THE RESULTS OBTAINED FOR THE „BIO"-CULTIVATED WHEAT IN GREECE

REZULTATE OBȚINUTE LA GRÂU ÎN CULTURĂ DE TIP „ BIO" ÎN GRECIA

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Abstract: *The wheat cultivated surfaces, where no chemical fertilizers and treatments against pests and diseases were applied, keep extending in Greece and in many other countries. Five varieties were cultivated, two varieties of Triticum durum (Athos und Simeto) and three of Triticum aestivum vulgare (Gegora, Dio and Dropia), on three agrifonds (without manure, fertilized with 10 t/ha and fertilizer with 20t/ha manure). The average crop results for the three agrifonds obtained for the Greek varieties of Triticum aestivum vulgare - Gregora and Dio - were of between 4100 and 4200, of between 3400 and 3700 for the "durum" varieties Athos and Simeto and of more than 3700 kg/ha for the Dropia variety created in Fundulea. As an average for the five varieties studied we noticed that, by applying 10 t manure/ha, the yield increased with 32%. By doubling the manure doses, the yield increase was of 60%. The yield differences of 943 kg/ha, respectively of 1767 kg/ha, are very significant.*

Rezumat: *Suprafețele ocupate cu culturi de grâu fără aplicare de îngrășăminte chimice şi fără tratamente chimice împotriva bolilor şi a dăunătorilor sunt în continuă creştere în Grecia şi în numeroase țări. S-au cultivat cinci soiuri, două de Triticum durum (Athos şi Simeto) şi trei soiuri de Triticum aestivum vulgare (Gegora, Dio şi Dropia), pe trei agrofonduri (fără gunoi de grajd, fertilizat cu 10 t/ha şi , fertilizat cu 20 t/ha gunoi de grajd. Rezultatele obținute au fost cuprinse în medie pe cele trei agrofonduri între 4100 şi 4200 la soiurile din Grecia de Triticum aestivum vulgare Gegora şi Dio, între 3400 şi 3700 la soiurile de tip „ durum" Athos şi Simeto şi de peste 3700 kg/ha la soiul Dropia, creat la Fundulea. În medie pe cele cinci soiuri, aplicarea a 10 t/ha de gunoi de grajd a mărit recolta cu 32%. Dublarea dozei de gunoi de grajd a amplificat valoarea sporului de recoltă la 60%. Diferențele de recoltă 943 kg/ha şi respectiv 1767 kg/ha sunt asigurate ca foarte semnificative.*

Key words: *wheat, „bio" crop, varieties, manure.*
Cuvinte cheie*: grâu, cultură „bio", soiuri, gunoi de grajd.*

INTRODUCTION

In the last decade, in Greece, one can notice a full expansion of the „BIO" crops, that means cultivation without using chemical fertilizers and pesticides. During the last years, more and more cultivators apply this technology for wheat crops too, without having all necessary technical information, that is without knowing which wheat varieties best fit for this art of cropping system, how to apply the crop rotation and how to fertilize the plants in this given context, as well as all other data referring to the seeding technology and to the specific irrigation works.

As the market needs "bio" wheat for both panification and pasta, this research was carried out for three wheat varieties of the species *Triticum aestivum vulgare* which ensure the panification need (Gegora and Dio cultivated in Greece and Dropia from Romania; they were tested but their quality was not particularly good) and for two varieties of „hard" wheat varieties of the species *Triticum durum* (Athos and Simeto) used in the pasta industry. The lower fertility potential of the soil obliges the cultivators to use organic fertilizers. This is why we studied the way the mentioned varieties behave when fertilized with variable doses of manure.

MATERIAL AND METHODS

The experiment was bifactorial, the A factor being the variety and the B factor the applied manure doses, such as:

The A factor: the cultivated variety.

a_1 - Gegora - *Triticum aestivum vulgare* – Greece;

a_2 – Dio - *Triticum aestivum vulgare* – Greece;

a_3 – Athos - *Triticum durum* – Greece;

a_4 – Simeto - *Triticum durum* – Greece;

a_5 – Dropia - *Triticum aestivum vulgare* – Romania.

The B factor – the manure doses.

b_1 – non-fertilized reference variety; b_2 – 10 t/ha; b_3 – 20 t/ha.

The experiment was done with three repetitions.

Upon harvesting, we measured the mass of 1000 grains (MMB) and the hectolitric mass (MH).

The calculation of the crop data were done according to the method of experiment placement in the field.

RESULTS AND DISCUSSION

Table 1 contains the obtained crop results.

Table 1

The crop results (kg/ha) obtained on the experimental field in Greece

The A factor The experimented variety	The b factor – The fertilization			The averages of the A factor			
	Mt	10t/ha	20t/ha	Yield kg/ha	%	Difference kg/ha	Significance
Gegora	3227	4081	5216	4174	100		
Dio	3262	4164	5013	4147	99	-27	
Athos	2584	3518	4288	3463	82	-711	000
Simeto	2739	3746	4536	3673	88	-501	000
Dropia	2854	3872	4449	3725	89	-449	000

DL5% = 183 kg/ha DL1% = 247 kg/ha DL0,1% = 352 kg/ha

The averages of the B factor

Specification	Mt	10t/ha	20t/ha
Yield kg/ha	2933	3876	4700
%	100	132	160
Difference kg/ha		943	1767
Significance		XXX	XXX

DL5% = 194 kg/ha DL1% = 266 kg/ha DL0,1% = 373 kg/ha

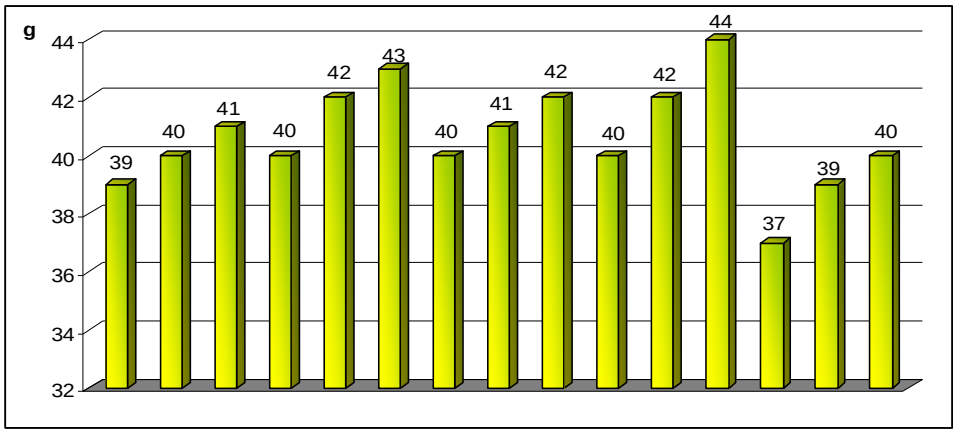
In the case of the studied variants the yields varied between 2854 kg/ha for the reference variant of the Dropia variety and 5013 kg/ha for the Dio variety in the variant fertilized with 20 t/ha organic fertilizer.

The average yield results for the three fertilization levels varied between 4174 for Gegora variety and 3463 kg/ha for Athos variety. Underlined is the fact that, for the ,,durum" wheat varieties, the yield results were significantly poor than the yield results obtained for the reference variety, Gegora, belonging to the species *Triticum aestivum vulgare*. The organic fertilizer was very well used, increasing the average yield in the case of all the five varieties

with 32% for a dose of 10 t/ha and with 60% for a dose of 20t/ha. The differences compared to the reference variant were very significant.

The results of the mass measurements done for 1000 grains (Fig. 1.) show that the lowest mass of 1000 grains was obtained for the Romanian variety (Dropia), which was not so well adapted to the conditions from Greece.

The highest mass of 1000 grains was obtained for the Simeto variety and was of 42 g. The organic fertilizer favourably used influenced the mass of 1000 grains, which increased with 1-4 g in the case of all experimented varieties as the quantity of applied fertilizer increased. The mass values for 1000 grains determined this year for the five varieties are closed to the values characteristic to the studied varieties, recommended for production.



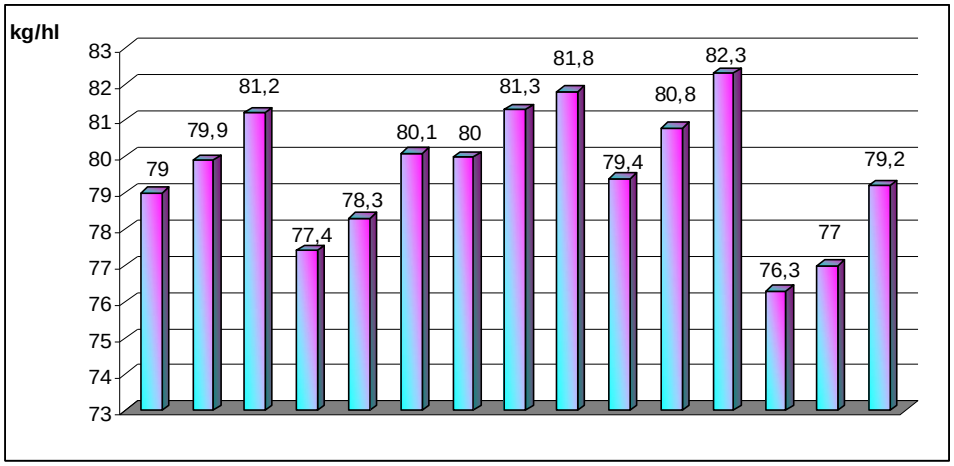
	Gegora			Dio			Athos			Simeto			Dropia		
	Mt	**10t/ ha**	**20t/ ha**	**Mt**	**10t/h a**	**20t/h a**	**Mt**	**10t/h a**	**20t/h a**	**Mt**	**10t/h a**	**20t/h a**	**Mt**	**10t/ ha**	**20t/h a**
g	39	40	41	40	42	43	40	41	42	40	42	44	37	39	40
Average	40,0			41,7			41,0			42,0			38,7		

Figure 1. The mass variation of 1000 grains (MMB g) registered on the experimental field in Greece

The determinations done regarding the influence of the variable organic fertilizer doses upon the hectolitric weight of five winter wheat varieties showed a fluctuation between the limit values 76,3 kg/hl and 82,3 kg/ha.(Fig. 2).

To notice is the fact that the values for all variants were higher than 75 kg/hl, this value being considered as inferior limit for panification wheat.

To mention is also the fact that the values of the varieties Athos and Simeto belonging to hard wheat specie (*Triticum durum*) were significantly higher than the values obtained for the varieties belonging to the specie *Triticum aestivum vulgare*. The lowest values were registered for the Dropia variety originating from Romania, a variety less adapted to the conditions from Greece.



	Gegora			Dio			Athos			Simeto			Dropia		
	Mt	**10t/ha**	**20t/ha**	**Mt**	**10t/ha**	**20t/ha**	**Mt**	**10t/ha**	**20t/ha**	**Mt**	**10t/ha**	**20t/ha**	**Mt**	**10t/ha**	**20t/ha**
Kg/hl	79,0	79,9	81,2	77,4	78,3	80,1	80,0	81,3	81,8	79,4	80,8	82,3	76,3	77,7	79,2
Average	80,0			78,6			81,0			80,8			77,7		

Fig. 2. The variation of the hectolitric weight (MH/hl) registered on the experimental field in Greece

CONCLUSIONS

1. The "bio" yields obtained by fertilizing the varieties Gegora and Dio of the species *Triticum aestivum vulgare* with 20 t manure/ha surpassed 5000 kg/ha.

2. By fertilizing the hard wheat varieties (*Triticum durum*) with 20 t manure/ha we obtained yields of more than 4200 kg/ha for the variety Athos and of more than 4500 kg/ha for the variety Simeto.

3. The Romanian variety Dropia cultivated in Greece registered the highest yield, that is 4449 kg/ha, for the variant fertilized with 20 t manure/ha.

4. The average yield for the 5 varieties fertilized with 10 t/ha increased with 32%. By doubling the dose to 20 t/ha, we registered a yield increase of 60%: The yield differences are very significant.

5. The mass of 1000 grains was closed to the mass specified for each variety in part. The use of manure increased with 1-4 g the MMB value, depending on the applied doses.

6. The hectolitric weight was high for all studied varieties, exceeding 77 kg/hl.

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