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MODERN ENERGY-SAVING TECHNOLOGY OF CULTIVATION OF TABLE BEET OF MOTHER ROOTS

Has already been present an efficiency of growing a mother root of a table beet using modern energy-saving technologies. It has already been proven positive impact aftereffect organo-mineral fertilizer system (introduction of a rotation of 14 t/ha manure + $N_{30}P_{28}K_{25}$ locally). The highest yield of varieties Bordo kharkov mother roots promoted drip irrigation. It has already been established that the cultivation of mother roots of beet varieties conical shape (variety Bahrianyi), has an effective density of 150 thousand units/ha with the timing of sowing II decade of May and I decade of June.

Keywords: *a table beet, mother roots, shteklings, drip irrigation, fertilizers, a seed roots, productivity*

Introduction. Ukraine is among the top ten of world leaders in terms of vegetable production (9.3 million tons of vegetables open ground and 0.73 million tons of melons), however, the level of productivity occupies 18-th place. Given the annual human need for vegetable and melon production at a rate of 161 kg and in compliance with the integrated program "Vegetables of Ukraine-2015", the main challenge for the future is to provide quality vegetables population of Ukraine in the amount of 12 million tons [1].

Beetroot is one of the leading food crops of open ground, which occupies about 10% of total crop area under vegetables. In Ukraine a table beet covers 44.1 hectares. Thus the yield of roots is an average of 20.3 t/ha, the total yield of 894.1 tons.

The problem of calculating the required quantity of fertilizers to grow crops, including vegetables and originated long ago. In studies Z.I. Zhurbytskiy first meet scientific data on the removal of nitrogen, phosphorus, potassium and calcium of plants a table beet. It was determined that the creation of 1 ton of product (mass of roots puff) the roots of a table beet consumes 3.36 kg of nitrogen, phosphorus and 1.40 kg 4.65 kg of potassium. Apply fertilizer at a dose $N_{90}P_{60}K_{120}$ provides growth yield 22.5 t/ha and cost reduction of nutrients in its formation nitrogen - up to 2.70 kg/t of phosphorus - up to 1.36 kg/t and potassium - to 4.3 kg/m [2].

In this regard, it is necessary to conduct research on the impact of different technological measures (fertilization in crop rotation systems, methods for fertilizing and irrigation) for content removal, consumption of battery plants of a table beet, utilization of nutrients from the soil. These data are necessary for the creation and adjustment of standards applying fertilizers into this culture.

Further development of the vegetable industry in the direction of increasing the volume of production should be based on the application of modern scientific advances, including the introduction of modern technology, new high technology varieties and hybrids.

The aim of our research was to develop the latest energy-saving technology of cultivation the mother roots of table beet with using advanced techniques adapted to specific soil and climatic conditions

Materials and methods. The study was conducted in 2007-2012 years in irrigation rotation Institute of vegetables and melons of NAAS, which is located in the eastern part of the forest-steppe of Ukraine in Kharkov region with varieties of Bordo kharkov of table beet (variety type of Bordo) and Bahrianyi (variety type of Erfurt) according to the "Methodology of research case in the vegetable and melon"(2001) and other generally accepted methods and standards by setting

laboratory field experiments [3, 4]. Soil of areas where experiments were carried out is black earth ached medium loamy. Humus profile 94 cm. The content of humus in the plow layer (0-30 cm) is 3.26 % in the subsoil (30-50 cm) is 3.00 %. Soil is non-saline, non-solonetsous, humus with favorable water-physical properties. Level of available forms of phosphorus and potassium is increased.

Results and discussion. Apply fertilizer at all backgrounds irrigation led growth removal of nitrogen, phosphorus and potassium of harvest of table beet. The biggest take-away value of the harvest gained by the use of fertilizers locally by drip irrigation (nitrogen is 158.2 , phosphorus is 43.3 , potassium is 164.8 kg/ha). Also all the backgrounds irrigation after fertilizer application total removal of nitrogen, phosphorus and potassium was greatest. For irrigation overall removal of nitrogen in fertilizer application (continuous and locally) was 200.6 and 212.7 kg/ha of phosphorus is 65.5 and 66.3, potassium is 198.7 and 213.4 kg/ha, respectively, that the overall level was more than a sprinkling background (Fig. 1).

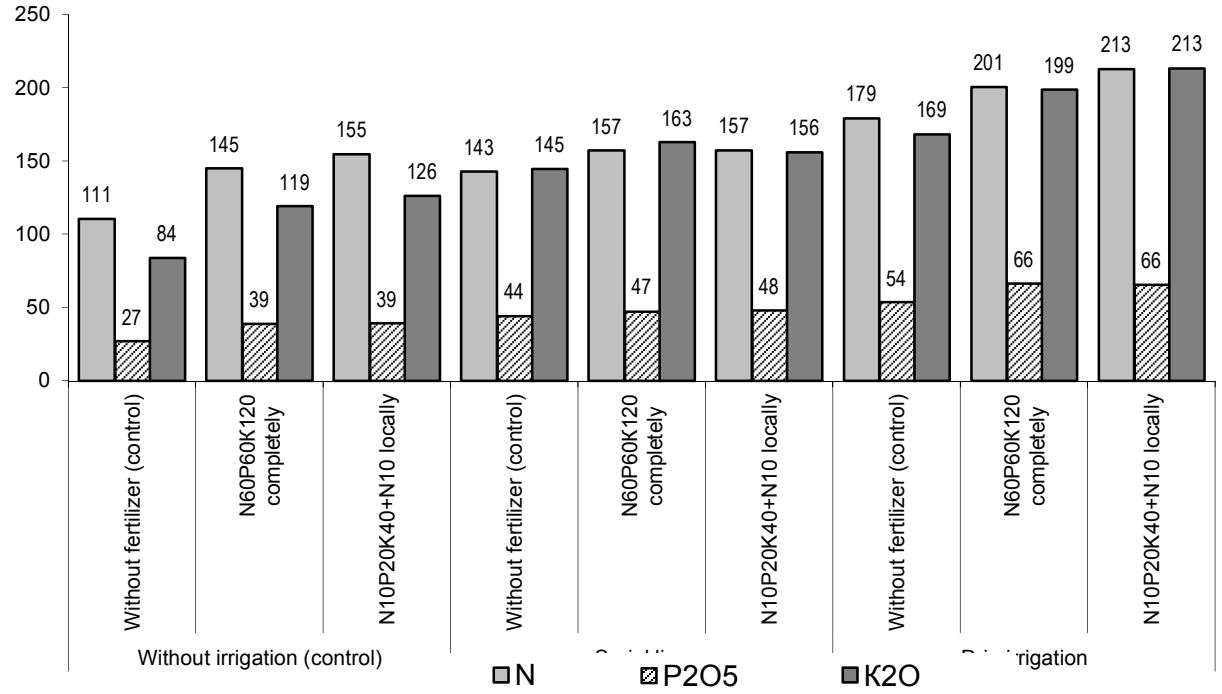

Figure 1. Effects of different methods of irrigation and fertilization on tap batteries of mother root of table beet the varieties of Bordo kharkov, kg/ha (average for 2008-2012)

All backgrounds irrigation coefficients battery with fertilizer local way of making them was higher than fertilizer use entirely.

Removal and consumption of main nutrients of plants of table beet changed also on the aftereffects of different fertilization systems in irrigated vegetable and fodder crop rotation (barley - perennial herb of the first and second years of use - cucumber - winter wheat - tomato - onion in turnip - cabbage - table beet).

It should be noted that during the growing of table beet aftereffect for different systems of fertilizing crop yield increased. The highest total yield aftereffect provide manure (28 t/ha crop rotation area) and the aftereffect of organic and mineral fertilization (21 t/ha manure + scattered $N_{30}P_{28}K_{25}$ and 14 t/ha manure + $N_{30}P_{28}K_{25}$ locally), the increase was 13.0-15.0 t/ha or 60.2-69.4 %, relative to controls. Delay of different fertilization effect on the accumulation of batteries in table beet plants. The largest of its content in the roots defined by the aftereffect of mineral and organic-mineral fertilization systems (nitrogen – 1.00-1.17 %, phosphorus – 0.65-0.72 %, potassium – 1.92-2.01 %). The largest number of judgments batteries of table beet aftereffect seen by 14 t/ha manure + locally $N_{30}P_{25}K_{25}$ (nitrogen - 68.2 kg/ha of phosphorus - 37.7 kg/ha and potassium - 108.9 kg/ha).

It is also found that the largest output of mother root of varieties Bordo kharkov standard fractions (61-100 mm) promoted drip irrigation, namely the background without fertilizers - 99.2

after fertilizing scattered - 110.7 locally - 116.5 thousand pcs/ha. Excess on benchmark was 5.12-23.48 %. A similar pattern was observed and the quantitative output of mother-shteklinhs of roots (41-60 mm) is the highest the figure obtained by drip irrigation and fertilizer - 133,1-142,6 thousand/ha. The excess was relatively standard – 30.5-39.8% (Table 1).

The optimum density when grown in rotation technological of IOB of NAAS of plants of table beet varieties of Bordo kharkov with a rounded root form for the first sowing (second decade of May) and the second (and decade of June) is 300-320 ths/ha. Late sowing (third decade of June) increases productivity by density of 480-520 ths/ha [5, 6].

By analyzing the results of research on scientific cultivation of table beet determined that they dealt mainly varieties of round or rounded- flattened shape [7, 8]. However, their research has shown that different elements of the technology, as applied conical of table beet of variety type of Erfurt works almost was not. So for us it was important to conduct research on technological varieties of root vegetables conical shape.

Table 1

Obtaining the mother root of table beet varieties of Bordo kharkov, depending on the method of irrigation and fertilizer, ths/ha (average 2008-2011)

The method of irrigation (factor A)	The method of fertilizing (factor B)	Mother roots	
		standards (sowing of II decade of May)	shteklinhs (sowing of III decade of June)
Without an irrigation (control)	Without a fertilizer (control)	48,7	57,2
	Scattered about $N_{60}P_{60}K_{120}$	71,7	104,5
	$N_{10}P_{20}K_{40}+N_{10}$	62,1	98,7
Overhead irrigation, 70–65% HB (standard)	Without a fertilizer (control)	71,8	92,5
	Scattered about $N_{60}P_{60}K_{120}$	94,4	102,0
	$N_{10}P_{20}K_{40}+N_{10}$	81,6	97,2
A drip, 70–65% HB	Without a fertilizer (control)	99,2	87,7
	Scattered about $N_{60}P_{60}K_{120}$	110,7	133,1
	$N_{10}P_{20}K_{40}+_{\text{фертигація}}N_{10}$	116,5	142,6

For planting in early June reduced the overall yield of roots compared with May to 1/4, but decreased and the proportion of non-standard products in the total harvest. This was due to the decrease in the number of roots have outgrown that do not meet the standard. With the gradual increase in the density of growing plants from 100 to 250 ths.pc/ha content standard in the total mass of roots decreased from 85 to 76 %, while the yield of standard root crops decreased by 4.9 t/ha. The highest yield of roots provided the standard density of 150 ths.pc/ha - 30.1 t/ha, out of mother of roots was also the largest - 17.2 t/ha. Plant density of 150 ths/ha higher than the other on all major indices, it is the most optimal and appropriate.

Table 2

Effect of sowing seed and density the mother roots of table beet variety of Bahrianyi for the total yield (average 2007-2010)

The density of plants ths.pc/ha	Yield, t/ha	Total content of roots in the crops			
		standard		including mother plants	
		t/ha	%	t/ha	%
Sowing of seeds of II decade of May (control)					
100	40,6	32,8	81	14,6	36
150	44,2	35,8	81	18,1	41
200	42,8	34,7	81	17,1	40
250	40,1	30,1	75	15,6	39
SSD_{05}	2,7			2,6	
Sowing of seeds of I decade of June					
100	32,4	27,5	85	14,3	44
150	36,7	30,1	82	17,2	47
200	33,3	30,1	78	14,3	43
250	32,7	24,9	76	13,7	42
SSD_{05}	2,9			2,4	
Sowing of seeds of III decade of June					
100	27,1	21,7	80	12,2	45
150	29,9	21,8	73	13,8	46
200	29,4	20,0	68	15,0	51
250	28,8	17,9	62	10,0	38
SSD_{05}	2,2			2,1	

Conclusions. Sales and implementing effective cost-reducing technologies in production will provide competitive field of fruit and vegetables to improve production efficiency in the future. The biggest take-away value of the harvest gained by the use of fertilizers locally by drip irrigation (nitrogen - 158.2, phosphorus - 43.3, potassium - 164.8 kg/ha). Proved positive after- effect of organic-mineral fertilization system (introduction of rotation 14 t/ha manure + $N_{30}P_{28}K_{25}$ locally) on yield of table beets. The biggest release of mother roots variety of Bordo kharkov of standard fractions (61-100 mm) promoted drip irrigation, namely the background without fertilizers - 99.2 after fertilizing scattered ($N_{60}P_{60}K_{120}$) - 110.7 locally ($N_{20}P_{20}K_{40}$) - 116,5 ths/ha. Excess on benchmark was 5.12-23.48 %. A similar pattern was observed and the quantitative output of mother - shteklinhs of roots (41-60 mm) is the highest the figure obtained by drip irrigation and fertilizer – 133.1-142.6 ths/ha. It is established that for growing queen of table beet varieties conical (Bahrianyi), effective density is 150 ths/ha of sowing (second ten days of May and June and decade), which provided a standard yield of roots 30,1-35,8 t/ha yield uterine roots – 17.2-18.1 t/ha (41-47 %).

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Анотація

Корнієнко С.І., Терьохіна Л.А., Куц О.В., Могильний В.В.

Сучасні енергоощадні технології вирощування маточних коренеплодів буряка столового

Представлено ефективність вирощування маточних коренеплодів буряка столового за використання сучасних енергоощадних технологій. Доведено позитивний вплив післядії органо-мінеральної системи удобрення (внесення в сівозміні 14 т/га гною + локально $N_{30}P_{28}K_{25}$). Найбільшому виходу маточників сорту Бордо харківський сприяло краплинне зрошення. Встановлено, що за вирощування маточників буряку столового сортів конічної форми (сорт Багряний), ефективною є густота 150 тис. шт./га зі строками сівби ІІ декада травня та І декада червня.

Ключові слова: *буряк столовий, маточні коренеплоди, штеклінги, краплинне зрошення, добрива, насінники, врожайність*

Аннотация

Корниенко С.И., Терехина Л.А., Куц А.В., Могильный В.В.

Современные энергосберегающие технологии выращивания маточных корнеплодов свеклы столовой

Представлена эффективность выращивания маточных корнеплодов свеклы столовой при использовании современных энергосберегающих технологий. Доказано положительное влияние последействия органо-минеральной системы удобрения (внесение в севообороте 14 т/га навоза + локально $N_{30}P_{28}K_{25}$). Наибольшему выходу маточников сорта Бордо харьковский способствовало капельное орошение. Установлено, что при выращивании маточников свеклы столовой сортов конической формы (сорт Багряный), эффективной есть густота 150 тыс. шт./га со сроками посева ІІ декада мая и І декада июня.

Ключевые слова: *свекла столовая, маточные корнеплоды, штеклинги, капельное орошение, удобрения, семенники, урожайность*