RESEARCH CONCERNING THE PATHOGENS CONTROL ON MELONS CROPS IN THE FIELD

ASPECTE PRIVIND CONTROLUL AGENŢILOR PATOGENI LA CULTURILE DE PEPENI GALBENI DIN CÂMP

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Abstract *The melons crops in the field crops are frequently attacked by Pseudoperonospora cubensis (downy mildew) Sphaerotheca fuliginea (powdery mildew) and Alternaria cucumerina (alternaria leaf spot). For controlling of these pathogens there were experimented different mixture between fungicides: Melody Compact 49 WG, Ortiva 250 SC, Bravo 500 SC and Dithane M 45 WP with Score 250 SC or Orius 25 EW. For controlling of pathogen Pseudoperonospora cubensis the best results were obtained with following mixtures: Melody Compact 49 WG 0.2 % + Score 250 SC 0,05 % and Melody Compact 40 WG 0,2 % + Orius 25 EW 0.05 %, with 97.7 % efficacy and respectively 95.2 %. For controlling of pathogen Sphaerotheca fuliginea the best results were obtained with following mixtures: Ortiva 250 SC 0,075 % + Score 250 SC 0,05 % and Ortiva 250 SC 0,075 % + Orius 25 EW 0.05 % with 100 % efficacy. The same variants gave good results in controlling of pathogen Alternaria cucumerina, with 91.8 % efficacy and respectively 89.8 %.*
Key words: melons, *Pseudoperonospora cubensis, Sphaerotheca fuliginea, Alternaria cucumerina*

Rezumat *Culturile de pepeni din câmp sunt frecvent atacate de agenţii patogeni Pseudoperonospora cubensis (mana) Sphaerotheca fuliginea (fainare) şi Alternaria cucumerina (alternarioza). Pentru controlul acestor agenţi patogeni au fost experimentate diferite amestecuri de fungicide: Melody Compact 49 WG, Ortiva 250 SC, Bravo 500 SC şi Dithane M 45 WP cu Score 250 SC sau Orius 25 EW. Pentru controlul agentului patogen Pseudoperonospora cubensis, cele mai bune rezultate au fost obţinute folosind următoarele amestecuri: Melody Compact 49 WG 0,2% + Score 250 SC 0,05% şi Melody Compact 40 WG 0,2% + Orius 25 EW 0,05%, cu o eficacitate 97,7% şi, respectiv, 95,2%. Pentru controlul patogenului Sphaerotheca fuliginea, cele mai bune rezultate au fost obţinute folosind următoarele amestecuri: Ortiva 250 SC 0,075% + Score 250 SC 0,05% şi Ortiva 250 SC 0,075% + Orius 25 EW 0,05% cu eficacitate 100%. Aceleaşi variante au dat rezultate bune în controlul agentului patogen Alternaria cucumerina, cu o eficacitate de 91,8%.*
Cuvinte cheie: pepeni galbeni, *Pseudoperonospora cubensis, Sphaerotheca fuliginea, Alternaria cucumerina*

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INTRODUCTION

Melon crops occupied an important surface worldwide, the most cultivated area with melons are on China, with over 400 thousand ha followed by Turkey, Iran, India and Egypt. High productions are obtained in warm climates such as Puerto Rico, Cyprus and Bahrain. In Europe, Romania ranks 4th as an area (4288 ha) after Spain, Italy and France (FAO, 2013).

Yellow melons crops on field are frequently attacked by the pathogens *Pseudoperonospora cubensis* (downy mildew) *Sphaerotheca fuliginea* (powdery mildew) şi *Alternaria cucumerina* (alternaria leaf blight).

Foliar diseases on melons have a negative impact on fruit yield and quality (Egel, 2016). In the USA, in the main areas where yellow melons are grown, it is recommended to apply fungicides for the control of pathogens *Pseudoperonospora cubensis* (Bravo, Echo, Aprovia Top, Cataraman, Mancozeb, Previcur Flex, Ranman), *Sphaerotheca fuliginea* (Aprovia Top, Fontelis, Luna Sensation, Inspire Super, Pristine) and *Alternaria cucumerina* (Aprovia Top, Convertible EG, Fontelis, Gavel, Inspire Super, Satori, 2017).

The objectives of the experience were to experiment some combinations of products and to establish the most effective control of the main pathogens that cause major damage to the yellow melon crop in the field.

MATERIAL AND METHOD

At RDIVFG Vidra was organized a monofactorial experience, with 10 variants, in 4 repetitions, placed in randomized complete blocks. The plot area was 10m2. The biological material was represented by the melon variety Festiv.

Planting date was on June 2, 2016, with seedlings produced in protected crops, on soil mulched with black polyethylene foil, one row per furrow at a distance of 1.5m between rows. The distance between plants per row was 50 cm.

For the simultaneous control of the three pathogens (*Pseudoperonospora cubensis, Sphaerotheca fuliginea and Alternaria cucumerina*) were experimented several combinations of fungicides Melody Compact (8.4% iprovalicarb + Cu 40.6% copper oxychloride) Ortiva 250 SC (azoxystrobin 250 g/L) 0.075%, Bravo 500 SC (chlorothalonil 500 g/L) 0.2%, Dithane M 45 WP (mancozeb 80% 250 g/L) 0.05% or Orius 25 EW (tebuconazole 250 g/L) 0.05%.

During the vegetation period, were applied 5 treatments (July 21, July 29, August 10, August 22, and August 30).

There were made observations regarding the occurrence and evolution of pathogen attack in correlation with climatic factors, the frequency and severity of the attack, and finally was calculated the degree of attack. The yield data was processed by variance analysis. The effectiveness of the treatment variants has been assessed according to the value of the degree of attack and the production obtained.

RESULTS AND DISCUTIONS

The attack of the three pathogens (*Pseudoperonospora cubensis, Sphaerotheca fuliginea* and *Alternaria cucumerina*) started relatively late (in the

third decade of July) because of unfavorable climatic factors (especially the maximum high temperatures of 31.2 – 32.6 ºC, relatively low humilities 76.3 - 77.5% and lack of rainfall). Due to the heavy rainfall from the second decade of August (34.5 mm) and the third decade of the same month (72.5 mm), the downy mildew attack produced by *Pseudoperonospora cubensis* had a rapid evolution: from a value of 0.9% in the third decade of July reached 68.7 in the first decade of September (tab. 1).

Table 1

Influence of climatic factors on the occurrence and evolution of the pathogens attack to yellow melon culture in the field (Vidra, 2016)

Pathogens and climatic factors	month / decade									
	June			July			August			September
	I	II	III	I	II	III	I	II	III	I
Pseudoperonospora cubensis	0	0	0	0	0	0.9	1.3	15.6	45.7	68.7
Sphaerotheca fuliginea	0	0	0	0	0	0.3	1.0	5.4	9.7	13.8
Alternaria cucumerina	0	0	0	0	0	0.2	2.9	8.9	11.7	14.7
Minimum temparature (ºC)	13.7	15.5	18.7	16.6	16.4	18.0	18.8	16.0	17.8	15.7
Medium temperature (ºC)	18.5	22.0	25.1	22.4	23.4	24.9	26.2	22.6	23.2	21.9
Maximum temperature (ºC)	23.7	29.3	31.5	28.8	31.2	32.6	32.3	29.8	30.0	29.7
Minimum relative humidity (%)	57.0	60.3	51.2	56.0	46.8	43.1	44.4	58.0	52.3	45.3
Medium relative humidity (%)	72.8	72.4	68.5	66.9	59.1	54.4	56.1	62.6	62.1	56.5
Maximum relative humidity (%)	90.0	90.2	88.4	85.1	77.5	76.3	73.6	79.8	77.5	75.5
Rains (mm)	17.0	6.5	7.0	0	0	2.0	0	34.5	72.5	0

For the control of *Pseudoperonospora cubensis* pathogen, the best results gave Melody Compact 49 WG 0.2% + Score 250 EC 0.05% (variant 1, fig. 1) and Melody Compact 49 WG 0.2% + Orius 25 EW 0, 05% (variant 2, fig. 2) with an efficacy of 97.2% and 95.2%, respectively (tab. 2).

In the case of the *Sphaerotheca fuliginea* fungus, the best results were obtained with Ortiva 250 SC 0.075% + Score 250 EC 0.05% (variant 3) or Ortiva 250 SC 0.075% + Orius 25 EW 0.05% (variant 4) with an efficacy of 100.0%.

Also, variants 3, 4 and 6 gave good results in controlling the *Alternaria cucumerina* pathogen with an efficacy of 91.8% and respectively 89.8%.

In untreated check the degree of attack on *Pseudoperonospora cubensis* was 68.7%, *Sphaerotheca fulginea* 13.8% and *Alternaria cucumerina* 14.7%.The frequency of the attacked fruits was 0 (variants 1, 2 and 9: Melody Compact 49 WG 0.2% + Score 250 SC 0.05%, Melody Compact 49 WG 0.2% + Orius 25 EW 0.05% and Dithane M 45 WP 0.2% + Score 250 EC 0.05% alternative to Orius 25 EW 0.05%) and 3.6% (Variant 6: Bravo 500 SC 0.2% + Orius 25 EW 0.05%, tab.

3) compared to 10.9% in the untreated check variant. Damaged fruits have rotted due to the attack of *Phytophthora* sp. and *Fusarium* sp. Regarding the yield / mp (tab. 3) the best results were obtained to the variant 1 (Melody Compact 49 WG 0.2% + Score 250 SC 0.05% with 2.582 kg / m^2.

Table 2

Effectiveness of some combinations of fungicides in the control of pathogens *Pseudoperonospora cubensis, Sphaerotheca fuliginea* and *Alternaria cucumerina* in yellow melon culture in the field (Vidra, 2016)

Nr. crt.	Variant	Degree of attack (%)					
		P. cubensis	Efficacy (%)	*S. fuliginea*	Efficacy (%)	*A. cucumerina*	Efficacy (%)
1	Melody Compact 49 WG 0.2 % + Score 250 SC 0.05 %	1.9	97.2	2.3	83.3	2.4	83.7
2	Melody Compact 49 WG 0.2 % + Orius 25 EW 0.05 %	3.3	95.2	2.0	85.5	2.0	86.4
3	Ortiva 250 SC 0.075 % +Score 250 SC 0.05 %	33.0	52.0	0	100.0	1.5	89.8
4	Ortiva 250 SC 0.075 % + Orius 25 EW 0.05 %	40.1	41.6	0	100.0	1.2	91.8
5	Bravo 500 SC 0.2 % + Score 250 SC 0.05 %	4.9	92.9	0.3	97.8	1.7	88.4
6	Bravo 500 SC 0.2 % + Orius 25 EW 0.05 %	7.9	88.5	0.1	99.3	1.5	89.8
7	Dithane M 45 WP 0.2 % + Score 250 SC 0.05 %	4.8	93.0	1.7	87.7	2.5	83.0
8	Dithane M 45 WP 0.2 % + Orius 25 EW 0.05 %	8.0	88.3	1.2	91.3	2.2	85.0
9	Dithane M 45 WP 0.2 % + Score 250 SC 0.05 % alternativ cu Orius 25 EW 0.05 %	7.0	89.8	0	100.0	1.9	87.1
10	Check untreated	68.7	-	13.8	-	14.7	-

Fig. 1 Variant 1 treatment with Melody Compact 49 WG 0.2 % + Score 250 SC 0.05 %

Fig. 2 Variant 2 treatment with Melody Compact 49 WG 0.2 % + Orius 25 EW 0.05 %

Fig. 3 Variant 10 - Check untreated

Table 3

Frequency of diseased fruit and yield at yellow melon crop in the field (Vidra. 2016)

Variant	Frequency of diseased fruit	Efficacy (%)	yield		
			kg/m^2	t/ha	%
1.	0	100.0	2.582***	25.820	134.0
2.	0	100.0	2.532***	25.320	131.4
3.	2.4	78.0	2.190***	21.900	113.6
4.	2.4	78.0	2.205***	22.050	114.4
5.	2.5	77.1	2.235***	22.350	116.0
6.	3.6	67.0	2.180***	21.800	113.1
7.	1.2	89.0	2.045***	20.450	106.1
8.	1.1	89.9	2.055***	20.550	106.6
9.	0	100.0	2.070***	20.700	107.4
10.	10.9	-	1.927	19.270	100.0

DL5% = 0.041 kg/mp; DL 1% = 0.055 kg/mp; DL 0.1% = 0.073kg/mp

CONCLUSIONS

For the control of the pathogen *Pseudoperonospora cubensis* (downy mildew). the product combinations Melody Compact 49 WG 0.2% + Score 250 SC 0.05% or Orius 25 EW 0.05% gave the best results with very good efficacy of 97.2% and respectively 95.2%.

For the control of the pathogen *Sphaerotheca fuliginea* (powdery mildew). the best results were obtained by using Ortiva 250 SC 0.075% + Score 250 SC 0.05% or Orius 25 EW 0.05% product combinations with 100.0% efficacy. Also. the same combinations realized good results in controlling the *Alternaria cucumerina* pathogen with an efficacy of 91.8% and respectively 89.8%.

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