GRAIN SORGHUM – PERSPECTIVES OF EXPANDING ITS CULTIVATION IN SOUTHERN BANAT AREA

SORGUL PENTRU BOABE - PERSPECTIVE DE EXTINDERE ÎN CULTURĂ ÎN SUDUL BANATULUI

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***Abstract**: Grain sorghum is an important crop since it is cultivated worldwide on over 40 million ha ensuring about 5% of the cereal production. Present hybrids are short in size, have stems resistant to fell, their grains detach easily upon harvesting, and yield considerable amounts. Its very good resistance to drought given the frequent years with precipitation deficit, as well as the few requirements from the soil ask for the expansion of its cultivation. Yields of over 5-10 t/ha are easy to obtain than in maize, while their nutritious value is close.*

***Rezumat:** Sorgul pentru boabe prezintă importanță deosebită, cultura fiind prezentă în lume pe o suprafață de peste 40 milioane hectare şi asigură cca 5% din producția de cereale. Hibrizii actuali au talie redusă, tulpini rezistente la cădere, boabele se desprind uşor din glumela recoltare şi au capacități mari de producție.*

Rezistența foarte bună la secetă, în condițiile frecvenței mari a anilor cu deficit de precipitații, cât şi pretențiile reduse față de sol impun extinderea în cultură. Producțiile de 5-10 t/ha sunt producții mai uşor de realizat decât la porumb, în condițiile în care valoarea nutritivă este apropiată.

***Key words:** grain sorghum, cultivation technology*
***Cuvinte cheie**: sorg pentru boabe-tehnologia culturii*

INTRODUCTION

Grain sorghum cultivation is not known in the territory between the River Caras and the River Danube.

Low soil requirements (it can be cultivated on lands whose pH is between 4.5 and 8.5) make it a tempting crop in this area of sandy, alkaline, and sometimes eroded lands. In this situation, grain crops are superior to those in maize, with fewer technological investment costs.

MATERIALS AND METHOD

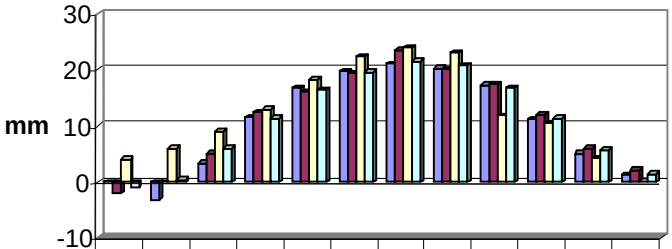
Research was carried out during the experimental cycle 2005-2007, a period whose climate was characterised by important differences compared to multi-annual means, both from the point of view of temperature and of precipitations, deficitary mainly in the last year of the trial cycle.

The soil type was moderately gleyied aluvosoil.

Trials were of the bi-factorial type. Factor A was represented by the maize hybrid Andreea and by the sorghum hybrids Alfoldi (Hungary) and Biserka (Serbia). Factor B was represented by the fertilisation level ($N_0P_{80}K_{80}$, $N_{50}P_{80}K_{80}$, $N_{100}P_{80}K_{80}$, and $N_{150}P_{80}K_{80}$). There were three replications. Winter wheat was the pre-emergent crop. The Andreea maize hybrid (the control) and sorghum hybrids yielded, in conditions of fertilisation, between 8 and 10 t/ha. The cultivation technology was the one mentioned above, with sowing in the first decade of the month of May, when soil temperature was 12-13^{0}C, with a sowing density of 50,000 plants/ha, and in sorghum with a sowing density of 100,000 plants/ha.

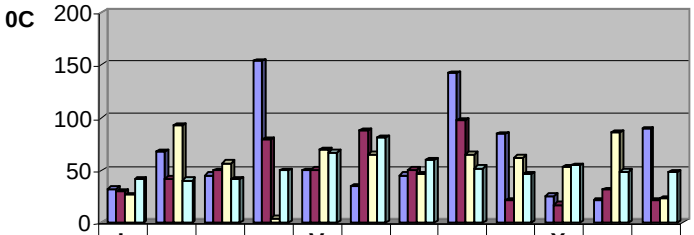
RESULTS AND DISCUSSION

The soil and climate conditions during the trial cycle compared to multi-annual means are presented in Figures 1 and 2. We can see that during the trial cycle we had, both from the point of view of temperature, and from the point of view of precipitations, important differences compared to multi-annual values, with impact on yield, though sorghum is a plant resistant to drought and high temperatures during vegetation.



	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII
2005	0	-3,3	3,4	11	17	20	21	20	17	11	5	1,3
2006	-2	0	5	12	16	20	24	20	18	12	6	2
2007	4	6	9	13	18	23	24	23	12	11	4,2	0,1
Multi-annual means	-1,2	0,4	6	11	17	20	22	21	17	11	5,7	1,4

Figure 1 – Monthly mean temperatures at the Meteorological Station in Timişoara compared to multi-annual means 2005-2007



	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII
2005	32	68	46	154	50	35	45	142	85	26	21	89
2006	30	42	49	79	50	88	50	98	21	17	31	21
2007	26	92	57	4	69	65	46	65	62	53	86	23
Multi-annual means	41	40	42	50	67	81	60	52	46	55	49	48

Figure 2 – Monthly mean precipitations at the Meteorological Station in Timişoara compared to multi-annual means 2005-2007

We can see that on the average for the four fertilization levels, the Alfoldi hybrid yielded 30% more, i.e. 1 t/ha compared to the yield of the Andreea maize hybrid. The yield of the Serbian sorghum hybrid Biserka overrated the yield of the Andreea maize hybrid with 19%,

i.e. over 680 kg/ha. Figure 3 shows that in the Andreea hybrid, the yield increase per 1 kg of nitrogen was 10.5 kg (for N_{50}), 8.5 kg (for N_{100}), and 8.4 kg (for N_{150}). The Alfoldi 1 sorghum hybrid valorised nitrogen fertilizers best: for 1 kg of nitrogen we obtained 10.5 kg (for N_{50}), 10.5 kg (for N_{100}), and 11.9 kg (for N_{150}).

Table 1

Grain yield during the trial cycle 2005-2007

Factor A	Factorial B				A Factorial avarage			
	$N_0P_{80}K_{80}$	N_{50} $P_{80}K_{80}$	N_{100} $P_{80}K_{80}$	N_{150} $P_{80}K_{80}$	Crop kg/ha	%	Differences	Significance
Andreea	2911	3438	3767	4176	3573	100		
Alfoldi 1	3621	4273	5293	5420	4651	130	1078	
Bisorka	3395	3851	4471	5327	4261	119	688	

Dl 5% = 157 kg/ha DL1% = 224 kg/ha Dl 0.5% = 325 kg/ha

B Factorial avarage

Specificance	$N_0P_{80}K_{80}$	N_{50} $P_{80}K_{80}$	N_{100} $P_{80}K_{80}$	N_{150} $P_{80}K_{80}$
Crop kg/ha	3309	3854	4410	4974
%	100	116	133	150
Differences		545	1101	1665
Significance			XXX	XXX

Dl 5% = 273 kg/ha DL1% = 388 kg/ha Dl 0.5% = 562 kg/ha

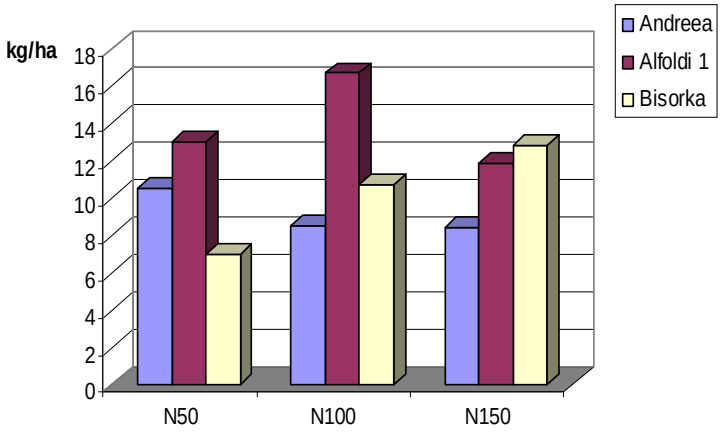


Figure 3. Grain yield increase per 1 kg of nitrogen on a fund of $P_{80}K_{80}$

In the Biserka sorghum hybrid, the increase in yield was 7.0 kg (for N_{50}), 10.7 kg (for N_{100}), and 12.8 kg (for N_{150}).

Results point out that in the conditions in which one of the three trial years was droughty, sorghum yields were superior to maize yields.

CONCLUSIONS

Grain sorghum culture in the area of moderately gleyied aluvosoil in the area between the rivers Caras and Danube should be expanded since it yields 20—30% more than maize.

The increase in grain yield per 1 kg of nitrogen applied on a fund of $P_{80}K_{80}$ was higher in the sorghum hybrid than in the maize hybrid.

During vegetation, there was an attack by *Schiophis graminis* and by the disease caused by *Pseudomonus syringae*, but below the damage threshold.

LITERATURE

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