STUDIES REGARDING THE INFLUENCE OF BASIC SOIL WORKS ON THE AUTUMN TWO-ROW BARLEY PRODUCTION

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Abstract. *In the agricultural years 2015 and 2016, in the Recaș area, we organised a monofactorial experiment which monitored the behaviour of two-row barley in three basic soil work variants:*

- *Harrowing year 3;*
- *Harrowing year 2;*
- *Harrowing year 1;*
- *Ploughing.*

The preceding plant was corn. The agricultural year 2015 presented precipitation humidity excess during the winter months, which led to a soil humidity excess. The year 2016 came with a normal precipitation amount. Given the well-known sensitivity of tow-row barley to humidity excess during the cold period of the year, there were plant losses, a fact that, in the end, led to a significant decrease in production. The number of lost plants was greater than with the variants where the basic soil work was replaced by superficial works several years in a row.

INTRODUCTION

Autumn hoeing cereals, under the condition of soils with low or moderate clay content, do not require a basic soil work. After previous, late harvested plants, ploughing is not recommended, because the tilled soil layer does not have time to "settle" so that aired spaces are large, capillary formation is delayed, which leads to an uneven plant emergence, and a significant grain percentage to not emerge. [1]

The lack of basic soil works for several years in a row can have negative consequences on the plant growth and development.

Two-row barley is very sensitive during the cold period of the year – winter- and the beginning of spring, to the excess water in the soil, which can determine the death of a significant plant number. On a soil, which has not been ploughed several years in a row, the water permeability decreases, determining a water excess at the level of plant roots or swamping. [2, 3]

MATERIALS AND METHODS

In 2015 and 2016, we organised a monofactorial experiment on a soil in the Recaș area where we monitored the growth and development of two-row barley plants, seeded after corn, with variants of superficial soil works in the absence of basic works for 3, 2 respectively 1 year.

We determined the number of plants per m^2 upon entering winter, and then the number of plants entering the vegetation stage at the end of March. We used Nectaria soil, applying a middle level technology. The climatic conditions are presented in the following tables: [5]

Table 1.

Year	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII
2015	2.1	2.9	7.1	11.6	17.7	21.2	24.9	24.5	19.0	10.9	6.7	3.1
2016	-0.3	6.9	7.7	13.7	16.3	21.6	23.9	24.3				
Annual averages	-1.2	0.4	6	11.3	16.5	19.6	21.6	20.8	16.9	11.3	5.7	1.4

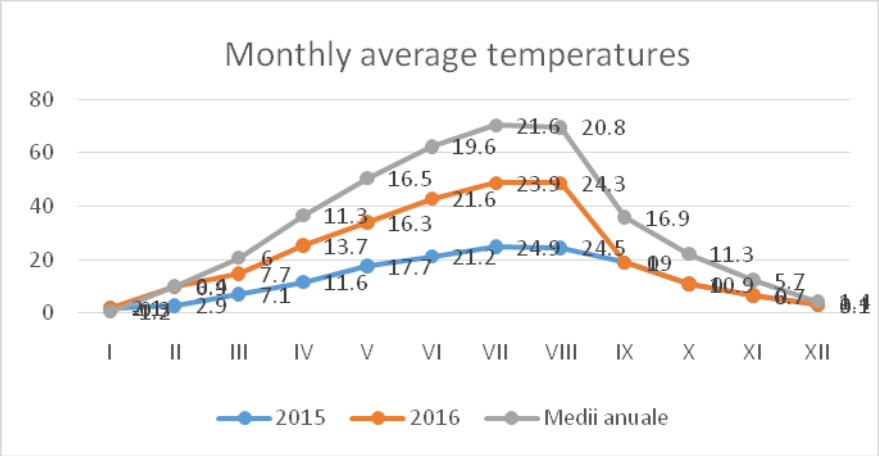

Fig. 1.Monthly average temperatures

Table 2.

Year	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII
2015	51.4	37.4	33.3	28.1	46.9	61.8	25	111.2	60.5	60.9	48.8	8.
2016	48	45	64	20	51	177	172					
Multiannual averages	40.9	40.2	41.6	50	66.7	81.1	59.9	52.2	46.1	54.8	40.6	47

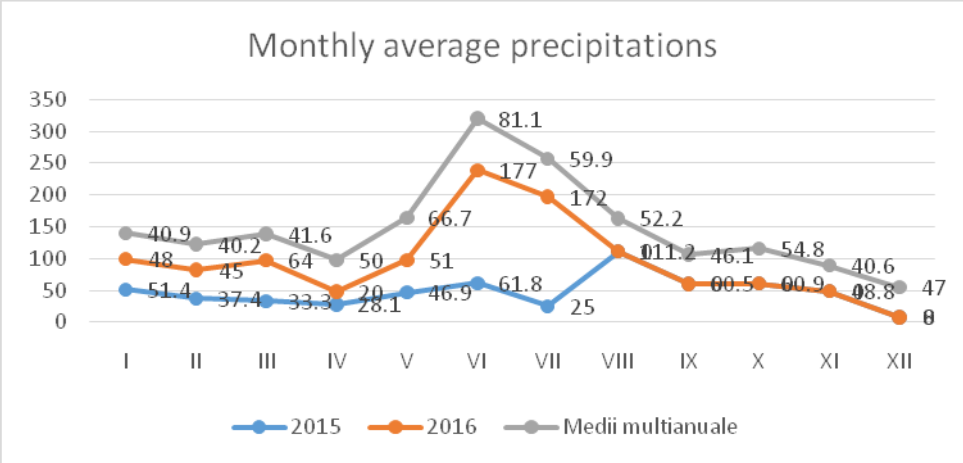

Fig. 2. Monthly average precipitations

During the period October-February of the agricultural year 2015, excessive precipitations of 120.4 l/m^2 were registered, compared to the multiannual average, which determined a water excess in the soil hard to process by tow row barley plants.

In the agricultural year 2016, during the same period, the precipitations were lower by 13.6 l as compared to the multiannual average, with no excess water in the soil.

RESULTS AND DISCUSSIONS

Regarding the average number of plants / m^2 determined upon entering winter (15 November) one may notice (tab 1) that there are no significant differences between the experimental variants except for the variant of the year III-2016, respectively year I-2015. [4]

Table 3.

Average no. of plants/ m^2 upon winter beginning

Variety / Year	Harrowing (B)			Year average			Specific
	Year III	Year II	Year I		%	Difference	
2015	397 ab	381 ab	402 a	393	100		
2016	369 b	384 ab	378 ab	377	96	-16	

Table 4.

Various averages for soil works

No. of plants/ m^2	383	383	370
%	103	103	100
Dif.	13	13	M +
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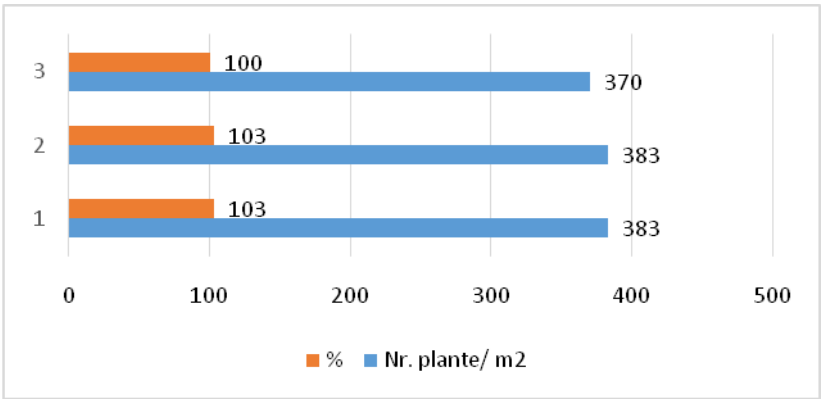

Fig. 3. No. of plants/m^2 in %

Table 5.

DL	A	B	AXB
5%	27.3	30.1	29.7
0.5%	39.4	46.9	41.8
0.1	51.8	58.2	62.2

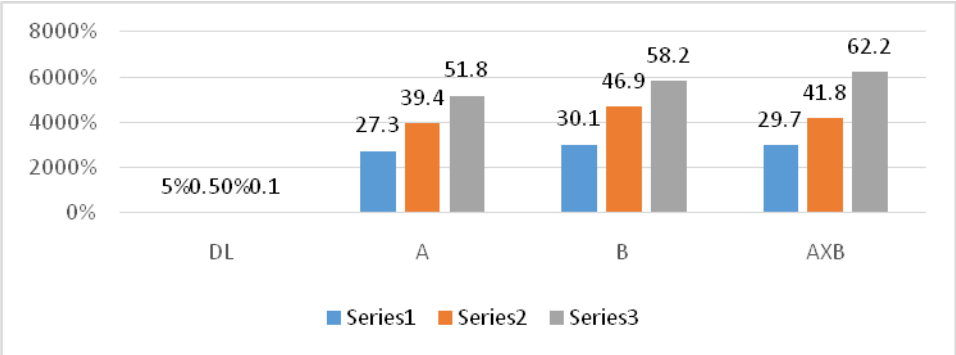

Fig. 4 No. of plants / m^2

We may state that crop emergence is not influence by the basic soil work (tilling, airing). In spring, at the end of March, the determined plant number is presented in table 4. It is observed that, in 2015, the remaining plant number is very low. Between the not tilled variants of 2 respectively 3 years, the differences are insignificant. In the variants where tilling was skipped only a year, the plant number is significantly higher (267) as compared to the other variants (154 respectively 161).

Table 6.

Average no. of plants / m^2 upon winter end

Variety Year (A)	Harrowing (B)			Annual averages			Specific
	year III	Year II	Year I		%	Difference	
2015	154 d	161 d	267 c	194	55	-160	
2016	343 b	376 a	352 ab	354	100	M+	

Table 7.

Various averages for soil works

No. of plants/ m^2	249	264	309
%	81	85	100
Dif.	-60	-45	M +
Signif.	000	000	

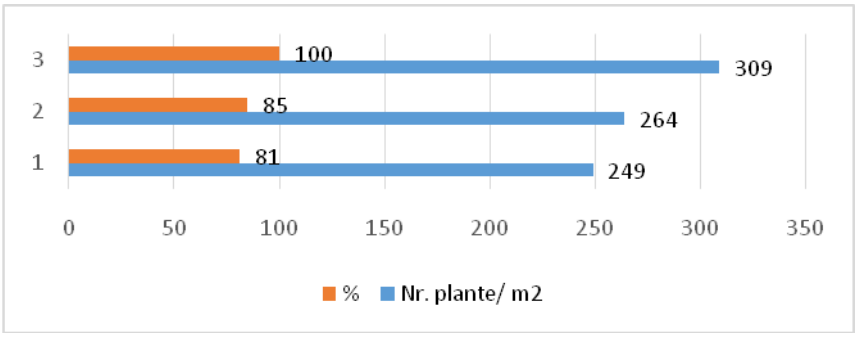

Fig. 5.No. of plants / m^2 in %

Table 8.

DL	A	B	AXB
5%	10.3	16.7	15.6
0.5%	16.9	21.3	20.7
0.1	29.4	30.2	29.4

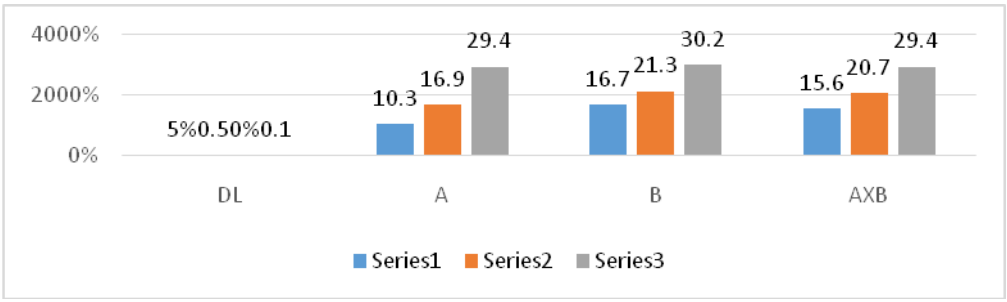

Fig. 6 No. of plants / m^2

The disappearance of a large number of plants was due to water excess in the soil, as a result of excessive precipitations. The effect was slightly less accentuated in the variant "year I", since soil compacting is more reduced in this variant, a fact which allowed for a better water infiltration in the soil.

In 2016, during the cold period, precipitations were closer to the multiannual average, without excess water at the root level, so that the number of dead plants was also more reduced (7.1-4.5%).

Table 9.

Percentage of plants lost during the cold period of the year

Year	Harrowing		
	Year III	Year II	Year I
2015	74.2	66	33.6
2016	7.1	4.5	6.9

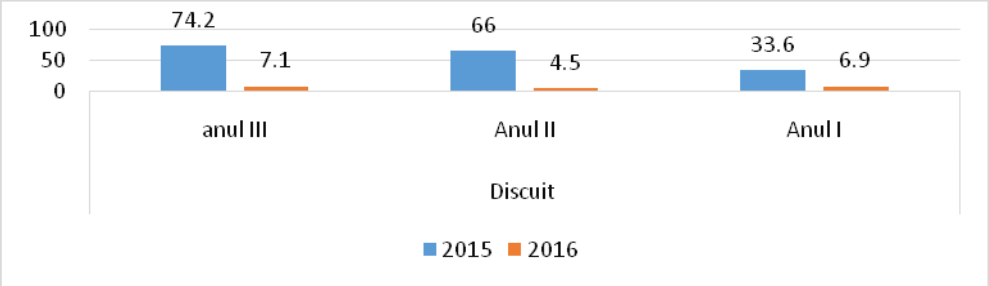

Fig. 7 Percentage of plants lost during the cold period of the year

CONCLUSIONS

1. Under precipitation excess conditions during the cold period of the year, soils where no basic works were performed for several years in a row registered higher plant losses in a percentage of 66-74.2 %.
2.Under the same climatic conditions, a basic soil work carried out for the previous crop determined plant losses in a percentage of 33.6 %.
3.During years when the precipitations are close to the multiannual average for the cold period, plant loss is very low (4.5-7.15) not being influenced by the skipped basic soil work for 2-3 consecutive years.

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