at which GA = 25.2%. The Gras Romanian cultivar registered the lowest attack of *Polystigma rubrum* in following the application of the treatments having about 6%. And in the case of the attack of the pathogen *Stigmina carpophila* the intensity of the attack decreased considerably, reaching 8.7% at the Romanian Gras cultivar. Stanley and Anna Spath cultivar recorded an attack rate of 11.5% and 10.2% respectively. In the case of Stanley cultivar a more pronounced reduction of the attack was observed in the treated variant as compared to the control variant (Table 3).

Table 3. The influence of the *Polystigma rubrum* and *Stigmina carpophila* on plum in Şoimari location, Prahova County, 2019

Culti var	Variant Untreated (control)/ treatment	Pathogen/disease					
		Polystigma rubrum/plum-leaf blister			*Stigmina carpophila*/shot-hole desease of plum		
		F (%)	I (%)	DA (%)	F (%)	I (%)	DA (%)
Stanley	Control	100	30	30	100	37	37
	Treatment	100	9.2	9.2	100	11.5	11.5
Anna Spath	Control	100	25.2	25.2	100	32.7	32.7
	Treatment	100	8	8	100	10.2	10.2
Romanian Gras	Control	100	20.5	20.5	100	30.2	30.2
	Treatment	100	6.2	6.2	100	8.7	8.7

The efficacy of the treatments applied in combating the attack of the pathogens

Polystigma rubrum and *Stigmina carpophila* was also calculated and as shown from the data in table 4 the highest efficacy was registered in the Romanian Gras cultivar in combating the shot-hole disease of plum, at which E = 71.1%. Regarding the Stanley and Anna Spath cultivars, the value of the treatment effectiveness was 68.91% and 67.88%.

Regarding the efficacy of the treatments on the red spot attack of the plum-leaf blister, the highest value of the efficacy was calculated in the Romanian Gras cultivar with E = 69.75% followed by the Stanley cultivar with E = 69.33%. In the Anna Spath cultivar it had an efficiency of 67.88% (Table 4).

Table 4. Effectiveness of the treatments applied in the control of the pathogens *Polystigma rubrum* and *Stigmina carpophila* in Şoimari location, Prahova County, 2019

Cultivar	Pathogen / disease				
	Untreated variant (control)/ treatment	*Polystigma rubrum*/plum-leaf blister		*Stigmina carpophila*/shot-hole desease of plum	
		DA (%)	E (%)	DA (%)	E (%)
Stanley	Control	30	69.33	37	68.91
	Treatment	9.2		11.5	
Anna Spath	Control	25.2	68.25	32.7	67.88
	Treatment	8		10.5	
Romanian Gras	Control	20.5	69.75	30.1	71.10
	Treatment	6.2		8.7	

Research has shown that under the conditions of them in the area of Romanian Gras cultivar had a good response to the treatment scheme applied (Alexandru et al., 2019). The year 2019 presented in the research area in the spring a cold and humid weather that allowed the manifestation of the shot-hole disease of plum which is harmful in cold and humid spring although it may occur and cause significant losses at any time during wet and cold weather (Evans et al., 2008).

Research on the control of plum pathogens highlights the role of treatments in the integrated management of key diseases of this species (Popa et al., 2012; Cristea at al., 2017).

CONCLUSIONS

The frequency of the attack was maximum in the pathogens monitored in all experimental variants. The application of the treatments considerably reduced the attack on all the plum cultivar analyzed. Romanian Gras cultivar reacted best to applying the treatments recording the lowest values of the attack of the micromycetes *Polystigma rubrum* and *Stigmina carpophila*. The highest values of the efficacy of the treatments against the monitored pathogens were registered in the Romanian Gras cultivar with an efficiency around 70% followed by the Stanley cultivar with an efficiency of about 69%.

REFERENCES

Adaskaveg, J.E., Ogawa, J.M., Buttler, E.E. (1990). Morphology and ontogeny of conidia in Wilsonomyces carpophilus gen. nov. and comb. nov., causal pathogen of shot hole disease of Prunus species. *Mycotaxon*, *31*, 275–290.

Alexandru, I., Cristea, S., Hoza, D. (2019). Effectiveness of treatments on the attack of *Polystigma rubrum* pathogens and *Stigmina carpophila* on plum in Soimari location, Prahova county. *Scientific Papers. Series B. Horticulture*, *63*(2), 79–82.

Alexandru, I., Mocuta, D.N., Popescu, M., Cristea, S. (2018). The evolution and productions of plams in Romania. *Proceedings of the 32nd International Business Information Management Conference, IBIMA 2018-Vision 2020: Sustenable Economic Development and Application of Innovation Management from Regional Expansion to Global Growth 2018*, 6331–6335.

Cannon, P.F. (1996). Systematics and diversity of the Phylla-choraceae associated with Rosaceae, with a monograph of *Polystigma*. *Mycological Research*, *100*, 1409–1427.

Cristea, S., Manole, M.S., Zala, C., Jurcoane, S., Danaila-Guidea, S., Mate, F., Dumitriu, B., Temocico, G., Popa, A., Calinescu, M. (2017). *In vitro* antifungal activity of some steroidal glycoalkaloids on *Monilinia* spp. *Romanian Biotechnological letters*, *22*, 12972–12978.

Douglas, B. (2018). Lost and Found Fungi Datasheet: *Polystigma rubrum*. Available from http://fungi.myspecies.info/sites/fungi. myspecies.info/fles/Polystigma%20rubrum.pdf

Evans, K., Frank, E., Gunnell, J. D. and Shao, M. (2008). Coryneum or Shot Hole Blight. Utah Pests Fact Sheet. Utah State University Extension. [Utah]: Utah State University Extension, Utah Plant Pest Diagnostic Laboratory.

Gheorghieş, C., Geaman, I. (2003). *Bolile plantelor horticole*. Ed Universitas. Bucureşti.

Iliev, P., Stoev, A. (2011). Susceptibility of plum cultivars to red spot/*Polystigma rubrum* (Persoon) De Candole. *Journal of Mountain Agriculture on the Balkans*, *14*(1), 163–172.

Mitre, I. Jr., Tripon, A., Mitre, I., Mitre. V. (2015). The response of several plum cultivars to natural infection

with *Monilinia laxa*, *Polystigma rubrum* and *Stigmina carpophila*. *Not Scibiol.*, *7*(1), 136–139.

Popa, T., Cristea, S., Zala, C.R. (2012). Prelimanry research regarding *Monilinia laxa* (Aderhold & Ruhland) Honey ex. Whetzel attack in plum tree. *Scietific Papers. Series A. Agronomy*, *LV*, 225–228.

Roberts, H.R., Pidcok, E.S., Redhead, C.S., Richards E., O'Shaughnessy, K., Douglas, B., Griffith, G. (2018). Foactors affecting the local distribution of *Polystigma rubrum* stromata on *Prunus spinosa*. *Plant Ecology and Evolution*, *151*(2), 278–283.

Vacaroiu, C., Zala, C.R., Cristea, S., Oprea, M. (2009). Research regarding the Ph influence, energetic sources and some crop environments upon the *Stigmina carpophila* fungus biology. *Scientific Papers. Series A. Agronomy*, *LII*, 404–408.

Yousefi, A., Shahri, M.H. (2014). Shot hole disease, survival and pathogenicity of the causal agent on stone fruit trees in Northeast Iran. *J. Crop Prot.*, *3*(4), 563–571.