A STUDY OF SOME COMPONENTS IN WINTER OIL RAPE

STUDIUL UNOR COMPONENTE DE PRODUCȚIE LA RAPIȚA PENTRU ULEI

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Abstract: *The level of production is determined by the interaction between plants' biological limits and by the influence of technological elements applied. Upon harvesting we made measurements concerning the values of some pheno-typical features characteristic of the Attila winter oil rape cultivar under study. The main components of the yield in winter oil rape are the number of main ramifications per plant, the number of siliques per plant, the number of seeds per silique, the number of plants per m*^{2}*, and the average volume of a seed.*

Rezumat: *Nivelul producției este determinat de interacțiunea dintre limitele biologice ale plantelor şi influența elementelor tehnologice aplicate. La recoltare s-au efectuat determinări privind valorile unor caractere fenotipice, ce caracterizează soiul Attila de rapiță pentru ulei, luat în studiu Componentele principale ale randamentului la rapiță sunt:numărul de ramificați principale/plantă,numărul de silicve/plantă, numărul de semințe/silicvă, şi numărul de plante/m*^{2} *şi masa medie a unei semințe.*

Key words*: sowing time, sowing density, row distance*
Cuvinte cheie*: epoca, desimea de semănat, distanța între rânduri.*

INTRODUCTION

The size of production in winter oil rape depends on the number of seeds and of their volume. The number of seeds is determined mainly by the photo-synthesis activity of the vegetal cover during reproduction, and the size of the seeds is influenced by the duration of their filling. According to some authors cited by Hălmăjan (…), there are enough experimental proofs that productivity elements are inter-independent. For a significant increase of the production potential of the present cultivars, they need an intense photo-synthesis activity, the number of seeds being directly dependent on the photo-synthesis of the vegetal cover. This is why an efficient cultivation system should ensure the sowing elements optimized by density, row distance, and sowing time, so that photo-synthesis activity be maximal during critical times.

MATERIAL AND METHOD

The cultivar under study was Attila.

The tri-factorial trial was set in three replications, with the following graduations of the trial factors:

- factor A – sowing time:
  a_1 – 1st time – September 1-10;
  a_2 – 2nd time – September 10-20;
  a_3 – 3rd time – September 20-30.
- factor B – row distance:
  b_1 – 12.5 cm;

b_2 – 25 cm;
b_3 – 37.5 cm.

- factor C – sowing density:
  c_1 – 50 g.g./m^2;
  c_2 – 100 g.g./m^2;
  c_3 – 150 g.g./m^2.

Calculating experimental data was done in accordance with the setting methods for trials in the field.

The pre-emergent plant was wheat.

RESULTS AND DISCUSSIONS

Results of measurements concerning production components in the Attila winter oil rape cultivar during 2004-2006 at the Didactic Station in Timisoara

The production level is determined by the interaction between the plants' biological limits and the influence of the technological elements applied.

The variation of the number of main ramifications per plant is shown in Table 1.

Table 1

Variation of the number of main ramifications per plant

Sowing time I									
Row distance	**12.5 cm**			**25 cm**			**37.5cm**		
Sowing density	***50 b.g./m²***	***100 b.g./m²***	***150 b.g./m²***	***50 b.g./m²***	***100 b.g./m²***	***150 b.g./m²***	***50 b.g./m²***	***100 b.g./m²***	***150 b.g./m²***
X	6.4	9.6	7	6.6	13.6	10	6.2	8.4	6.2
S²	0.24	4.24	1.2	0.24	1.44	0.4	0.16	1.04	0.16
S	0.49	2.06	1.1	0.49	1.2	0.63	0.4	1.02	0.4
SX	0.10	0.41	0.22	0.10	0.24	0.13	0.08	0.20	0.08
SX%	7.66	21.46	15.71	7.42	8.82	6.30	6.45	12.14	6.45
Sowing time II									
Row distance	**12.5 cm**			**25 cm**			**37.5cm**		
Sowing density	***50 b.g./m²***	***100 b.g./m²***	***150 b.g./m²***	***50 b.g./m²***	***100 b.g./m²***	***150 b.g./m²***	***50 b.g./m²***	***100 b.g./m²***	***150 b.g./m²***
X	7.2	7.4	4.6	6.4	6.6	5.8	4.8	6.8	4.2
S²	2.96	1.44	0.64	1.04	1.04	1.76	0.96	1.76	0.56
S	1.72	1.2	0.8	1.02	1.02	1.33	0.98	1.33	0.75
SX	0.34	0.2	0.16	0.20	0.20	0.27	0.20	0.27	0.15
SX%	23.89	16.22	17.39	15.94	15.45	22.93	20.42	19.56	17.86
Sowing time III									
Row distance	**12.5 cm**			**25 cm**			**37.5cm**		
Sowing density	***50 b.g./m²***	***100 b.g./m²***	***150 b.g./m²***	***50 b.g./m²***	***100 b.g./m²***	***150 b.g./m²***	***50 b.g./m²***	***100 b.g./m²***	***150 b.g./m²***
X	3.6	5.2	2.8	4.4	4.8	3.2	4.6	5.6	5.2
S²	0.24	0.56	0.56	0.24	1.36	0.16	0.64	1.44	0.56
S	0.49	0.75	0.75	0.49	1.17	0.4	0.8	1.2	0.75
SX	0.10	0.15	0.15	0.10	0.23	0.08	0.16	0.24	0.15
SX%	13.16	14.42	26.79	11.4	24.38	12.50	17.39	21.43	14.42

The largest values were when cultivated at a row distance of 5 cm, since the nutrition space allowed the even growth and development of the plants.

Sowing density is correlated with row distance, so that for a density of 100 g.g./m^2 and for a sowing distance of 25 cm we got the tallest plants.

As for the sowing time, the values are sensibly equal between the 1st and 2nd decades of September, with a decreasing trend when sowing is delayed to the end of September. This means that in the trial variants, winter oil rape has a low ramification rate, the amplitude being only 4-9.

Results lead to the conclusion that plants in general have a low ramification rate, with favourable impact on ripening evenness and on harvesting in a single phase.

The number of siliques per plant is a hereditary trait of the cultivars that directly influence yield, but which is also influenced by climate conditions, mainly the necessary water supply for the plants.

Table 2 presents the number of siliques per plant. The amplitude of this important productivity feature is between 424.2 siliques in the 1st sowing time and 105.2 siliques in the 3rd sowing time.

Table 2

Number of siliques per plant

Sowing time I									
Row distance	**12.5 cm**			**25 cm**			**37.5cm**		
density	***50 b.g./m²***	***100 b.g./m²***	***150 b.g./m²***	***50 b.g./m²***	***100 b.g./m²***	***150 b.g./m²***	***50 b.g./m²***	***100 b.g./m²***	***150 b.g./m²***
X	356.4	334.8	362.6	338.8	424.2	388.8	242.8	334.8	223.2
S^2	11.84	67.76	53.84	118.96	74.96	34.96	77.36	67.76	20.16
S	3.44	8.23	7.32	10.91	8.66	5.91	8.8	8.23	8.23
SX	0.69	1.65	1.46	2.18	1.73	1.18	1.76	1.65	1.65
SX%	0.97	2.46	2.02	3.22	2.04	1.52	3.62	2.46	2.46
Sowing time II									
Row distance	**12.5 cm**			**25 cm**			**37.5cm**		
density	***50 b.g./m²***	***100 b.g./m²***	***150 b.g./m²***	***50 b.g./m²***	***100 b.g./m²***	***150 b.g./m²***	***50 b.g./m²***	***100 b.g./m²***	***150 b.g./m²***
X	161.8	127.8	164	125.2	142.8	137.2	223.2	160.4	159
S^2	12.56	35.76	14	14.96	11.76	34.16	20.16	61.84	50.24
S	3.54	5.98	3.74	3.87	3.43	5.84	4.49	7.86	7.09
SX	0.71	1.20	0.75	0.77	0.69	1.17	0.90	1.57	1.42
SX%	2.19	4.68	2.28	3.09	2.40	4.26	2.01	4.90	4.45
Sowing time III									
Row distance	**12.5 cm**			**25 cm**			**37.5cm**		
density	***50 b.g./m²***	***100 b.g./m²***	***150 b.g./m²***	***50 b.g./m²***	***100 b.g./m²***	***150 b.g./m²***	***50 b.g./m²***	***100 b.g./m²***	***150 b.g./m²***
X	105.2	137.2	125.2	147	159.4	129	127.8	142.8	152.8
S^2	3.76	34.16	14.96	56.8	50.24	15.2	35.76	11.76	80.56
S	1.94	5.84	3.87	7.54	7.09	3.9	5.98	3.43	8.98
SX	0.39	1.17	0.77	1.51	1.42	0.78	1.20	0.69	1.80
SX%	1.84	4.26	3.09	5.13	4.45	3.02	4.68	2.40	5.88

The number of seeds per silique is determined mainly by the photo-synthetic activity of the vegetal cover during the reproduction period, and the size of the seeds is influenced by the duration of filling (EGLI, 1990, cited by Hălmăjan). The total number of seeds per silique depends on growth conditions, and it varies between 356,4-565,2 shown in Table 3.

Table 3

Total number of seeds per silique

Sowing time I									
Row distance	**12.5 cm**			**25 cm**			**37.5cm**		
density	***50 b.g./m²***	***100 b.g./m²***	***150 b.g./m²***	***50 b.g./m²***	***100 b.g./m²***	***150 b.g./m²***	***50 b.g./m²***	***100 b.g./m²***	***150 b.g./m²***
X	362.6	431.6	338.8	502.8	392.2	490.8	373.2	520.2	425.2
S^2	53.84	55.84	118.96	54.96	82.16	82.96	16.16	91.76	6.96
S	7.32	7.47	10.91	7.41	9.06	9.11	4.02	9.58	2.64
SX	1.46	1.49	2.18	1.48	1.81	1.82	0.80	1.92	0.53
SX%	2.02	1.73	3.22	1.47	2.31	1.86	1.08	1.84	0.62
Sowing time II									
Row distance	**12.5 cm**			**25 cm**			**37.5cm**		
density	***50 b.g./m²***	***100 b.g./m²***	***150 b.g./m²***	***50 b.g./m²***	***100 b.g./m²***	***150 b.g./m²***	***50 b.g./m²***	***100 b.g./m²***	***150 b.g./m²***
X	401.4	485.8	356.4	452.6	468.6	544.4	525.4	472.6	422.6
S^2	16.64	23.36	11.84	33.44	47.44	31.44	30.24	34.24	42.64
S	4.08	4.83	3.44	5.78	6.89	5.61	5.5	5.85	6.53
SX	0.82	0.97	0.69	1.16	1.38	1.12	1.10	1.17	1.31
SX%	1.02	0.99	0.97	1.28	1.47	1.03	1.05	1.24	1.55
Sowing time III									
Row distance	**12.5 cm**			**25 cm**			**37.5 cm**		
density	***50 b.g./m²***	***100 b.g./m²***	***150 b.g./m²***	***50 b.g./m²***	***100 b.g./m²***	***150 b.g./m²***	***50 b.g./m²***	***100 b.g./m²***	***150 b.g./m²***
X	411.4	481.6	420.4	433.6	565.2	562.4	520.2	525.2	539.8
S^2	86.24	82.64	14.64	61.04	10.16	13.84	41.36	37.36	32.56
S	9.29	9.09	3.83	7.81	3.19	3.72	6.43	6.11	5.71
SX	1.86	1.82	0.77	1.56	0.64	0.74	1.29	1.22	1.14
SX%	2.26	1.89	0.91	1.80	0.56	0.66	1.24	1.16	1.06

CONCLUSIONS

The main components of yield in winter oil rape are strongly influenced by both the production potential of the cultivar and cultivation technology applied.

Climate conditions were particularly favourable to the growth and development of winter oil rape, influencing productivity elements all during the vegetation period.

An efficient cultivation system should ensure the optimising of sowing elements through density, row distance, and time. The impact of trial factors pointed out that the best results are when sowing is done in the 1st decade of September, at a sowing distance of 25 cm, and at a sowing density of 150 g.g./m².

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