

THE INFLUENCE OF NITROGEN FERTILISATION ON THE TRITICALE CULTURE ESTABLISHED ON THE ACID SOILS FROM ALBOTA-ARGES

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Abstract

During the agricultural years 2006/2007 and 2007/2008, on the acid soils of Albota, Arges county, we established cultures of triticale (triticosecale) in randomized blocks. We used seven varieties, such as: Plai, Trilstar, Stil, Goru, Haiduc, Titan and TF2. The main village of Albota bears the characteristics of Climatic Area 2. The precipitations in the area were taken over by the Weather Station of Pitesti.

It was performed the fertilization of the experimental land with nitrogen in an optimum amount of 90 kg/ha and in a suboptimum amount of 12 kg/ha, and also with phosphorus in amount of 80 kg/ha. The years had different characteristics. While 2007 was extremely droughty, 2008 was a regular year according to the precipitations registered.

Due to the statistical processing via the regression and the variation method, we found that triticales are productively efficient both for optimum and suboptimum fertilized plots. Triticales are recommended for hungry soils, poorly productive for wheat because they have the genetic possibility to ensure some efficient crops in regular years of precipitations and to ensure good crops in draughty years. By administrating nitrogen in a small quantity, the remanence of chemicals in plants is very low, with significant importance for the people and animal health. The data are shown in tables.

INTRODUCTION

Triticosecale or triticale belongs to *plantae kingdom, Trachebionta subkingdom, Liliobsida class, Cipperaliss order, Poaceae family*. The binominal denomination is *x triticosecale witt*.

Triticale – a synthetic man-made species by crossing wheat (*Triticum* sp.) and rye (*Secale cereale*) which slowly entered in production because of the flows presented by the first forms especially due to the fertility of ears, the behaviour of falling, the development of endosperm and the germination in the ear [4].

According to the research made described in specialist literature, it is established that triticales react well on soils with reduced natural fertility, humid and with high acidity, such as albic or brown luvic soils.

At the same time, it emphasizes a higher tolerance compared to the toxicity of mobile aluminium ions in soil.

The purpose of this paper is to emphasize the poorer soils, to promote the triticale culture and to get maximum production with minimum nitrogen administrated. Therefore, we protect the soil by diminishing chemicals.

The experiences were placed on acid soil from Albota, Arges, on plots of 10 m² for each variety of triticale.

MATERIAL AND METHODS

The material is represented by the acid soil from the locality of Albota, non/fertilised in the last five years (ecologic reconversion) on which we placed the triticale culture in 2007 and 2008. The varieties of triticale sown were: Plai, Titan, Trilstar, Stil, Gorun, Haiduc and TF2.

They made experiments with nitrogen fertilisation in different rates: nitrogen optimum dose of 90 kg/ha and suboptimum dose of 18 kg/ha and the unique phosphorus fertilisation dose of 80 kg/ha. They examined the cultures established in years with different amounts of precipitations; 2007 was droughty and 2008 was regular. The results obtained were interpreted through the regression method and the variation method.

The following objectives were considered:

1. Soil characterisation.
2. Area characterisation from the agricultural and climate perspective.
3. Experiences with administration of fertilizers in two years, the droughty 2007 and the regular 2008 year according to rainfall.
4. The results in production and their interpretation by statistics.

The wet, cold and acid soils are at the same time low in fertility (about 1.5% humus; 1.0-1.5 mg/100 g soil of assimilable phosphorus; 7.8 mg/100 g. soil K₂O and 0.1% nitrogen), where small crops are obtained for most of the cultures. The depletion of organic matter, the reduced contribution of nitrogen, phosphorus, potassium, the high acidity on big surfaces, the high content of mobile aluminium, the high content of clay, the defective comprehensive drainage are features that request ameliorating measures for this kind of soils.

The acid soils where we placed the experiences from Albota have an agricultural horizon of 20-22 cm thickness with average tissue (clay-bearing), under which there is an eluvial horizon of 20-30 cm thickness, very poorly structured, pseudogley, with high content of aluminium and low content of humus. In depth, there is then the rainproof horizon with 60-70% clay preventing the entrance of water and of the radicular system. The presence of the claylike-eluvial horizon, often enriched with clay and very compressed, emphasizes the unfavourable features impressed by the fine tissue sediments.

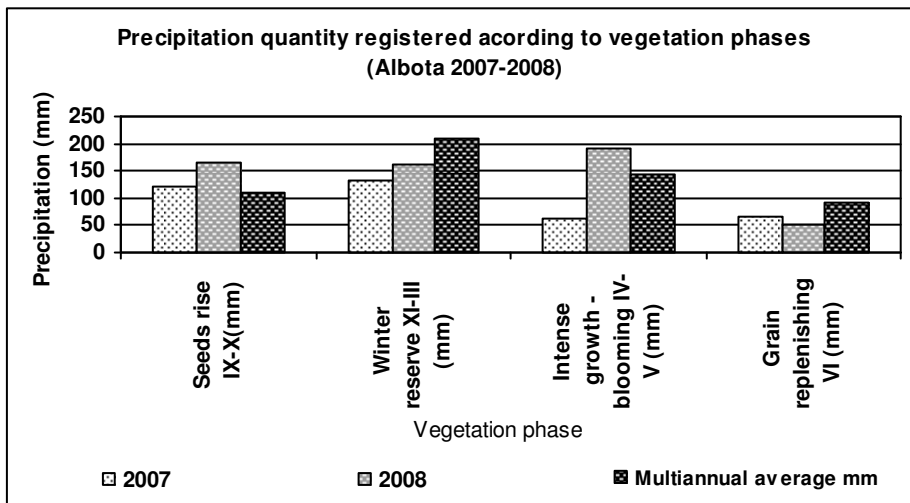


Fig. 1. Amount of precipitations registered on the vegetation stage

RESULTS AND DISCUSSION

For the varieties fertilized with the optimum amount of nitrogen, the best production stability according to the variation factors are the varieties Titan and TF2 and the lowest is Plai.

Comparing the average production to the production obtained under the most favourable conditions of culture, we can say that the variety Titan accomplished during the testing period about 85% of the maximum production, and the variety Plai accomplished only 77%. The highest production loss under unfavourable conditions of culture, compared to the soil average, was accomplished by the variety Plai, and the smallest loss the variety Titan.

By establishing the stability with the help of the regression factor and of average production [3], the same varieties with good production stability are emphasized. The varieties Plai and Haiduc have the highest production rate but a regression factor of 1.10 and 1.29 respectively which implies the tendency of these genotypes to achieve higher productions under favourable culture conditions.

For the options fertilized with optimum nitrogen amount, the best production stability according to the variation indicators are obtained by the varieties Gorun and the lowest is for the variety Haiduc. Comparing the average production to the production obtained under the most favourable culture conditions, we can say that the variety Titan achieved during the testing period about 69% of the maximum production, and Haiduc got only 58%.

Table 1

Average production obtained by the triticale varieties and the regression indicator during 2007-2008

Varieties	Triticale production							
	Optimum fertilised with 90 kg N; 80 kg K				Suboptimum fertilised with 18 kg N; 80 kg K			
	2007	2008	average	Regressi on indicator	2007	2008	average	Regression indicator
Plai	4350	8027	6189	1.38	3850	7801	5826	1.10
Titan	4350	6203	5277	0.69	3410	6429	4920	0.84
Trilstar	4360	6943	5652	0.97	3210	6937	5074	1.04
Stil	4160	6616	5388	0.92	3210	6656	4933	0.96
Gorun	4570	7102	5836	0.95	2980	5950	4465	0.82
Haiduc	4570	7768	6169	1.20	3250	7875	5563	1.29
TF2	4160	6433	5297	0.85	3290	6515	4903	0.90
Average	4360	7013	5687		3314	6880	5097	

Table 2

Average production of triticale varieties and its variation during the observation years

No.	Optimum azote fertilised					Suboptimum azote fertilised			
	Variety	Prod. kg/ha	s%	% from max. production	Min. average production	Production kg/ha	s%	% from max. production	Min. average production
1	Plai	6189	26.00	77	1839	5826	27.93	66	1976
2	Titan	5277	13.03	85	927	4920	21.34	69	1510
3	Trilstar	5652	18.26	81	1292	5074	26.35	63	1864
4	Stil	5388	17.37	81	1228	4933	24.36	65	1723
5	Gorun	5836	17.90	82	1266	4465	21.00	66	1485
6	Haiduc	6189	22.61	79	1599	5563	32.70	58	2313
7	TF 2	5297	16.07	82	1137	4903	22.80	67	1613
8	Average	5687	18.76	81	1327	5097	25.21	65	1783

Table 3

Increment of production due to optimum fertilization

No.	Varieties of triticale	Increment of production 2007 Kg/ha	Increment of production 2008 Kg/ha
1	Plai	500	226
2	Titan	940	-226
3	Trilstar	1150	6
4	Stil	950	-40
5	Gorun	1590	1152
6	Haiduc	1320	-780
7	TF2	870	482

The highest production loss under unfavourable culture conditions was obtained by the variety Haiduc and the lowest by the variety Gorun.

By establishing the stability with the help of the regression factor and of average production [3], the same varieties with good production stability are emphasized (Figure 2). The varieties Haiduc and Plai had the highest production rate, but a regression factor of 1.11 and 1.29, respectively, which implies the tendency of these genotypes to achieve higher productions under favourable culture condition.

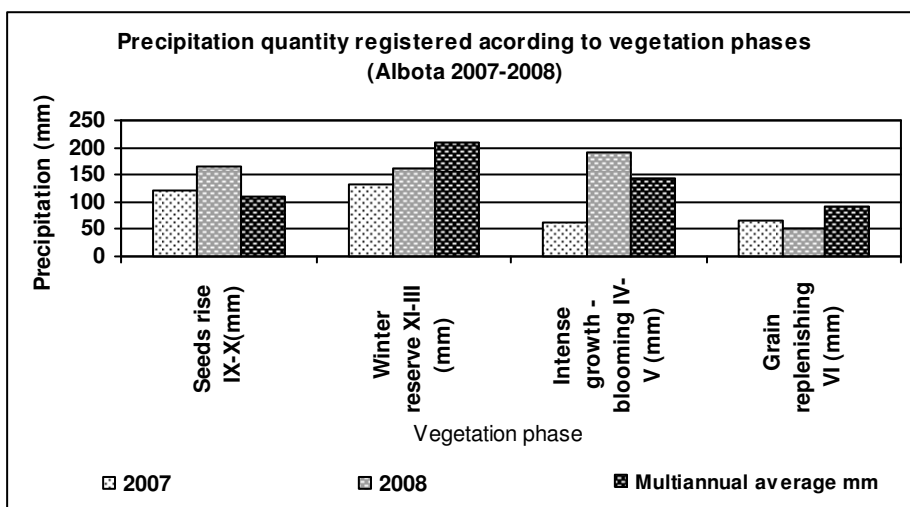


Fig. 2. Relation between the triticale average production (fertilized with nitrogen in optimum amount) and the adjustment to weather conditions (Albota 2007-2008)

CONCLUSIONS

From the study performed, the conclusions are as follows:

1. The main factor influencing the triticale production stability in the area is the water.
2. The triticale varieties were a little influenced by the lack of water and did not respond well to the good administration of water and nitrogen.
3. The varieties Titan, Gorun, TF2 and Stil have a good production stability both in conditions of optimum and of suboptimum nitrogen amount.
4. The varieties Plai and Haiduc have the highest production rate but a high regression factor which implies the tendency of these genotypes to achieve higher productions under favourable culture conditions.

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