

RESEARCHES REGARDING THE LEAVES DISEASES AT WILLOW IN SRC CROPS – MEASURES OF PREVENTION AND CONTROL IN ECOLOGICAL CONDITIONS OF SOUTH WEST OF OLTENIA

CERCETĂRI PRIVIND BOLILE FOLIARE LA SALCIE ÎN PLANTAȚII DE TIP SRC – MĂSURI DE PREVENIRE ȘI COMBATERE ÎN CONDIȚIILE ECOLOGICE DIN SUD VESTUL OLTENIEI

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***Abstract** Lately in our country, the willow culture intensified as a result of increasing requests for obtaining biomass. The intensification of culture, as of any other plants determined the mass propagation of pathogens, which sometimes contributes to undermining culture. In the South-western Oltenia conditions, were identified pathogens that cause staining black leaf willow (*Marssonnia salicicola*), rust (*Melampsora salicicola*) and willow tar spot fungus (*Rhystima salicinum*). Phytosanitary treatments applied to the earliest stage of the attack with fungicides as: Dithane M 45 – 0,2%, Topsin WP - 0,1 %, Alert SC - 0.1%, Merpan 50 WP – 0.2%, have ensured the phytosanitary protection of plants.*

Key words: willow, pathogen, prevention, fungicides

***Rezumat:** În România în ultima vreme, cultura salciei s-a intensificat, ca urmare a solicitărilor crescânde pentru producerea de biomasă. Intensificarea culturii, ca a oricărei alte plante a tras după sine înmulțirea în masă a agenților patogeni, care contribuie uneori la compromiterea culturii. În condițiile din sud – vestul Olteniei, au fost identificați agenți patogeni care produc pătarea neagră a frunzelor de salcie (*Marssonnia salicicola*), rugina (*Melampsora salicicola*) și pecinginea (*Rhystima salicinum*). Tratamentele fitosanitare aplicate în faza incipientă a atacului cu fungicidele: Dithane M 45 – 0,2%, Topsin WP - 0,1 %, Alert SC - 0.1%, Merpan 50 WP – 0.2% , au asigurat o protecție fitosanitară a plantelor.*

Cuvinte cheie: salcie, patogen, combatere, fungicide

INTRODUCTION

Willow, as forest species with wide spread around the globe, is responsible to a large extent of needs of current and future human society.

Due to rapid growth, the willow crops realise in a short time a major amount of wood, creating conditions for satisfying the increasing needs of wood.

Enhancing culture, like any other plants attract the mass propagation of pathogens contributing to undermining the plant sometimes (Filat, Chira, 2004).

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The most common criptogamic infections are produced by species of *Melampsora*, *Marsonia* and *Rhystima*. The whole vegetative apparatus of these fungi is represented by an endoparazit, intercellular mycelium (rarly intracellular), yellow due to the presence of lipocrom, primary (n) haploidal and secondary dicariotic (n + n), which predominates. In addition to active parazitic mycelium, there is a resistance mycelium in different organs of perennials plants (Marcu, 2005).

The aim of present work is presenting the research on the symptomatology of the attack of foliare diseases of willow and the measures for preventing and controlling the pathogens .

MATERIAL AND METHODS

The biological material under study was made up of 27 varieties and byotypes of *Salix* from fields of the University of Craiova – SCDP Vâlcea.

Observations were made on the symptoms produced by patogens as: *Marssonina salicicola*, *Melampsora salicicola* and *Rhystima salicicola*. Also have studied some aspects of the biology of patogens as well as methods of preventing and controlling them. Depending on the disease symptomatology was established the frequency of attack ($F\% = [n \times 100] : N$).

It was tested the efficacy of biological products, fungicides as: Dithane M 45 conc. 0,2 %, Topsin M70 WP conc. 0,1 %, Alert SC – 0,1%, Merpan 50 WP conc. 0,2 %, Systhane 12 EC conc. 0,05 %.

Fungicides have been associated with the insecticide Sumialpha 5 EC conc. 0,02% for the control of pests.

Phytosanitary treatments have been applied by foliare spraying at an interval of 14 days.

RESULTS AND DISCUSSIONS

The attack of staining black leaf willow (*Marssonina* sp.) manifests in all phases of vegetation of the plant, in conditions of high humidity (over 70%) and optimum temperature of 22-24°C.

The disease has been reported in our country for the first time by Teodorescu and Mocanu in Brăila in 1968.

Characteristic symptoms appeared on the leaves during the growing season starting from June. On the surface of the leaf blade are observed in the early stages of attack, yellow-greenish spots, small point. These spots are small at first, rare, colored uniform, then shall be increased by 1-3 mm in diameter, increased in number and became brown rust on edges-redheads and yellowish whitish in the central part. The whitish portions develops the fructification of phungus.

At big attacks, spots cover a large area of the foliar blade, appear on the ribs, ribbed and offshots (fig. 1).



Fig. 1 - Attack of *Marssonina salicicola* at willow (original)

Willow leaf rust (*Melampsora salicicola*), has been reported in the country by Tr. Săvulescu in counties Prahova and Suceava.. Biological material was analyzed in terms of this disease symptomatology, presented on the leaves starting from June – yellowish greenish very small spots (0.5-1 mm) circular or irregular that grow and join them in time. On these spots were noticed some small orange spots which until autumn comes the appearance of crusts, which are rust brown with frutification of phungus. (fig. 2).



Fig. 2 - Attack of *Melampsora salicicola* at willow (original)

Rhystima salicinum which produces willow tar spot fungus on leaves has been reported in Corabia, Turnu Măgurele and Ploiești by C.C. Georgescu and M. Badea, in 1935.

The disease manifests in vegetation starting with June, when on the leaves appear yellowish spots at first, then grey-black. These black point spots of 0.1-0.2 cm, with time become curved with glossy crusts appearance and unregulate surface (fig. 3).



Fig. 3 - Attack on leaves of *Rhystima salicinum*

The data in table 1, shows that the genotypes of plant have resistance (R) or have different levels of sensitivity to *Marssonina salicicola* fungus attack. Thus, willow varieties as Tordis and Tora and biotypes Cozia 1, Arpașu de sus 1, Arpașu de sus 2, Arpașu de sus 5, Pesceana 1, Pesceana 2, Pesceana 3, Pesceana 4 și Pesceana 7, have shown resistance to this disease.

Table 1

The reaction of willow biotypes against phytopathogenic fungi attack

No crt.	Specifica-tion	<i>Marssonina salicicola</i>		<i>Melampsora salicicola</i>		<i>Rhystima salicicola</i>	
		Attack fequency %	Qualifier	Attack fequency %	Qualifier	Attack fequency %	Qualifi er
1	Tordis	0	R	40	MS	0	R
2	Tora	0	R	0	R	0	R
3	Inger	20	PS	20	PS	0	R
4	Jorr	20	PS	30	MS	0	R
5	Lădești	20	PS	50	MS	10	PS
6	Cozia 1	0	R	20	PS	0	R
7	Cozia 2	20	PS	20	PS	0	R
8	Cozia 3	20	PS	40	MS	0	R
9	Cozia casantă	0	R	0	R	0	R
10	Robești 1	20	PS	0	R	15	PS
11	Drăgășani	0	R	20	PS	15	PS
12	Gibești	20	PS	30	MS	0	R
13	Arpașu de sus 1	0	R	30	PS	0	R
14	Arpașu de sus 2	0	R	30	PS	0	R
15	Arpașu de sus 3	20	PS	40	MS	10	PS

16	Arpașu de sus 4	20	PS	40	MS	10	PS
17	Arpașu de sus 5	0	R	0	R	0	R
18	Arpașu de sus 6	20	PS	30	PS	0	R
19	Arpașu de sus 7	20	PS	30	PS	0	R
20	Pesceana 1	0	R	40	MS	10	PS
21	Pesceana 2	0	R	40	MS	10	PS
22	Pesceana 3	0	R	30	MS	0	R
23	Pesceana 4	0	R	40	MS	0	R
24	Pesceana 5	20	PS	50	MS	10	PS
25	Pesceana 6	20	PS	50	MS	10	PS
26	Pesceana 7	0	R	0	R	0	R
27	Pesceana 8	20	PS	0	R	0	R

Legend:

0% attacked plants = R (rezistent),

0-20% attacked plants = PS (less sensitive),

21-50% attacked plants = MS (moderate sensitive),

51-60 % attacked plants = S (sensitive)

Well behaved, proving the resistance (R) to attack of fungus on the leaves that produces willow rust (*Melampsora* spp.) varieties as Tora și Jorr and biotypes as Cozia casantă, Robești 1, Arpașu de sus 5, Pescaana 7 și Pescaana 8.

Compared with willow tar spot fungus *Rhystima salicinum*, the biological material proved resistant (R), at this type of fungus. Have reacted negatively genotypes as : Tordis, Tora, Inger, Jorr, Cozia1, Cozia 2, Cozia 3, Cozia casantă, Gibești, Arpașu de sus 1, Arpașu de sus 2, Arpașu de sus 5, Arpașu de sus 6, Arpașu de sus 7, Pescaana 3, Pescaana 4, Pescaana 7 și Pescaana 8.

Less sensitive (PS) and moderate sensitive (MS), to attack the three pathogens proved to be genotypes: Cozia 1, Cozia 2, Drăgășani 1, Arpașu de sus 3, Arpașu de sus 4, Arpașu de sus 6, Arpașu de sus 7, Pescaana 5 and Pescaana 7.

In the table 2 the data presents the efficacy of fungicides against staining black leaf willow attack (*Marssonina salicicola*) all products tested have shown good capacity (75,0-90,0%), but showed very good, product Systhane 12 EC conc. 0,05% (90,0%).

Table 2

The effectiveness of fungicides to combat willow diseases produced by *Marssonina salicicola*, *Melampsora salicicola* and *Rhystima salicicola*

No. Crt.	Product used	Conc. %	Effectiveness of fungicide of the attack of :		
			<i>Marssonina salicicola</i>	<i>Melampsora salicicola</i>	<i>Rhystima salicicola</i>
1	DITHANE M 45	0,2	80	90	90
2	TOPSIN M70 WP	0,1	85	80	80
3	ALERT SC	0,1	75	75	90
4	MERPAN 50 WP	0,2	85	80	90
5	SYSTHANE 12 EC	0,05	90	80	80
6	ZEAMĂ BORDELEZĂ	0,5	85	85	90

In preventing and controlling that rust (*Melampsora salicicola*) all products used have had a very good effectiveness(80,0-90,0%), but showed very good, product Dithane M45 conc. 0,2 % (90,0%). Frequency of attack of *Rhystima salicicola* is very low, at willow plants, fungicides used to combat the three pathogens have ensured an optimum protection of plants with good efficacy (80-90 %).

CONCLUSIONS

1. Staining black leaf willow (*Marssonina salicicola*), willow leaf rust (*Melampsora salicicola*) and willow tar spot fungus on willow leaves (*Rhystima salicicola*) are pathogens met in willow cultures, may occur separately, but also at the same time;

2. In order to combat these pathogens in short coppice rotation cultures (SRC) of willow for biomass, it is recommended the use of resistant genotypes with reduced sensitivity to the attack;

3. During the period of vegetation in these types of crops is important to pick up the infected plants (hygiene culture), in order to prevent the transmission of the pathogen from one plant to another;

4. Plant protection treatments in the earliest stage of the attack with one of its fungicides: Dithane M45- 0,2%, Topsin WP – 0,1 %, Alert SC - 0.1%, Merpan 50 WP– 0,2%, Zeamă bordeleză – 0,5%, have ensured that the phytosanitary protection of plants.

REFERENCES

1. **Comeș I., Lazăr Al., Bobeș I., Hatman M., Drăcea A, 1982** - *Fitopatologie*, Editura Didactică și Pedagogică București.
2. **Mihai Filat, Dănuț Chira, 2004** – *Cercetări pentru introducerea în cultură de specii/clone de plop și salcie cu potențial silvoproductiv superior și rezistență sporită la adversități*. Anale ICAS, 47, București;
3. **Olimpia Marcu, 2005** – *Fitopatologie forestieră*, Editua Silvodel, Brașov;
4. **Tăut I., Sestan T., 1997** – *Chemical and experimental effects in Romania by biological fungicides to control of cryptogamic agents in solarium and forest nurseries*. Proceedings Workshop of Forest Insect and Disease Survey, Cehia;
5. *** www.donsgarden.co.uk;
6. *** www.invasive.org;
7. *** <http://www.zdravgozd.si>