

EVALUAREA UNOR SOIURI DE CĂPȘUN PRIVIND COMPORTAREA LA ATACUL AGENTILOR PATOGENI DE NATURA FUNGICĂ FIELD EVALUATION OF SOME STRAWBERRY CULTIVARS REGARDING THEIR BEHAVIOR TO FUNGAL PATHOGENS

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Abstract

The researches were done between 2012-2013, many observation and assessments being carried out in strawberry field, on the incidence (F%), severity (I notes; I %) and damages degree (DD%) of diseases which affect the strawberries foliage: *Mycosphaerella fragariae* - leaf spot, *Podosphaera aphanis* - powdery mildew and *Diplocarpon earliana* - leaf scorch. Under the environment of South-central of Roumania, the most tolerant cvs. on the *Mycosphaerella fragariae* - leaf spot were: 'Cambridge Favourite' (GA%=0.00-0.06) and 'Mira' (GA%=0.00-0.86). As regard the behavior on the *Podosphaera aphanis* - powdery mildew attack, the most tolerant cvs. were 'Cambridge Favourite', 'Onebor', 'Idea' (GA%=0.00) and 'Elsanta' (GA%=0.00-1.70). The most tolerant cvs. on the *Mycosphaerella fragariae* - leaf spot were: 'Benton', 'Mira', 'Idea' (GA%=0.00) and 'Cambridge Favourite' (GA%=0.00-0.03). 'Mira' and 'Onebor' are still used in strawberry breeding.

Cuvinte cheie: căpșun octoploid, fungi, frunză

Keywords: *Fragaria x ananassa*, fungi, leaf

1. Introduction

In open field, strawberry is often attacked by many pathogens, causing fruit, leaf and crown diseases which are important factors in strawberry production in Romania. The severity of them depends on cultivar susceptibility (Muller, 1965) weather conditions (Jarvis 1964) and level of infections source (Meszka and Bielenin, 2011).

In order to extend the strawberry surfaces, one of the solutions is to integrate less polluted technologies with the most adapted cultivars at so much soil diversity and environment of Romania.

The paper presents the results of some strawberry cvs. grown in open experimental field at RIFG Pitesti, according with their behavior at main fungi attack.

2. Material and methods

During 2012-2013, the strawberry cvs.: 'Cambridge Favourite', 'Elsanta', 'Benton', 'Onebor', 'Mira', and 'Idea' were conventionally grown (37,000 plants/ha), in a perennial field trial, planted in single rows, in a randomized block design, including 20 plants per variant (cultivar) and 4 replications.

Along the experimentation period, meteorological data were collected using the automatic weather station WatchDog and processed using the Specware 9.0 Pro software (Specware Inc. Plainfield, Illinois USA).

Observations and assessments were done regarding the disease incidence (F %) and the attack severity (I notes or I % area) for three fungi affecting the foliage of the strawberries: *Mycosphaerella fragariae* - leaf spot, *Podosphaera aphanis* - powdery mildew and *Diplocarpon earliana* - leaf scorch. The attack frequency was calculated using the formula: $F = n / N \times 100$, where, n = no. of affected organs, and N = total no. of the de observed organs. For the attack intensity (I) the 0-6 scale was used, where, note '0' = lack of strike, note '1' = 5 %, note '2' = 20 %, note '3' = 35 %, note '4' = 60%, note '5' = 80 % and note '6' = 90 % of leaves surface which is affected (according the scale proposed by Delhomez Nathalie, Odile Carisse and Lareau M., 1995).

The data were collected on four replicates and ranged using Microsoft Office Excel 2003 facilities, for each cultivar being calculated the damage degree, depending on the moment when the observations and assessments were done under the concrete field conditions. This indicator was represented also as histogram type charts. The statistical data assessment was realized using the analysis, definition and

integration software Rresearch Manager 7.4.1., Gylling Data Management Inc., Brookings, South Dakota, USA). Statistical tests were performed and the most relevant was the Duncan Test.

3. Results and discussions

Results on the evolution of meteorological parameters that influence the behavior of strawberry cvs. to fungi attack. Analyzing of the figures 1 and 2 on can observe that both in the year 2012 and 2013 as well, there good conditions for the occurrence and the development of the fungal maladies on strawberry. During 2012 the most favorable periods for the fungal infections were: the end of April, the beginning of May and on for shorter intervals from June till the end of September. In 2013, the most favorable periods for fungal infections were from the second decade of April until the end of September.

The assessments of the Fig. 3 reveals that in 2012, the leaf wet extent suddenly overpass 11 hours/day in April, 10 hours/day in May, June and the end of July and again 11 hours/day at the beginning of September. Such conditions favored especially the development of *Mycosphaerella fragariae* - leaf spot.

From the Fig. 4 on can observe that in 2013, although leaf wet extent suddenly overpass 11-12 hours/day, the development of the fungi *Mycosphaerella fragariae* - leaf spot and *Podosphaera aphanis* - powdery mildew were less favored.

Mycosphaerella fragariae - leaf spot. By the examination of the Fig. 5 and 6 it observes that the attack of was present both in 2012 and 2013.

In 2012, depending on the period when the evaluation was carried out the most attacked varieties were in descendent order: 'Elsanta' (DD%=8.93-13.88), 'Onebor' (DD%=9.10-10.06) and Benton (DD%=0.05-6.03). On the 'Mira' and 'Idea' cvs. the damages degree was under the economic damages threshold (EDT), DD%=0,00-0,86 and respectively 0,08-0,95. The less affected variety was 'Cambridge Favourite' with DD%=0.00-0.06.

Under the conditions of the year 2013, during the summer, the attack of *Mycosphaerella fragariae* - leaf spot was under the economic damages threshold (EDT), on the all cvs. (DD%=0.00-0.19). 'Cambridge Favourite' had not any symptoms of attack on leaves (DD%=0.00). The first differentiation was observed late on the end of September, the most affected cvs. Being: 'Idea' (DD%=4.75), 'Onebor' (DD%=3.60) and 'Elsanta' (DD%=3.10). 'Cambridge Favourite' also proved the less affected leaves (DD%=0.06).

Podosphaera aphanis - powdery mildew. The assessment of the Fig. 7 and 8 reveals that the attack of the powdery mildew fungi was present in 2012 as well as in 2013.

Under the condition of 2012, the attack of the pathogenic fungi *Podosphaera aphanis* didn't occurs on cvs. leaves, except 'Elsanta' on which the damages degree DD% was only 1,7.

Under the conditions of the 2013, during the summer, the attack of the pathogenic fungi *Podosphaera aphanis* - powdery mildew was evident in the mid of May when only 'Mira' (DD%=1.45) and 'Benton' (DD%=0.75%) were affected. At the end of the vegetation period the most affected cvs. were also 'Mira' (DD%=3.75) and 'Benton' (DD%=2.65%).

Diplocarpon earliana - leaf scorch. Under the conditions of 2013, during the vegetation period, the attack of this fungi was more pregnant on the end of May, but far from economical damage threshold (EDT) and only at the cvs. 'Elsanta' and 'Onebor' (DD%%=0,04, respectively DD%=0,05).

At the end of the vegetation period, the attack was evident at: 'Elsanta' (DD%=0.3) and 'Onebor' (DD%=0.28) and slight detectable at 'Cambridge Favourite' (DD%=0.03).

4. Conclusions

The most tolerant cvs. on the *Mycosphaerella fragariae* - leaf spot attack were: Cambridge Favourite (GA%=0.00-0.06) and 'Mira' (GA%=0.00-0.86).

As regard the behavior on the *Podosphaera aphanis* - powdery mildew attack, the most tolerant cvs. Proved to be 'Cambridge Favourite', 'Onebor', 'Idea' (GA%=0.00) and 'Elsanta' (GA%=0.00-1.70).

The most tolerant cvs. on the *Mycosphaerella fragariae* - leaf spot during 2012 – 2013 period were: 'Benton', 'Mira', 'Idea' (GA%=0.00) and 'Cambridge Favourite' (GA%=0.00-0.03).

References

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Figures

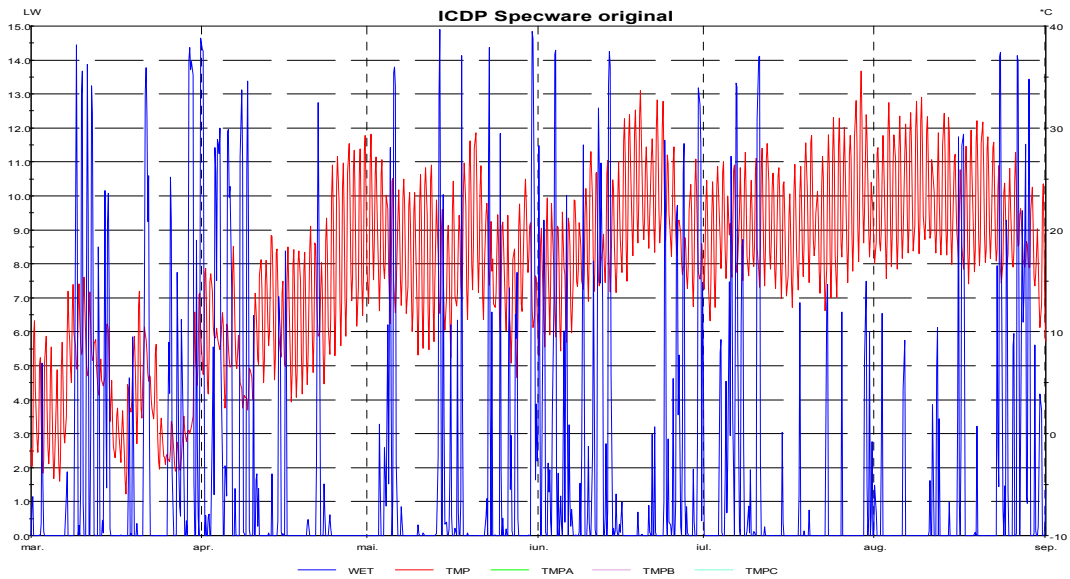


Fig. 1. The relationship between temperature and air relative humidity TEMP(*C)-HUM(%) RIFG Pitesti-Romania 2012

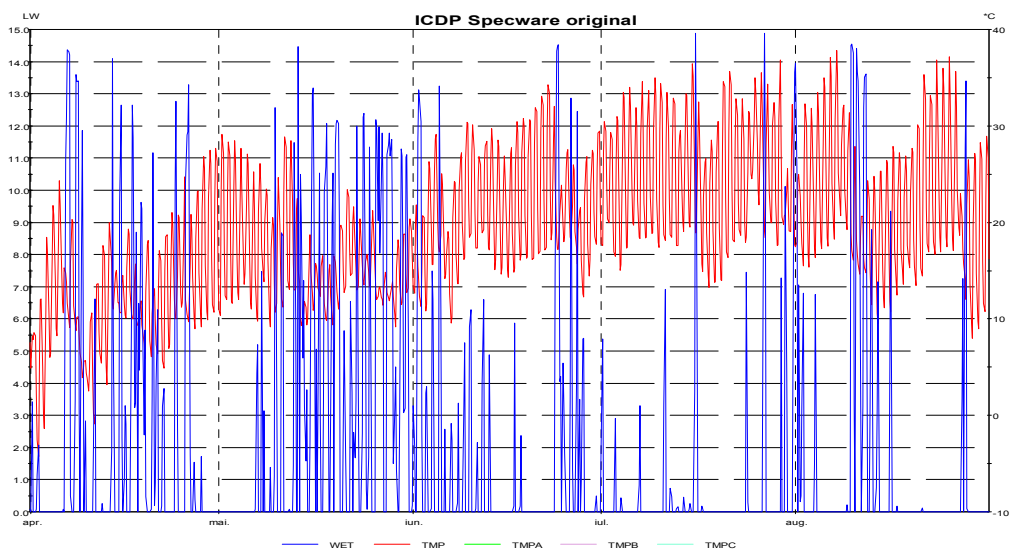
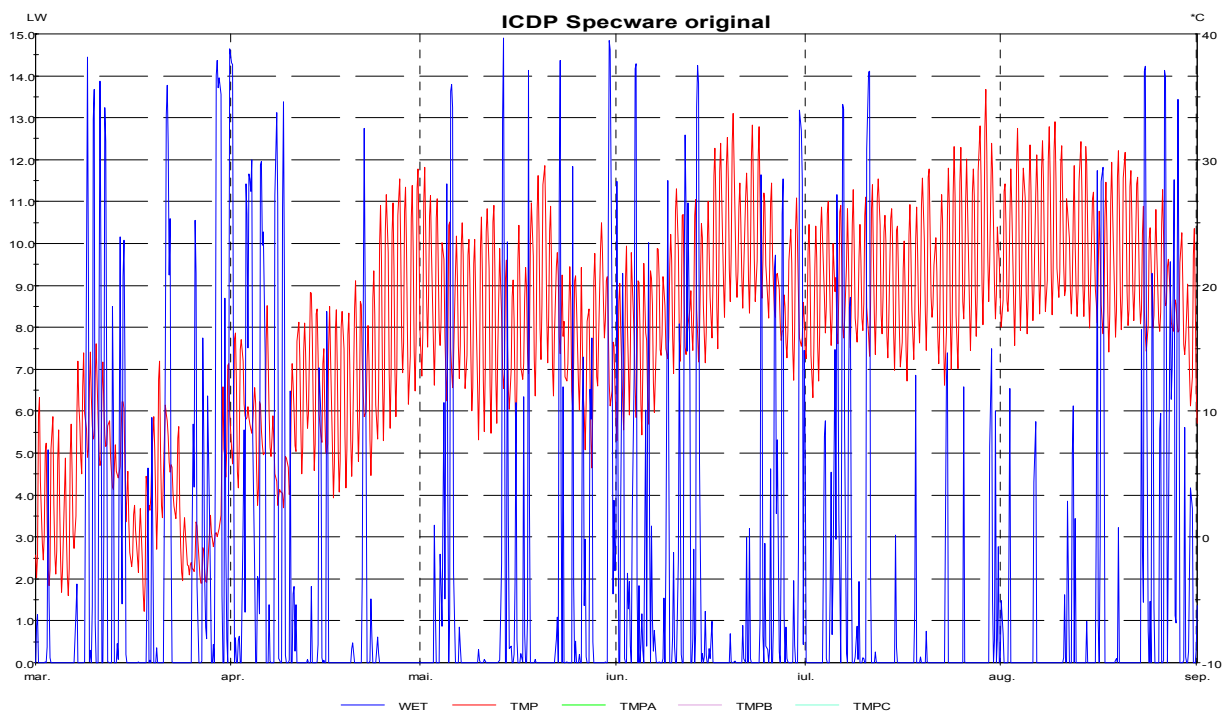
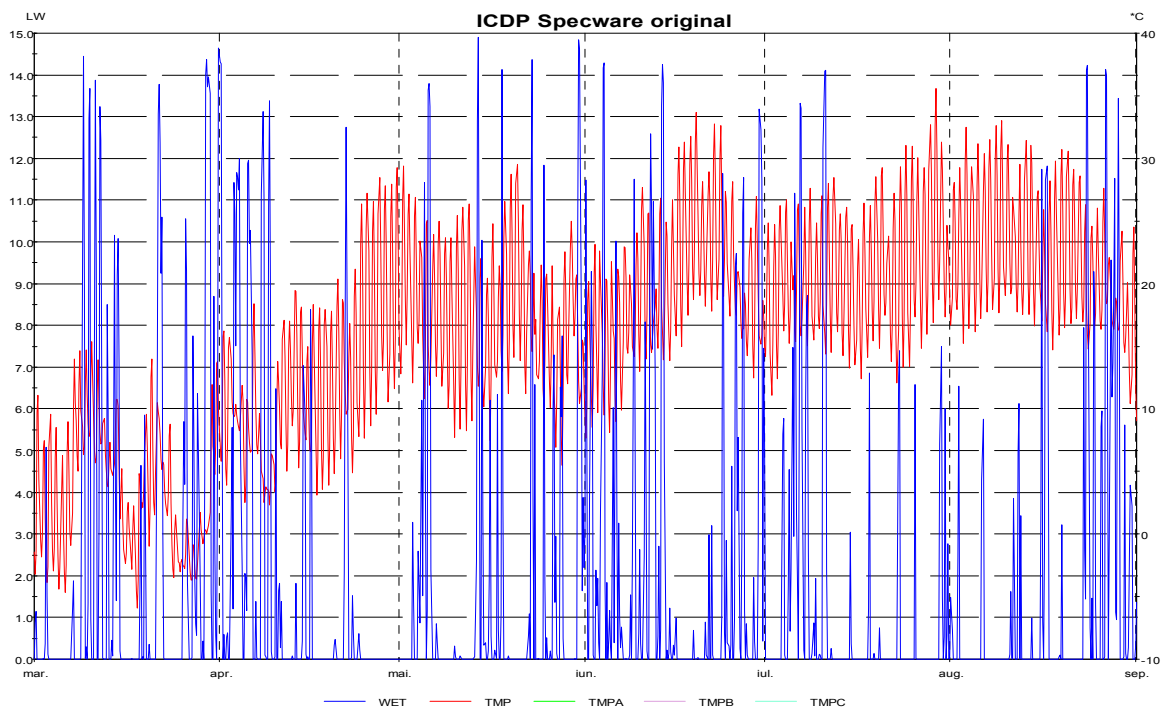


Fig. 2. The relationship between temperature and air relative humidity TEMP (*C) – LWET (h) RIFG Pitesti-Romania 2013



**Fig. 3. The relationship between temperature and leaf wet hours TEMP (°C) - LWET (h)
RIFG Pitesti-Romania 2012**



**Fig. 4. The relationship between temperature and leaf wet hours TEMP (°C) - LWET (h)
RIFG Pitesti-Romania 2013**

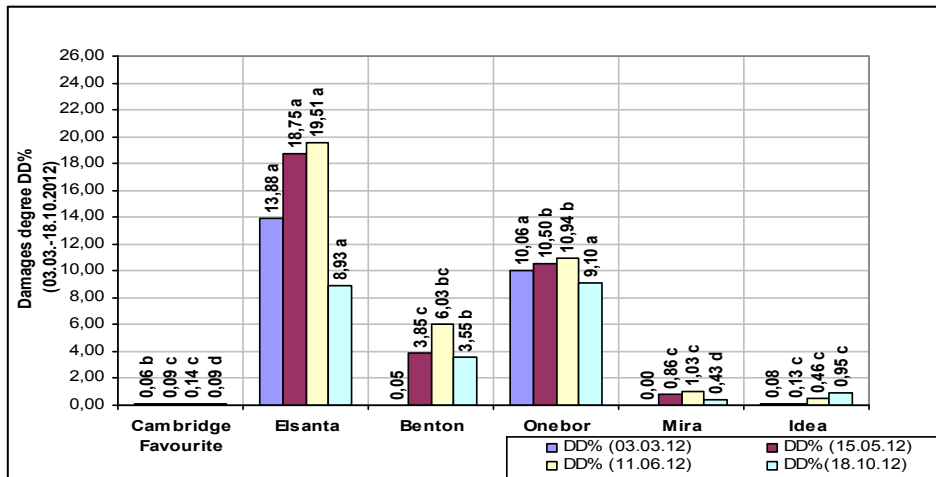


Fig. 5. Strawberry cvs. behavior on *Mycosphaerella fragariae* attack (RIFG Pitesti Romania, 2012)

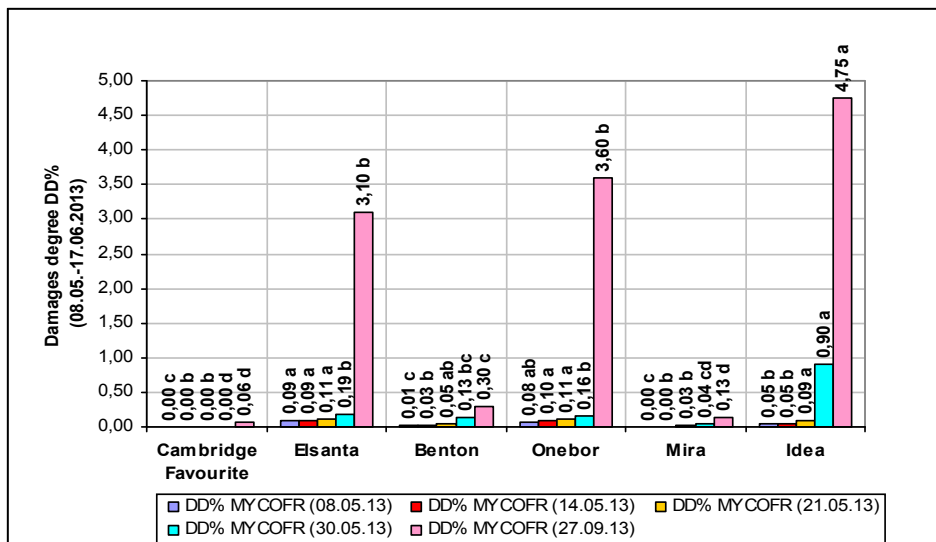


Fig. 6. Strawberry cvs. behavior on *Mycosphaerella fragariae* attack (RIFG Pitesti Romania, 2013)

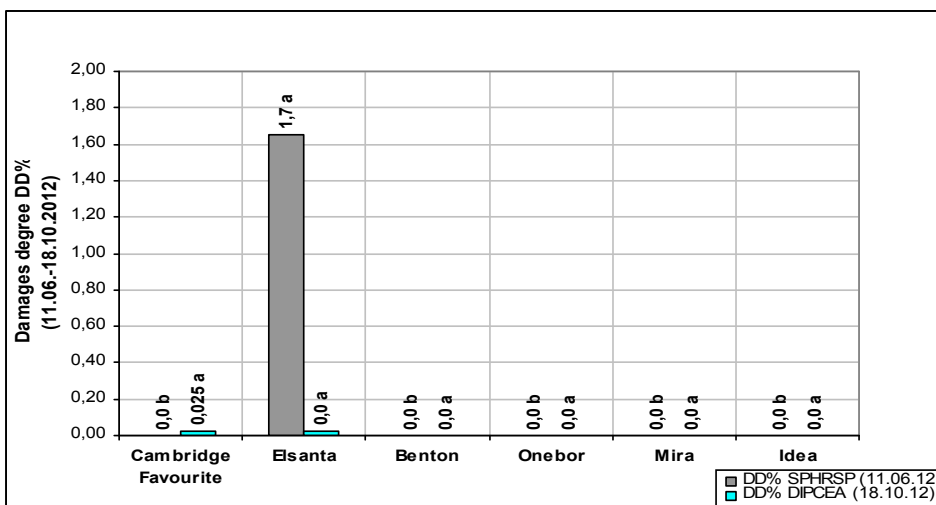


Fig. 7. Strawberry cvs. behavior on *Podosphaera aphanis* and *Diplocarpon earliana* attack (RIFG Pitesti Romania, 2012)

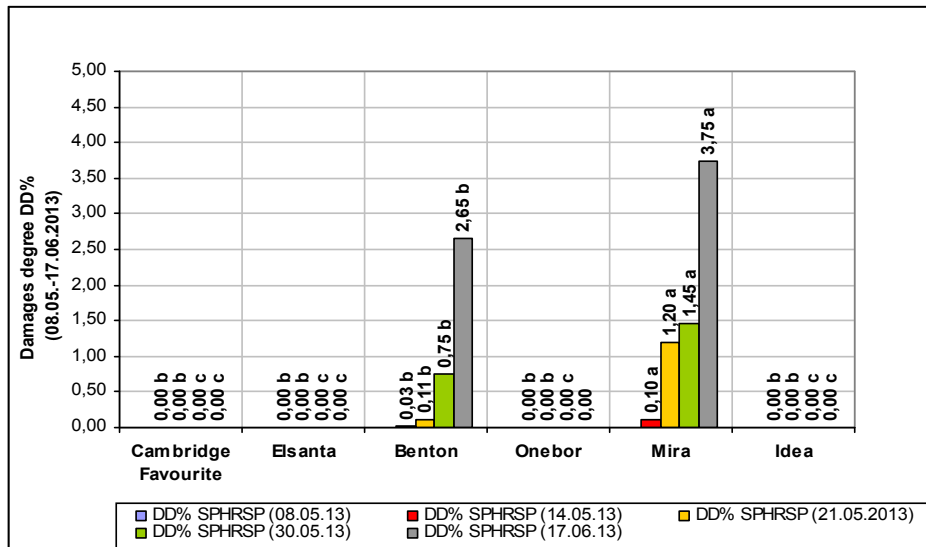


Fig. 8. Strawberry cvs. behavior on *Podosphaera aphanis* attack (RIFG Pitesti Romania, 2013)

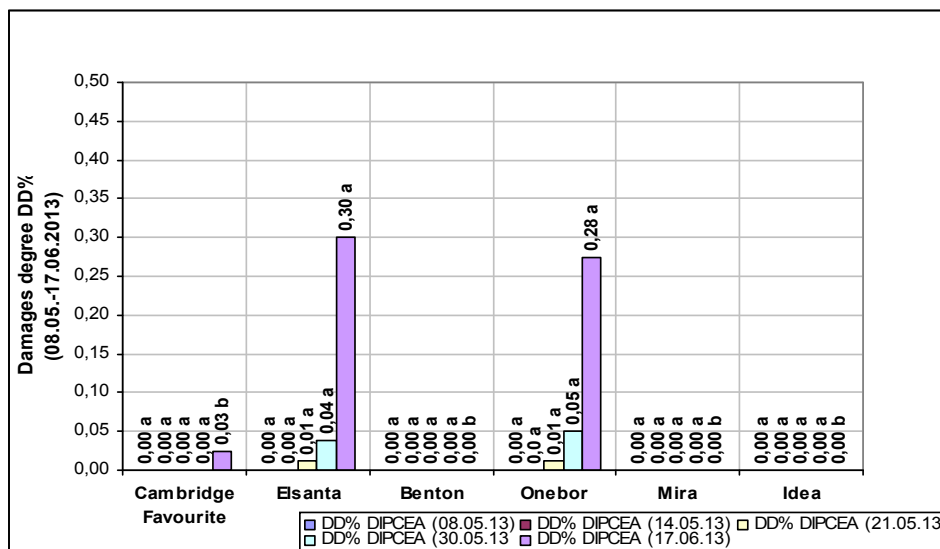


Fig. 9. Strawberry cvs. behavior on *Diplocarpon earliana* attack (RIFG Pitesti Romania, 2013)