RESEARCH ON THE INFLUENCE OF NITROGEN DOSES AND VARIETY ON THE PRODUCTION OF SPRING TWO-ROWED BARLEY (CONV. HORDEUM DISTICHUM) IN THE WESTERN PART OF THE COUNTRY

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Abstract. *Obtaining quality and economically motivated productions represents a desire that all farmers follow, and in the conditions of two-rowed barley culture, mineral fertilization often prevents them in its achievement. Taking into account the influence of fertilizers over the quality of the harvest, fertilization should be differentiated according to the purpose for which the culture is intended, feed or malt for brewing. In order to accomplish the theme entitled " Research on the influence of nitrogen doses and variety on the production of spring two-rowed barley (conv. Hordeum distichum) in the Western part of the country" research have been carried out on the territory of the Didactic Station of the Banat's University of Agricultural Sciences and Veterinary Medicine "King Michael I of Romania" from Timisoara. The main objective of the research was to bring a contribution in determining the influence of doses and of the variety on production, leading to the achievement of economically efficient harvests with superior quality attributes. The effect of nitrogen doses, and of the variety on spring two-rowed barley, has been tested in a bifactorial experience, located on a cambic chernozem soil, phreatic moist. The results point out that nitrogen fertilization has influenced production, the highest value of 2733 kg/ha was obtained by the N100fertilization variant, with a production increase of 8 % compared to the control variant N40 (2532 kg/ha), and a harvest difference of 201 kg/ha, statistically ensured as a significant. By increasing the nitrogen dose from N40 to N80 production increased by 7%, with a significant harvest difference between the two variants of 196 kg/ha. Regarding the protein content, its lowest value was obtained in the fertilization variant N40, in the Kompact variety (10.68%), followed by the Cristalia variety (11.07 %) and the Annabell variety (11.39 %). The results obtained add originality in terms of fertilization and adaptability of some varieties of spring two-rowed barley, representing a viable source of information for spring two-rowed barley growers, who want to obtain high production, but also qualitative ones.*

Keywords*: nitrogen doses, protein content, starch content*

INTRODUCTION

Cereal cultivation is a basic source of food for the population and the animals raised by man, being spread over an area of 760 million ha, which represents 50% of the arable land of our planet. (PIRSAN P., 2005) With the exception of Antarctica, cereals are grown basically on all continents, their distribution being influenced by ecological and economic-historical factors. Major grain crops produced around the world are: wheat, rice, corn and barley. (CHAVEN AND KADAM, 1989).

There are concentrations of certain cereal crops on continents such as: Europe and North America producing 70% of the world's wheat production, monsoon Asia producing 90% of the world's rice production, and North and South America providing 60% of the world wide maize's production.

It is currently not possible to conceive a production at the level of the productive potential of the varieties, without the application of high doses of fertilizers.

This is possible due to the progress achieved in the improvement of varieties, currently zoning varieties with increased resistance to fall, foliar diseases and an increased capacity to exploit high doses of fertilizers.

The "fertilization" factor has become one of the main means both for directing vegetative growth and in achieving a higher quantity of production depending on its destination.

MATERIAL AND METHODS

In order to realize the theme entitled “Research on the influence of nitrogen doses and variety on the production of spring two-rowed barley (conv. Hordeum distichum) in the Western part of the country” research was carried out on the territory of the Didactic Station of the Banat’s University of Agricultural Sciences and Veterinary Medicine “King Michael I of Romania” from Timisoara.

The main objective of the research was to bring a contribution in determining the influence of doses and of the variety on production, leading to the achievement of economically efficient harvests with superior quality attributes.

The effect of nitrogen doses, and of the variety on spring two-rowed barley, has been tested in a bifactorial experience organized according to the subdivided parcel method with the following experimental factors.

Factor A – total nitrogen dose (Kg/ha) with gradations:

a1 - N40
a2 - N60
a3 - N80
a4 -N100

Factor B - variety, with graduations:

b1- Annabell
b2- Crystalline
b3- Compact

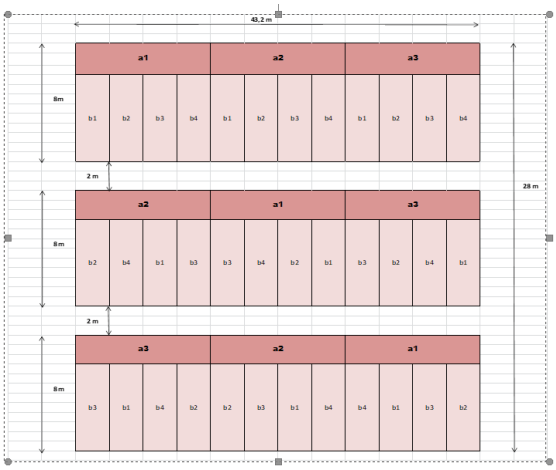

Figure 1. Groundplan of bifactorial experience

RESULTS AND DISCUSSIONS

Production results ranged from 2422 kg/ha in the fertilized variant with the dose of N40 in the Annabell variety and 2839 kg/ha in the Kompakt variety in the fertilized variant with the n100dose. (Table 1).

Under the conditions of Timisoara area, when fertilizing with nitrogen, the highest production of 2733 kg/ha was obtained in the fertilization variant N100, with a production increase of 8 % compared to the control variant N40 (2532 kg/ha), with a harvest difference of 201 kg/ha, statistically ensured as significative. By increasing the nitrogen dose from N40 to N80 production increased by 7%, with a harvest difference between the two variants of 196 kg/ha.

In the fertilization variant N60 the production of spring two-rowed barley was of 2588 kg/ha, the difference in production between this variant and the control variant being statistically uninsured.

As regards the influence of the variety on the spring two-rowed barley harvest, it is apparent that the Kompakt variety, with the highest production of 2772 kg/ha, was registered having a production increase of 5 % with a difference of 246 kg/ha statistically ensured significantly distinct. The Cristalia variety (2637 kg/ha) was recorded with a production increase of 3% compared to the Annabell control variety, with the production difference of 111 kg/ha not being statistically insured.

Table 1

The influence of nitrogen doses and variety on production

A Factor Nitrogen doses	B Factor Variety		
	Annabell	Cristalia	Kompakt
N40	2422	2532	2643
N60	2478	2588	2699
N80	2589	2699	2911
N100	2617	2727	2839

A factor means				
	N40	N60	N80	N100
Production kg/ha	2532	2588	2728	2733
%	100	102	107	108
Difference		56	196	201
Signification			XX	XX

DL5%=143; DL1%=194; DL 0,1=266

B factor meaning			
Specification	Annabell	Cristalia	Kompakt
Production kg/ha	2526	2637	2772
%	100	103	105
Difference		11	2466
Significations			Xx

DL5%=112;DL1%=185;DL0,1=345

Protein content results (%)

Table 2 presents the results on the protein content, from which it results that in spring two-rowed barley, in the climatic conditions of Timisoara, the amplitude of the protein content was between 10.63 % on the background of fertilized with N40 and 12.93 % on the background of fertilized with N100.

With reference to the level of fertilization, it was noted that when the dose of N40 was applied, the protein content was lowest (10.81%), by doubling the dose of nitrogen to N80,

namely N100, the protein content recorded a percentage increase of 10 % (N80), respectively 14 % (N100) compared to the N40 control variant, resulting a difference of 1.06 % and 1.55 % respectively, insured as statistically very significant.

From the results obtained by applying 70% of the total dose of nitrogen to sowing, namely 30% in vegetation, it follows that, under the conditions from Timisoara, the protein content was lower than in the Șistarovăț area, the highest protein content being obtained this time too, when applying 30% of the total dose of nitrogen to sowing, respectively 70 % into vegetation. Regarding the differences between the average values of the protein content, one may notice that these are statistically insured as insignificant.

With reference to the fractional application of nitrogen doses, it is found that the lowest protein content value of 11.56 % was recorded in the control variant, where nitrogen doses were applied fractionally only once (1 application), by fractional application of nitrogen doses, three times (3 applications) resulted in a percentage increase in the protein content of 1%. , compared to the control variant, statistically insured as insignificant.

Table 2

The influence of nitrogen doses and variety on protein content (%)

A Factor Nitrogen doses	B Factor Variety		
	Annabell	Cristalia	Kompakt
N40	10.94	10.74	10.45
N60	11.20	11.00	10.71
N80	11.73	11.52	11.21
N100	11.86	11.65	11.35

A factor means				
	N40	N60	N80	N100
Protein content%	10.71	10.98	11.48	11.62
%	100	103	107	109
Difference		0.27	0.77	0.91
Significance			X	XX

DL5%=0.54; DL1%=0.74; DL 0,1=1

B factor meaning			
Specification	Annabell	Cristalia	Kompakt
Production kg/ha	2526	2637	2772
%	100	103	105
Difference		11	2466
Significations			Xx

DL5%=0.10;DL1%=0.25;DL0,1=0.80

Starch content results (%)

The average values of the starch content obtained in the Timisoara experimental center (Table 3) ranged from 60.27% in the fertilized variant with the dose of N40 at the Annabell variety and 65.94% when applying the dose of N100 to the Kompact variety.

One may notice that this year the highest starch content of 65.20% was obtained in the fertilized version with the dose of N100, where there was a percentage increase compared to the control variant N40 (60, 85%) of 5%, thus returning a difference of 4.35% statistically ensured as distinctly significant. By doubling the dose of nitrogen from N40 to N80 the value of the starch content registered a percentage increase of 3% compared to the control variant, thus returning a difference of 3.73%, statistically assured as significant.

When applying the dose of N60 the value of the starch content was 62,10 %, recording a percentage increase of 2% compared to the control variant N40, the difference of 1.25% being meaningless.

From the analysis of the influence of the variety on the starch content, one may notice that from the varieties studied, the highest starch content of 63. 89 % was obtained from the Kompact variety, followed by the Cristalia variety (63.08%) and the Annabell variety (62. 57%).

The largest percentage increase in starch content of 2% compared to the Annabell control variety was recorded in the Kompakt variety, with a difference of 1.32%, statistically ensured as significant. A percentage increase of 1% compared to the Annabell variety was recorded in the Cristalia variety, with the difference of 0.51% being statistically ensured as insignificant.

Table 3

The influence of nitrogen doses and variety on starch content (%)

A Factor Nitrogen doses	B Factor Variety		
	Annabell	Cristalia	Kompakt
N40	60.27	60.76	61.54
N60	61.5	62	62.8
N80	63.96	64.48	65.31
N100	64.58	65.1	65.94

A factor means				
	N40	N60	N80	N100
Protein content%	60.85	62.10	64.58	65.20
%	100	102	103	105
Difference		1.25	3.73	4.35
Significance			X	XX

DL5%=3.07; DL1%=4.18; DL0.1%=5.66

B factor meaning			
Specification	Annabell	Cristalia	Kompakt
Production kg/ha	62.57	63.08	63.89
%	100	101	102
Difference		0.51	1.32
Significations			X

DL5%=0.54;DL1%=1.21;DL0,1=3.86

CONCLUSIONS

Nitrogen-fertilization influenced production, the highest value of 2733 kg/ha was obtained in the N100fertilization variant, with a production increase of 8 % compared to the control variant N40 (2532 kg/ha), with a harvest difference of 201 kg/ha, statistically ensured as a significative. By increasing the nitrogen dose from N40 to N80 production increased by 7%, with a harvest difference between the two variants of 201 kg/ha.

From the data presented on the protein content obtained under the conditions of Timisoara, it appears that the lowest value of the protein content was obtained in the fertilization variant N40, in the Kompact variety (10.68%), followed by the Cristalia variety (11.07 %) and the Annabell variety (11.39 %).

The main conclusions that emerge from the scientific paperwork, bring an added originality in terms of fertilization and the adaptability of some varieties of spring two-rowed barley, representing a viable source of information for spring two-rowed barley growers, who want to obtain high productions, but also qualitative.

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