THE INFLUENCE OF FERTILIZATION WITH VARIABLE DOSES OF NITROGEN FERTILIZERS APPLIED ON A CONSTANT PHOSPHOROUS AND POTASSIUM FOND ON THE YIELD AND ON THE OIL CONTENT OF THE WINTER RAPE

INFLUENȚA FERTILIZĂRII CU DOZE VARIABILE DE ÎNGRĂŞĂMINTE CU AZOT APLICATE PE FOND CONSTANT DE FOSFOR ŞI POTASIU ASUPRA RECOLTEI ŞI A CONȚINUTULUI DE ULEI LA RAPIȚA DE TOAMNĂ

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Rezumat: *Lucrarea cuprinde rezultate parțial obținute la rapița pentru ulei, pe un sol de tip cernoziom salsodic, salinizat slab între 50-100 cm, cu textură lutargiloasă. Soiul folosit a fost Winner. Cea mai mare recoltă de peste 3100 kg/ha s-a obținut în varianta fertilizată cu $N_{80}P_{80}K_{80,}$ îngrăşământul cu azot folosit a fost sulfatul de aluminiu; îngrăşămintele cu azot au scăzut conținutul de ulei de la 46,5% (N_0) la 41,6%(N_{120}) în varianta fertilizată cu azotat de amoniu şi de la 46,5% (N_0) la 43,9% în varianta fertilizată cu sulfat de amoniu.*

Abstract. *The work contains the partial results regarding the oil content of rape obtained on a salsodic chernozem soil poorly salted between 50 and 100 cm and having a clay-argillaceous texture. The used variety was the Winner variety. The highest yield obtained was of over 3100 kg/ha and has been obtained for the variant fertilized with $N_{80}P_{80}K_{80.,}$ The used nitrogen fertilizer was the aluminum sulfate. The nitrogen fertilizers have decreased the oil content from 46.5% (N_0) to 41,6%(N_{120}) in the variant fertilized with ammonium nitrate and from 46.5% (N_0) to 43.9% in the variant fertilized with ammonium sulfate.*

Key words: *oil rape, fertilization*
Cuvinte cheie: *rapiță pentru ulei, fertilizare.*

INTRODUCTION

Extension of rape cultivation is due to the progress obtained in the chemical composition of the oil simultaneously with the increase of the oil content, which at present reaches 42-48%. The oil is used for food, but also as nontoxic fuel, being biodegradable. Now at the world level 27 mil hectares are cultivated with rape. In parallel, the average production must also increase. The paper contains the results obtained in the western part of the country, on poorly salted soils by differentiated fertilization, having effects upon the yield and the oil content and production.

MATERIALS AND METHOD

The researches have been performed on a poorly salted salsodic chernozem, having a water pH of 7.60 at the surface and of 8.24 in the first 50 cm, and a humus content of 3.06, a phosphorus content of 29 ppm and a nitrogen content of 284 ppm. The experiments have been bifactorial, the A factor being the used fertilizer type - ammonium nitrate and ammonium sulfate - and the B factor the nitrogen doses applied, based on $P_{80}K_{80}$, $b_1 – N_0$; $b_2 – N_{50}$; $b_3 – N_{100}$; $b_4 – N_{150}$ and $b_5 – N_{200}$. The nitrogen fertilizers have been used on a constant $P_{80}K_{80}$ level. The variety used: Winner. The precursory cultivated plant: the winter wheat.

RESULTS AND DISCUSSIONS

The crop results obtained are presented in Table 1.

Table 1

The yield obtained for the oil rape

The A factor. The type of nitrogen fertilizer	The B factor – the N doses on a base of $P_{80}K_{80}$					The averages of the A factor			
	N_0	N_{50}	N_{100}	N_{150}	N_{200}	Yield Kg/ha	%	Difference Kg/ha	Signification
Ammonium nitrate	913	1564	2391	2624	2932	2085	100		
Ammonium sulfate	913	1827	2636	2918	3127	2284	109	199	XXX

DL 5% = 86 kg/ha DL 1% = 119 kg/ha DL 0.1% = 162 kg/ha

The averages of the B factor

Specification	N_0	N_{50}	N_{100}	N_{150}	N_{200}
Yield kg/ha	913	1695	2513	2771	3029
%	100	185	275	303	332
Difference kg/ha		782	1600	1858	2116
Signification		XXX	XXX	XXX	XXX

DL 5% = 137 kg/ha DL 1% = 188 kg/ha DL 0.1% = 266kg/ha

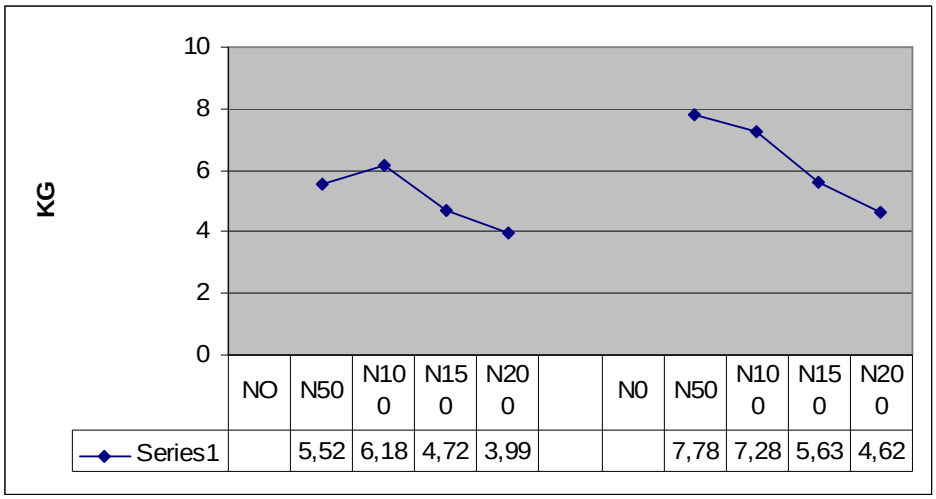

Fig.1. The yield growth for 1 kg nitrogen according to the type of fertilizer used for the oil grape

It results that on the tested nitrogen levels by using ammonium sulfate on poorly salted soils there has been obtained an average yield growth of 9%. The fertilizers containing nitrogen have been well used, the yield has increased together with the doses from 913 kg/ha for the variant N_0 to 3029 kg/ha for the variant N_{200}. Figure 1. shows the oil content. One can notice that the fertilizers containing nitrogen have decreased the oil content from 42.6% (N_0) to 41.1% (N_{200}) in the variants fertilized with N_{200} and from 42.6 (N_0) to 42.0% in the variants fertilized with ammonium sulfate. Based on the oil content and on the grain production there has been calculated the oil production, which is presented in Table 2.

Table 2

The oil production obtained in the case of rape according to the fertilization

The A factor The type of nitrogen fertilizer	The B factor – the N doses on a base of $P_{80}K_{80}$					The averages of the A factor			
	N_0	N_{50}	N_{100}	N_{150}	N_{200}	Yield Kg/ha	%	Difference	Signification
Ammonium nitrate	389	665	1007	1097	1187	869	100		
Ammonium sulfate	389	778	1117	1234	1313	966	111	97	XXX

DL 5% = 38 kg/ha DL 1% = 52 kg/ha DL 0.1 % = 70 kg/ha

Specification	N_0	N_{50}	N_{100}	N_{150}	N_{200}
Yield kg/ha	389	721	1062	1165	1250
%	100	185	273	299	321
Difference kg/ha		332	673	776	861
Signification		XXX	XXX	XXX	XXX

DL 5% = 59 kg/ha DL 1% = 81 kg/ha DL 0.1 % = 111 kg/ha

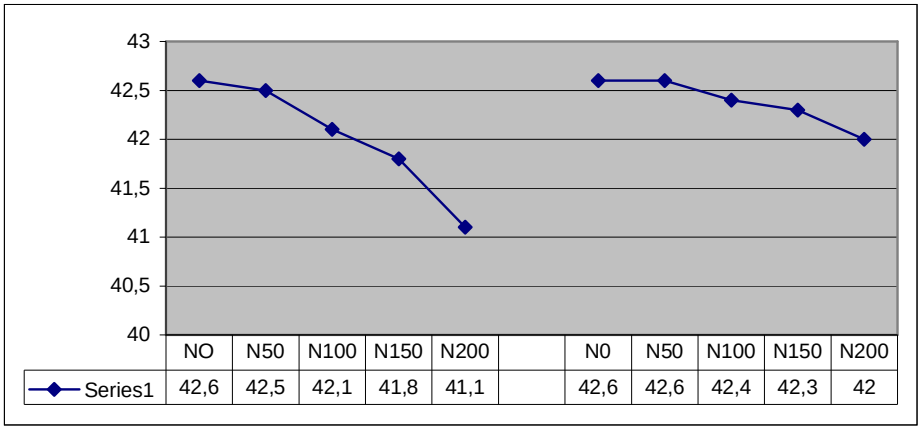

Fig.2. The variation of the oil content according to the nitrogen doses used on a base of $P_{80}K_{80}$ and the type of fertilizer

It results that in the case of the variants fertilized with ammonium sulfate, because of the highest grain yield, the oil production was also 11% higher. The doses of nitrogen fertilizer, although decreasing the oil content, have also increased the average oil production for the two types of fertilizer with over 800 kg/ha, because of the increase of yield in the researched area.

CONCLUSIONS

1) In the areas with poorly salted soils, the oil rape is a crop that ensures yields of over 3000 kg/ha, with oil content which may surpass 42%.

2) By using nitrogen fertilizers in the form of ammonium sulphate, there can be obtained an increase of yield with 9% and of the oil production with 11% as compared with the use of fertilizers in form of ammonium nitrate.

LITERATURE

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