BEHAVIOUR OF SOME SPECIES AND HYBRIDS OF MELONS TO THE ATTACK OF SOME SPECIFIC PATHOGENOUS AGENTS: VIROSIS, MILDEW - *PSEUDOPERONOSPORA CUBENSIS* ROSTOV., ANTHRACNOSIS - *COLLETOTRICHUM LAGENARIUM* (PASS.) ELL. ET HALS. AND VERTICILLIUM WILT - *VERTICILLIUM DAHLIAE* KLEB., IN 2002, 2003, 2004 AND 2005

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Resistance, tolerance or on contrary, sensibility of these species or hybrids to the important pathogenous agents are basic factors for obtaining a good production and a maximum profit to the melons. For this reason, different species and different hybrids have been tested during four years (2002, 2003, 2004 and 2005), within some comparative cultures of orientation. In 2002 there were tested 5 species and 3 hybrids, in 2003: 3 hybrids and 2 species, in 2004: 3 hybrids and 2 species and in 2005:7 hybrids. Experiences were performed during all those 4 years according to the rules of the experimental technique (placement in the field, statistic calculus of the experimental error). To these species and hybrids there have been noticed the dynamics of apparition and evolution of the agents mentioned in the title of this paper. Between the studied species and hybrids there have been recorded real differences regarding their behavior to the attack of the mentioned pathogenous agents

Key words*: virosis, Colletotrichum lagenarium, Verticillium dahliae, Pseudoperonospora cubensis*

The melons are attacked during vegetation by a series of pathogenous agents, more important being: virosis, mildew of cucurbitaceous (*Pseudoperonospora cubensis*), anthracnosis of cucurbitaceous (*Colletotrichum lagenarium*) and verticillianum wilt (*Verticillium dahliaie*).

Among the symptoms produced by the attack of these pathogenous there are some certain differences. Thus, in the case of virosis, the main symptoms that appear are those of leaf mosaic, often joined by a curling more or less intense. To stronger attacks, the creeping stems of the plants remain small. The cucurbitaceous mildew is characterized by apparition of some spots on leaves being delimited by nervures. On the inferior side of the leaf, these spots are covered during wet weather by a grey down (the asexual fructifications of the fungi). At strong attacks,

the leaves fade away and fall, and the production decreases quantitatively but especially qualitatively. The attack of anthracnosis determines apparition on the leaves of some brown spots – red or brown, which, during wet weather, is covered by the fructifications of the fungi. The serious attack is manifested on fruits, on which deep and brown spots appear. The small fruits blacken totally and fall. On the bigger fruits there appear round, big and yellow spots which later become brown and deepen in the tissue. During wet weather, these spots are covered by a pink down (the asexual fructifications of the fungi). On wet weather, the fruits can putrefy completely. The attack of the fungi *Verticillium dahliae* Kleb. is manifested at blooming-fructification. Usually, it has a slower evolution and is characterized by apparition of the phenomenon of yellowing and necrosis of the leaves, followed by a slow wilt. The small fruits become brown and dry, and the biggest ones do not reach maturity anymore.

MATERIAL AND METHOD

The Experiences were performed in Braila. In 2002, there were used the species: Hales Best Jumbo, Ananas, Turkestan, Yellow Canari, Honey Dew Green and the hybrids Passport F1, Tornado F1 and Laser F1, in 2003 the species Titus, Yellow Canari and the hybrids Joker F1, Tornado F1 and Ananas F1, in 2004 the species Fondant, Yellow Canari and the hybrids Ananas F1, Green Star F1 and Sweet America F1, and in 2005 the hybrids Green Star F1, Griffalia F1, Laser F1, New Gal F1, Early Ropey F1, Ananas F1, Green Go F1. These experiences were set up according to a strict observance of the culture technology, proper to the melon.

Apparition and evolution of the pathogenous agents mentioned in the title of this paper were observed to each species or hybrid separately, starting from the apparition of the first symptoms. For this purpose, there has been used the notification system that needs calculation of the following values: F% (frequency of the attack), I% (intensity of the attack) and A.D.% (attack degree) where A.D. = Fx I/100. To calculate the frequency (F%), in case of mildew and anthracnosis there have been used plant organs (leaves, respectively leaves and fruits) and in case of virosis and verticillium wilt there have been used entire plants.

Experimental results were also processed according to the experimental technique, by statistic analysis (method of multiple comparisons – the Duncan test).

RESULTS AND DISCUSSIONS

Species and hybrids tested in 2002 (draughty year). The hybrids Tornado F1, Laser F1 and Passport F1 proved to be clearly superior to the species, concerning the resistance to the studied pathogenous agents, fact that led to obtaining of some significant productions in comparison with the species from the experience. The most sensitive cultivars and the least productive proved to be the old species, Turkestan and Ananas. The species Honey Dew Green manifested sensibility to virosis, but this aspect was important in obtaining a smaller production than the hybrids. The species Halest Best Jumbo, proved to be quite resistant, but obtained a smaller production. In 2002, the differences in production

were made firstly by virosis and verticillium wilt and less by mildew, 2002 being quite hot and draughty.

Table 1

Behavior to the attack of main pathogenous agents (A.D.-%), of some cultivars in 2002

	Pathogenous Ag. / Cultivar	t/ha	Virosis	*P. cubensis*	*C. lagenarium*#	*V. dahliae*
1	Passport F1	15,6	0,73	1,52	0	0,63
2	*Halest Best Jumbo*	11,9	1,50	4,6	0,33	0,86
3	Ananas	10,3	6,83	5,25	0,52	7,33
4	Turkestan	10,6	10,23	6,03	0,50	7,10
5	Honey Dew Green	12,3	13,46	1,50	0,41	2,26
6	Laser F1	17,2	0,76	0,63	0	0,53
7	Tornado F1	17,7	1,20	0,71	0	0,40
8	Yellow Canari	12,0	6,00	4,20	0	6,63

#-NO. ANALYSED LEAVES/ EXP. PARCEL = 21
¤-NO. ANALYZED PLANTS / EXP. PARCEL = 10

Table 2

Synthesis of the experience results with 8 cultivars (species and hybrids) studied in 2002

Classification	Variant	Production T/ha	Signification
I	Tornado F1	17,7	a
II	Laser F1	17,2	a
III	Passport F1	15,6	a
IV	Honey Dew	12,3	b
V	Yellow Canari	12,0	b
VI	Hales Best J.	11,9	b
VII	Turkestan	10,6	b
VIII	Ananas	10,3	b

Variants a, are significantly distinct in comparison with variants b.

Species and hybrids tested in 2003 (draughty year). To the melons, in 2003, there were tested 5 cultivars (3 hybrids and 2 species). From the analysis of the results it has been noticed a significant sensibility of the hybrid Ananas F_1 to the attack of fungi *Verticillium dahliae* in comparison with the hybrids Joker F_1, Tornado F_1 and in comparison with the species Titus. The attack of the fungi determined obtaining to the hybrid Ananas F_1 of a production significantly inferior (14,6 t/ha) to the hybrids Joker F_1 (20,9 t/ha) and Tornado F_1 (20,5 t/ha) as well as in comparison with the species Titus (19,4 t/ha). It must be emphasized that the species Yellow Canari proved to be quite sensitive to the verticillium wilt but, the fungi attack occurred later than the hybrid Ananas F_1, this fact leading to a significant increase in production in comparison with this (19,6 14,6 t/ha comparing with 14,6 t/ha). We mention the fact that even if the species Yellow

Canari obtained a production very close to the one of the hybrids Joker F_1 and Tornado F_1 and of the species Titus, a quite high percentage (approximately 30%) of the fruits remained less sweet and without flavor. Due to the fact that 2003 was especially a draughty and hot year, the other pathogenous agents *(Pseudoperonospora cubensis* and *Colletotrichum lagenarium*) registered low values of the attack degree not offering significant differences.

Table 3

Behavior to the attack of main pathogenous agents (A.D.-%), of some cultivars in 2003

	Pathogenous Ag. / Cultivar	t/ha	Virosis	*P. cubensis* #	*C. lagenarium* #	*V. dahliae*
1	***Titus***	19,4	1,40	0,90	0	0,60
2	***Joker F1***	20,9	0,50	0,28	0	0,20
3	***Tornado F1***	20,5	0,33	0,37	0	0,32
4	***Ananas F1***	14,6	1,16	1,80	0	12,86
5	***Yellow Canary***	19,6	2,00	0,86	0	8,83

#-No. analysed leaves/ exp. parcel = 21 ¤-No. analyzed plants / exp. parcel = 10

Table 4

Synthesis of the experience results with 5 cultivars (species and hybrids) studied in 2003

Classification	Variant	Production T/ha	Signification
I	Joker F1	20,9	a
II	Tornado F1	20,5	a
III	Yellow Canary	19,6	a
IV	Titus	19,4	a
V	Ananas F1	14,6	b

Variants a, are significantly distinct in comparison with variant b.

Species and hybrids tested in 2004 (rainy year). To the melons, in 2003, there were tested 5 cultivars (3 hybrids and 2 species). Their behavior to the mildew attack and anthracnosis was significantly different. Thus, to the mildew, the hybrids Green Star F_1 and Sweet America F_1, proved to be more resistant than the species Fondant and Yellow Canari, as well as in comparison with the hybrid Ananas F1. As far as the attack of anthracnosis concerns, the most sensible proved to be the species Fondant. Very important is the fact that this species proved to be quite sensible to the anthracnosis attack on fruits, an attack that occurred after 25th of August 2004, on the background of some heavy rains fallen in the third decade of this month. The fruits of the other cultivars that made the object of the experience proved to be quite resistant, under the given conditions, to the anthracnosis attack. Regarding the production, the hybrids Green Star F_1 and Sweet America F_1 obtained significant productions (12,3 t/ha respectively 12,7 t/ha) in

comparison with the hybrid Ananas F_1 (10,0 t/ha) and the species Yellow Canari (10,9 t/ha) and Fondant (8,2 t/ha). The species Fondant proved to be significantly less productive than the other cultivars, especially due to the sensibility of the fruit to the anthracnosis attack.

Table 5

Behavior to the attack of main pathogenous agents (A.D.-%), of some cultivars studied in 2004

	Pathogenous Ag. / Cultivar	t/ha	Virosis	P. cubensis #	C. lagenarium #	V. dahliae
1	***Fondant ****	8,2	1,76	7,03	5,80	0,93
2	***Ananas F1***	10,0	2,83	4,53	3,36	2,10
3	***Yelow Canary***	10,9	1,26	5,86	2,16	2,33
4	***Green Star F1***	12,3	1,44	1,60	1,56	1,80
5	***Sweet America F1***	12,7	0,53	1,76	1,93	1,61

#-No. analysed leaves/ exp. parcel = 21 ¤-No. analyzed plants / exp. parcel = 10

Table 5

Synthesis of the experience results with 5 cultivars (species and hybrids) studied in 2004

Class.	Variant	T/ha	Significance
I	Sweet America F1	12,7	A
II	Green Star F1	12,3	Ab
III	Yelow Canary	10,9	B
IV	Ananas F1	10,0	Bc
V	Fondant	8,2	Cd

Variants a, are significantly distinct in comparison with variants b, bc and cd.
Variants ab, are significantly distinct in comparison with variants bc and cd.
Variants b, are significantly distinct in comparison with variant cd.

Species and hybrids tested in 2005 (rainy year). To the melons, in 2005, there were tested 7 cultivars (hybrids). The hybrids Ananas F_1 and Green Go F_1 proved to be more sensible to the fungus attack of *Verticillium dahliae*, this fact leading to significant differences in production in comparison with the others. It must be emphasized that in a rainy and cold year as 2005 was, the differences between the tested cultivars of melons were not caused by the specific pathogenous agents (mildew, anthracnosis) but by a pathogenous agent - *Verticillium dahliae* which usually attacks strongly in the draughty and hot years as 2003 was.

Table 7

Behavior to the attack of main pathogenous agents (A.D.-%), of some cultivars studied in 2005

	Pathogenous Ag. / Cultivar	t/ha	Virosis	P. cubensis #	C. lagenarium #	V. dahliae
1	***Early Ropey F1***	17,9	*0,35*	2,40	0,46	4,66
2	***Laser F1***	19,4	*0*	1,62	0,37	0,30
3	***New Gal F1***	18,8	*0*	1,23	0,33	0,53
4	***Ananas F1***	15,1	*2,00*	5,03	0,96	13,33
5	***Green Go F1***	14,5	*1,50*	1,86	0,83	13,43
6	***Green Star F1***	19,8	*1,75*	1,80	0,24	0,41
7	***Griffalia F1 PMR***	19,7	*0,85*	1,74	0,66	1,03

#-No. analysed leaves/ exp. parcel = 21 ¤-No. analyzed plants / exp. parcel = 10

Table 8

Synthesis of the experience results with 7 cultivars (hybrids) studied in 2005

Class.	Variant	T/ha	Significance
I	Green Star F1	19,8	a
II	Griffalia F1	19,7	a
III	Laser F1	19,4	a
IV	New Gal F1	18,8	a
V	Early Ropey F1	18,0	a
VI	Ananas F1	15,1	b
VII	Green Go F1	14,5	b

Variants a, are significantly distinct in comparison with variants b.

CONCLUSIONS

Nowadays, there is a very wide range of species and hybrids of melons. Between them, there are very big differences, regarding their behaviour to the attack of the specific pathogenous agents. This fact was proved during 4 years of observations (2002, 2003, 2004 and 2005) when there were tested a total of 11 hybrids and 7 species.

Most of the hybrids proved to be more resistant to the attack of the pathogenous agents than the species, both in the draughty years (2002 and 2003) and in the rainy years (2004 and 2005). In draughty years, highly important proves to be the resistance to the wilt determined by the fungus *Verticilium dahliae*. Most of the tested hybrids proved a good resistance to the attack of this fungus. Here we mention the hybrids: Passport F1, Laser F1, Sweet America F1, Green Star F1,

Griffalia F1. The hybrids Ananas F1 and Green Go F1 proved to be more sensible. Among the species, a very good behavior to the attack of the complex of pathogenous agents had only the species Titus, which in some cases was superior to some hybrids as Ananas F1.

Some species (Turkestan ,Ananas, Honey Dew, Yellow Canary) proved to be sensible to the verticillium wilt and virosis. In the rainy years, it is very important the resistance to the mildew (*Pseudoperonospora cubensis*) and anthracnosis (*Colletotrichum lagenarium*). In the case of the species with sensible fruits to anthracnosis (Fondant), even great losses can be registered. Excepting this species, the rest of the tested species and hybrids proved a very good resistance of the fruits to anthracnosis, a very dangerous disease during rainy summers. In case the number of years with draughty springs and summers increases, it is highly important the cultivation of hybrids of melons to have resistance to wilts, especially to the one produced by the fungus *V. dahliae* as well as to virosis. Resistance to virosis is highly important, because their attack is manifested every year, no matter if it is draughty and hot or rainy and cold.

Some species as: Turkestan, Ananas and Honey Dew proved to be sensible to the attack of the virosis.

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