Research Journal of Agricultural Science, 46 (1), 2014

CARAWAY (*CARUM CARVI*) DISEAS ON WILD FLORA.

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Abstract. *Research aim was to determine the caraway diseases on the wild flora from Nera river basin and to see the spread of those diseases Stage of research is being characteristic for partial interpretation of experimental data after the first experimental year, in preparation the doctoral thesis.*
Materials and methods - observations were carried out in 2013, between June and October. Those observations consist from two separate operations: first operation was to determine the areas with representative populations of caraway(Carum carvi), second to determin if this plants are affected of some pathogens and third operation was to evaluate the attack parameters of each pathogen.
The novelty is relatively high, work providing important data for agricultural practice in the experimental area, taking in consideration the implications this are plants used for a relatively large scale for some pharmaceutical and cosmetic industry and also for food preparation as spice. From this point of view there are restrictions concerning plants from wild flora because they are considered to be sources for resistance genes at diseases in the plant breeding process. Achievements stage in this field. In this work were carried out research concerning the possible reactions of the pathogens depending on local biocoenosis factors. Limits of the research are that data from the research are just from one year readings. Practical implications of the research consisted of playing a part of a complex study of the diseases of medicinal plants from wild flora on the Nera river basin. The originality of the work comes from the fact that data are relevant in view of mapping of the diseases of medicinal plants from wild flora which are considered to be genetic resources for breeding process. Importance of the paper became from bringing in front of the specialists a new topic concerning new and data, from observations of pathogens behavior in relation with caraway plants from wild flora.
Key words: *Carum carvi, wild flora, diseases*

INTRODUCTION

Romania is a member of CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora) from 1994 as it is specified in the treaty, all CITES representatives convene at least once every 2 or 3 years to evaluate the state of the world's wild fauna and flora. As is known, plants of spontaneous are equally exposed to the attack of pathogens as those from normal field crops.

In many cases spontaneous plants are selected and used as genitors in plant breeding process. Many such selections are made in order to improve the resistance of plant varieties or breeding lines to different pathogens. From this point of view, plant health evaluation of spontaneous gene corresponds to assess the status of reserve that can be used in the plant breeding. Finally the evaluation of the health status of populations of spontaneous plant species and provide data for evaluating the pressure of various infectious pathogens and their spreding area.

In this paper we wanted to render an assessment of the health of the cumin(*Carum carvi*) plants from spontaneous flora in the middle basin of the Nera river. Number of 10 surveys was considered sufficient given that these locations were between 1 and 2 acres and all of 10 determinations were made on the largest diagonal.

MATERIALS AND METHODS

During 2013 were conducted assessments of *Carum carvi* populations in the area of l Potoc, Slatina Nera and Sasca places (both Romanian and Sasca Sasca Montana) located in the middle basin of the Nera river. Locations consisted of typical plant associations for high meadow of Nera river. In each of these locations were made by 10 surveys on plant density cumin and assessed the attack frequency and intensity of powdery mildew *(Erysiphe martii f.sp. carvi)* and septoria *(Septoria carvi)*.

Number 10 determinations for each populations was considered sufficient taking in consideration that these locations were about 1 hectare. All 10 determinations were made diagonally in all locations. Based on registred data of the attack frequency and intensity was calculated degree of attack as synthetic index for each of the two pathogens.

RESULTS AND DISCUSSION

The locations chosen for the measurements are located on land not used for agriculture but for hay or grazing freely. It also should be noted that receiving sunlight all day and water, especially in terms of atmospheric moisture because of the vicinity of river Nera, caraway plant density in all three locations showed an average of 3.5 plants / m^2 (table 1). Compared to this average, even if the average of this population seems relatively close, there are relevant differences between them. The plant density of Sasca population was at a significantly negative difference from the mean while density of Potoc population stood at a significant difference compared to the populations average.

Over the past year in all three locations analyzed, caraway plants were attacked by two pathogenic fungi: powdery mildew caused by the fungus *Erysiphe martii f.sp. carvi* and septoriosis produced by fungus *Septoria carvi*. Both fungi symptoms were observed and evaluated after we evaluate the simptoms produced by anamoph funguses stages.

Analysis of data from caraway mildew evaluations from table 1, point out that the attack frequency, between the three populations, the lowest frequency of attack was registred by Slatina Nera population which stood at 46 % , a difference located below the level of significance compared to the control. The highest frequency of mildew attack was recorded at Sasca population whose average was at a significant difference from the control.

The intensity of attack, however, show larger differences among the three populations. Thus while the population Sasca averaged below the limit of significance while the average of powdery mildew attack intensity on Slatina Nera population stood at a significant difference while the average of mildew attack intensity on Potoc population was at a negative significant difference compared to the control.

The degree of attack of the fungus *Erysiphe martii*, as a synthetic indicator of the frequency and intensity of attack, showed that in fact the most affected by powdery mildew attack was Sasca population whose average degree of attack was situated at a significant difference from the control and the lowest affected by powdery mildew was Potoc population whose average degree of attack was at a negative significant difference from control.

Septoria carvi fungus attack (table 2) shows instead a different behavior of plants against pathogens. The frequency of attack of the fungus Septoria carvi has the highest average population Potoc, while the lowest frequency of attack of septoria population was recorded at Slatina Nera.

The intensity of attack of the fungus *Septoria carvi* recorded the highest average at populations of Slatina Nera and Sasca with a significant differences from control. Population Potoc record the lowest intensity of attack, its average was situated at a negative significant differences from control.

. The attack degree of the fungus *Septoria carvi* infection averages recorded at all three populations medium was situated below the level of significance. This point out that the attack frequency and attack intensity were in a dynamic balance between the three locations and the attack parameters was greatly influenced by the local microclimate conditions.

Table 1.

Caraway population density in four locations of Nera river basin and caraway powdery mildew *(Erysiphe martii f.sp. carvi)* attack parameters (frequency, intensity and attack degree) for the same surveys in 2013.

Survey	Caraway density (plants/m^2)				Caraway mildew frequency (%)				Caraway mildew intensity(%)				Caraway mildew attack degree			
	population of Sasca	population of Slatina Nera	population of Potoc	Average	population of Sasca	population of Slatina Nera	population of Potoc	Average	population of Sasca	population of Slatina Nera	population of Potoc	Average	population of Sasca	population of Slatina Nera	population of Potoc	Average
1	4	3	3	3,3	70	60	60	63,3	30	40	20	30,0	21	24	12	19,0
2	3	3	4	3,3	30	30	50	36,7	40	40	40	40,0	12	12	20	14,7
3	3	5	4	4,0	60	20	70	50,0	40	30	30	33,3	24	6	21	17,0
4	3	3	4	3,3	40	40	50	43,3	30	50	30	36,7	12	20	15	15,7
5	4	4	3	3,7	50	30	60	46,7	60	60	30	50,0	30	18	18	22,0
6	5	2	3	3,3	60	60	30	50,0	40	30	60	43,3	24	18	18	20,0
7	3	3	6	4,0	60	60	30	50,0	30	30	40	33,3	18	18	12	16,0
8	1	4	4	3,0	40	50	40	43,3	30	60	30	40,0	12	30	12	18,0
9	2	3	3	2,7	70	60	30	53,3	60	50	20	43,3	42	30	6	26,0
10	3	6	5	4,7	30	50	60	46,7	40	40	40	40,0	12	20	24	18,7
Average	3,1	3,6	3,9	3,5	51	46	48	48,3	40	43	34	39,0	20,7	19,6	15,8	18,7
Difference	-0,4	0,1	0,4	witness	2,7	-2,3	-0,3	witness	1,0	4,0	-5,0	witness	2,0	0,9	-2,9	witness
Signfic.	o	-	*	-	*	-	-	-	-	*	o	-	*	-	0	-
DL 5% =0,2 DL 1% = 0,5 DL 0,5 % = 1,2					DL 5%=2,4 DL 1%=5,7 DL 0,1%=12,3				DL 5% = 3,1 DL 1% = 6,3 DL 0,1% = 14,2				DL 5% = 1,7 DL 1% = 3,3 DL 0,1% = 8,2			

Table 2.

Caraway population density in four locations of Nera river basin and caraway septoriosis *(Septoria carvi)* attack parameters (frequency, intensity and attack degree) for the same surveys in 2013.

Survey	Caraway density (plants/m^2)				Caraway septoriosis frequency (%)				Caraway septoriosis intensity(%)				Caraway septoriosis attack degree			
	population of Sasca	population of Slatina Nera	population of Potoc	Average	population of Sasca	population of Slatina Nera	population of Potoc	Average	population of Sasca	population of Slatina Nera	population of Potoc	Average	population of Sasca	population of Slatina Nera	population of Potoc	Average
1	4	3	3	3,3	60	40	30	43,3	20	30	10	20,0	12	12	3	9,0
2	3	3	4	3,3	60	30	40	43,3	10	30	10	16,7	6	9	4	6,3
3	3	5	4	4,0	40	40	70	50,0	30	20	30	26,7	12	8	21	13,7
4	3	3	4	3,3	60	60	50	56,7	30	30	20	26,7	18	18	10	15,3
5	4	4	3	3,7	20	50	60	43,3	40	10	20	23,3	8	5	12	8,3
6	5	2	3	3,3	40	40	40	40,0	20	20	30	23,3	8	8	12	9,3
7	3	3	6	4,0	60	30	50	46,7	20	30	20	23,3	12	9	10	10,3
8	1	4	4	3,0	50	50	40	46,7	30	20	20	23,3	15	10	8	11,0
9	2	3	3	2,7	50	70	60	60,0	20	20	30	23,3	10	14	18	14,0
10	3	6	5	4,7	30	40	40	36,7	20	30	30	26,7	6	12	12	10,0
Average	3,1	3,6	3,9	3,5	47	45	48	46,7	24	24	22	23,3	10,7	10,5	11	10,7
Difference	-0,4	0,1	0,4	witness	0,3	-1,7	1,3	witness	0,7	0,7	-1,3	witness	0,0	-0,2	0,3	witness
Signfic.	o	-	*	-	-	oo	*	-	*	*	o	-	-	-	-	-
DL 5% = 0,3 DL 1% = 0,7 DL 0,5 % = 1,2					DL 5% = 0,9 DL 1% = 1,5 DL 0,1% = 3,1				DL 5% = 0,5 DL 1% = 1,4 DL 0,1% = 4,2				DL 5% = 0,7 DL 1% =1,8 DL 0,1% = 4,2			

CONCLUSIONS

1. The three populations of caraway (Carum carvi) are significant in number of individuals, revealing a reserve worthy of consideration for plant breeding.

2. Mildew was present in all three locations, analyzing the attack as a synthesis of the frequency and intensity of attack indicate a greater sensitivity of the Sasca population plants and reduced susceptibility to powdery mildew attack on plants from population Potoc .

3. Fungus *Septoria caravi* was also present in all three locations analyzed. The level of attack of this fungus revealing practically equal sensitivity of the plant popations averages because the attack degree of the fungus Septoria carvi was below the limit of significance on all three populations.

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