A STUDY ON THE IMPACT OF NITROGEN FERTILISATION ON HERBA YIELD AND ON VOLATILE OIL CONTENT IN BASIL (*Ocimum basilicum* L.)

STUDIU PRIVIND INFLUENȚA FERTILIZĂRII CU AZOT ASUPRA RECOLTEI DE HERBA ŞI A CONȚINUTULUI DE ULEI VOLATIL LA BUSUIOC (*Ocimum Basilicum* L.)

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Abstract: *The paper presents research results from the period 2004-2006, research carried out on a batigleic aluvosoil in the water meadow on the Bocşa territory of the Bârzava River (Caraş-Severin County). Results pointed out the fact that on the average for the five biotypes under study and for the two sowing densities, nitrogen fertilisers applied on an agri-fund of $P_{60}K_{40}$ increased the yield with 52.00% for a rate* of *N_{50} and with 74.00% for a rate of N_{100}.*

Rezumat: *Lucrarea cuprinde rezultatele cercetărilor din perioada 2004-2006, efectuate pe un sol de tip aluviosol batigleic din Lunca Bârzavei, teritoriul Bocşa. Rezultatele obținute au evidențiat că în medie pe cele cinci biotipuri luate în studiu şi cele două desimi de cultivare, îngrăşămintele cu azot aplicate pe fond de $P_{60}K_{40}$, au mărit recolta cu 52% nivelul dozei de N_{50} şi cu 74% la nivelul dozei de N_{100}.*

Key words*: Ocimum basilicum, fertilisation, and sowing density*
Cuvinte cheie: *Ocimum basilicum, fertilizare, desimi de semănat*

INTRODUCTION

Ocimum basilicum L., original from India, has good cultivation conditions in Romania, in the Bărăgan Plain, in the Burnaz Plain, in the Oltenia Plain, and in the Timiş Plain. A species very demanding for temperature, it is only cultivated as an annual species.

MATERIAL AND METHOD

Research was carried out in the water meadow of the Bârzava River. Trials were of the tri-factorial type and organised after the sub-divided plot method with three replications. Factor A – level of fertilisation (N_0, N_{50}, and N_{100} on an agri-fund of $P_{60}K_{40}$); Factor B – sowing density (100,000 and 200,000 plants per ha); Factor C – genotype (Basilica, Geea, De Şag provenance, De Novi Sad provenance - the *Viridis* form, the De Novi Sad provenance – the *Violaceum* form). We measured annually volatile oil content and calculated, on this ground and on the ground of the herba yield, the yield of volatile oil.

RESULTS AND DISCUSSION

Basil proved to be a species that responds with increased yields to nitrogen fertilisation. Table 1 shows that, on the agri-fund of $P_{60}K_{40}$ through fertilising with N_{50} we can get an increase in yield compared to the control (N_0) 52.00% higher, i.e. a very significant difference.

Doubling nitrogen rate increased even more the yield to 74.00%. As for the behaviour of the five genotypes, we can see that average yields were sensibly close to (8,333 kg/ha), Geea (8,264 kg/ha), and the De Şag provenance (8,565 kg/ha). The De Novi Sad provenance was below the yields in native cultivars and provenances.

Doubling sowing density from 100,000 plants/ha to 200,000 plants/ha, the yield increased with 25.00%, i.e. 1,697 kg/ha, a difference ensured statistically as very significant. Volatile oil content on the average per experimental cycle was between 0.25% as measured in the Basilica cultivar, and 0.17% as measured in the De Şag provenance.

Volatile oil yield is shown in Table 2. We can see that in this territory average oil yield for the three experimental years was between 9.37 l/ha as measured in the De Novi Sad provenance (the *Violaceum* form) in the variant fertilised with $N_0P_{60}K_{40}$, and 25.12 l/ha in the Basilica cultivar, in the variant fertilised with $N_{100}P_{60}K_{40}$.

On the average for the five genotypes, we could see that, applying 100.00 kg of nitrogen on an agri-fund of $P_{60}K_{40}$, though resulting in diminished volatile oil content due to the herba increased yield, led to getting an increase of 46.00% in volatile oil, the difference of 6.33 l/ha being very significant. On the average for the five geno-types the highest volatile oil yield (about 20.00 l/ha) was in the adapted cultivars Basilica and Geea.

Table 1

The results synthesis of volatile oil production obtain in Bocşa area, in the experimental cycle 2004-2006

Factor A Agri-fund	Factor B cultivar (provenance)					Averages of Factor A			
	Basilica	Geea	De Şag	De Novi Sad f.*Viridis*	De Novi Sad f.*Violaceum*	Yield l/ha	%	Difference l/ha	Difference
$N_0P_{60}K_{40}$	16.82	16.37	14.29	10.89	9.37	13.54	100		
$N_{100}P_{60}K_{40}$	25.12	22.53	20.29	16.83	14.52	19.87	146	6.33	XXX

DL5%=0.89 l/ha DL1%=1.19 l/ha DL0.1%=1.57 l/ha

Averages of Factor B

Cultivar (provenance)	Basilica	Geea	De Şag	De Novi Sad f. *Viridis*	De Novi Sad f. *Violaceum*
Yield l/ha	20.97	19.45	17.29	13.89	11.94
%	100	92	82	66	57
Difference l/ha		-1.52	-3.68	-7.08	-9.03
Significance			000	000	000

DL5%=2.00 l/ha DL1%=2.66 l/ha DL0.1%=3.50 l/ha

Tabelul 2

The synthesis crop of green herba obtain in the Bîrzava Meadow – Bocşa area in 2004-2006 experimental cycle (kg/ha)

A Agri-fund	B Plant density/ha	C cultivar (provenance)					Averages of Factor A			
		Basilica	Geea	De Şag	De Novi Sad forma *Viridis*	De Novi Sad forma *Violaceum*	Yield (herba) kg/ha	%	Difference kg/ha	Significance
$N_0P_{60}K_{40}$	100.000	5.093	4.963	5.069	4.247	3.528	5.317	100		
	200.000	6.659	6.800	6.756	5.629	4.431				
$N_{50}P_{60}K_{40}$	100.000	7.932	7.803	8.122	6.550	4.918	8.093	152	2.776	XXX
	200.000	9.831	10.214	10.333	8.381	6.848				
$N_{100}P_{60}K_{40}$	100.000	9.312	8.936	9.848	8.263	6.391	9.241	174	3.924	XXX
	200.000	11.175	10.871	11.262	9.665	7.590				

DL 5%=343 kg/ha DL 1%=458 kg/ha DL 0,1% =601 kg/ha

Averages of Factor C

Specification	Basilica	Geea	De Şag	De Novi Sad form *Viridis*	De Novi Sad form *Violaceum*
Yield kg/ha	8.333	8.264	8.565	7.122	5.467
%	100	99	103	85	66
Difference kg/ha		-69	231	-231	-2.867
Significance					000

DL 5%= 1086 kg/ha DL 1%= 1449 kg/ha DL 0.1% = 1903 kg/ha

averages of Factor B

Specification	Density of the plants/ha	
	100.000	200.000
Yield kg/ha	6.732	8.429
%	100	125
Difference kg/ha		1.697
Significance		XXX

DL 5%= 627 kg/ha DL 1%=836 kg/ha DL 0.1% =1098 kg/ha

CONCLUSIONS

Applying nitrogen fertilisers at rates of N_{50} and N_{100} on an agri-fund of $P_{60}K_{40}$ led to an increase in yield of 52.00% and 74.00% respectively.

Volatile oil content was between 0.17% and 0.25%, while volatile oil yield was between 9.37 and 25.12 l/ha.

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