THE STUDY OF POTENTIAL RAW COTTON PRODUCTION TO THREE SPECIES OF COTTON (GOSSYPIUM SP.) IN REPORT WITH FERTILIZATION DEGREE AND PEDOCLIMATIC CONDITIONS IN THE YEAR 2009, IN THE WEATHER CONDITIONS OF TIMISOARA

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Abstract: *The purpose of this paper was to emphasize the production potential of raw cotton through behavior analysis of three species of cotton (Marismas, Coko and Canada) from Greece and North America, in pedoclimatic conditions of Timisoara and in function of fertilization degree. Investigations developed during the period 2008-2010. Bifactorial experience was placed in the field after subdivided parcels method. The experimental factors established were: factor A - agrofield (A_1 - $N_0P_0K_0$, A_2 - $N_{30}P_{30}K_{30}$, A_3 - $N_{60}P_{30}K_{30}$, A_4- $N_{90}P_{60}K_{60}$, A_5-$N_{120}P6_0K_{60}$, A_6-$N_{30}P_{30}K_{30}$ + foliar fertilization); factor B- species (b_1 - Marismas-Greece, b_2 - American provenance, b_3 - Coko-Greece). It was made pedoclimatic factors monitoring during vegetation period. For production quality and quantity an important role had the three fertilizer macroelements: the azoth, phosphorus, and potassium, the azoth represented the dominant fertilizer factor. Analysis of vegetation conditions for the cotton realized during the period May- October, active vegetation period (180 days) bordering between seeding date (9^{th} May) and the first autumn hoarfrost (the second decade of October month). Investigation brought a reference data base of cotton crop appreciated in Western Romania. Also, it was a good point of view to develop the agricultural field of Banat's Plain. Production analysis of raw cotton, fibers and seeds obtained under species influence emphasized differences among them, in that way: by the weather conditions of Timisoara in the year 2009, the average productions of raw cotton were: Grecian species Marismas – 2005 kg/area, Grecian species Coko- 2069 kg/area, and Canada species - 2145 kg/area. In separated analysis of every species under agrofield influence it distinguished two of agrofields with bigger influence on raw cotton production to the three species of cotton, such as, a_4 - $N_{90}P_{60}K_{60}$ and a_5-$N_{120}P_{60}K_{60}$, respectively the azoth doses applying about 90 kg/area and on potassium and phosphorus field about 60 kg/area from every one. The three species of cotton presented a good adaptability to pedoclimatic conditions of Timisoara in the year 2009.*

Key words: *cotton, production, agrofield*

INTRODUCTION

It was the most important plant. It assured over 70-75% of global production of vegetal fibers and contributed with approximate 50% to total global production of artificial and natural fibers. It had an economical importance both exporter countries and importer ones. Cotton was used in different domains, the main sector remaining the textile industry: the food industry being an important source of vegetal proteins, thanks of its high contain of proteins, 21.2-29.4%; quantitatively, cotton oil placed on the fourth place in global production of oil; nectarious plant; the fodders domain; paper and cellulose industry; dye and polish industry; plastic industry; geotextile industry; pharmaceutic industry. Over 120 years, cotton was knew such a crop plant on Romania territory.

MATERIAL AND METHODS

Experimental field was placed into a plain microrelief with large lowland. The soil where the experiences made up was chernozem cambic, phreatic dampy, decarbonated, formed on loesoid deposits, loam soil on clay soil. The phreatic water found in 1.5-2.0 m depth. Bifactorial experience was placed in the field after subdivided parcels method. The established experimental factors were:

1. Factor A - agrofield: A_1 - $N_0P_0K_0$, A2 - $N_{30}P_{30}K_{30}$, A_3 - $N_{60}P_{30}K_{30}$, A_4 - $N_{90}P_{60}K_{60}$, A_5 - $N_{120}P_{60}K_{60}$, A_6 - $N_{30}P_{30}K_{30}$ + foliar fertilization

2. Factor B - species: b_1- Canada - American provenance; b_2 – Marismas - Greece provenance; b_3 – Coko - Greece provenance

The technology applied for cotton crop was the specific one in big crop. The predecessor of the cotton crop was the maize. The plant needed minimum 1500 hours (at least 85 cloudless days) and sun brightness for the period 1st May- 30 October. Cotton had moderate requests concerning the water, its exudation coefficient being of 360-650 units of water for unit of dry substance of our country. Cotton had the capacity to resist to a lower humidity, and from plant with hydrophile aspect, it easily brought features of xerophite plant. In function of its predecessor plant, the furrow made at 25-30 cm depth. The germinal layer prepared through successive works, in spring (2-3), the cockles arose until the seeding stage, it were aerated and eliminated, think made by the combiner at 4-5 cm depth. The combiner presented the advantage of control only to work at 5-6 cm depth, and it assured an equal seeding as depth. There were applied treatments to control the pests and the cockles in preparing the germinal layer. An important role for the quality and quantity production had the three macroelements fertilizer: the azoth, phosphorus and potassium. To touch the objects established through investigation, crop fertilization differently made on 6 agrofields (A_1 - $N_0P_0K_0$, A_2 - $N_{30}P_{30}K_{30}$, A_3 - $N_{60}P_{30}K_{30}$, A_4 - $N_{90}P_{60}K_{60}$, A_5 - $N_{120}P_{60}K_{60}$, A_6 - $N_{30}P_{30}K_{30}$+ foliar fertilization). Crop fertilization made using complex chemicals of type N15P15K15. For seeding was used cotton seed from the crops before the first hoarfrost. Cotton was seeding in 9th May, then when the temperature in soil consequently maintained three days at least, at 12 degree C; the average air temperature of minimum 13-15 degree C, whereas the soil temperature at a depth of 30 cm became at 10 degree C. The seeding realized at 50-60 cm among rows. After emergence it made in series density corrections. In vegetation the evolution monitoring and maintenance of experimental factors and experience in its totality were realized. The cropping begun when on every plant were 1-2 very well opened capsules, in absolute maturity. The cropping moment was the one before the first hoarfrost falling. Cropping made between 25 September and 31 October.

RESULTS AND DISCUSSIONS

Cotton lost of its initial weight at least 11-17% through drying, so that the production weight registering made when the humidity of cotton fibers became 11-12%. After cropping the three species of cotton obtained productions of: raw cotton, fibers and seeds. In this paper were presented the productions of the three species of raw cotton made in study in the year 2009.

In table 1. was presented a synthesis of raw cotton productions at the three species of cotton on the six agrofields in the year 2009 in weather conditions of Timisoara - Experimental and Didactical Station of Timisoara. Analysis of cotton productions realized under fertilization influence emphasized the fact that, in general fertilization had a positive influence on productions of raw cotton at the three species made in study. In unfertilization conditions obtained a production of 1782 kg/area of raw cotton. The best result of raw cotton production

realized on agrofield A4- 2338 kg/area with 31% more than production of testifier variant, registering a production increase of 556kg/area face to the testifier variant, statistically assured as very significant.

Table 1

Synthesis of raw cotton productions at the three species of cotton on the six agrofields in the year 2009 in weather conditions of Timisoara country- Experimental and Didactical Station of Timisoara

Factor A environments							
Factor A agrofield	**Factor B species**			**Production kg/area**	**%**	**Difference**	**Signification**
	Marismas	**Canada**	**Coko**				
A1	1761	1920	1666	1782	100	–	
A2	1886	2106	1973	1988	111	206	***
A3	2050	2172	2018	2080	116	298	***
A4	2375	2306	2355	2338	131	556	***
A5	2084	2203	2241	2176	122	394	***
A6	1876	2163	2163	2067	115	285	***

Dl 5% - 65 kg/ha; Dl 1% - 87 kg/ha; Dl 0,1% - 115 kg/ha

Factor B environments			
factor B species	**Marismas**	**Canada**	**Coko**
Producție kg/ha	2005	2145	2069
%	100	106	103
Diferența	–	140	64
Semnificația		*	

Dl 5% -113 kg/ha; Dl 1% - 151kg/ha; Dl 0,1% - 198 kg/ha

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In table 2 and figure 1 were presented and represented productions obtained to Marismas species in the year 2009. Results analysis emphasized the fact that agrofield favorably influenced the raw cotton productions to Marismas species. Function of agrofield,

the raw cotton production increased from 1761 kg/area on agrofield A1 to 2375 kg/area on A4 agrofield. Percentage production increased face to the testifier with 7% on A2 agrofield, 16% on A3 agrofield, 34% on A4 agrofield, and with 18% on A5 agrofield.

Table 2

The raw cotton production kg/area under agrofield influence to Marismas species in the year 2009 in weather conditions of Timisoara country- Didactical Station of Timisoara

Agrofield	Production kg/are	%	Difference	Signification
A1	1761	100	-	
A2	1886	107	125	*
A3	2050	116	289	***
A4	2375	134	614	***
A5	2084	118	323	***
A6	1876	106	115	*

Dl 5% - 95; Dl 1% -126; Dl 0,1% -166

On A6 agrofield the average production on raw cotton was only of 2084 kg/area, with 18% bigger than the production obtained on testifier variant. Production increases face to agrofield varied between 125 kg/area on A2 agrofield and 614 kg/area on A4 agrofield. On A6 agrofield it obtained a production increase face to the testifier variant of 115 kg/area. We might to remark the fact that the production increases on the three agrofields were statistically assured as very significant: on A3 agrofield, the production increase of 289 kg/area, on A4 agrofield production increase was of 614 kg/area, and on A5 agrofield it was 323 kg/area. Production increases realized on A2 and A5 agrofields were statistically assured as significant. Levels and differences between raw cotton productions to Marismas species realized on the six agrofields and represented also in figure 2.8.

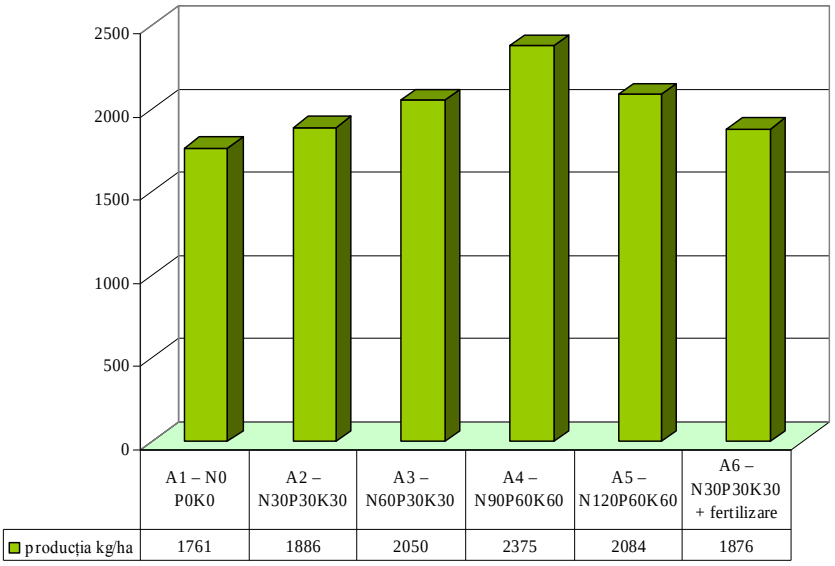

Figure 1. Production kg/area of raw cotton under agrofield influence to Marismas species in the year 2009 in weather conditions of Timisoara- Didactical Station of Timisoara

Table 3

Production kg/area of raw cotton under agrofield influence to Canada species in the year 2009 in weather conditions of Timisoara- Didactical Station of Timisoara

Agrofield	Production kg/are	%	Difference	Signification
A1	1920	100	–	
A2	2106	109	186	***
A3	2172	113	252	***
A4	2306	120	386	***
A5	2203	137	283	***
A6	2163	112	243	***

Dl 5% - 91 kg/ha; Dl 1% - 122kg/ha; Dl 0,1% - 160 kg/ha

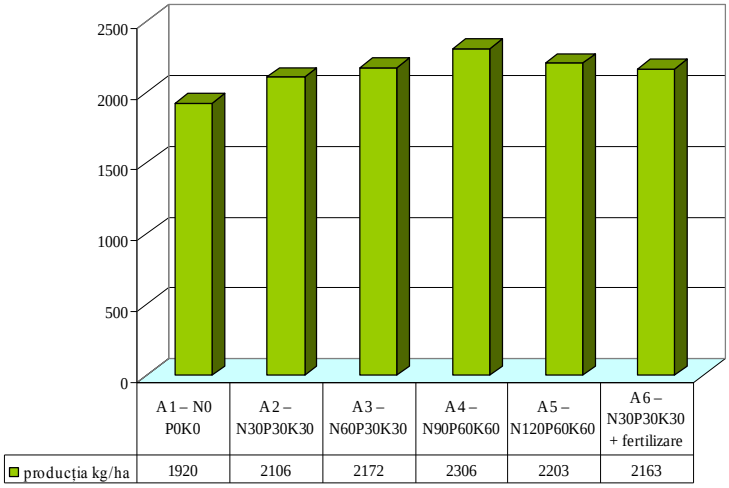

Figure 2. Production kg/area of raw cotton under agrofield influence to Canada species in the year 2009 in weather conditions of Timisoara- Didactical Station of Timisoara

In table 3 and figure 2 were presented and represented average productions obtained to Canada species under agrofield influence in the year 2009 in weather conditions of Timisoara. Face to Marismas species, the levels of average productions of raw cotton to Canada species were bigger. Also, in case of Canada species the raw production of cotton were strongly influenced by agrofield. To Canada species raw cotton productions increased on all the agrofields face to the unfertilizer variant (1920 kg/area): 2106 kg/area on A2 agrofield, 2172 kg/area on A3 agrofield, 2306 kg/area on A4 agrofield, 2203 kg/area on A5 agrofield and 2163 kg/area on A6. Percentage increases of raw cotton productions function of agrofield were 9% on A2 agrofield, 13% on A3 agrofield, 20% on A4 agrofield, 37% on A5 agrofield and 12% on A6 agrofield. Production increases realized under agrofield influence varied from 186 kg/area on A2 agrofield until 386 kg/area on A4 agrofield. We might to remark the fact that on A2, A3, A4, A5 and A6 agrofields the production increases realized face to testifier variant production (unfertilizer) were statistically assured as very significant. Face to Marismas species, Canada species production of raw cotton was positively influenced by foliar fertilization (%), respectively an increase of 243 kg/area. Also in the graphical image (figure 2) of the raw cotton productions to Canada species under agrofields influence, the averages

emphasized the fact that fertilization dose positively influenced those productions.

Table 3

Production kg/area of raw cotton under agrofield influence to Coko species in the year 2009 in weather conditions of Timisoara – Didactical Station of Timisoara

Agrofield	Production kg/are	%	Difference	Signification
A1	1666	100	–	
A2	1973	118	307	***
A3	2018	121	352	***
A4	2355	141	689	***
A5	2241	134	575	***
A6	2163	129	497	***

DL 5% - 134 kg/ha; DL 1% -178 kg/ha; DL 0,1% - 234 kg/ha

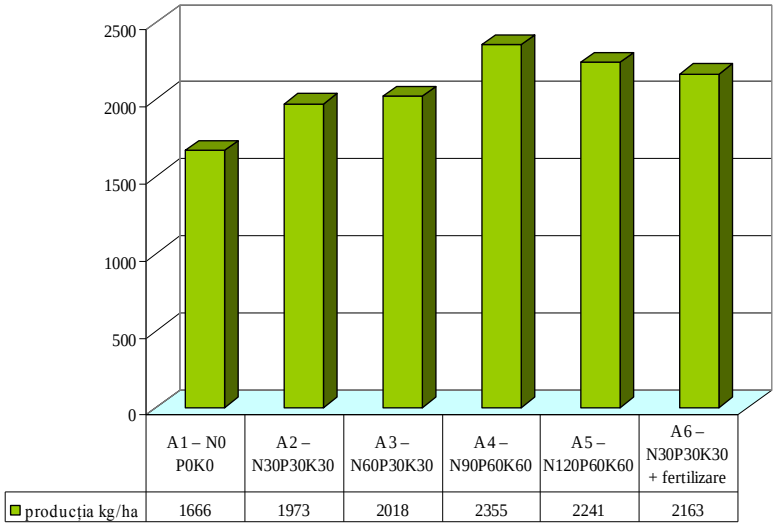

Figure3. Production kg/area of raw cotton under agrofield influence to Coko species in the year 2009 in weather conditions of Timisoara

In table 3 and figure 3 were presented and represented the average productions of raw cotton to Coko species obtained in weather conditions of Timisoara in the year 2009. In case of Coko species productions of raw cotton were lower than the ones realized to Canada species and approximate equal with ones of Marismas species.

From results analysis' productions observed that in case of Coko species, production of raw cotton was positively influenced by fertilization level.

Function of agrofield raw cotton productions increased from 1666 kg/area in unfertilizer variant, to 2355 kg/area on A4 agrofield.

Among the six agrofields under the aspect of raw cotton productions it remarked A4 agrofield where obtained a production of 2355 kg/area, with 41% bigger than the production obtained in testifier variant.

Face to that one on A4 agrofield obtained a production increase of 689 kg/area which was statistically assured as distinctly significant.

In case of agrofield where the foliar treatment applied, the raw cotton production became 2163 kg/area, with a production increase of 497 kg/area, face to unfertilizer agrofield,

such as testifier 1666 kg/area. In weather conditions of the year 2009 it distinguished two agrofields with bigger influence on raw cotton production to Coko species.

Those agrofields were A4 with a production of 2355 kg/area of raw cotton and A5 with a production of 2241 kg/area raw cotton.

CONCLUSIONS

An important role for production quality and quantity had the three fertilized macroelements: the azoth, phosphorus, potassium. To touch the objects established through investigation, the crop fertilization differently made on six agrofields and three repetitions as it followed: A1- N0P0K0, A2- N30P30K30, A3- N60P30K30, A4- N90P60K60, A5- N120P60K60, A6- N30P30K30, plus foliar fertilization;

Production analysis of raw cotton to the three species obtained under species influence emphasized differences among those as it followed:

- in weather conditions of the year 2009, the average productions of raw cotton were: Grecian species Marismas 2005 kg/area, Grecian species Coko 2069 kg/area, and to Canada species- 2145 kg/area; it were distinguished two agrofields with bigger influence on production of raw cotton to three species of cotton A4- N90P60K60 and A5- N120P60K60, respectively doses' azoth applying of 90 kg/area and 120 kg/area on a field of phosphorus and potassium of 60 kg/area;

Through separated analysis of every species behavior under agrofield influence it determined:

- fertilization dose until dose of 90 kg/area positively influenced the production of raw cotton, fibers and seeds;
- production increasing were statistically assured as significant and very significant as distinct on agrofields A4-N90P60K60 and A5- N120P60K60.

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