STUDY CONCERNING THE MORPHOLOGICAL AND BIOLOGICAL CHARACTERISTICS OF THE SPECIES OENOTHERA BIENNIS L. IN THE BIOLOGICAL SYSTEM IN THE WESTERN ROMANIA

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Abstract: *This paper present studies on the morphological and biological characteristics of the species Oenothera biennis L. in the biological system, in the western Romania (Timis and Bihor counties) in two areas: one in the plain and one in the hill. The species is important from medical point of view; people's interest in medicinal plants has increased greatly due to side effects of drugs obtained by chemical leading to serious complications. The research was conducted under specific conditions of sustainable agriculture and the influence of experimental factors on the morphological and biological characteristics. The purpose of the researches was to increase knowledge on the behavior of the morphological and biological features. The experiences were place in the period 2011-2012 and they followed: plant height, ramifications number/plant, capsules number/plant, 1000 grains weight. The seed was produced at the Department of Crop. The researches were made in two periods of seed: March and October. We used different doses of natural fertilizer (50kg a.s. N/ha, 100 kg a.s. N/ha, and 150 a.s. N/ha). It is due to mention that 170 a.s. N/ha is the maximum amount of organic nitrogen allowed by national and European law to be used in the organic cultures. Average height was significantly closer between the two seed periods; number of ramifications/plant was also about the same, with minor differences, number of capsules/plant was grown with organic nitrogen dose, so the number of capsules / plant was less influenced by sowing period. Sowing in spring (March) , late autumn (October), do not influence the level of significance grains 1000 grain weight.*

Key words: *ramification, capsules, height, 1000 grain weight, plant.*

INTRODUCTION

The paper is important because bring news on biological and morphological characteristics at *Oenothera biennis* L. species. To accomplish this goal were made biometric measurements concerning the number of ramifications/plant, number of capsules/plant and measurements to determine the average height of plant.

Evening primrose-*Oenothera biennis* L. is a plant that began the existence 70.000 years ago in Central America, is called " natural healer " or " King who heals everything." The plant was the main food for American tribes, at the beginning was cultivated for roots nutritional edible, oil seed, oil valuable for the content in gamma -linolenic acid.

It spread throughout Europe and West Asia, New Zealand , Australia. In Romania is present in the following regions: Arad, Orşova, Baia de Arama, Bistrita Nasaud, Galati, Fălticeni Medgidia. It is widespread in places sandy riverbank, gravel, along railroads, pastures, fallow land.

Evening primrose-*Oenothera biennis* L. is a species from Onagraceae (Oenotheraceae) family, native from North America, known as “natural cure” or “king`s cure all”, finds good pedoclimatic conditions in the Romanian Western Plain.

MATERIAL AND METHOD

The seed was produced at the Department of Crop. The researches were made in two periods of seed: March and October. We used different doses of natural fertilizer (50kg a.s. N/ha, 100 kg a.s. N/ha, and 150 a.s. N/ha). It is due to mention that 170 a.s. N/ha is the maximum amount of organic nitrogen allowed by national and European law to be used in the organic cultures.

The experiments were realized in a hilly area and plain, two types of soil : clay loam and cambic chernozem.

The row distance was 50 cm, number of repetitions: three. The previous plant was autumn wheat.

The results were calculated by analyzing the statistic string of variations. The results were calculated in accordance with the display in the field, respectively the bifactorial experiments type 2 x 3, with three repetitions.

RESULTS AND DISCUTION

Results of the experiences in the year 2011 on plant height variation, depending on the time of sowing and fertilization presented in tab.no. 1, shows that average levels of fertilization, plant height was approximately equal in the two periods of sowing.

Nitrogen fertilizers have increased the size, in the investigated field N_0-$N_{150,}$ with 22 cm in variants sown in spring and with 29 cm in variants sown in autumn.

Summary of the experimental data presented in table no.1, shows that the average height was significantly closer between the two periods of sowing.

Organic fertilizers have increased the plant height from 142 cm (N_0) to 164 cm (N_{150}), at the variants sown in spring, and from 140 cm (N_0) to 169 cm (N_{150}) at the variants sown in autumn.

Fig. no. 1.*Oenothera biennis* L. culture (original photo)

Table no. 1.

Summary of results at the experimental cycle 2011-2012 at plant height (cm) depending on the sowing period and fertilization level

	Sowing period 20-30 III				Sowing period 20-30 X			
	N_0	N_{50}	N_{100}	N_{150}	N_0	N_{50}	N_{100}	N_{150}
Height plant (cm)	142	155	162	164	140	151	164	169
S^2	137,55	67,11	51.31	43,55	225,11	98,22	54.24	14
S	11,72	8,19	7.12	6,59	15	9,91	7.84	3,74
Sx	3,70	2,59	2.56	2,08	4,74	3,13	4.11	1,18
S%	8,25	5,28	3.99	4,02	10,71	6,56	6.25	2,21
U	0	2,87	3.21	5,16	0	1,93	2.89	5,93
Semnification	Mt	x	xx	xxx	Mt	-	x	xxx

$t_{5\%}$= 2,201
$t_{1\%}$=3,106
$t_{0,1\%}$=4,437

Summary data presented in table no. 2, shows that the variants sown in spring, the number of ramifications ranged from 8,7 (N_0) to 11,7 (N_{150}), and at the variants sown in autumn ranged from 8,4 (N_0) to 11,8 (N_{150}).

In conclusion, the organic nitrogen fertilizers applied on the fund of $P_{60}K_{60}$ increased the number of ramifications at the both variants sown in the spring and autumn.

Fig. no. 2. *Oenothera biennis* L. -ramifications- (original photo)

Table no.2.

Summary of results at the experimental cycle 2011-2012 concerning the number of ramifications/plant depending on the sowing period and fertilization level

	Sowing period 20-30 III				Sowing period 20-30 X			
	N_0	N_{50}	N_{100}	N_{150}	N_0	N_{50}	N_{100}	N_{150}
Ramifications number/plant	8,7	9,9	10,2	11,7	8,4	9,9	10,6	11,8
S^2	1,21	3,61	3.88	4,1	2,72	4,17	4.25	3,15
S	1,10	1,90	2.01	2,02	1,64	2,04	3.01	1,77
Sx	0,34	0,60	0.88	0,64	0,52	0,64	0.66	0,56
S%	12,09	18,09	16.85	17,01	19,41	18,24	18.24	14,32
U	0	2,01	3.22	3,84	0	3,25	3.33	5,08
Semnification	Mt	-	xx	xx	Mt	xx	xx	xxx

$t_{5\%}$= 2,201
$t_{1\%}$=3,106
$t_{0,1\%}$=4,437

Summary results of the experimental cycle 2011-2012 (table no. 3) shows that the number of capsules/plant increased with the dose of organic nitrogen from 147 (N_0) to 346 (N_{150}), at the spring sown variants, and from 149 (N_0) to 338 (N_{150}) at the variants sown in autumn.

Number of capsules/plant was less influenced by sowing period.

Fig. no. 3. *Oenothera biennis* L. –flower- (original photo)

Table no.3

Summary of results at the experimental cycle 2011-2012 concerning the number of capsules/plant depending on the sowing period and fertilization level

	Sowing period 20-30 III				Sowing period 20-30 X			
	N_0	N_{50}	N_{100}	N_{150}	N_0	N_{50}	N_{100}	N_{150}
Capsules number/plant	147	290	330	346	149	293	331	338
S^2	156,66	451,11	550.21	542,88	134,44	242	354	491,33
S	12,51	22,23	21.23	23,29	11,59	15,55	16.66	22,16
Sx	3,95	6,71	7.01	7,36	3,66	4,91	5.14	7,00
S%	8,87	7,50	7.09	6,95	8,34	15,55	11.21	6,88
u	0	18,21	20.21	23,19	0	22,,65	19.21	23,13
Semnification	Mt	xxx	xxx	xxx	Mt	xxx	xxx	xxx

$t_{5\%}$= 2,201
$t_{1\%}$=3,106
$t_{0,1\%}$=4,437

Summary results of the experimental cycle 2011-2012 (table no. 4) concerning the 1000 grains weight shows that the sowing in spring in late March or fall in late October, did not influence the level of significance, at the 1000 grain weight of seeds.

Organic fertilizers have increased the weight of 1000 seeds with 6% in the N_{50} dose and with 12% at the dose of N_{150}.

Table no. 4.

Summary of results at the experimental cycle 2011-2012 concerning the 1000 grains weight seeds depending on sowing period and fertilization level

A Factor Sowing period	B Factor – fertilization level				Factor averages A-sowing period			
	N_0	N_{50}	N_{150}	N_{150}	MMB (g)	%	Difference (g)	Semnificaţion
A_1-sowing period 20-30 III	0,253	0,273	0.0273	0,280	0,268	100		-
A_2-sowing period 20-30 X	0,253	0,266	0.0270	0,291	0,270	100	0,002	-
Factor averages B								
MMB (g)	0,253	0,269	0.275	0,285				
%	100	106	109	112				
Difference (g)	0	0,016	0.022	0,032				
Semnificaţion	Mt	-	x	xx				

DL 5%= 0,031 Kg/ha
DL 1%= 0,072 kg/ha
DL 0,1%=0,230 kg/ha

DL 5%=0,021 kg/ha; DL 1%= 0,031 kg/ha; DL 0,1%= 0,046 kg/ha

CONCLUSIONS

The experimental results shows that there are not large differences between the periods of sowing, fertilizer levels and morphological and biological characteristics.

Even if experiences occurred in two different areas in terms of relief: plains and hills , and the soil : chernozem cernozion , clay loam , the results were not registered big differences .

AKNOLEDGEMENTS

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BIBLIOGRAPHY

1. BORCEAN, I., PÎRŞAN, P., LAZĂR, ŞT., 1989 – Cercetări privind introducerea în cultură a unei noi specii Oenothera biennis L., Lucrările simpozionului ,,Plante medicinale - realizări şi perspective", Piatra-Neamţ.
2. BORCEAN, I., PÎRŞAN, P., MANEA, D., BORCEAN, A., CIULOI, ANCA 1991 – Cercetări privind stabilirea epocii de semănat şi optimizarea fertilizării la Oenothera biennis L., Lucrările simpozionului de ,,Plante medicinale", Piatra-Neamţ.
3. ADINA MIHALEA, 2005, Teza de doctorat, Studii privind biologia si tehnologia de cultivare a speciei Oenothera biennis L.
4. MORARIU, I., 1973 – Botanica generală şi sistematică cu noţiuni de geobotanică, Ed. a III-a, Ed. Ceres, Bucureşti