DYNAMICS OF APPARITION AND EVOLUTION TO THE MELON (*CUCUMIS MELO* L.) OF THE FUNGI ATTACK *VERTICILLIUM DAHLIAE* KLEB., WICH LEADS TO VERTICILLIUM WILT IN THE DROUGHTY YEARS 2002 AND 2003 AND THE RAINY YEARS 2004 AND 2005 IN CONDITIONS OF THE BARAGAN FIELD, BRAILA AREA

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The pathogenous appears each year with different intensities and degrees of attack, firstly in accordance with the meteorological factors. The attack is stronger in draughty and hot years. In rainy and cold years, the attack of the fungus does not create problems. In order to reduce the damages produced by this pathogenous, there have been studied the factors which determine apparition and evolution of the attack. In this respect, it has been given a special importance to the first symptoms, to the evolution of these symptoms in accordance with the meteorological factors (precipitations, medium temperature, medium humidity of air, dew). After apparition, in the draughty and hot years of 2002 and 2003, the disease had a faster evolution and a higher degree of attack of 13,75% and respectively 11,70% at the end of August. In 2004 and 2005, rainy and cold years, the disease had a slower evolution of 3,16% and respectively 1,57% in the second half of August.

***Key words**: Verticillium dahliae, evolution, attack, symptoms, experience*

The attack of the fungi *Verticillium dahliae Kleb.* is developed at blooming-fructification and usually it has a slow evolution. This attack is characterized by apparition of the phenomenon of yellowing and necrosis of the leaves.

The first symptom usually appears at a leaf situated in the second quart of the plant which wilts and turns yellow especially on a side of the lamina. The leaf petiole remains turgescent. The wilt of the plant spreads towards the top as well as towards the basis of the plant. During hot and sunny weather, the plants quickly become wilt but during night they become to normal. Gradually, the wilt becomes definite, and the plants do not recover. The small fruits become brown and dry, and the big ones do not reach maturity. In a transversal section through the stem, it can be noticed the browning of the conducting vessels.

MATERIAL AND METHOD

The experiences have been performed in Braila. There have been used the species of melon Titus in 2002, 2003 and 2005, and the species Fondant in 2004. These experiences have been settled in accordance with a strict observance of the culture technology, proper to the melon. For collecting, analyzing and processing of meteorological data it has been used the "Agroexpert" system of the Phytosanitary Unit within The Office for Agriculture and Rural Development (D.A.D.R) Braila. Apparition and evolution of the *Verticillium dahliae Kleb* were recorded to the untreated reference variant, starting from the recording of the attack to the last decade of August, inclusively. The experimental results have also been treated according to the experimental technique by a statistic analysis (the method of limit differences – LD 5% and LD 1%). For evaluation of the attack, it has been used the notification system that needs calculation of the following values: F% (frequency of the attack), I% (intensity of the attack) and AD% (attack degree) where AD = Fx I/100. The plants which presented symptoms were numerous, following the attack evolution of the fungus at there plants during all vegetation period.

RESULTS AND DISCUSSIONS

Recordings in 2002 (draughty year). The attack of verticillium wilt developed starting with the second decade of July (19.07), by apparition of some marginal necrotic spots on the leaves situated at the middle level of the plants, some of these spots having the shape of letter "V". The attack degree at the beginning of the disease was diminished, being 0,42%. Starting with August, on the background of a draughty period (only 24 l/m^2 precipitation/August) and relatively hot, the pathogenous agent evolved quite fast, so that at the end of this month and the beginning of September, the attack degree of vertigilliosis reached the value of 13,75%. The preponderant symptoms of the disease were the marginal necrosis of the leaf lamina joined afterwards in a more advanced phases by yellowing and inter-nervure necrosis. To the end, the disorders of growth appeared which were followed by the complete drying of the plants. The attacked plants wilted completely during a long time (after the second decade of September) though succeeding in making fruits quite good – with approximately 5-10% smaller than those of healthy plants, being acceptable in taste. However, the plants that were not attacked by the verticilliosis had fruits qualitatively superior to those which were attacked. The plants which were attacked by mildew as well as by verticilliosis had the smallest and poorest fruits qualitatively.

Recordings in 2003 (draughty year). In 2003, the attack of the fungus *Verticillium dahliae* developed at the melons, at the studied species-Titus, on 15th of July, earlier than 2002. the beginning that was earlier than usual of this pathogenous can be explained by the severe draught that occurred during May – 35 l/m^2 of precipitations, only in the third decade and June – 14 l/m^2 in the entire month. The disease began by partial yellowing of the leaves lamina situated approximately at the middle of the creeping stem (AD=0,5%), followed a little bit later by yellowing and necrosis both inter-nervure and marginal, "V"-shaped.

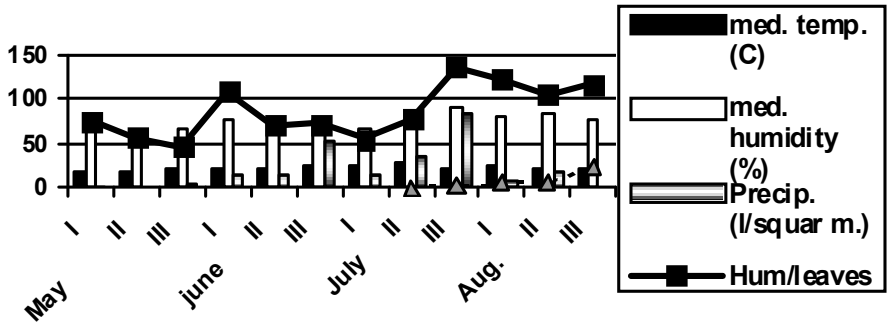

Figure 1 **Evolution of the attack of the *Verticillium dahliae Kleb* at the melon, Titus species, according to the climatic conditions of 2002.**

The disease developed quite slow in the second half of July. During August, the evolution of the attack degree of the disease grew, reaching the value of 1,92% recorded at the beginning of the month, the value of 11,7% recorded at the end of August and the beginning of September. The disorders of growth developed during August, followed afterwards by reversible wilts and at the end by the complete wilt. The affected plants succeeded to have a first small quantity of fruits at the beginning of August, quite acceptable as size and quality, these being though quite smaller than the ones made by the healthy plants. The following linked fruits remained small and did not become mature any more. The complete milt of the attacked plants lasted quite long, over 45 days starting from the beginning of the disease. This proves that the species of melon Titus under the conditions of a great infection supported better the attack of the fungus *Verticillium dahliae,* the attack in comparison with the species of watermelon Crimson Sweet, at which, at the end of August and beginning of September, the attack degree of the pathogenous was 41,3%. We underline the fact that the two cultivars were placed very close one to another, within the experimental lot of melons and watermelons, both following the same preparatory plant (tomatoes).

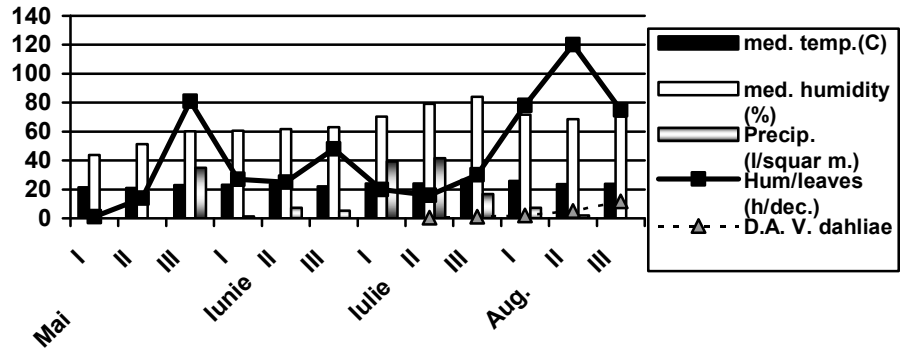

Figure 2 **Evolution of the attack of the *Verticillium dahliae Kleb* at the melon, Titus species, according to the climatic conditions of 2003.**

Recordings in 2004 (rainy year). In comparison with the previous years, this pathogenous did not raise special problems in 2004. the disease began on 20th of July totally isolated, the attack degree being reduced (0,30%). Furthermore, the evolution of the pathogenous was slow in the third decade of July. Starting with August, the fungus had a quite faster evolution, due to the heavy rain from the end of July which were followed by a draughty period in the first part of August, determining an attack degree at the middle of August of 3,16%. Towards the end of August, the very strong attack of the mildew (A.D. – 85,6% in the third decade of August) made the symptoms of verticilliosis be dominated by those of mildew being practically impossible to be distinguished the contribution of this fungus to the regress of the attacked plants. This manifestation weaker in 2004 than in previous years of the verticilliosis to the melons can have different causes, as:

- weaker source of implant due to the change of location of experience in 2004, on a field previously cultivated with corn, species unaffected by verticilliosis. We underline that in the previous year, this corn crop was well maintained in the point of weeds' fight, especially of dicotyledonous which are frequently hosts for verticilliosis as the species of *Xanthium, Amaranthus, Chenopodium, Cirsium, Sonchus, etc.*;

- medium temperatures quite lower than usual, from May and June and the weather quite wetter did not create optimum conditions for the fungus.

The studied cultivar – Titus proved to have a quite good tolerance to this pathogenous which in some hot and draughty years under certain conditions, can produce serious losses, especially to the sensitive cultivars.

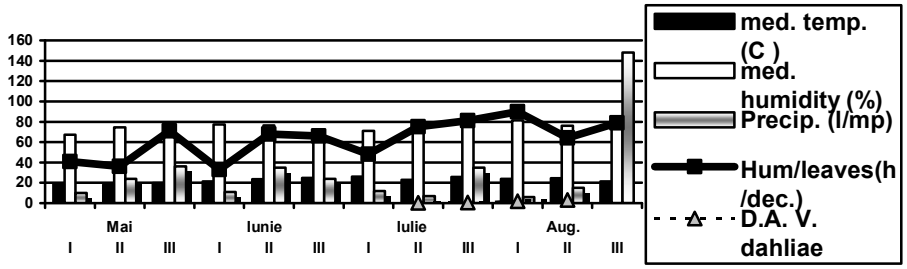

Figure 3 **Evolution of the attack of the *Verticillium dahliae Kleb* at the melon, Fondant species, according to the climatic conditions of 2004**

Recordings in 2005 (rainy year). In 2005, the verticillium wilt began at the studied species Titus, in the second decade of July – 17-07, the attack degree at the beginning being low – 0,40%. The disease manifested by slightly partial yellowing of the lamina, joined by marginal necrosis, some being "V"-shaped. Evolution of the pathogenous agent, from the start to the beginning of August, was slow, thus the value of the attack degree at the end of the first decade in August was only 1,34%, being much smaller than the previous years. We appreciate that the slower evolution of the verticillium wilt in 2005 was due both to the climatic conditions less convenient to the development of the pathogenous, and to a tolerance quite

good of the studied cultivar. Some cultivars studied in 2005 presented stronger attacks of this disease in comparison with the Titus species.

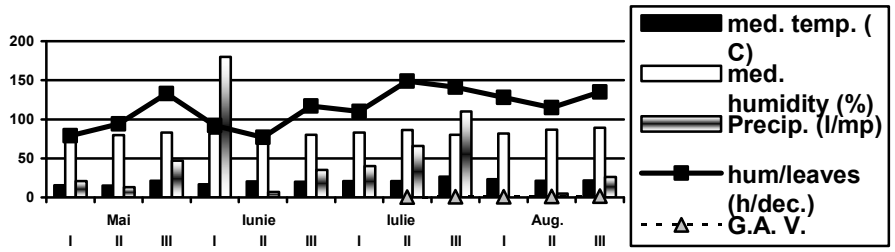

Figure 4 **Evolution of the attack of the *Verticillium dahliae Kleb* at the melon, Fondant species, according to the climatic conditions of 2005**

CONCLUSIONS

From the analysis of the obtained results, it has been concluded that in the draughty and hot years (for example 2003) the risk of apparition of some dangerous attacks of some soil fungus – especially *Verticillium dahliae,* increases very much. Due to the fact that the soil pathogenous agents have completely different ways of attack, biology and ecology towards those which attack the air organisms, evaluation of their risk of apparition is highly difficult. It is important to emphasize that application of treatments at soil with specific phyto-pharmaceutical products – consisting in Metiltiofanat, Carbendazim or Benomyl (Topsin, Bavistin, Benlate etc.) is extremely difficult, and some authors mention that their action is slow.

Among the most important factors in apparition of some dangerous attacks of verticillium wilt, there are:

- resistance, tolerance, respectively sensibility of the cultivar. It is the most important factor, because even during years with meteorological conditions favorable to the attack and great source of implant, the resistant cultivars recorded good productions quantitatively and qualitatively;
- in case May and June are draughty and hot, the risk of attack apparition of the two pathogenous agents increases very much;
- occurrence of heavy rains followed by very high temperatures and soil cracking, especially in July, increase very much the risk of apparition of this disease;
- Non-observance of a rational alternation of crops, in which the cucurbitaceous and other sensitive species are successively cultivated, contribute very much to the increase of the risk of apparition of the fungus *Verticillium dahliae* attack which attacks a great number of cultivated and spontaneous species;
- the attack of some predators on soil – especially in June and July, as the wireworms (Agriotes.sp) that offer entrances for the pathogenous through the lesions they make on roots, fact that occurred quite frequently in 2003.

In the rainy and cold years, the attack of *Verticillium dahliae* is smaller but in these years, the sensitive cultivars might have problems.

Under the conditions of some draughty and hot springs, of cultivating species or a sensitive hybrid, of existence of a great supply of wireworms (Agriotes sp.) in soil and of non-observance of crop alternation, it is very possible apparition of some strong attacks of the fungi *Verticillium dahliae* starting with the second half of July to The melons.

BIBLIOGRAPHY

1. Davies, R. M., Gubler, W. D., 2004 - *Cucurbits Verticillium Wilt Pathogen: Verticillium dahliae* University of California.
2. Marinescu, Gh., Costache, M., Stoenescu, A 1986 - *Diseases of the Vegetable Plants*, Ceres Publishing House, Bucharest.
3. Săulescu, N. A., Săulescu, N. N. 1967 - *Field of Experiences*, Agro-Silvica Publishing House, Bucharest.
4. Velichi, E., 2006 - *Contributions to the technology of prevention and integrated control of the pathogenetic agents of melon water melon within Baragan Plain (Braila area).* Doctoral Thesis. U.S.A.M.V.