RESEARCH REGARDING THE INTRODUCTION OF SORGHUM CROPS IN THE ALMĂJ DEPRESSION

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Abstract

Sweet sorghum can grow silage, harvesting being made in the early phase of grains milk, the contents of soluble sugars and plant dry weight is optimal. Silage is like maize silage, taking care to make silo pressing vigorously for full removal of air. Meals sorghum crop is rich in soluble sugars (15-18% cell juice contains soluble sugars), silage is easy (lactic ferments meet optimal conditions for breeding)

The paper comprises research results obtained during the period 2010 – 2012, regarding the influence of the seeding period and field density on the stalk production and sugar content given the pedo-climatic condition from southern Banat, respectively the in Almăj Depression.

The results highlight the probability of obtaining an over 60 t/h fresh stalk production, if the seeding is performed during 10 – 15 May. The optimal field density is of 130.000 plants/ha.

The biologic material used was the Fundulea 135 ST species.

For the prevention of fuzarioze (Fusariun spp) attacks and Pythium spp seeds were treated with Merpaseed 48 FS, 2 l/t.

In the vegetation, for aphid (Schizaphis graminum) control, two treatments with Nuprid 200SC were applied.

Key words: sorghum, technology elements.

INTRODUCTION

Grain sorghum is a very important cereal for human food and animal feed. In China and Africa, the flower and leaf sheaths to obtain a dye used to dye fabrics, wool and hides. In many parts of the world, sorghum has been used traditionally for various foodstuffs, such as porridge, unleavened bread, cookies, cakes, couscous and various soft drinks and alcoholic. Traditional cooking of sorghum is plentiful, cooked sorghum grain is one of the simplest products. Whole grains can be presented as ground flour or shelled before grinding, which then are used in different traditional foods. The cuisine of the southern United States sorghum syrup is used as a sweet spice, usually biscuits, corn bread, pancakes, cereals or beans. The sweet sorghum juice fertilization seeks to quality, which is why it is recommended for food purposes, growing on fertile soils. Favorable moisture conditions, sorghum react favorable to nitrogen fertilization both in terms of the yield and protein content in dry areas, have positive effect and phosphorus. Doses practiced today in the world varies, depending on experimental conditions.

Grain yield of sorghum grain is very influenced by the technology applied (particularly fertilizer) that determines the quality and increase production.

MATERIALS AND METHODS

Experience within the village in Almăj Depression was located on a vertic batistagnic preluvosoil soil type, moderately eroded by water, very deep, with inflatable clay, very fine texture, medium loamy clay/silty clay. Texture is not differentiated on profile being fine throughout the profile, Figure 1.

Soil reaction is slightly acidic throughout the profile with pH values between 6.00 and 6.86.

Humus is in moderate quantities in the first 50 cm (2.33 to 2.12%) and smaller quantities in the lower horizons (1.53%).

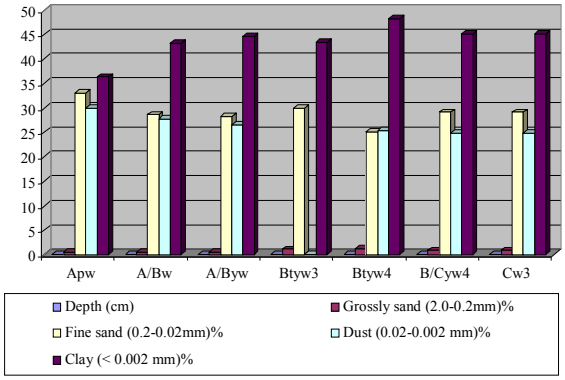


Figure 1. Soil texture

Mobile potassium content is higher with values ranging between 207.5 ppm and 182.6 ppm in the Ap horizon Btyw horizon. Mobile phosphorus content is higher with values ranging between 63.3 ppm and 117.3 ppm, and nitrogen index value is medium.

From Romania's climatic season map, one can draw the conclusion that the reference area is situated in the continental climate, Banat subtype, with submediterranean and oceanic nuances.

The experiments were bifactorial, organized in three repetitions, with the following factor graduations:

Factor A – seeding period, with three graduations: a_1 – 25 – 30 April, a_2 – 1 – 5 May, a_3 – 10 – 15 May.

Factor B – field density, with three graduations: b_1 – 80.000 plants/ha, b_2 – 130.000 plants/ha, b_3 – 180.000 plants/ha.

During the vegetation period, observations were registered regarding disease and pest attacks or harvesting variants (the grain milk stage). We determined: plant height, number of harvested green plants, main stalk and shoot thickness and stalk sugar content.

The precursory plant was autumn wheat crop. Fertilization was done uniformly with $N_{200}P_{100}K_{100}$.

The seeding distance between rows was of 70 cm, in order to use the same machine systems as for corn. Weed control was done through pre-emergent herbiciding with Gesaprim 50 WP 5 kg/ha and post-emergent for dicotyledonous weeds, cu Icedin F 2 l/ha.

For the prevention of fuzarioze (Fusariun spp) attacks and Pythium spp seeds were treated with Merpaseed 48 FS, 2 l/t.

In the vegetation, for aphid (Schizaphis graminum) control, two treatments with Nuprid 200SC were applied.

RESULTS AND DISCUSSIONS

The production result synthesis for the period 2010 – 2012 can be found in table 1.

Table 1

Sorghum stalk production result obtained in the Almăj Depression.

Factor A Seeding period	Factor B – density pl/ha			Factor A averages			
	b_1 80.000	b_2 130.000	b_3 180.000	Harvest kg/ha	%	Difference %	Significance
a_1 25 – 30 IV	42.75	44.94	41.24	42.97	100		
a_2 1 – 5 V	49.59	55.90	53.43	52.97	123	10.00	xxx
a_3 10 – 12 V	66.42	70.65	68.53	68.53	159	25.56	xxx

LSD 5% = 2.4 t/ha LSD 1% = 3.6 t/ha LSD 0.1 % = 4.7 t/ha

Factor B averages

Specification	b_1 – 80.000	b_2 – 130.000	b_3 – 180.000
Harvest kg/ha	52.92	57.16	54.58
%	100	108	103
Difference		4.24	1.66
Significance		xxx	

The data presented in the table show that the studied plant shows a minimal germination temperature of 14 - 15° C. Good results are obtained in the researched area if the seeding is carried out during the first two decades of May. Thus, compared to the seeding carried put in the last decade of

April, seeding during the first May decade led to a harvest increase of 23%, statistically insured as highly significant. Seeding during the second May decade increased the production growth as compared to the control variant to 59%, resulting in a highly significant difference of 25 t/ha.

Bringing seeding forward to 10^0 C, leads to a non-uniform sprouting, with many empty spaces and a sprouting delay of 8 to 10 days in table 2.

Table 2

Vegetation observations

Seeding period	25 – 30 IV			1 – 5 V			10 – 15 V		
Density pl/ha	80.000	130.000	180.000	80.000	130.000	180.000	80. 000	130.000	180.000
Leaf number at harvesting date	8	7	7	9	8	8	9	8	7
Shoot diameter mm	12.2	12.0	11.9	12.5	12.2	11.8	12.0	11.9	11.7
Stalk diameter mm	18.8	18.0	17.5	19.3	19.0	18.5	18.7	18.7	18.2
Plant height cm	237	233	230	242	239	237	225	225	220

Seeding during the first part of May does not create problems for germination regarding the soil dryness aspect, since sorghum seeds need low water quantities to sprout, only 26% of the grain dry mass.

Regarding the optimal harvest density, 130.000 plants/ha proved to be the best one, variant leading to a stalk harvest increase of 8%, resulting in a highly significant difference of 4 t/ha.

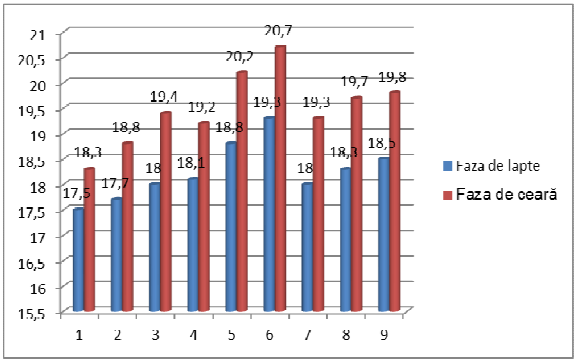
Because of the lower soil fertility, even under fertilization conditions, increasing the density to 180.000 plants/ha is not motivated, the production growth being only 3% as compared to the control variant with 80.000 plants/ha.

Regarding the plant height, the results obtained showed that in the researched field, an accessible height harvest tendency was registered proportional to the filed density growth.

The average green leaf number, at harvesting date, on the three seeding lots was of 8.66 in the 80,000 plants/ha variant, close to the one in the 180,000 plants/ha variant, of 7.33.

The main stalk diameter as well as that of the shoots registered a slight decrease when increasing crop density.

Figure 1 presents the sugar content variation depending on the research factors.



Milk stage	17.5	17.7	18.0	18.1	18.8	19.3	18.0	18.3	18.5
Wax stage	18.3	18.8	19.4	19.2	20.2	20.7	19.3	19.7	19.8
Density pl/ha	80. 000	130. 000	180. 000	80. 000	130. 000	180. 000	80. 000	130. 000	180. 000
Seeding period	25 – 30 IV			1 – 5 V			10 – 15 V		
X	18.2			19.4			18.9		
Difference				1.2			0.7		

Figure 1. Sugar content depending on the seeding period, field density and determination moment

In the researched field, the sugar content determined in the stalk midLSDe interval during the grain milk stage maturity, ranged between 17.5 % and 20.7 % .

Asan average, related to the three seeding densities, the highest content was registered with the variants seeded during the first seeding decade. During all three seeding periods, a sugar content increase tendency was registered proportionally with an increase in density.

CONCLUSIONS

1. Under the climatic aridization tendency conditions, the drought resistant plant spreading is motivated taking into consideration the attempt to obtain economic efficiency and the existence of market demand. The multiple uses of sorghum in the food industry and the production of ethanol motivate the present study.

2. The in Almăj Depression, an area with continental climate, Banat subtype with submediterranean and oceanic nuances, accounts for all conditions necessary for the cultivation of this termophile plant.
3. Sensibility to temperature during the germination period explains production growth of 23 % and 59% obtained during seeding periods from the first, respectively second, May decade, as compared to last April decade seeding.
4. Optimal density, under lower soil fertility conditions, is of 130,000 plants/ha. Increasing plant density to 180,000 is not motivated, the harvest obtained with this variant being only 3% higher than the one of the 80.000 plants/ha variant.
5. Stalk sugar content in the researched field and according to the determination date ranged between 17.5 % and 20.7%, the highest deposit being obtained for the ripening determination during the grain wax stage for the first May decade seeding variation with a 180,000 plants/ha density.

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