RESEARCH CONCERNING THE INFLUENCE OF SOWING PERIOD AND ROW DISTANCE ON THE NUMBER OF SPIKES AND THE NUMBER OF PLANTS ON A SQUARE METER OF AUTUMN WHEAT IN WESTERN ROMANIA

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Abstract: *The paper presents the results obtained in the last two years of experience, about the influence of sowing period and row distance on the number of spikes and the number of plants on a square meter, specifically at the Teaching Resort of University of Agricultural Science and Veterinary Medicine of Banat Timisoara, located in the Plain Banato-Crisan, Plain subunit Berecsău Bega-Timis interfluve. Researches were conducted on a chernozem soil, low gleyed, formed on decarbonated loesoide deposits. The goal of the research is to establish seeding technology under current climate conditions, based on the frequent situations in which, for various reasons we can't saw in the optimal sowing period. Wheat is a grass, originally from the Fertile Crescent region of the Near East, but now cultivated worldwide. The material investigated is the variety Alex (Lovrin 50), variety created by S.C.D.A Lovrin and approved in 1994. Variety Alex is the representative variety for the western part of the country and has the largest expansion in the mentioned area. Among the biometric measurements performed through direct measurements in the field, the number of plants per square meter and number of spikes have an quantitative influence on the production. Number of plants per square meter ranged between 168, obtained in the first year, and 280, obtained also in the first year. The number of spikes on a square meter ranged between 420, obtained in the first year, and 809, obtained in the second year.*

Keywords: ***wheat, sowing period, row distance***

INTRODUCTION

The results of this study are part of a PhD program, having as theme: " Research on sowing technology ofwinter wheat in Western Romania ", funded by the European Social Fund, the Pilot Program PhD Research Scholars Support Contract from the POS DRU / 6 / 1.5 / S / 21 USAMVB Timisoara, under the leadership of the distinguished university professor Paul Pîrsan.

Wheat is the most important cultivated plant, with the highest prevalence in the world, cultivated in over 100 countries. In Romania, over the past five years, wheat acreage was about 2 million ha.

Timisoara has a temperate continental climate, typical of the south-eastern Pannonian Basin, with some Mediterranean influences (Adriatic variant Its general features are marked by diversity and irregularity of atmospheric processes. Being predominantly influenced by the maritime air masses from the North-West, Timisoara receives more precipitation than most cities in the Romanian Plain. Number of days with rain in Timisoara is of 142.

In Table 1 and Table 2 are presented the rainfall and temperatures in the studied years, reported to the multiannual average.

Table 1

Rainfall recorded in the Timişoara area

Average rainfall(mm)	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII
2008	21	9	61	45	49	157	46	25	51	17	53	55
2009	27	24	48	22	23	45	112	41	4	10	106	42
2010	25	27	50	82	49	51	44					
Multiannual average	39,1	38,3	33,9	46,8	63,1	79,6	62,4	51,4	42,1	42,2	49,4	52,6

As for the temperature, Timişoara enjoys a warm climate with mostly mild winters and hot summers.

Table 2

Temperature recorded in the Timişoara area

Average temperature (^{0}C)	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII
2008	0.9	3.7	7.7	12.4	17.8	21.6	21.9	22.6	15.4	12.3	7.1	3.6
2009	-1.1	1.4	6.6	15	18	20.1	23	23,7	20,0	12,3	8,3	4,3
2010	1	2.2	9.2	16.5	15.8	21	25					
Multiannual average	-1,6	1,1	5,8	11,2	16,3	19,4	21,1	20,4	16,5	11,0	5,6	0,8

The first year of experience was characterized by a warm autumn, the average temperature being around 7-8ºC, with 2-3 ºC higher than the multiannual average temperature. The registered precipitations were over 50mm in every month, October being the driest month in autumn. Timi□oara enjoyed a mild winter with small amount f precipitations. The spring recorded an average of 13 ºC temperature and 31mm rainfall. The summer was hot and wet, with over 20 ºC temperature and with 112 mm rainfall in July.

The autumn of the second year of experience was even more warm, with an average over 8 ºC and with a large amount of precipitations in November (106mm). October was the driest month of the autumn also this year, recording only 10mm rainfall. In the winter were recorded temperatures over 0 ºC, and small amount of precipitations. In the spring the average temperature was over 13 ºC, but the average rainfall was over 60mm. The summer was hot and with a small amount of precipitations, the averages were over 20 ºC temperature and 47mm rainfall.

MATERIAL AND METHODS

The purpose of the research is to determine the influence of sowing time and row distance on the number of spikes and the number of plants on a square meter.

The material investigated is the variety Alex (Lovrin 50), variety created by S.C.D.A Lovrin and approved in 1994, representative for the west of the country.

The research was conducted at the Teaching Resort of USAMVB Timi□oara. Trials were of the polifactorial type with three repetitions, in the study were taken the following factors:

- Sowing date, with four variations;
- Row distance, with three variations.

During the vegetation period were conducted field analysis to determine the number of spikes and the number of plants on a square meter.

RESULTS AND DISCUSSIONS

The following tables and figures contain the results obtained during the two years of experience.

Number of plants per square meter ranged between 168, obtained in the first year (Table 3), and 280, obtained also in the first year (Table 3).

The climatic conditions during the two years of experience were favorable obtaining a good number of plants on a square meter, specially the averages from autumn, winter and spring months.

Table 3

The number of plants on a square meter obtained in the year 2008-2009

Factor A - Sowing period	Factor B - Row distance			Factor A average			
	12.5 cm	25 cm	Scattering	**X**	**%**	**Difference**	**Semnification**
I	223	280	217	240.00	100	-	Mt.
II	214	210	209	211.00	88	-29.00	00
III	201	198	199	199.33	83	-40.67	000
IV	191	168	184	181.00	75	-59.00	000

DL 5%=6.99; DL 1%=9.52; DL 0.1%=12.79

Factor B average			
X	207.25	214.00	202.25
%	100	103	98
Difference	-	6.75	-5.00
Semnification	Mt.	000	000

DL 5%=6.05; DL 1%=8.24; DL 0.1%=11.08

Table 4

The number of plants on a square meter obtained in the year 2009-2010

Factor A - Sowing period	Factor B - Row distance			Factor A average			
	12.5 cm	25 cm	Scattering	**X**	**%**	**Difference**	**Semnification**
I	231	225	222	226.00	100	-	Mt.
II	226	221	218	221.67	98	-4.33	-
III	220	216	212	216.00	96	-10.00	00
IV	208	206	205	206.33	91	-19.67	000

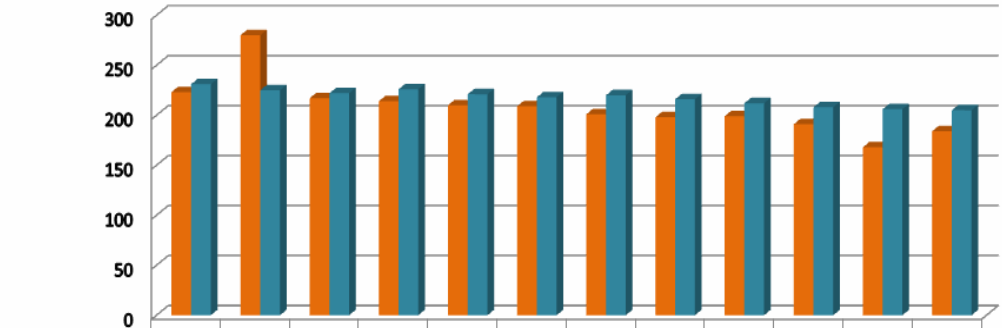
DL 5%=6.62; DL 1%=9.02; DL 0.1%=12.12

Factor B average			
X	218.00	214.33	211.67
%	100	98	97
Difference	-	-3.67	-6.33
Semnification	Mt.	-	0

DL 5%=5.73; DL 1%=7.81; DL 0.1%=10.49

The sowing period had a negative impact on the number of plants per square meter having a 20% decrease in the first year, and about 10 % in the second year, compared to the control variant.

About the row distance there was a 3% increase compared to the control variant in the first year in the 25 cm row distance, but in the second year the impact was negative.



	A1xB1	A1xB2	A1xB3	A2xB1	A2xB2	A2xB3	A3xB1	A3xB2	A3xB3	A4xB1	A4xB2	A4xB3
Year 2008-2009	223	280	217	214	210	209	201	198	199	191	168	184
Year 2009-2010	231	225	222	226	221	218	220	216	212	208	206	205

Figure 1. Number of plants per square meter under the influence of sowing period and row distance

As it is showed in the figure 1., the higest number of plants per square meter was obtained in the first year of experience, year characterized by a smaller amount of rainfall in the autumn.

The number of spikes on a square meter ranged between 420, obtained in the first year (Table 5), and 809, obtained in the second year (Table 6).

Because of the high temperatures and the sufficient amount of rainfall in the second period of vegetation, the generative period of wheat had been developed under favorable climatic conditions.

Table 5

The number of spikes on a square meter obtained in year 2008-2009

Factor A - Sowing period	Factor B - Row distance			Factor A average			
	12.5 cm	25 cm	Scattering	**X**	**%**	**Difference**	**Semnification**
I	758	784	673	738.30	100	-	Mt.
II	706	567	606	626.43	85	-111.87	00
III	643	515	537	565.10	77	-173.20	000
IV	592	420	460	490.70	66	-247.60	000

DL 5%=79,50; DL1%=108.40; DL 0.1%=145.60

Factor B average			
X	636.69	541.76	560.22
%	100	85	88
Difference	-	-94.93	-76.47
Semnification	Mt.	000	00

DL 5%=68,90; DL1%=93.80; DL0.1%=126.61

The sowing period influenced the number of spikes on a square meter, every delay of the sowing date determined about 7% decrease in the number of spikes, compared to the control variant.

The row distance had a negative impact, the best results were obtained in the control variant.

Table 6

The number of spikes on a square meter obtained in the year 2009-2010

Factor A - Sowing period	Factor B - Row distance			Factor A average			
	12.5 cm	25 cm	Scattering	**X**	**%**	**Difference**	**Semnification**
I	809	653	710	723.80	100	-	Mt.
II	768	619	654	680.40	94	-43.40	-
III	726	583	594	634.27	88	-89.53	0
IV	666	536	533	578.07	80	-145.73	000

DL 5%=70.80; DL 1%=96.40; DL 0.1%=129.60

Factor B average			
X	742.13	597.53	622.75
%	100	81	84
Difference	-	-144.60	-119.38
Semnification	Mt.	000	000

DL 5%=61.30; DL 1%=83.50; DL 0.1%=112.20

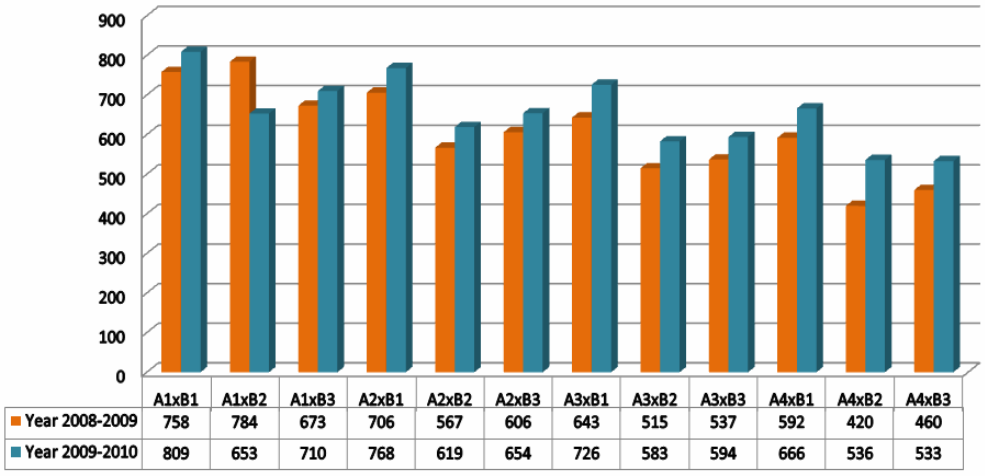


Figure 2. Number of spikes per square meter under the influence of sowing period and row distance

The summary contained in the figure 2., shows the best results in the second year of experience, year characterized by higher temperature and amount of precipitation than the previous year.

CONCLUSIONS

Research carried out pointed that every delay of the sowing period has a negative impact on on the number of plants and spikes of wheat, this leads to the conclusion that a sowing period after 15 October is not recommended .

The row distance also had a significant negative impact on the number of plants and spikes of wheat compared to the control variant.

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