

RESEARCHES REGARDING THE VARIATION OF THE WHEAT PROTEIN CONTENT AND PRODUCTION ACCORDING TO THE CULTIVATION AREA, TO THE WHEAT VARIETY AND TO THE FERTILIZATION

CERCETĂRI PRIVIND VARIATIA CONȚINUTULUI ȘI A PRODUCȚIEI DE PROTEINĂ LA GRÂU ÎN FUNCȚIE DE ZONA DE CULTURĂ, SOI ȘI FERTILIZARE

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Abstract: In this paper are presented the results obtained in Greece, in the region Aitolokarmania, on an alluvial soil, and in Romania, in Câmpia Timișului (Timiș Plain), on a typical chernozem. The studied varieties are Gegora and Dio from Greece and Dropia from Romania. In Greece, the fertilization was done with 10 and 20 t manure/ha and in Romania with $N_{75}P_{60}K_{60}$ and $N_{150}P_{60}K_{60}$. The protein content increased as the fertilizer dose increased. So, in Greece the protein content increased from 13,3% at the reference variant and 14,8% at the Gegora variety, to between 13,6% (Mt) and 14,1% (in the variant fertilized with 20t manure/ha) at the Dio variety and to between 13,0% (Mt) and 13,9% at the Dropia variety. In Romania, the protein content varied between 13,2% (N_0) and 14,8% (N_{150}) at Gegora variety, between 12,9% (N_0) and 13,9% (N_{150}) at Dio variety and between 12,5% (N_0) and 14,1% (N_{150}). The protein average quantity per hectare and according to the fertilization levels was of 566 kg/ha for Dropia variety and of 486 kg/ha for the varieties Gegora and Dio in Romania and of 502 kg/ha for Dropia variety, of 591 kg/ha for Gegora variety and of 573 kg/ha for Dio variety in Greece.

Rezumat: În lucrare sunt prezentate rezultatele obținute în Grecia, zona Aitolokarmania, pe un sol aluvionar și în România, în Câmpia Timișului, pe un sol cernoziom tipic. Soiurile luate în studiu sunt Gegora și Dio din Grecia și soiul Dropia din România. În Grecia fertilizarea s-a făcut cu 10 și 20 t/ha gunoi de grajd, iar în România cu $N_{75}P_{60}K_{60}$ și $N_{150}P_{60}K_{60}$. Conținutul de proteină a fost crescut odată cu dozele de îngrășămintă. Astfel, în Grecia conținutul de proteină a crescut de la 13,3% în varianta martor și 14,8% la soiul Gegora, între 13,6% (Mt) și 14,1% (varianta cu 20t/ha gunoi de grajd) la soiul Dio și între 13,0% (Mt) și 13,9% la soiul Dropia. În România, conținutul de proteină a variat între 13,2% (N_0) și 14,8% (N_{150}) la soiul Gegora, între 12,9% (N_0) și 13,9% (N_{150}) la soiul Dio și între 12,5% (N_0) și 14,1% (N_{150}). Cantitatea de proteină la hectar, în medie pe nivelurile de fertilizare, a fost de 566 kg/ha la soiul Dropia și 486 kg/ha la soiurile Gegora și Dio în România și de 502 kg/ha la soiul Dropia, 591 kg/ha la soiul Gegora și 573 kg/ha la soiul Dio în Grecia.

Key words: wheat, protein, varieties, fertilization.

Cuvinte cheie: grâu, proteină, soiuri, fertilizare

INTRODUCTION

The protean substances build the most important part of the wheat grain when it comes to the nutritive value and to the quality for the breeding products industry.

The protean substances content of the wheat grains is influenced by genetic (variety) and vegetation factors.

Most of the common wheat varieties (*Triticum aestivum vulgare*) of the world collection contain in their grains between 12 and 16% protean substances.

The cereals from the droughty areas are richer in proteic substances than the ones from humid regions.

The protean substance content of the wheat grains is positively influenced by each measure taken in order to increase the soil fertility.

This research presents the results regarding the protein content and quantity obtained in different climatic regions (Greece and Romania) for the three varieties Gegora, Dio and Dropia, cultivated on different soil types, differently fertilized.

MATERIAL AND METHODS

The experiments done in Greece were bifactorial, the A factor being the cultivated variety (Gegora and Dio created in Greece and Dropia created in Romania) and the B factor the agrifond. The experiment was carried out in three graduation variants, non-fertilized reference variety, variety fertilized with 10 t manure/ha and with 20 t manure/ha.

In Romania the A factor was represented by the same wheat varieties and the B factor by the fertilization with $N_0P_{60}K_{60}$, $N_{75}P_{60}K_{60}$ and $N_{150}P_{60}K_{60}$.

The experiments from Greece were carried out on an alluvial soil having a pH of 7,4 and a humus content of 2,10%.

In Romania the experiments were carried out on a typical chernozem, light carbonated, having a pH of 8,2 and a humus content of 3,18%.

RESULTS AND DISCUSSION

Figure 1 presents the evolution of the protein content obtained in Greece.

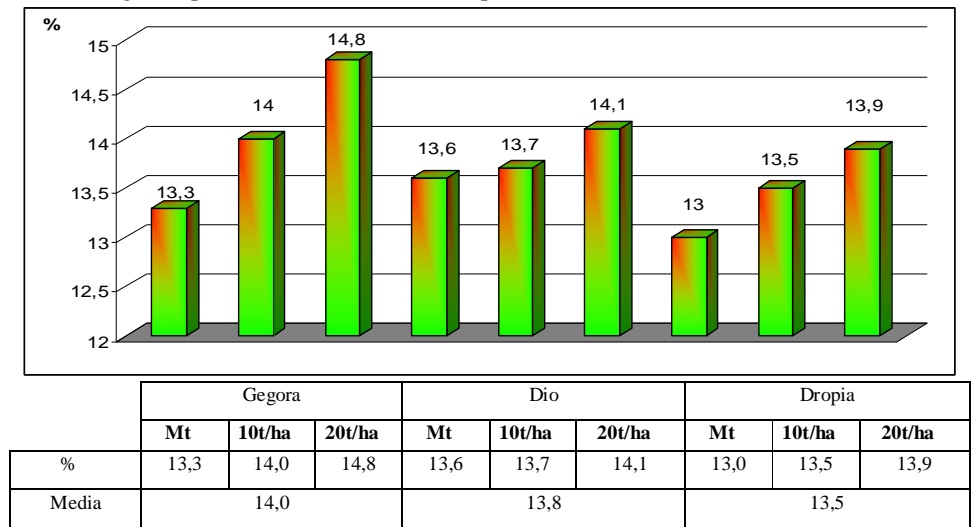


Figure 1. The variation of the protein content registered on the experimental field in Greece

It results that the fertilization with manure favourably influenced the protein content, which increased at all the three varieties as the fertilizer dose increased.

The limits for the Gegora variety lied between 13,3% for the reference variant and 14,8% for the variant fertilized with 20 t manure/ha, and between 13,6% and 14,1% at the Dio variety, respectively between 13,0% and 13,9% for the Dropia variety.

The protein production is given in Table 1.

Table 1

The protein quantity obtained in Greece

A The variety	B – The fertilization			The average values of the A factor			
	Mt	10 t/ha	20 t/ha	The protein content kg/ha	%	Dif. Kg/ha	Significatio n
Gegora	429	571	772	591	100		
Dio	433	570	707	573	97	-18	0
Dropia	365	522	618	502	85	-89	000

DL5% = 16 kg/ha DL 1% = 23 kg/ha DL0,1%= 31 kg/ha

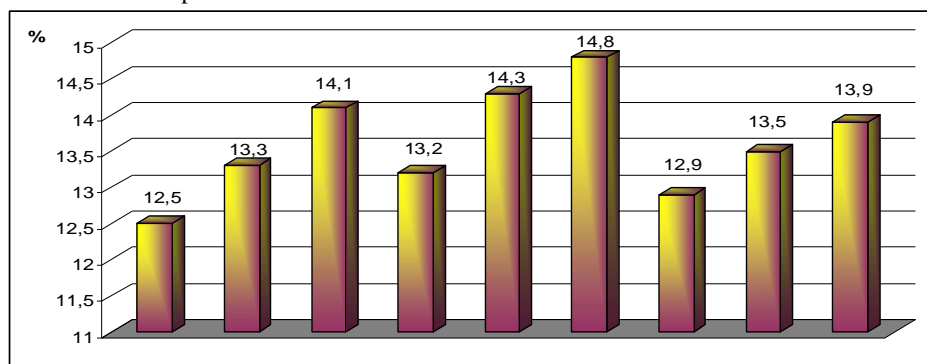
The averages of the B factor

Specification	Mt	10 t/ha	20 t/ha
Quantity kg/ha	409	554	699
%	100	135	170
Difference kg/ha		145	290
Signification		XXX	XXX

DL5% = 19 kg/ha DL1%= 26kg/ha DL0,1%= 35kg/ha

It results that, at all varieties, the higher protein quantity was obtained in the variant fertilized with 20 t/ha.

Figure 2 presents the protein content according to the variety and to the fertilization, obtained on the experimental field from Romania.



	Dropia			Gegora			Dio		
	N ₀	N ₇₅	N ₁₅₀	N ₀	N ₇₅	N ₁₅₀	N ₀	N ₇₅	N ₁₅₀
	P ₆₀ K ₆₀			P ₆₀ K ₆₀			P ₆₀ K ₆₀		
% proteină	12,5	13,3	14,1	13,2	14,3	14,8	12,9	13,5	13,9
Cond. mediu	13,3			14,1			13,4		

Figure 2. The variation of the protein content according to the variety and to the fertilization determinate on the experimental field from Romania

It results that, for all varieties, the protein content increased as the nitrogen doses increased, from 12,5% (N₀) to 14,1% (N₁₅₀) for the Dropia variety, from 13,2% (N₀) to 14,8% (N₁₅₀) for the Gegora variety and from 12,9% (N₀) to 13,9% (N₁₅₀) for the Dio variety.

The protein quantity is given in Table 2.

Table 2

The protein quantity obtained in Romania

A The variety	B – The fertilization			The average values of the A factor			
	Mt	10 t/ha	20 t/ha	The protein content kg/ha	%	Dif. Kg/ha	Signification
Gegora	430	558	712	566	100		
Dio	339	477	642	486	85	-80	000
Drophia	388	468	602	486	85	-80	000

DL5% = 19 kg/ha DL 1% = 26 kg/ha DL0,1%= 34 kg/ha

The averages of the B factor

Specification	Mt	10 t/ha	20 t/ha
Quantity kg/ha	385	501	652
%	100	130	169
Difference kg/ha		116	267
Signification		XXX	XXX

DL5% = 15 kg/ha DL1%= 22kg/ha DL0,1%= 30kg/ha

It results that the highest protein quantity was obtained for the Drophia variety.
The protein quantity increased at all studied varieties as the nitrogen dose increased.

CONCLUSION

1. In Greece, the protein content increased at all studied varieties as the manure doses increased, from 13,3% (no manure used) to 14,8% at the Gegora variety, from 13,6% to 14,1% at the Dio variety and from 13,0% to 13,9% at the Drophia variety.

2. The average quantity of protein for the three varieties was of 470 kg/ha for the reference variety, of 652 kg/ha for the variant fertilized with 10 t/ha and of 804 kg/ha for the variant fertilized with 20 t manure/h.

3. On the experimental field from Romania the protein content increased as the nitrogen doses applied on a base of $P_{60}K_{60}$ increased from 12,5% (N_0) to 14,1% (N_{150}) for the Drophia variety, from 13,2% (N_0) to 14,8% (N_{150}) at the Gegora variety and from 12,9% (N_0) to 13,9% (N_{150}) for the Dio variety.

4. The average protein quantity for the three studied varieties was of 392 kg/ha for the reference variety (N_0), of 514 kg/ha in the variant fertilized with N_{75} and of 670 kg/ha for the variant fertilized with N_{150} .

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