INFLUENCE OF SEEDING DENSITY ON WINTER RAPE SEED AND OIL YIELDS IN CONDITIONS OF SCDA LOVRIN

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ABSTRACT
Rapeseed seeding density plays an important role in achieving seed and oil production. To quantify this role there have been initiated researches in S.C.D.A. Lovrin, Timis county in bifactorial experience: varieties and densities.
Best results are obtained in the range of 100-150 germinable seeds/m² density.
The oil content is strongly influenced by seeding density, having different influences for each hybrid. In Pamela variety and PR46W14hybrid, the oil content in seeds is reduced with increasing seeding density from 50 germinable seeds/m² to 200 germinable seeds/m². In Extend and Exotic hybrid, oil content increases with density (the highest values were obtained at the density of 200 germinable seeds/m²).
Average productions obtained this experimental year ranged between 3034 kg / ha and 3460 kg / ha.
Both seed production and seed oil content are important elements for oil production.

Keywords:. rape, density, cultivation, production, oil

INTRODUCTION

Extension of rape surfaces is due to progress achieved in improving the chemical composition of the oil, concomitant with oil content increasing (41-47%), increasing production and resistance to wintering and shaking (VRINCEANU, 1986, cited by BÎLTEANU et al, 1991) .
Density is an essential element in the production of rape. It strongly influences the maturity uniformity of seeds (STAN, 1998; TABĂRĂ, 2005).
Density correlates with distance between rows, with the time of sowing and soil conditions (SOLTNER, 1986).
The amount of seed per hectare correlates with density to be realized and seed quality indices. For our country, corresponding to used densities, it is sown a quantity of 6-10 kg/ha (BÎLTEANU, 1993; BÎLTEANU, 2001), 8-15 kg/ha (BORCEAN ET AL, 1991).
SOLTNER (1990), cited by BÎLTEANU (1993), recommends that at harvesting the density should be between 50-80 plants/m². VOLIUD (1992) cited by MUNTEAN ET AL., (1995) mentions that, in Switzerland, the highest yields are achieved with 30-50 plants/m².
MUNTEAN ET AL., (1995) recommends at seeding a density of 100-150 germinable seeds/m², to have at harvest 80-110 plants/m².

MATERIAL AND METHOD

Research is carried out at S.C.D.A. Lovrin in 2011 in a bifactorial experience, placed in randomized blocks. Factors were:
A factor. Rape varieties and hybrids with four graduations. Varieties and hybrids used have different origins: a_1 - Pamela; a_2 – Extend; a_3 – Exotic; a_4 - PR46W14.
B factor. Seeding densities with four graduations: b_1 - 50 g.s./m², b_2 - 100 g.s./m²; b_3 - 150 g.s./m², b_4 - 200 g.s./m².

Seeding time was the first half of the first decade of October. The used agrofond was $N_{90}P_{90}K_{90}$, the other technology elements are the ones specific to the area.
The experimental results were calculated and interpreted by specific methods of experimental technique.
In laboratory, the oil content was determined by solid-liquid extraction method using a Soxtherm device.

RESULTS

The results obtained in seed production for the four rapeseed cultivars under the influence of seeding density are presented in *Table 1*.
It can be seen that the best yields were obtained in the seed range of 100-150 g.s./m². The production increases were statistically highly significant at the density of 100 g.s./m² and distinct significant at the density of 150 g.s./m².
After analyzing the results we can say that with increasing seeding density, production is reduced.

Table 1. Seed production in four rapeseed cultivars under the influence of seeding density in 2011

A Factor Cultivar	A Factor – Density germinable seeds/m²				Averages of the A Factor			
	50	100	150	200	Kg/ha	%	Dif. kg/ha	Significance
PAMELA	3045	3500	3590	3225	3340	100		
EXTEND	3338	3530	3548	3425	3460	104	120	
EXOTIC	3773	3470	3105	2985	3333	100	-7	
PR46W14	2500	3530	3230	2875	3034	91	-306	0

DL5% =300 kg/ha DL1%= 400 kg/ha DL0,1%= 524 kg/ha

Averages of the B factor

Specification	50	100	150	200
Kg/ha	3164	3508	3368	3128
%	100	111	106	99
Difference kg/ha		344	204	-36
Signification		***	**	

DL5% =150 kg/ha DL1%= 200 kg/ha DL0.1%= 262 kg/ha

The results obtained in oil production in four rapeseed cultivars under the influence of seeding density are presented in *Table 2*. Oil production from the four cultivars differ among themselves with values between 1430 kg/ha in Extend hybrid and 1268 kg/ha in PR46W14 hybrid. Neither production increase of 47 kg/ha in Extend hybrid, neither the differences of 29 kg/ha in Exotic hybrid respectively 123 kg/ha in PR46W14 hybrid compared to Pamela hybrid are not statistically assesed.
Oil production is strongly influenced by seeding density, making the best production values in the seeding ranges of 100-150 g.s./m².
At a seeding density of 100 g.s./m², the production increases of 144 kg/ha were statistically highly significant, while at 150 g.s./m², the production increase of 84 kg/ha as distinct significant.

Unlike other hybrids, Exotic hybrid realized the best production at a density of 50 g.s./m² because of the good degree of branching.

Table 2. Oil production from the four rape cultivars under the influence of seeding density in 2011

A Factor Cultivar	A Factor – Density germinable seeds/m²				Averages of the A Factor			
	50	100	150	200	Kg/ha	%	Dif. kg/ha	Significance
PAMELA	1291	1463	1486	1322	1391	100		
EXTEND	1368	1455	1469	1459	1438	103	47	
EXOTIC	1517	1416	1273	1242	1362	98	-29	
PR46W14	1060	1476	1344	1190	1268	91	-123	

DL5% =124 kg/ha DL1%= 165 kg/ha DL0,1%= 217 kg/ha

Averages of the B factor

Specification	50	100	150	200
Kg/ha	1309	1453	1393	1303
%	100	111	106	100
Difference kg/ha		144	84	-6
Signification		***	**	

DL5% =62 kg/ha DL1%= 83 kg/ha DL0.1%= 108 kg/ha

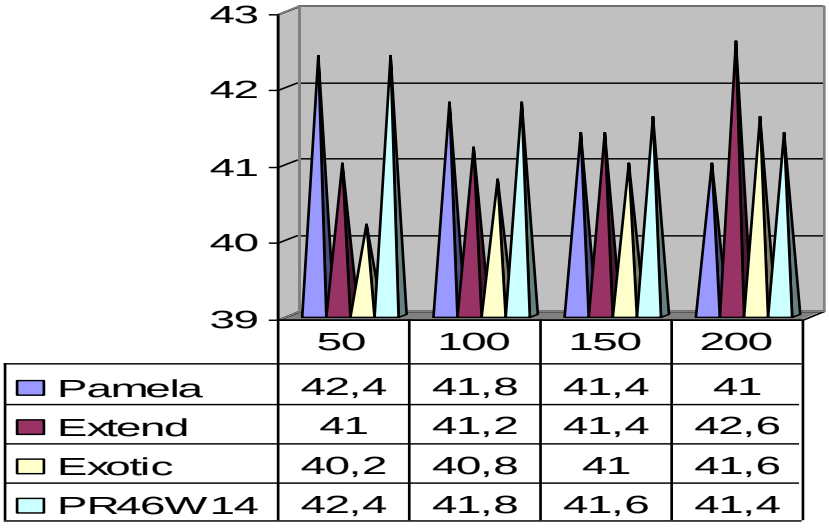

Figure 1: Oil content variation (%), depending on the variety and hybrid grown in different seeding densities in 2011

Figure 1. is the variation of the four rapeseed cultivars oil content under the influence of seeding density. From the table it can be concluded that seeding density strongly influence oil content of rape seeds with values between 42.6% in Extend hybrid and 40.2% in Exotic hybrid.

Depending on cultivar density interaction there is a specific response to each one. At Pamela hybrid, the highest seed oil content 42.4% is achieved at a density of 50 g.s./m, at

Extend hybrid, the maximum content 42.6% is achieved at a density of 200 g.s./m², at Exotic hybrid the maximum of 41.6% is obtained at 200 g.s./m² and at PR46W14 hybrid the maximum oil percentage of 42.4 is obtained from a density of 50 g.s./m².

CONCLUSIONS

Analysis of the production results obtained in four rapeseed cultivars under the influence of seeding density on S.C.DA. Lovrin in CONDITIONS of 2011 allows us to formulate some conclusions.

Studied cultivars have a good degree of adaptability to climatic conditions from Lovrin microfauna.

Studied cultivars have a good production capacity.

Seed production level is influenced by seeding density in all four cultivars.

There are cultivars with oscillatory behavior in different seeding densities (EXOTIC hybrid) – high production level at a seeding density of 50 g.s./m² and low production level at a seeding density of 100 respectively 150 g.s./m².

The highest seed production was performed by Extend hybrid, 3460 kg/ha.

In terms of seeding density the best results are obtained by seeding rape at a density of 100 g.s./m², 3508 kg/ha.

Oil content varies between 40.2% at EXOTIC hybrid sown at a density of 50 g.s./m² and 42.6% at EXTEND hybrid when it is sown at a density of 200 g.s./m².

The oil content varies according to cultivar and seeding density.

In terms of seeding density, the oil content of the same cultivar varies from one density to another: in Pamela variety and PR46W14 hybrid the highest oil content is achieved at a density of 50 g.s./m², while in Extend and Exotic hybrids the maximum oil content in seeds is carried out at a density of 200 g.s./m².

In terms of density, the highest oil production is obtained when rape is sown at a density of 100 g.s./m² -1453 kg/ha, the production increase achieved compared to control variety is of 144 kg/ha which is provided statistically as very significant.

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