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Аннотация

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Экономическая оценка выращивания сорго сахарного зависимости от сортовых особенностей и норм удобрений в условиях правобережной лесостепи Украины

Представлены результаты исследований по урожайности зерна и сухой биомассы сорго сахарного в зависимости от сортовых особенностей и удобрений. Показана экономическая оценка выращивания сорго сахарного при условии уборки его на зерно и сухую биомассу в условиях Правобережной Лесостепи Украины.

Ключевые слова: *Сорго сахарное, урожайность зерна, биомасса, сорт, норма удобрений, строк уборки, экономическая оценка.*

Annotation

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Economical evaluation of Sorghum saccharatum cultivation depending on varietal peculiarities of this crop and rate of fertilization under conditions of right-bank forest-steppe of Ukraine

Research results on grain yield and dry biomass Sorghum saccharatum depending on the varietal peculiarities and rate of fertilizers application, economic evaluation of cultivation Sorghum saccharatum on grain and dry biomass under conditions of right-bank forest-steppe of Ukraine are given in this article.

Keywords : *Sorghum saccharatum, grain yield, biomass, variety, Fertilization, harvesting time, economical evaluation.*

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INFLUENCE OF DENSITY OF STANDING OF PLANTS OF SWEET SORGHUM ON YIELD FORMATION AND ACCOUNTING ACCUMULATION OF WATER-SOLUBLE SUGAR

The analysis of influence of density of standing of plants and agro biological method of pinching (removal of panicle) of sweet sorghum on yield formation and accounting accumulation of water-soluble sugar were carried out. The mass fraction of stalks in structure of the crop and sugar content in juice is defined.

At average yield of green mass of 40 t/ha can be obtained 6.12 t of alcohol from 1 ha and 12-15 t of secondary production (pressing) that can be used as fodder or solid fuel [1]. Ability of sweet sorghum plants to accumulate a large amount of soluble sugar does this culture potential source of raw materials for the food industry and bio-energetic. In bio-energetic there are three directions of use of sweet sorghum: production of bioethanol, solid fuel production (briquettes, pellets) and bio-

gas. The exit of bioethanol depends on amount of sugar in juice of stalks of sweet sorghum. Depending on varietal features and a harvesting phase sweet sorghum juice can contain to 22% of sugar.

In the drought-resistant conditions of the South of Ukraine the varieties and the hybrids of sweet sorghum can provide a sugar exit to 2,2-2,5 t/ha. At cultivation of sweet sorghum in the Steppe of Ukraine with productivity of green material to 870 t/ha and exit of juice of 41% it is possible to receive 3,4-5,4 t/ha of the fermented carbohydrates at the content of sugar in juice to 15% [2, 3].

In order to enhance the accumulation of sugars in the stems of sorghum sugar was used agrobiological reception for purposeful regulation of outflow of assimilates by the action of auxin, particularly in the stem of the plant by removing panicle (pinching) during flowering. This method was offered by the scientists from Russian research and design institute of technology of sorghum and corn of the Russian Federation [4].

Technique and conditions of researches. Researches were conducted in the farm «Zeleni Koshary» of Mykolayiv Institute of AIP, (Northern Steppe of Ukraine) during 2010–2012 on standard scientific and special agronomical techniques [4, 5, 6].

The scheme of the experiment included:

factor A – variety Tsukrove 15 and the hybrid Medovy;

factor B - density of standing: 100,120, 160 thousand pieces of seeds on 1ha

factor C - pinching (removal of panicle).

The total sowing area of site 50 m^2, accounting - 25 m^2. Frequency of experience - quadruple.

Results of researches. Analyzing the obtained data of field researches it should be noted that the variety Tzukrovy 15 differently reacted to changing density of standing of plants and agrobiological method of pinching. So, the increase in density of standing of plants of sweet sorghum to 160 thousand pieces / ha does not significantly increase productivity of biomass in comparison with density of standing of 100 thousand pieces/ha, and application of agrobiological method of pinching increases not only productivity of biomass by 6-8%, and and the content of sugar in juice to 1,6%.

The increase in productivity of biomass against pinching of plants was due to the formation of laterals from a leaf bosom on reproductive escapes - on 1-2 laterals on a stalk. Thus the share of stalks in yield biomass as valuable part for production of sugar varied from 61,9% in option with density 120 thousand/hectare to 72,09% at the density of 100 thousand/hectare (tab. 1).

Table 1

Influence of density of standing and pinching of plants of sweet sorghum on productivity of biomass and sugar accumulation in the variety Tsukrovy 15 2010-2012

Variant	Density of standing of plants thousand/ha	Yield, t/ha		Stalks in structure of yield, %	Content, %		Accounting accumulation of sugar, t/ha
		biomass	stalks		juice in stalk	sugar in juice	
1	100	25,0	18,0	72,0	67,9	20,4	2,49
2	100+ pinching	29,1	20,3	78,1	68,0	21,7	3,37
3	120	25,7	16,5	61,9	69,6	20,2	2,20
4	120+ pinching	31,0	22,3	82,3	69,9	22,1	4, 13
5	160	26,0	18,1	69,2	68,6	19,7	2,43
6	160+ pinching	32,0	23,0	73,9	67,4	21,3	2,49
$LSD_{0,05}$		6,9	6,4				1,89

After carrying out pinching the share of stalks by the time of harvesting considerably increased and reached 82,3%.

The content of sugar in juice of stalk of plants of the variety Tsukrove 15 was approximately the same level at various density of standing of plants and it was 19,7-22,1%. Carrying out pinch-

ing allowed to increase the content of sugar in stalk juice for 2,1%. The same tendency was observed in hybrid Medovy.

At determination of optimum density of standing of plants which affects the accumulation of sugar in plants it is established that the maximum exit of sugar - 3,53% was at hybrid Medovy with density of standing of 120 thousand pieces/ha. (Tab. 2)

Table 2

Influence of density of standing and pinching of plants of sweet sorghum on biomass yield and sugar accumulation in hybrid Medovy, 2010-2012

Variant	Density of standing of plants thousand/ha	Yield, t/ha		Stalks in structure of yield, %	Content, %		Accounting accumulation of sugar, t/ha
		biomass	stalks		juice in stalk	sugar in juice	
1	100	26,0	18,3	68,2	67,6	20,7	2,44
2	100+ pinching	29,1	20,3	78,1	68,0	21,5	3,37
3	120	28,2	19,1	70,4	67,1	20,9	2,53
4	120+ pinching	32,0	23,2	71,9	72,5	22,2	4,19
5	160	27,0	19,0	70,1	62,5	21,1	2,23
6	160+ pinching	31,5	23,0	71,9	69,4	21,3	3,47
$LSD_{0,05}$		5,9	4,7				1,89

The sugar exit from unit of area increased by 1,26 t/ha on the variants where pintserovka of plants was carried out.

At determination of optimum density of standing of plants of sweet sorghum it was established that hybrid Medovy at density of 120 thousand pieces/ha has the yield of biomass of 6 t/ha which was more in comparison with density of standing of plants in 100 thousand pieces/ha.

Relatively productivity of stalks, the greatest indicator of 23,2 t/ha it was noted on options where carried out pinching of plants of sweet sorghum.

Conclusions. For the purpose of increase of sugar content and obtaining the maximum exit of sugar of sweet sorghum it is necessary to carry out sowing with optimum density of standing of plants of 200 thousand units/ha.

In crop structure the mass fraction of stalks in the variety Tsukrove 15 and hybrid Medovy was 61,9-82,3 and 68,2-78,1% respectively.

Application of agrobiological method of pinching of plants increases the content of sugar of juice of a sorghum sugar for 1,5%, and accounting accumulation of sugar for 1,96 t/ha.

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Анотація

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Вплив густоти стояння рослин сорго цукрового на формування врожаю та розрахункове накопичення водорозчинного цукру

Проведено аналіз впливу густоти стояння рослин та агробіологічного методу пінцировки сорго цукрового на формування врожаю та розрахункове накопичення водорозчинного цукру. Визначена масова частка стебел в структурі врожаю та вміст цукру в соку.

Аннотация

Сторожик Л.И., Сергеева И.А.

Влияние густоты стояния растений сорго сахарного на формирование урожая и расчетное накопление водорастворимых сахаров

Проведен анализ влияния густоты стояния ний и агробиологического метода пинцировки сорго сахарного на формирование урожая и расчетное накопление водорастворимого сахара. Определена массовая доля стеблей в структуре урожая и содержание сахара в соке.