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PRELIMINARY RESEARCH REGARDING *MONILINIA LAXA* (Aderhold & Ruhland) Honey ex Whetzel ATTACK IN PLUM TREE

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Abstract

The importance of fruit-tree growing is determined by the importance of fruit as food. However, in order to enjoy them, the fruit must be firstly protected against the various pathogen infections. The range of disease attack is highly variable each year, according to crop and area. From this point of view, this paper presents aspects regarding the Monilinia attack degree in plum tree. Monilia disease, brown rot of fruit or plum mummification, is a widespread disease of plum growing in all countries and may cause serious damage by destroying flowers and fruit. Fungus Monilinia laxa is a specific wound parasite that penetrates the tissues of the organs it attacks (fruit, branches, leaves) through various injuries caused by insects (Cydia funebrana) and hail, or open gates to other parasitic fungi (Stigmina carpophila). Research followed all the stages of the disease attack, as well as the occurrence of the first symptoms correlated with weather conditions, the evidence of the symptoms in plum tree, the data related to frequency (disease incidence), intensity (severity) and efficacy treatments with fungicides Dithane M-45 WP (80% mancozeb active ingredient), Topsin AL 70 WP (70% thiophanate methyl active ingredient), Merpan 80 WDG (80% captan active ingredient), Bravo 500 SC (500 g/l clorotalonil active ingredient), Alcupral 50 WP (50% cooper oxychloride active ingredient), Teldor 500 SC (500 g/l fenhexamid active ingredient) and Signum FG (26,7% boscalid + 6,7% piroclostrobin active ingredient) the pathogen Monilinia laxa, the varieties Anna Späth, d'Agen, Record, Stanley and Tuleu timpuriu. The study was developed during the proces of doctoral studies programme financed trough project POSDRU/107/1.5/S/76888.

Key words: *attack, disease, monilia, plum, fungicides.*

INTRODUCTION

The importance of fruit-tree growing is determined by the importance of fruit as food. However, in order to enjoy them, the fruit must be protected firstly against various pathogen infections [1].
The range of disease attack is highly variable each year, according to crop and area [4]. From this point of view, this paper presents aspects regarding the *Monilinia* attack degree in plum tree.
Monilia disease, brown rot of fruit or plum mummification is a widespread disease of plum growing in all countries and may cause serious damage by destroying flowers and fruit [2].
Fungus *Monilinia laxa* is a specific wound parasite that penetrates of the organs it attacks (fruit, branches, leaves) through various injuries caused by insects (*Cydia funebrana*) and hail, or open gates to the attack of other parasitic fungi (*Stigmina carpophila*) [5].
The results of this paper are the included in the topic of the personal of doctoral thesis.

MATERIAL AND METHOD

Visual observation is the fastest method to identify a disease based on signs and symptoms shown by infected plants. This method involves a high degree of subjectivity, depending largely on the diagnosing person's level of knowledge.
The scoring attack for *Monilinia laxa* has a particular importance for the plum tree in establishing the need for chemical treatments during the vegetation season.
The attack value is represented by frequency (F%), intensity (I%), attack degree (AD%) and loss (L%). Frequency is the percentage of fruit attacked out of 100 examined fruit. Attack intensity indicates the degree to which the fruit is attacked under examination. Intensity was

noted directly in percentage. The attack degree referred to the severity of disease in the crop and was calculated using frequency and intensity.

Calculations included five fruit trees belonging to the same variety in each variant (with or without treatment). For accurate information, we noted the attack/tree in every third row of fruit trees. We observed the attack in the same tree on two levels by moving on the diagonal of the row, and we calculated the average.

Intensity was noted directly in percentage. The attack degree present severity of disease in the crop and was calculated using the frequency (disease incidence) and intensity (severity).

Damage or loss is the result of strong attack, resulting in crop losses valued by certain methods.

Transformation coefficient from degree attack to damage for *Monilinia laxa* was k=0.9.

We used a grading scale from 0-4: 0=absence of disease, 0%; 1=low attack, 1-25%; 2=low to medium attack, 26-50%; 3=medium to strong attack, 51-75% and 4=high attack, 76-100% [3].

The fungicides used were Dithane M-45 WP (80% mancozeb active ingredient), Topsin AL 70 WP (70% thiophanate methyl active ingredient), Merpan 80 WDG (80% captan active ingredient), Bravo 500 SC (500 g/l clorotalonil active ingredient), Alcupral 50 WP (50% cooper oxychloride active ingredient), Teldor 500 SC (500 g/l fenhexamid active ingredient) and Signum FG (26.7% boscalid + 6.7% piroclostrobin active ingredient) [6, 7].

The varieties used in this study were: Anna Späth, d'Agen, Record, Stanley and Tuleu timpuriu.

The experiments were established in a 10-year old years.

Research was conducted between 2010 and 2011.

Treatments were applied as follows: first, at the end of vegetation; second, white button phenophase treatment; the third, treatment when 10-15% of petals were shaken and the last treatment applied at the beginning of fruit ripeningt. Four treatments were applied in different variants (Table 1).

The results were statistically assured by using variance analysis.

RESULTS AND DISCUSSIONS

Successful management of *Monilinia laxa* involves a combination of health practices aimed to reduce the amount of initial inoculum and the judicious use of fungicides.

Table 1. Treatment options

No. treatment	Phenophase	Fungicides	Concentration (%)
1	end of vegetation	Alcupral 50 WP	0.4
2	white button	Dithane M-45 WP	0.2
		Merpan 80 WDG	0.15
		Bravo 500 SC	0.15
3	10-15% petals shaken	Bravo 500 SC	0.15
		Dithane M-45 WP	0.2
		Merpan 80 WDG	0.15
4	beginning of fruit ripeningt	Teldor 500 SC	0.08
		Topsin AL 70 WP	0.07
		Signum FG	0.05

Observations took place a week after the application of the last treatment for each plum tree variety.

Only the effect of chemical treatments in different combinations was highlighted as cultural hygiene measures imposed by technology were applied in all variants.

Climatically, 2010 was more favorable than 2011 for the attack of the pathogen *Monilinia laxa*.

It must be noted that the attack on the flowers, leaves and shoots in spring was insignificant in both years of research and all varieties under study.

Dangerous attack was reported in the fruit, as most of the fruit attacked fell while only few remained mummified in the tree crown.

Table 2 presents the variants as follows:

Variant 1 was without the application of fungicides.

Variant 2 of treatment consisted of application of fungicides: Dithane M-45 WP, Bravo 500 SC, Teldor 500 SC.

Variant 3 of treatment consisted of application of fungicides: Merpan 80 WDG, Dithane M-45 WP, Topsin AL 70 WP.

Variant 4 of treatment consisted of application of fungicides: Bravo 500 SC, Merpan 80 WDG, Signum FG.

Table 2. Response of plum varieties to the pathogen *Monilinia laxa*

Variety	Variant	Medium attack						Loss (%)		Note	
		Frequency (%)		Intensity (%)		Attack degree (%)					
		Year									
		2010	2011	2010	2011	2010	2011	2010	2011	2010	2011
Anna Späth	1	47	42	100	100	47	42	42.3	37.8	2	2
	2	7	4	100	100	7	4	6.3	3.6	1	1
	3	8	5	100	100	8	5	7.2	4.5	1	1
	4	3	1	100	100	3	1	2.7	0.9	1	1
d'Agen	1	48	39	100	100	48	39	43.2	35.1	2	2
	2	7	5	100	100	7	5	6.3	4.5	1	1
	3	8	6	100	100	8	6	7.2	5.4	1	1
	4	3	2	100	100	3	2	2.7	1.8	1	1
Record	1	36	28	100	100	36	28	32.4	25.2	2	2
	2	5	2	100	100	5	2	4.5	1.8	1	1
	3	5	3	100	100	5	3	4.5	2.7	1	1
	4	0	0	0	0	0	0	0	0	0	0
Stanley	1	71	55	100	100	71	55	63.9	49.5	3	3
	2	9	7	100	100	9	7	8.1	6.3	1	1
	3	10	6	100	100	10	6	9.0	5.4	1	1
	4	6	4	100	100	6	4	5.4	3.6	1	1
Tuleu timpuriu	1	45	35	100	100	45	35	40.5	31.5	2	2
	2	6	4	100	100	6	4	5.4	3.6	1	1
	3	7	4	100	100	7	4	6.3	3.6	1	1
	4	2	1	100	100	2	1	1.8	0.9	1	1
DL 5%						0.9	0.5				
DL 1%						1.3	0.7				
DL 0.1%						1.8	0.9				

The data presented in Table 2 show that the results on the behaviour of the plum tree varieties to the pathogen *Monilinia laxa* in both untreated variants (V1) and the variants treated with various fungicides (V2, V3 and V4) are statistically assured in a very significant manner.

It is noteworthy that there was no attack of *Monilinia laxa* in the variety Record during the two years of research in the variants treated with fungicides Bravo 500 SC (applied in phenophase white button), Merpan 80 WDG (applied in phenophase 10-15 petals shaken) and Signum FG (applied at the beginning of fruit ripeningt).

The varieties Anna Späth and d'Agen had a similar response to *Monilinia laxa* in 2010 in the variants treated with fungicides (3-8% attack degree). In 2011 the variety Anna Späth had a slightly lower attack degree (1-5%) than the variety d'Agen (2-6% attack degree).

The variety Stanley showed the highest attack degree of *Monilinia laxa* (55-71% attack degree) în the variant without treatment and 4-10% attack degree in the variants treated with fungicides).

The variety Tuleu timpuriu was very little attacked in the variants treated with fungicides (2-6% attack degree în 2010 and 1-4% attack degree în 2011).

In terms of scale scoring, all varieties showed a weak attack in the variants treated with fungicides, denoted by 1.

In the varieties Anna Späth, d'Agen, Record and Tuleu timpuriu, we found low to medium attack in the untreated variants.

The variety Stanley showed medium to strong attack in the untreated variants.

The increasing order of attack degree in the investigated plum varieties was thw following: Record (0-5% attack degree), Tuleu timpuriu

(1-7% attack degree), Anna Späth (1-8% attack degree), d'Agen (2-8% attack degree) and Stanley with an attack degree of 4-10% in all the variants treated with fungicides.
All the variants treated with fungicides were shown to be effective, compared with the untreated variant.
The effect of fungicide application was influenced by climatic conditions, as shall be demonstrated in a subsequent paper. The application of systemic fungicides in the ripe fruit phenophase played an important role in protecting the fruit when rainfall occurred until the harvest.

CONCLUSIONS

Monilia disease, brown rot of fruit or plum mummification, is a widespread disease of plum growing in all countries and may cause serious damage by destroying flowers and fruit.
The range of *Monilinia laxa* attack in plum tree is highly variable each year.
The variety Record showed the lowest attack degree of the pathogen *Monilinia laxa* both in the untreated variants and the variants treated with fungicides.
The highest attack degree of the pathogen *Monilinia laxa* was recorded in the variety Stanley (55-71% attack degree in the varieties with no treatment and 4-10% in the treated variants).
In all the variants treated with various fungicide combinations, the attack degree of the pathogen *Monilinia laxa* was much lower, compared with the untreated variants.

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