

SUGAR BEET SEED GROWING ECOLOGICAL AND ECONOMIC ASPECTS IN UKRAINE

**A.V. DORONIN, Candidate of Economic Sciences,
Senior Research Fellow
National Academy of Agrarian Sciences of Ukraine**

It is shown sugar beet seed growing ecological and economic aspects in Ukraine. It was analyzed sugar beet seed growing in recent years. It is determined sugar beet seeds growing efficiency and was promoted seed sustainable development under increasing economic competition conditions improving ways.

In Ukraine sugar beet seed producing during the market reformation was dropped significantly decline. Sugar beet growing firms, farms and other farms are massively switched to foreign hybrids seed planting which is more expensive than domestic. However, hybrids domestic selection by the productivity is not inferior to foreign and more adapted to local conditions. Therefore sugar beet seed growing paramount importance environmental and economic aspects researches are becomes.

Sugar beet seed producing national revival development significant contribution were did V. Balan, N. Hizbullin, V. Doronin, W. Zubenko, M. Royik, L. Ostrovsky, V. Bondar and others. The goal of this article is recommendations studying for sugar beet seeds growing efficiency improving in Ukraine and to developing the ensure ways of seed sustainable development in the increasingly economic competition.

Research Methodology. In the article writing process were used system analysis and logic synthesis methods for sugar beet seeds growing environmental and economic aspects study in Ukraine, settlement and constructive - in of seed sugar beet economic efficiency indicators determining, comparative analysis - the statistical information analyzing process; induction and deduction - for study results summarize, an abstract logic - the conclusions and proposals formulation.

Research results. To ensuring the industrial seed producing effective management scientifically is necessary to know the sugar beet seed ecology - the relationship between the cultivation conditions and seed biological properties [1, p. 5].

The seed ecology main objective is to study the relationship between the cultivation conditions, preparation and storage, and its biological properties, and the conditions studying under which the seed fully realizes its potential productivity.

By the Institute of bioenergy crops and sugar beet of the National Academy of Agrarian Sciences of Ukraine was developed seed growing technology by without planting (direct method) and planting or transplanting (indirect method) methods that provide a high coefficient of its breeding and post-harvest technology and presowing seed preparation on the seed plants.

Previously, the main method of sugar beet seeds breeding was planting mean uterine root growing, harvesting and storing them in a fixed storage or piles. Only the National Association of Sugar Producers of Ukraine "Ukrtsukor" was propagated seed in 134 specialized farms with sugar beet seed producing. Today, there was not seed farms, also eliminated the work of special equipment to perform certain processes production.

Transplanting seed growing method in which uterine summer roots are not dug, and in the spring its transplanting has no perspectives in Ukraine conditions. Since uterine roots that transplanting should be weighing 100-150 g and have 4-5 cm head diameter, smaller roots are quickly lose turgor, poorly rooted. In Ukraine, more roots 100-150 g mass at the time of overwintering is freezing [2, p. 20].

Therefore, at this time without planting method of sugar beet seed growing is progressive and economically viable for the country [3, p. 11]. Although it's high reproduction coefficient is not provided, and there is the risk of plants loss during the winter.

It should be noted that regardless of the sugar beet seed methods growing one of the main tasks is to ensuring a high reproduction coefficient - is the ratio of grown seed to sowing. In particular, due to the seed multiplication low coefficient is increased cost production and reduced competitiveness.

On agro-ecological conditions of high quality sugar beet seeds cultivation was influenced abiotic, biotic and anthropogenic factors. So it is important to know on which factors can be influencing certain economic activities, and that you want to adapt.

Abiotic factors are environmental conditions complex that directly or indirectly influencing on the seed. Biotic factors are effects due to the seed activities of other living organism's influence. Anthropogenic factors are caused by human activities.

Seed placement, sugar beet seed mechanized technology development and implementation must bind with agroclimatic zones features.

Areas seed in Ukraine covering three agro-climatic zones which supply heat to the resource and sediments are characterized by parameters given in Table. 1 [4].

1. Moisture and heat resources indicators of seed production areas agro-climatic zones in Ukraine *

Agroclimatic zone	Precipitation amount, mm		Assimilate soil moisture in the spring by plowed fields, mm in layer		above 10 ° C temperatures sum during the growing season, degrees	above 1 hydrothermal coefficient probability values in May-August, %
	per year	per vegetation on period	0-100 cm	0-150 cm		
Sufficient moisturizing	> 550	450-340	220-180	300-250	2000-2500	100-60
Unstable moisturizing	549-480	339-330	179-140	249-180	2500-2800	59-50
Insufficient moisture	479-430	299-260	139-110	179-140	2800-3000	49-40

* Source: author was generated according to dates[4].

In Ukraine sufficient moisture Agro-climatic zone are: Ivano-Frankivsk, Lviv, Chernivtsi, Ternopil, Chernihiv, Khmelnytsky, Zhytomyr region and the northern part of Vinnitsa region.

Unstable moisture zone: southern parts of Khmelnytsky, Vinnitsa, Kiev and Sumy regions, the northern districts of Cherkasy, Poltava and Kharkiv regions.

Insufficient humidifying zone: southeastern regions Cherkasy, Kharkiv and Poltava regions, the northern district of Kirovograd region, Nikolayev, Odessa, Kherson and Crimea.

In unstable and insufficient humidifying areas especially the first place is occupied moisture. Light and heat efficiency is depending on seed moisture and nutrients availability.

Almost seed third part was grown in the eastern forest steppe zone, which has a higher active temperatures amount (over 2600 ° C), lower humidity during flowering and fruit formation.

In the western forest steppe zone of Ukraine were producing only tenth part of the whole seed. For this zone are typical high humidity, slightly lower active temperatures sum and strong solar radiation relatively.

Most favorable for sugar beet seed high yields formation with good sowing qualities and productive properties is central and southern forest-steppe zone of western and southern regions of Odessa and Kherson regions and Crimea.

It should be noted that during a long time there is a positive tendency of domestic sugar beet seed production that exceeds the quality standards in force requirements in Ukraine (Fig. 1).

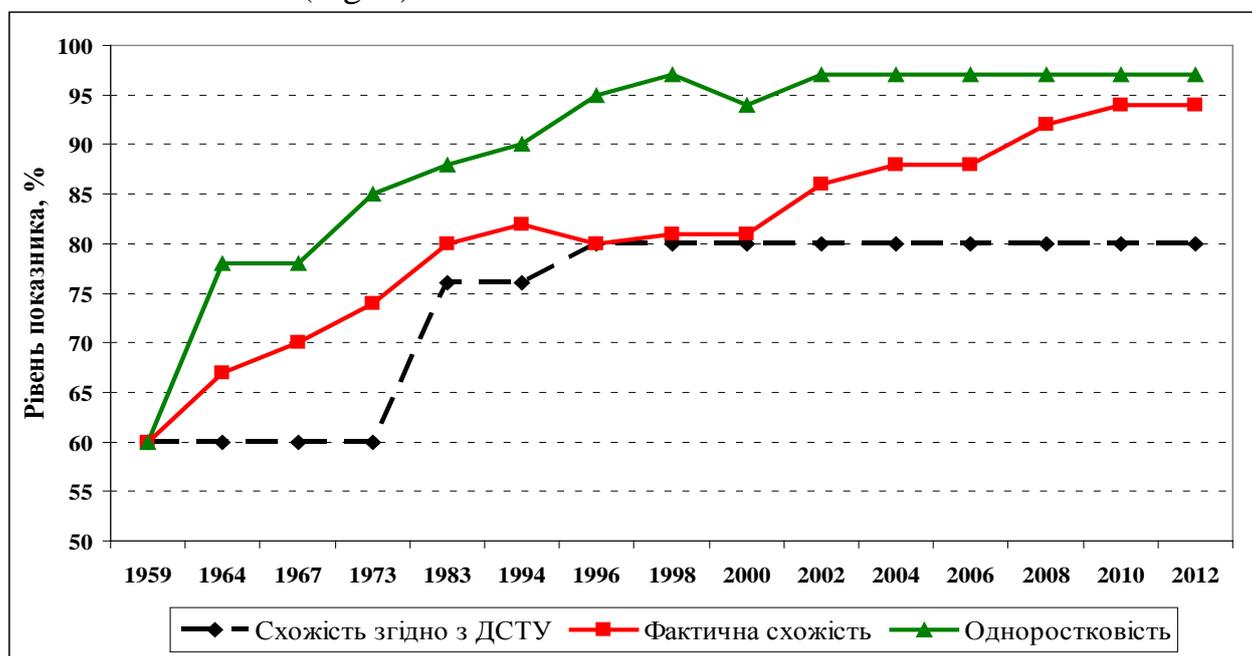


Fig. 1. Sugar beet domestic seed quality indicators dynamics in Ukraine*

* Source: author was generated according to Ukrainian state seed inspection data.

Any industry effectiveness, including seed production is largely determined by the production scale. In recent years is significantly reduced seed sugar beet area

from 2,578 hectares in 2007 to 572 ha in 2012 (Fig. 2). Preferably, seed was grown by unplanting way. In 2013 seed plants area were decreased to ___ha.

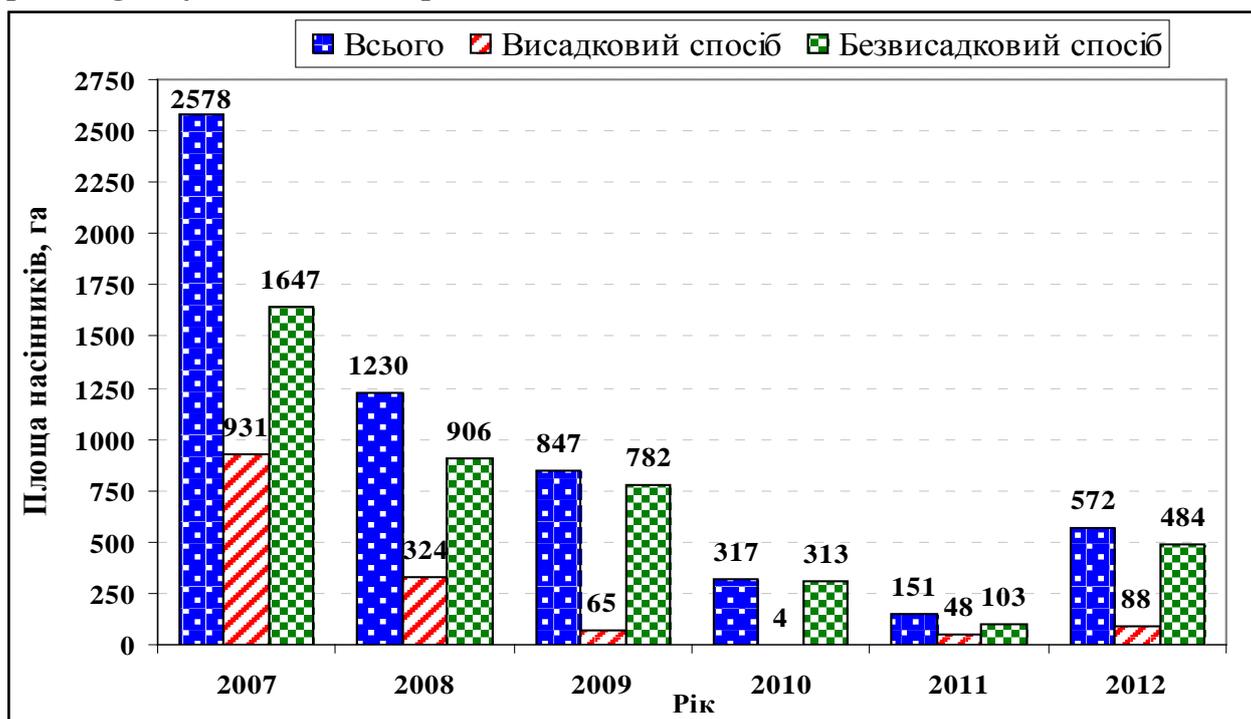


Fig. 2. Sugar beet seed plants areas in Ukraine *

* Source: author was generated according to Ukrainian state seed inspection data.

Sugar beet growing companies, farmers, and also part of sugar beet growing farms are gradually shifted to hybrids leading foreign firms sowing seeds, which in 2007 were employed 29.6% from the total sugar beet areas cultivation seed in Ukraine, respectively, in 2008 - 55%, 2009 - 83.3%, 2010 - 50%, 2011 - 30%, 2012 - 30%. In Ukraine sugar beet seed total yield was declined from 3470 tons in 2007 to 188 tons in 2012, including domestic hybrids 2429 tons in 2007 to 47 tons in 2012 respectively.

It is occurs own seed production decay, which has always been based on the varieties and hybrids domestic breeding, included 135 specialized seed farms, 4 large seed factories, institutions and elite breeding farm of the Institute of bioenergy crops and sugar beet NAAS of Ukraine, and seed production government agencies. There are no full-fledged specialized seed farms almost.

This situation is intolerable, especially if, when Ukrainian sugar beet hybrids last generation productivity is practically not inferior to foreign ones, are better adapted to soil and climatic conditions adverse, and their seed is almost in 3 times cheaper than foreign. Specific preconditions for the revival seed production are available. It is preserved, though somewhat deformed selection material base of primary and basic seed production, some special farms is operating. [6]

Sugar beet seed growing technology elements compliance, the main ones are plants nutrition and protect them from pests, diseases and weeds with soil and climatic conditions is provide native seed yield increasing - from 0.5 t/ha in 2009 to 1.0 t/ha in 2011.

However, overall seed production reproductive, seed preparation quality before sowing, the price mechanism in seed production were suffered considerable destruction, which led to self-destruction of a large part of seed farms, destroyed irrigation systems in southern Ukraine, which withdraw seed plants areas enlargement by unplanted cultivation method.

Sugar beet harvested seeds production calculations results by unplanted way on irrigated lands of southern Ukraine is indicating that domestic producers has substantial reserves to efficiency production increase due to yield changes (Table 2).

Thus, by the sugar beet seed yield of 1.5 t/ha - the 1 hectare cost amounted to UAH 13965.53 or 9310.35 USD per 1 ton, respectively, 2.0 t/ha - 14961.46 UAH or 7480.73 USD per 1 ton, 2.5 ton/ha - 15460.35 UAH or 6184.14 USD per 1 ton. Its mean that sugar beet seed productivity increase from 1.5 to 2.5 t/ha, due to an increase of 10.7% one hectare costs with 13,965.53 to 15,460.35 USD is reduces the cost per unit of production by 33.6% - from 9310.35 to 6184.14 UAH/t.

Costs structure analysis on sugar beet harvested seed production is showing that its yield increase is cost share increasing of fertilizer and labor costs, respectively, decreases - for fuels and lubricating materials, seeds, water, almost the same costs share of depreciation, maintenance, pesticides, administrative and other costs (Fig. 3).

2. Sugar beet harvested seed costs by the different yields in Ukraine *

Index	Seed yield, t/ha					
	1,5		2,0		2,5	
	per 1 ha, UAH	per 1 t, UAH	per 1 ha, UAH	per 1 t, UAH	per 1 ha, UAH	per 1 t, UAH
Labour remuneration with charges	2431,09	1620,73	2856,66	1428,33	3068,14	1227,26
Fuel and lubricants	1850,48	1233,66	1890,47	945,23	1900,57	760,23
Amortization	587,42	391,62	602,64	301,32	608,52	243,41
Current repair	440,57	293,71	451,98	225,99	456,39	182,56
Seed	2700,00	1800,00	2700,00	1350,00	2700,00	1080,00
Fertilizer	2575,00	1716,67	2929,70	1464,85	3122,05	1248,82
Pesticides	303,88	202,59	303,88	151,94	303,88	121,55
Water	987,00	658,00	987,00	493,50	987,00	394,80
Other costs	593,77	395,85	636,12	318,06	657,33	262,93
Administrative costs	1496,31	997,54	1603,01	801,51	1656,47	662,59
Costs total	13965,53	9310,35	14961,46	7480,73	15460,35	6184,14

* Source: author's calculations.

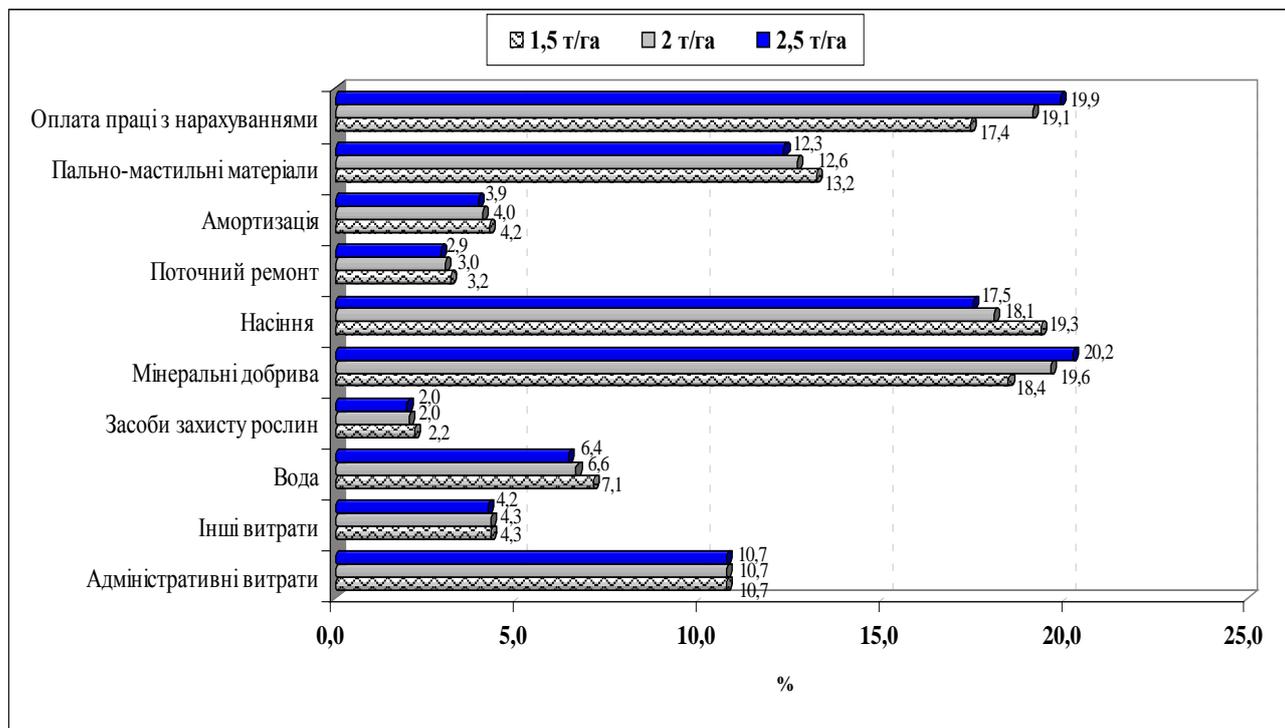


Fig. 3. Cost structure on sugar beet harvested seed production of at by the different yields in Ukraine *

* Source: author's calculations.

Sugar beet harvested seed production in all three cases will be profitable with an average seed selling price in Ukraine 12709 UAH/t (excluding VAT) or 15250 UAH/ton (VAT) (Table 3).

3. Sugar beet harvested seed Efficiency by the different yields in Ukraine *

Index	Seed yield, t/ha		
	1,5	2,0	2,5
1 ton seed industrial prime cost, UAH	9310,4	7480,7	6184,1
1 ton seed total prime cost, UAH	9775,9	7854,7	6493,3
1 ton seed realization price (excluding VAT), UAH	12709		
Seed production profitability level, %	30	61,8	95,7

* Source: author's calculations.

According to sugar beet seed yield of 1.5 t/ha the profitability will be 30%. The highest profitability - 95.7% will be received by the yield of 2.5 t/ha, while there will be major growing costs - 15,460.35 USD per 1 ha.

In order to ensure expanded reproduction in agriculture according to norms it is necessary that production profitability level was not lower than 30%. Sugar beet seed yield increased makes it possible not only to provide expanded reproduction, but also to the demand for seed by a lower price is generally enhance the production competitiveness.

Today we can identify main following problems in sugar beet seed production in Ukraine:

- destroyed a clear system of seed production;
- outdated physical infrastructure;
- deformed seeds market;
- seed falsification was prompted the leading companies to buy productive foreign seed and led to the loss of confidence in the domestic selection and seed production;
- sugar beet area sharp reduction was led to a decrease in demand for seeds;
- new domestic hybrid seed absence that are viable by the quality features was led to areas increase of foreign seed selection;
- seed growing technology non-implementation in seed farms by the planting and without planting methods were resulted in lower yield and seed quality;
- the constant rising cost of materials and services for seed growing pushing up seed cost and reducing the competitiveness of sugar beet seed production compared with other cultures;
- authors (breeders) are not interested to introduce new hybrids in production this led to their work limitation - only hybrids creation and as a result - today there is no sufficient amount of high quality basic seed of parental components for mother beets sowing.

To solve the main problems of sugar beet seed production in Ukraine it should be implemented a number of important organizational, economic, technological and regulatory measures for the restoration of Ukrainian seed production system, which would provide for expansion by 2015 the area under sugar beet seed of Ukrainian selection to 40-45% and in 2020 - up to 60-65% from the total sowing area.

This task is not easy because measures to restore own seed production should be sufficiently specific and effective. It is necessary to convince consumers of ordinary seed those new domestic hybrids are not worse overseas. To perform this task, necessary to produce a sufficient number of new hybrids high quality factory seed. It is therefore necessary to extend the work on the basic components creation and reproduction of the newest ChS hybrids of Ukrainian selection whose seed are not enough. It must be restored specialized seed farms with factory hybrid seed reproductions operation by the planting way: in Vinnytsia region - 4, Kyiv - 4, Kharkov - 4, Poltava - 3 Sumy - 3, and extended seed sowing area without planting plants in Crimea and Odessa region at least 1,500 hectares. In the production should be implemented technology with coefficient withdrawal root crops planting 1:3 - 1:5, which allow obtaining seed factory reproductions of purity 96-98%, which is in the processing of seed plants, will have similarity and uniformity, monogermity not lower than the seed of foreign firms. In Ukraine it is necessary to introduce a unified system of approvals, certifications, licensing, accounting and reporting in the seed production, to improve the price mechanism so as to ensure the ordinary seed profitability not less than 50% [6].

In the period of domestic seed production revival is urgently needed public financial support as its production and consumption. It would be reasonable to resume the practice of financial stimulation authors local hybrids based on actual planted area derived them varieties and seed producers by the realization high sowing material with 97-100 % germination.

It is proposed to subsidize from the state budget uterine roots sowing and seed plants squares in seed farms in the amount of UAH 5,000 per hectare, and customers encourage of domestic seed by compensation from the budget of its value at 11 Euros per planting unit. Only one substitution of foreign for domestic seed, even with the amounts of subsidies, savings will amount to 120-150 million UAH per year [6].

It must be re-established a clear hierarchical structure and corresponding scheme of seed production. Its principal provisions are reduced the switch of single hybrids basic seed breeding, use only high-quality basic seed that grown in specialized research institutions and experimental selection station, the F1 hybrid seed concentration growing only in highly spetsnashospah, basic seed preparation on specialized equipment of seed plant under the control of scientific institution-organizer and factory reproduction - at certified by the Ministry of Agrarian Policy and Food of Ukraine seed plants; the introduction of a single coherent state Seed Testing by State Seed Inspection. It is necessary of the domestic seed market deeper research, the implementation of a clear pricing marketing.

Conclusions. Ukraine has all necessary conditions and opportunities for recovering items of Ukrainian seed in the seed market - up to 40-45% in 2015 to 60-65% - in 2020. To restore the seed production it is necessary a number of measures, the main ones are adequate basic and ordinary seeds of new hybrids production, technological and organizational restructuring the system of seed production and targeted financial support from state and pricing politics change. Sugar beet seed yield increases is promote the effectiveness of its production and ensure the competitiveness of products at cost parameters.

REFERENCES

1. Gizbullin N.G. Agroecological bases of zonal sugar beet seed production / N.G. Gizbullin - Moscow All-Union Scientific Research Institute of information and technical and economic research in agriculture, VASHNIL, 1981. - 58. - (Plant production and biology of agricultural crops).
2. Royik M.V. Sugar beet new hybrids and the system of seed production / M.V. Royik, N.G. Hizbullin // Seed production: the theory and practice of cultivation technology and recovery of seeds and propagating material capable competitiveness in the European market conditions: Collection scientific papers of the Institute of bioenergy crops and sugar beet NAAS of Ukraine. - Simferopol: Arial, 2012. - Vol. 16. - P. 19-21.
3. Balan V.M. Sugar beet seed growing by without planting method: history of development, status and perspectives / V.M. Balan // Sugar Beet. - 2012. - № 4. - P. 9-11.
4. Zubenko V.F. Sugar beet: Basics of agrotechnics / Ed. V.F. Zubenko. - K.: Urojay, 1972. - 506 p.
5. Doronin V.A. The impact of measures of preseeding preparation on biological sugar beet seed properties / V.A. Doronin, M.V. Busol, J.V. Belik // Seed production: the theory and practice of cultivation technology and recovery of seeds and propagating material capable competitiveness in the European market conditions: Collection scientific papers of the Institute of bioenergy crops and sugar beet NAAS of Ukraine. - Simferopol: Arial, 2012. - Vol. 16. - P. 110-112.

6. Bondar V.S. The problem of domestic sugar beet seed production resurgence / V.S. Bondar, V.A. Doronin, A.N. Shutenko // Seed production: the theory and practice of cultivation technology and recovery of seeds and propagating material capable competitiveness in the European market conditions: Collection scientific papers of the Institute of bioenergy crops and sugar beet NAAS of Ukraine. - Simferopol: Arial, 2012. - Vol. 16. - P. 323-324.

Doronin A.V. Sugar beet seed growing ecological and economic aspects in Ukraine

It is shown the sugar beet seed growing ecological and economic aspects in Ukraine. It is done seed cultivation zones characteristic by planting and unplanning methods. In recent years it was analyzed sugar beet seed production condition, and given the problems that have arisen in the sphere that led to sugar beet seed production decline in Ukraine. It is given seed production conducting economic characteristics. It is proved that only by seed productivity increasing from 1.5 t/ha to 2.5 t/ha, due to of 10.7% increase for one hectare - reduced products unit costs to 33.6% or 9310.35 to 6184.14 UAH/t. It is shown that even in the seed yield of 1.5 t/ha the profitability level is 30%.

The structure analysis of sugar beet harvested seed costs production was shows that by the increase of its yield is increasing the cost share of fertilizer and labor costs, respectively, decreasing - for fuels and lubricating materials, seed, water, almost the same share of depreciation, maintenance, pesticides costs, administrative and other expenses.

It was determined the ways of sugar beet seeds growing efficiency improving and promotes the seed production sustainable development under the conditions of economic competition increasing. It is noted that in Ukraine there are all necessary conditions and opportunities for Ukrainian seed recovering positions in the seed market, but their realization is not possible without government support.

Keywords: sugar beet seeds ecology, seed production costs, pricing, efficiency, seed production, competition.