BEHAVIOR OF SOME VARIETIES OF TRITICUM TURGIDUM (L.) THELL SSP. TURGIDUM CONV. DURUM (DESF.) M. K. UNDER THE PEDOCLIMATIC CONDITIONS FROM BANAT PLAIN

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Abstract. *This paper presents the crop and quality results obtained on the dark mollic eutric cambisol, moderate gleizated in Timisoara area, for five species of durum wheat varieties, in different fertilization conditions. The varieties considered were Grandur and Condurum of Romania, Achilles and Claudio of Italy, and Selyemdur and Betadur of Hungary. The reference variety in this experiment was Alex belonging to the species Triticum aestivum vulgare. The fertilization levels were $N_0P_{70}K_{70}$, $N_{64}P_{70}K_{70}$ and $N_{128}P_{70}K_{70}$. On an average, for the 7 varieties, by applying a dosage of N_{64} the crop increased by 12%, and by doubling the nitrogen dosage to N_{128}, on the same $P_{70}K_{70}$ background, the crop growth was enhanced by 21%. Among the existing varieties, the best results were registered for Claudio (5874 kg/ha) followed by the Achilles variety (5,599 kg/ha). With respect to the behaviour of the varieties, we notice that the biggest yield has been obtained for the reference variety Alex of Triticum aestivum vulgare L. This explains the necessity to differentiate the purchase prices of Durum wheat, a species where the production potential of the varieties is under the one of the bread wheat. Among the Durum wheat varieties, the Italian varieties Claudio and Achile called our attention. On an agrifund containing $N_{128}P_{70}K_{70}$ we obtained crops of 6413 kg/ha (Claudio) and of 6128 kg/ha (Achile). The results of the biometric determinations showed a tendency of plant height increase as the nitrogen dose increases, that is from 73,70 cm (N_0) to 91,00 cm for Grandur variety, from 85,15 cm to 95,85 cm for Condurum variety, from 87,85 cm to 90,55 cm for Achile variety, from 84,20 cm to 92,25 cm for Claudio variety, from 76,60 cm to 80,60 cm for Selyemdur variety and from 74,65 cm to 79,55 cm for Betadur variety. All varieties have proven a similar tendency to grow once the nitrogen dose has been increased. The growth could be noticed in the length of the ear, in the number of spicule on the ear and the number of seeds on ear. The protein content ranged from 12.3% to 13.7%, the wet gluten content from 16.64% to 24.60%, and the falling number between 374 and 456 seconds.*

Key words: *Durum wheat, varieties, fertilization.*

INTRODUCTION

The pedoclimatic conditions from significant agriculture areas of Romania are favorable to growing durum wheat meant for producing high quality pasta.

However, right now the area cultivated with durum wheat is small, 4,246 in 2013 by comparison to 12,509 in 2010.

Out of that area, only 207 ha were used for wheat cultivation in year 2013 in the West development region, the quantity harvested from this area being of just 721 tons.

Expanding the durum wheat in the agriculture can be done by cultivating some varieties adjusted to this area and using some adequate technologies, this being the aim of the present research.

MATERIAL AND METHODS

The experiment type was bifactorial, organized according to subdivided plots method, with three repetitions.

A Factor – the agrifund, with three graduations (a_1 - $N_0P_{70}K_{70}$; a_2– $N_{64}P_{70}K_{70}$;a_3– $N_{128}P_{70}K_{70}$;)

B Factor – the variety, with 7 graduations (Alex – reference variety of Triticum aestivum vulgare L and 6 varieties of Durum wheat Triticum turgidum (L) Thell, ssp Turgidum, Durum convariety (Desf.) M.K., as follows:

-Grandur and Condurum created in Romania;

-Achile and Claudio from Italy;

-Selyemdur and Betadur from Hungary.

The applied technology was the one specific for wheat in the cultivated region of Câmpia de Vest (Western Plain).

Measurements regarding the stem length, the number of spicule/ear, the number of seeds/ear were done after harvesting. The quality analysis aimed at determining the mass of 1000 seeds, the hectolitre mass, the protein content, the wet gluten content, the deformation number and the falling number.

RESULTS AND DISCUSSION

The crop results are given in Table 1.

Table 1

A Factor Agrifund	B Factor - Variety							Average Values of the A Factor			
	Alex	Grandur	Condurum	Achile	Claudio	Selyemdur	Betadur	Recolta kg/ha	%	Difference kg/ha	Signification
$N_0P_{70}K_{70}$	5318	4569	4855	5019	5294	3980	4835	4838	100		
$N_{64}P_{70}K_{70}$	5920	5140	5305	5650	5864	4539	5439	5411	112	573	X
$N_{128}P_{70}K_{70}$	6240	5156	5907	6128	6463	4666	5964	5832	121	1206	XXX

DL 5% = 564 kg/ha
DL 1% = 835 kg/ha
DL 0,1% =1178 kg/ha

Average Values of the B Factor

Specification	Alex	Grandur	Condurum	Achile	Claudio	Selyemdur	Betadur
Yield kg/ha	5826	5055	5356	5599	5874	4395	5413
%	100	87	92	96	101	76	93
Difference kg/ha		-771	-470	-227	48	-1431	-413
Signification		00				000	

DL 5% = 564 kg/haDL 1% = 835 kg/haDL 0,1% = 1178 kg/ha

The crop results underline the favourable reaction at fertilization of all varieties used for the experiments. On a constant base of $P_{70}K_{70}$ and by applying an average of one N_{64} dose to each of the 7 varieties, the yield increased with 573 kg/ha, which means a significant difference. By doubling the nitrogen dose to an average of N_{128} for the studied varieties, the yield increased with 1206 kg/ha, the difference being significant.

With respect to the behaviour of the varieties, we notice that the biggest yield has been obtained for the reference variety Alex of Triticum aestivum vulgare L. This explains the necessity to differentiate the purchase prices of Durum wheat, a species where the production potential of the varieties is under the one of the bread wheat. Among the Durum wheat

varieties, the Italian varieties Claudio and Achile called our attention. On an agrifund containing $N_{128}P_{70}K_{70}$ we obtained crops of 6413 kg/ha (Claudio) and of 6128 kg/ha (Achile).

The results of the biometric determinations showed a tendency of plant height increase as the nitrogen dose increases, that is from 73,70 cm (N_0) to 91,00 cm for Grandur variety, from 85,15 cm to 95,85 cm for Condurum variety, from 87,85 cm to 90,55 cm for Achile variety, from 84,20 cm to 92,25 cm for Claudio variety, from 76,60 cm to 80,60 cm for Selyemdur variety and from 74,65 cm to 79,55 cm for Betadur variety.

All varieties have proven a similar tendency to grow once the nitrogen dose has been increased. The growth could be noticed in the length of the ear, in the number of spicule on the ear and the number of seeds on ear.

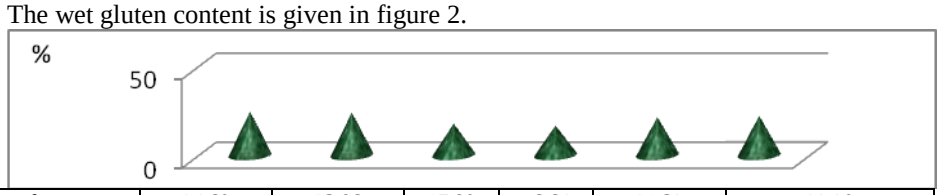
Figure 1 presents the evolution of the protein content when no nitrogen fertilizers have been used for the studied varieties.

% protein	13,14	12,3	12,5	12,6	12,4	12,6
variety	Grandur	Condurum	Achile	Claudio	Selyemdur	Betadur

Fig. 1 Protein content variation % according to variety

In the researched area the protein content varied between 12,3% for Condurum variety and 13,14% for Grandur variety.

The wet gluten content is given in figure 2.

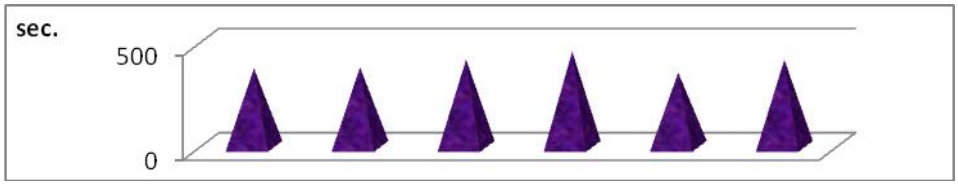


% wet gluten	24,60	23,96	17,80	16,64	21,32	22,20
Variety	Grandur	Condurum	Achile	Claudio	Selyemdur	Betadur

Fig. 2 Variation of the wet gluten content according to the variety

The wet gluten content was low at the Italian varieties, that is of 16,64 % (Claudio) and of 17,8 % (Achile). The values registered for the Romanian varieties were good, that is 24,60% for Grandur and 23,96% for Condurum.

The evolution of the falling number according to the cultivated variety is presented in figure 3.

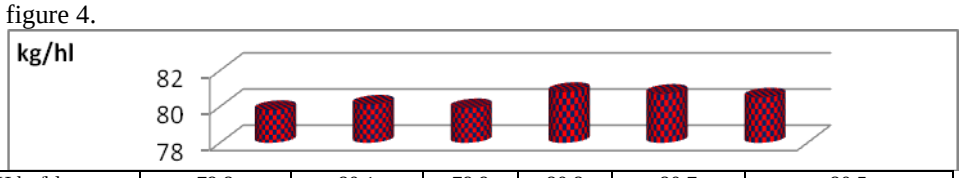


Seconds	374	379	417	456	354	416
Variety	Grandur	Condurum	Achile	Claudio	Selyemdur	Betadur

Fig. 3 The variation of the falling number according to the variety

The values are high for all varieties, but this number is of lesser importance for the analyzed varieties belonging to the variety Triticum turgidum, ssp. Turgidum, conv. durum, used in the pasta industry and not in the bread industry.

The results of the determinations done referring to the hectolitre mass (kg/ha) are given in figure 4.



MH kg/hl	79,8	80,1	79,9	80,8	80,7	80,5
variety	Grandur	Condurum	Achile	Claudio	Selyemdur	Betadur

Fig. 4 Variation of the hectolitre mass according to the variety

The values of the hectolitre mass of the six researched varieties are close to each other in the researched area, that is of between 79,8 kg/hl and 80,8 kg/hl.

CONCLUSIONS

The results of the researches carried out on the dark mollic eutric cambisol from Timişoara are preliminary results, as the experiment cycle is not concluded yet. Still they can be used for orientation by the Durum wheat cultivators of the mentioned area.

1. Among the researched varieties of Triticum turgidum (L) THELL ssp. Turgidum conv. durum (DESF) M.K. designated for pasta industry the biggest yields were obtained for the varieties Claudio (6463 kg/ha) and Achile (6128 kg/ha), cultivated on an agrifund fertilized with $N_{128}P_{70}K_{70}$.

2. The Romanian varieties Condurum (5907 kg/ha) and Grandur (5156 kg/ha), as well as the Hungarian variety Betadur (5964 kg/ha) can be in the attention of the cultivators.

3. The nitrogen fertilizers applied on a base of $P_{70}K_{70}$ averagely increased the yield with 12% when the nitrogen dose was of N_{64} and with 21%, by doubling the nitrogen dose to N_{128}.

4. The protein content was of between 12,3% (Condurum) and 13,14% (Grandur) if not fertilized with nitrogen.

5. The wet gluten content decreased at the varieties from Italy (16,64% Claudio, 17,8% Achile) and exceeded 24% at Grandur variety (24,60%).

6. The hectolitre mass of all varieties was situated between 79,8 kg/hl for Grandur and of 80,7 kg/hl for Selyemdur.

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