THE INFLUENCE OF THE FERTILIZATION UPON THE CONTENT AND PRODUCTION OF PROTEIN ON SOME AUTUMN WHEAT VARIETIES, AT SC-DA VALU LUI TRAIAN, CONSTANTA COUNTRY

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In a modern agriculture and sustainable the use of nutrients is especially important for obtaining high yields and high capacity planned to wheat. The results worldly obtained prove that the fertilization is one of the main factors in increasing yields. The yields obtained are related and correlated with the quantities of fertilizers used. Fertilization can create the possibility to increase the fund nutrients into forms available to plants, to increase the mobility of different ions and their potential, and soil reaction by changing the ratio between them, the result being an easier nutrition with nutrients from the soil dowry. Long experience plays a crucial role in understanding the complex interactions plant x soil x climate and their effect on production plants. They are essential to understand a series of slow changes that happen in soil by application of fertilizers and other technological links. The average in these three years of experience to regarding the protein content of 12,96 % was obtained by the Flamura 85 and 11,48 5% by the Alex varieties; the average of the varieties on these three years was 12,29%. The fertilization had a favorable influence on the production's average in all three years, obtaining a significant growth of production of 1562,2 kg/ha on the agro-fund $N_{160}P_{70}$, against the unfertilized one; the smallest productions were obtained on the unfertilized agro-fund N_0P_0.

Key words: *the protein content, protein production, unfertilized, fertilized, cultivars*

Not only in research activities but also in production and the process of purchasing the wheat for making bread, high quality wheat must be a major objective. Romania has suitable weather conditions to obtain high quality wheat used for making bread. In our country there are varieties of wheat which are used in the process of making bread however none of them were admitted for being used as fodder.

Practice and research in agriculture [4],[2],[1], have shown the fact that the content and production of protein per hectare are also influenced by technological circumstances, among them the chemical fertilizers are the most important, such as

nitrates which condition the amino acid and protein's biosynthesis and the harvest quality, implicitly.

The long term studies and tests upon different Romanian soils allowed the research of the mineral fertilizers of nitrate, phosphorus and potassium's influence upon wheat harvest and its protein content.

The fertilizers along with the growing plant influence even more the harvest quality. The results of the I.C.C.P.T. Fundulea research during 1971 – 1978 emphasizes the relationship between the percentage of protein within wheat grains and the quantity of nitrates applied to growing plants [3],[5].

MATERIAL AND METHOD

The study applied to nine varieties of Romanian wheat.

Biological material used in the study was obtained at IC-DA Fundulea and SC-DA Lovrin and tested on comparative crops in competition. The factors were put in a bi-factorial experiment under the subdivided lots.

The research was performed during the period 2003 – 2007, at SC-DA Valu lui Traian, on an appropriate vermic soil, with no irrigation.

From the climate's perspective, the annual average temperature of the area is approximately 10,85^{0}C and the rainfall average per several years is 421,5 mm.

RESULTS AND DISCUSSIONS

During the period 2004 – 2007 different varieties of wheat were cultivated in the area of the experiment, under certain weather conditions. Differences in quality were remarqued.

As far as the fertilizing influence upon the content of gross protein wheat crops concerns, it can be observed that, in the agricultural year 2004 – 2005, there was registered significant increasing in all fertilized grounds (*tab.1.*). The slightest percentage of gross protein was registered on the unfertilized soil, of 12, 3 %, and the biggest percentage was registered on the lot $N_{160}P_{70,}$ of 14, 5 %, with an increase of 2, 2 % in comparison to the lot N_0P_0 which remained unfertilized. This increase was ensured statistically.

Table 1

The influence of agrofound on the protein content from the wheat caryopses, in the agricultural year 2004-2005

Agri-fund	Brute protein (%)	% compared with witness	Difference (%)	Signification
$N_{160}P_{70}$	14,5	117,89	2,2	xxx
$N_{120}P_{70}$	13,8	112,20	1,5	xxx
$N_{80}P_{70}$	12,9	104,88	0,6	xxx
N_0P_0	12,3	100,00	mt	

DL 5%= 0,1 %; DL 1%= 0,15 %; DL 0,1%= 0,2 %.

During the agricultural year 2005-2006, the influence of the fertilized grounds upon the content of gross protein also determined significant increases at all lots, for instance there were percentages between 13,3 % at the lot $N_{80}P_{70}$ and 15,1 % at the lot $N_{160}P_{70}$ (*tab.2.)*.

Table 2

The influence of agrofound on the protein content from the wheat caryopses, in the agricultural year 2005-2006

Agri-fund	Brute protein (%)	% compared with witness	Difference (%)	Signification
$N_{160}P_{70}$	15,1	117,05	2,2	xxx
$N_{120}P_{70}$	14,2	110,08	1,3	xxx
$N_{80}P_{70}$	13,3	103,10	0,4	xxx
N_0P_0	12,9	100,00	mt	

DL 5%= 0,1 %; DL 1%= 0,2 %; DL 0,1%= 0,3 %.

Also, during the agricultural year 2006-2007, the soil fertilizing has influenced the protein content positively, resulting in significant increases at the three fertilized soil lots in comparison to the unfertilized one (*tab.3)*. The slightest percentage of gross protein was registered at the lot $N_{80}P_{70}$, of 12, 4 %, with an increase of 5, 98 % more than the unfertilized lot. The highest percentage was registered at the lot $N_{160}P_{70}$, of 14, 2 %, with an increase of 21, 37 % more than the lot N_0P_0 (11, 7 % gross protein).

Table 3

The influence of agrofound on the protein content from the wheat caryopses, in the agricultural year 2006-2007

Agri-fund	Brute protein (%)	% compared with witness	Difference (%)	Signification
$N_{160}P_{70}$	14,2	121,37	2,5	xxx
$N_{120}P_{70}$	13,5	115,38	1,8	xxx
$N_{80}P_{70}$	12,4	105,98	0,7	xxx
N_0P_0	11,7	100,00	mt	

DL 5%= 0,10 %; DL 1%= 0,15 %; DL 0,1%= 0,20 %.

As far as the soil fertilizing influence upon the protein production concerns, it can be observed that the increases are significant at all three fertilized lots (*tab.4*). Protein production had values between 631, 8 kg/ha at the unfertilized lot whereas it had 790, 7 kg/ha at the lot $N_{160}P_{70}$ with an increase of 158, 9 kg/ha more than the unfertilized lot.

Table 4

The influence of agrofound on the protein production from the wheat caryopses, in the agricultural year 2004-2005

Agri-fund	Brute protein (%)	% compared with witness	Difference (%)	Signification
$N_{160}P_{70}$	790,7	125,15	158,9	xxx
$N_{120}P_{70}$	731,8	115,83	100,0	xxx
$N_{80}P_{70}$	689,6	109,15	57,0	xxx
N_0P_0	631,8	100,00	mt	

DL 5%= 4,3 kg/ha; DL 1%= 6,5 kg/ha;DL 0,1%= 10,4 kg/ha.

During the agricultural year 2005 – 2006, the influence of the fertilized soil upon the protein production resulted in higher crop yields per hectare (*tab.5)* comparing to the year before. The increases were significant at all fertilized soils. The slightest protein production per hectare was registered at the unfertilized soil, of 589, 8 kg/ha.

Table 5

The influence of agrofound on the protein production from the wheat caryopses, in the agricultural year 2005-2006

Agri-fund	Brute protein (%)	% compared with witness	Difference (%)	Signification
$N_{160}P_{70}$	1007,9	170,89	418,1	xxx
$N_{120}P_{70}$	889,2	150,76	299,4	xxx
$N_{80}P_{70}$	699,6	118,62	109,8	xxx
N_0P_0	589,8	100,00	mt	

DL 5%= 11,4 kg/ha; DL 1%= 17,2 kg/ha; DL 0,1%= 27,7 kg/ha

By increasing the applied quantity of nitrates, at 40 kg/ha, it has been registered a yield of 699, 6 kg/ha, with an increase of 109, 8 kg/ha more than the lot N_0P_0. Following, the lot $N_{120}P_{70}$ had a crop yield of 889, 2 kg/ha, with an increase of 299, 4 kg/ha more than the unfertilized lot. Lastly, it has been registered that a protein production of 1007, 9 kg/ha at the lot $N_{160}P_{70}$ with an increase of 418, 1 kg/ha more than the unfertilized lot.

As far as the fertilizing influence upon the protein production per hectare concerns, during the period 2006 – 2007, it can be observed that, even though the registered crop yields were smaller than those of the years before, the differences were ensured statistically (*tab.6*). The slightest protein production per hectare, of 475, 2 kg/ha was registered at the lot N_0P_0, and the highest, of 767,4 kg/ha was registered at the lot $N_{160}P_{70}$.

Table 6

The influence of agrofound on the protein production from the wheat caryopses, in the agricultural year 2006-2007

Agri-fund	Brute protein (%)	% compared with witness	Difference (%)	Signification
$N_{160}P_{70}$	767,4	161,49	292,2	xxx
$N_{120}P_{70}$	660,5	138,99	185,3	xxx
$N_{80}P_{70}$	581,8	122,43	106,6	xxx
N_0P_0	475,2	100,00	mt	

DL 5%= 27,5 kg/ha; DL 1%= 41,7 kg/ha; DL 0,1%= 66,9 kg/ha

CONCLUSIONS

1. Regarding the protein content, it has values between 14,16 % and 10,90%. Analyzing the protein content per genus and years, we can affirm the followings:

- the biggest protein content of 14,0 %, was obtained by the genus Flamura 85, in the agricultural year 2004-2005; de 15,5 % (with a significant growth of 0,9 % against the witness Flamura 85), by the genus Boema, in the agricultural year 2005-2006 and of 13,8 %(with a significant growth of 0,2 %), by the genus Romulus, in the agricultural year 2006-2007;

- the smallest protein content was obtained by the genus: Alex, of 12,8 % in the agricultural year 2004-2005 and 12,2 % in the agricultural year 2006-2007; Delabrad, of 12,8 %, in the agricultural year 2006-2007;

- the average in these three years of experience to regarding the protein content of 12,96 % was obtained by the genus Flamura 85 and 11,48 5% by the genus Alex; the average genus on these three years was 12,29%.

2. Regarding the protein production, the biggest production were obtained for he genus Alex, with a protein production of 779,4 kg/ha (with a significant growth of 68,6 kg/ha, against the witness genus Flamura 85), in the agricultural year 2004-2005; Boema, with a production of 957,7 kg/ha (with a significant growth of de 140 kg/ha), in the agricultural year 2005-2006; Rapid, with a production of 744,7 kg/ha (with a significant growth of 19,9 kg/ha, statistically non confirmed), in the agricultural year 2006-2007.

The smallest protein production per hectare were obtained by the genus: Lovrin 34, with a protein production of 653,6 kg/ha (with a significant negative difference of 57,2 kg/ha), in the agricultural year 2004-2005 and of 719,6 kg/ha (with a significant negative difference of 98,0 kg/ha), in the agricultural year 2005-2006; Alex, with a protein production of 473,8 kg/ha (with a significant negative difference of 251,0 kg/ha), in the agricultural year 2006-2007.

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