RESEARCHES REGARDING THE INTRODUCTION OF ANTHRACNOSE-RESISTANT VARIETIES IN CHERRY TREE (*COCCOMYCES HIEMALIS* SIN *BLUMERIA JAAPI*) IN THE ORCHARD CENTRE LUGOJ HERINDEŞTI

Snejana DAMIANOV, Gh. SIMERIA, Ioana GROZEA, Ramona ŞTEF, Ana Maria VÎRTEIU, C. FORA

Banat's University of Agricultural Sciences and Veterinary Medicine, Faculty of Agricultural Sciences, Timisoara, Aradului Street, no. 119, RO-300645, Romania, E-mail: snejisnejana@yahoo.com

Abstract: *The pathogen Coccomyces hiemalis Higg. causes big losses in nursery gardens, generating massive defoliations. The fungus causing this disease produces infections in the spring, during flowering and during petal falling, by generating a mycelium that has several infection cycles in the vegetation stage, with 7-9-day incubation period, if the mean temperature is 17.6-21.8°C. The leaves attacked fade under conditions of premature defoliation and shoots and twigs die down, at the beginning of autumn. To determine the attack caused by Coccomyces hiemalis Higg. that produces cherry tree anthracnose, the main disease affecting this tree species, we carried out observations on a number of 8 cherry tree varieties and determined attack's risk degree, frequency and intensity during the maximal attack period. We have done research on the influence of varieties, shapes and distance crown planting trees on the main diseases and pests attack. The fungus forms completed in the conditions of the area, with a high degree of sporulare being pretentious to temperature (biological threshold 10°C)and humidity. Terms of disease evolution were fired since April when he made ascosporilor design. Varieties' resistance was determined according to the results obtained; then we determined the warning and the application of phyto-sanitary treatments. From the viewpoint of the attack caused by Coccomyces hiemalis Higg., in the South-West of the country, we grouped the cherry tree varieties as follows: slightly attacked (SA: Seneca, Cerna, Ulster); medium attacked (MA: Timpurii de Mai, Rosii de Bistrita); strongly attacked (PA: Van, Bing, Germesdorf). To reduce the environmental pollution occurred during the chemical control of this disease, we recommend the introduction of slightly- and medium- attacked varieties in cherry tree orchards. Compared with the number of 8 phyto-sanitary treatments warned, we applied only 4 treatments, in the slightly attacked varieties: Seneca, Cerna, Ulster; this represents a 50% reduction of treatments and environmental pollution.*

Key words: *anthracnose, cherry tree, variety, attack degree, resistance*

INTRODUCTION

Cherry tree leaf anthracnose, leaf riddling and brown rot (*Monilinia fructicola*) represent the main diseases that affect the cherry tree in the South-West of the country, with an attack degree reaching 7.9%.

One of the methods applied to prevent the losses caused by anthracnose is represented by the utilization of resistant varieties, tolerant to the attack of this pathogen agent; that is why the study on the behaviour of various varieties and hybrids against the attack caused by the fungus causing anthracnose (*Coccomyces hiemalis* Higg sin. *Blumeriella jaapi* Rehm. V. Arx.) is of great importance.

The reduced yields obtained, compared with the ecologic conditions and the biological potential of this species, have required the advance of researches in order to find out new varieties and to extend the intensive orchards by applying modern methods of maintenance, fertilization and control on diseases and pests.

There are researches performed on the influence exerted by varieties, tree crown shape

and planting distance on the attack caused by the main diseases and pests.

The elaboration of integrated control systems, to reduce the pesticide consumption, and of better protection for the environment and human health rely on the association of all methods (agro-technical, resistant varieties, mechanical, physical, chemical and biological methods) and treatment applications according to the economic losses produced and to other treatment regulations, with special attention to the linking between chemical and biological methods, and also between chemical methods and natural control. The successful key-problem in most integrated control systems is represented by the utilization of the phenomenon of chemical products selectivity.

MATERIAL AND METHODS

The researches aimed supervised the behaviour of some cherry tree varieties and hybrids under the attack performed by the fungus *Coccomyces hiemalis*. The researches were carried out in the comparative orchard plantations from the Orchard farm Lugoj Herindeşti (intensive cherry tree plantations 5 x 4 in linear display).

We carried out observations and determinations regarding the frequency, intensity and the attack degree of the main diseases that affect cherry tree in the South-West of the country.

The experience includes a number of 8 variants; each variant comprises 3 replications and each replication includes 5 trees. In order to determine the attack caused by *Coccomyces hiemalis* Higg., we supervised 3 trees belonging to each variety (each tree was considered to be a replication). During the maximal attack period of this pathogen, we observed a number of 300 leaves (from 3 twigs, differently located in tree crown), 50 shoots and 100 fruits from each tree.

According to attack's frequency and intensity caused by the fungus *Coccomyces hiemalis* Higg. determined successive to our observations, the varieties were classified in 5 groups, as follows:

- very slightly attacked (FSA, where F = 0.1 – 3%, 1 = 3%);
- slightly attacked (SA, where F = 3.1 – 11%, 110%);
- medium attacked (MA, where F = 11.1 – 25%, 1 = 25%);
- strongly attacked (PA, where F = 25.1 – 50%, 1 = 50%);
- very strongly attacked (FPA, where F = 50.1 – 100%, 1 > 50%).

RESULTS AND DISCUSSIONS

The behaviour of cherry tree varieties and hybrids under the attack caused by *Coccomyces hiemalis* Higg. in the region Lugoj Herindeşti is presented in table 1.

Table 1

Anthracnose attack degree in cherry tree varieties, in 2010

Nos.	Variety	Attack degree				
		Replication			Total S	Mean
		I	II	III		
1.	Timpurii de Mai	4.8	4.2	4.45	13.45	4.5
2.	Rosii de Bistrita	2,9	2,45	2,65	8,0	2,7
3.	Seneca	1,15	0,65	0,75	2,55	0,85
4.	Cerna	0,93	0,53	0,81	2,27	0,75
5.	Ulster	0,7	0,8	1,2	2,7	0,9
6.	Van	13,7	14,1	13,5	41,3	13,75
7.	Bing	12,15	12,85	12,64	37,64	12,55
8.	Germersdorf Control	12,35	12,6	12,7	37,5	12,55

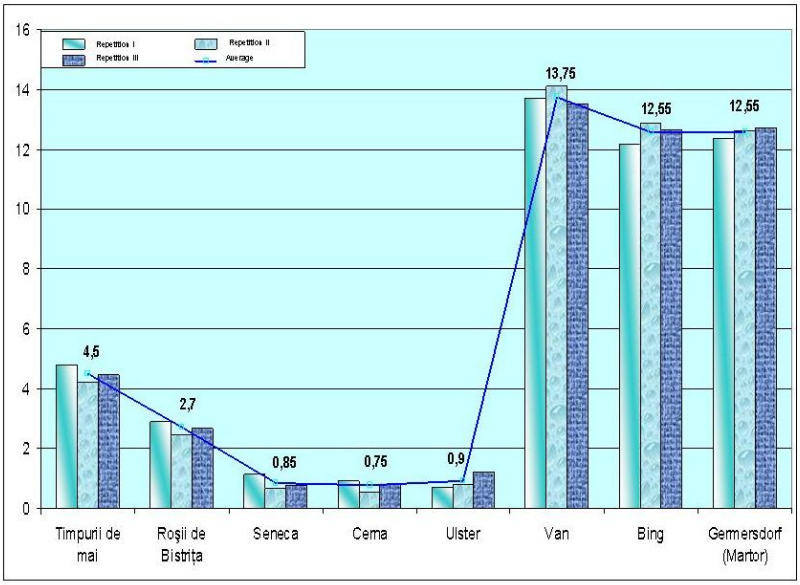

Figure 1. Graphic representation of anthracnose's attack degree in cherry tree varieties, in 2010

Table 2

Results of the observations on anthracnose attack (*Coccomyces hiemalis* Higg.) in cherry tree varieties in the region Lugoj Herindeşti, in 2010

No.	Variety	Frequency F%	Intensity I%	Attack degree Ga%	Difference compared to control	Significance	Qualification
1.	Timpurii de Mai	18	25	4.5	-8.05	000	MA
2.	Rosii de Bistrita	11	25	25	-9,85	000	MA
3.	Seneca	8,5	10	10	-11,7	000	SA
4.	Cerna	7,5	10	10	-11,8	000	SA
5.	Ulster	9	10	10	-11,65	000	SA
6.	Van	27,5	50	50	1,2	-	PA
7.	Bing	25,1	50	50	0	-	PA
8.	Germersdorf Control	25,1	50	50	-	-	PA

DL 5% = 1,92
DL 1% = 2,52
DL 0,1% = 3,37

Note:
- very slightly attacked – FSA
- slightly attacked – SA
- medium attacked – MA
- strongly attacked – PA
- very strongly attacked – FPA.

According to the data presented in table 2, we may conclude that, under the attack caused by *Coccomyces hiemalis* Higg in the South-West of the country, the cherry tree varieties may be classified as follows: slightly attacked (SA: Seneca, Cerna, Ulster); medium attacked (MA: Timpurii de Mai, Rosii de Bistrita): strongly attacked (PA: Van, Bing, Germersdorf).

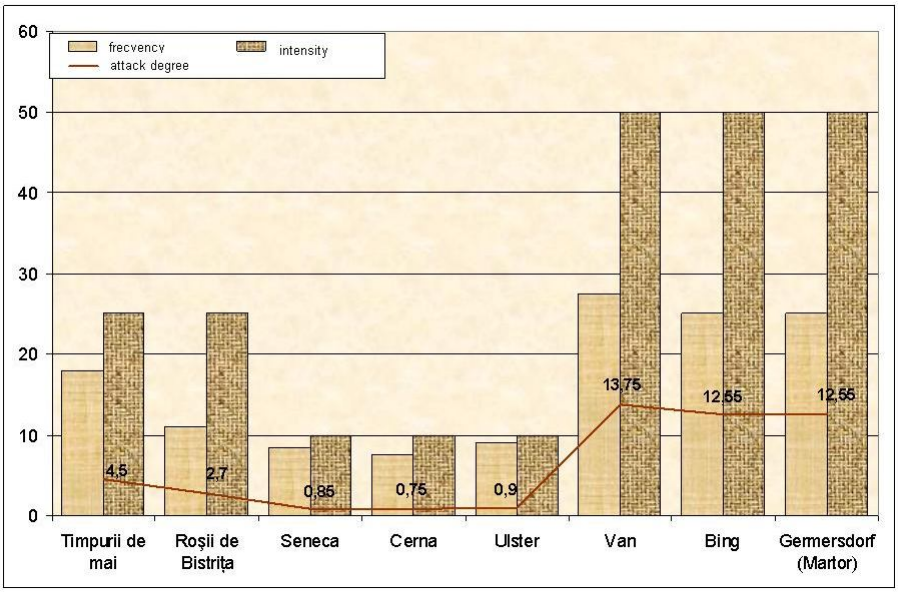

Figure 2. Graphic representation of anthracnose attack (Coccomyces hiemalis Higg.) in cherry tree varieties in the region Lugoj Herindeşti, in 2010

Table 3

Warning and application of phyto-sanitary treatments in cherry tree, in the region Lugoj Herindeşti, in 2010

No.	Variety	Resistance group	No. of treatments warned	No. of treatments applied	%	
					Applications	Reductions
1.	Timpurii de Mai	MA	8	6	75	25
2.	Rosii de Bistrita	MA	8	6	75	25
3.	Seneca	MA	8	6	75	25
4.	Cerna	SA	8	4	50	50
5.	Ulster	SA	8	4	50	50
6.	Van	SA	8	4	50	50
7.	Bing	PA	8	8	100	-
8.	Germersdorf Control	PA	8	8	100	-

According to the data presented in table 3, we may conclude that, compared with the number of 8 phyto-sanitary treatments warned, we applied only 4 treatments in the slightly attacked varieties (Seneca, Cerna, Ulster) and this represents a 50% reduction of treatments and environmental pollution.

In the varieties Timpurii de Mai and Rosii de Bistrita, medium attacked by anthracnose, we applied 6 treatments and the reduction was of 25%.

In the varieties Van, Bing and Germesdorf, strongly attacked by anthracnose, we applied all the 8 treatments warned.

Although the varieties Van and Germesdorf were strongly attacked by leaf blight or cherry tree anthracnose, we could observe earlier tree defoliation, with the corresponding consequences. However these varieties were proposed for maintenance in the orchard, because of fruit quality and resistance to splintering during rainy years (like 2010).

CONCLUSIONS

1. Cherry tree anthracnose or leaf blight, caused by the pathogen *Coccomyces hiemalis* Higg. Sin. *Blumeriella jaapi* Rehm. Von Arx., is the main cherry tree disease that generates significant losses in cherry tree orchards; the warnings for the application of phyto-sanitary treatments during the vegetation period are emitted according to this.

2. To reduce expenses and environmental pollution during the application of treatments against this disease and to introduce in orchards the varieties with resistance to *Coccomyces hiemalis* Higg., in the region Lugoj Herindeşti, we supervised the behaviour of 8 cherry tree varieties under anthracnose's attack.

3. In the pedo-climatic conditions of 2010, in the region Lugoj Herindeşti, the behaviour of cherry tree varieties under anthracnose's attack was the following:

- slightly attacked varieties: Cerna, Seneca, Ulster;
- medium attacked varieties: Timpurii de Mai, Rosii de Bistrita;
- strongly attacked varieties: Van, Bing, Germesdorf.

4. By introducing in cultivation the slightly attacked cherry tree varieties, the phyto-sanitary treatments and environmental chemical pollution got reduced with 50%. In the case of the medium attacked varieties, this reduction was of 25%.

5. To reduce the environmental pollution occurred under chemical control of diseases, we recommend the introduction in cherry tree orchards of the varieties that were slightly and medium attacked by anthracnose, the main harming disease in cherry tree.

6. Although the varieties Germesdorf and Van were strongly attacked by anthracnose, in 2010, are proposed to be maintained in orchards, because of their productivity, fruit quality and resistance to splintering during rainy years.

BIBLIOGRAPHY

1. AMZĂR GH., 1988 – Cultura cireşului şi vişinului în România, Sinteza programului de cercetare şi dezvoltare Iaşi, Contribuţii tehnologice la modernizarea culturii cireşului şi vişinului.
2. AMZĂR VALENTINA, 1981 – Comportarea unor soiuri şi clone de cireş şi vişin la atacul de Coccomyces hiemalis Higg şi Ascospera Oud., Cluj Napoca.
3. BĂNCILĂ M., SIMERIA GH., FENEANU N., FIAT S., 1995 – Conveer varietal la specia cireş în zona Banat, Bistriţa.
4. BECERESCU D., SIMERIA GH., CREŢOIU L., 1983 – Unele aspecte simptomatologice privind antracnoza sâmburoaselor la ciuperca Coyyomyces hiemalis, Analize ale ICPP vol. XVII, 77 – 85 .
5. CICHI M., 2001 – Pomicultură – partea generală, Editura Reprografia, Craiova.
6. CHIRA LENUŢA, CHIRA A., MATEESCU F., 2006 – Pomii fructiferi, Lucrările de înfiinţare şi întreţinere a plantaţiilor, Editura MAST, Bucureşti.
7. COCIU V., 1990 – Soiuri noi, factori de progres în pomicultură, Ed. Ceres.
8. COCIU V., 1992 – Cercetări privind modernizarea sortimentului de plante pomicole, 25 de ani de activitate a Institutului de cercetare şi proiectare pentru pomicultură, Piteşti Mărăcineni.

9. DRĂGĂNESCU., 1986 – Cercetări privind comportarea unor soiuri în zona ecologică de şes a Banatului, Lucrări ştiinţifice.
10. DRĂGĂNESCU E., 2002 – Pomologie, Ed. Mirton, Timişoara.
11. DRĂGĂNESCU E., MIHUŢ E., 2005 – Cultura speciilor pomicole, Editura Waldpress, Timişoara.
12. GHENA N., CIREAŞĂ V., MIHĂESCU GR., GODEANU I., POPESCU M., DROBOTĂ GH., 1977 – Pomicultură generală şi specială, Editura didactică şi pedagogică Bucureşti.
13. MINOIU N., 1980 – Antracnoza frunzelor de cireş (Coccomyces hiemalis Higg. sin. Blumeriella jaapi Rehm. V. Arx., Metodici de prognoză şi avertizare a tratamentelor împotriva bolilor şi dăunătorilor plantelor de cultură, p. 358 – 363.
14. MIRINOIU N., 1974 – Cercetări asupra biologiei şi combaterii antracnozei cireşului şi vişinului, Coccomyces hiemalis Higg. în pepiniere. Portaltoiul principalelor specii de pomi fructiferi – sinteza ASAS – ICPP Piteşti Mărăcineni.