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Feasibility efficiency and entomological MAKING OF Trichogramma

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In this work the biotechnological production process and making entomological drug Trichogramma results of determining the economic efficiency and payback of equipment that is used.

Biotechnological process entomological drug Trichogramma, cost, cost-effectiveness.

Problem. Mass production and use of entomological drug Trichogramma in biological plant protection were in the 70-90 years of the last century. In each sector drug delivered free until there was government support. With the collapse of the Union collapsed the whole system, biometod came on the market, biolaboratoriyi started working on self-sufficiency, and management, who are used to the free supply of the drug, most refused to use it, and laboratories began to stop their activities. This situation in turn has allowed foreign companies at a rapid procedure to enter the Ukrainian market of chemicals and sweep it.

Currently in Ukraine there are about 20 bio-laboratories, including educational, scientific and industrial laboratory of biological plant protection National University of Life and Environmental Sciences of Ukraine, which is equipped with modern facilities for the production of entomological drug trichogramma. The laboratory is engaged not only in breeding

drug, but its practical use in biosecurity in farms of the university.

Increased production and use of entomological drug Trichogramma on agricultural crops is essential, but the question of efficiency of production and use of payback and equipment that it uses remains open.

Analysis of recent research. The manufacturing process of entomological drug Trichogramma consists of two stages: the first stage - zhyvytelya Trichogramma egg production (Collar pest - grain moth); second - production of the drug.

Biotechnology production of grain moth consists of the following operations: preparation and contamination of grain; getting butterflies and moths eggs grain; cleaning and calibration eggs; quality evaluation and storage of grain moth eggs; waste disposal [1].

During breeding Trichogramma entomological drug must be aware that the room for the production of grain moths and entomological drug Trichogramma be separated from each other (Fig. 1) to prevent uncontrolled infection grain moth eggs as trichogramma constantly search for eggs.

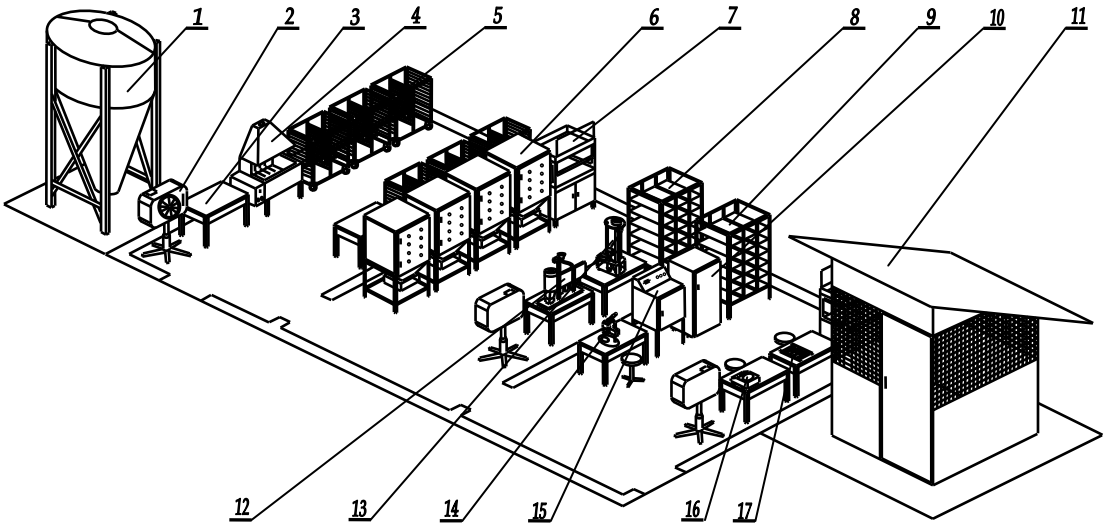

Fig. 1. Location of process equipment in the laboratory for the production of Trichogramma 1 - bunker; 2 - humidifier; 3 - table; 4 - air conditioning grain; 5 - rack grain; 6 - boxing sytotrozhnyy; 7 - fume cupboard; 8 - rack gardens of grain moth; 9 - rack containers with trichogramma; 10 - luggage Trichogramma egg and grain moths; 11 - Insectarium;
12 - calibrator grain moth eggs; 13 - cleaner eggs; 14 - binokulyar; 15 - thermostat; 16 - weight; 17 - device to determine the ability of Trichogramma search.

For disinfection and moisturizing conditioner using grain corn. Disinfected seed dispersed by ditches layer no more than 4 cm and within 1-2 days lead up to humidity 15-16% [2]. Scattered grain on cuvettes set on racks that are designed to accommodate cartridges with a grain of corn grain operation infection moth and its development from egg stage to stage peredimahovoho age. Indoor getting moths and their eggs must maintain appropriate climatic conditions: temperature at 24 ± 1 ° C and a relative humidity of 75 to 80% [3].

For the cultivation of grain moth using high-quality, refined varietal barley, which includes an average 20-21 thousand. Grains in 1 kg [4]. After 4-5 days of early infection grain mix thoroughly determine its moisture and if necessary adjusted to the set. When beginning to fly grain moth grain loaded into box that is designed to collect grain moth adults. Grain moth collected once a day. To keep and grain moth laying eggs placed in special cages.

For navisok division into factions, and to remove impurities (dust, quotes, wings, etc.). Fraction of grain moth eggs using cleaner eggs.

The resulting grain moth eggs used for further production and moths breeding Trichogramma. In the first case, use svizhevidkladeni grain moth eggs or eggs that are kept up 3 to 4 days at a temperature of from 1 to 3 ° C and relative humidity of 85 to 90%.

To improve the quality of production and industrial uterine culture Trichogramma in biotechnological process calibrator was introduced grain moth eggs [5]. After cleaning and calibration of grain moth eggs are counted and if necessary determine their number - about 1 g 50 thousand. Eggs [6].

The second stage biotechnological production of Trichogramma breeding is the drug that includes the following: nakatuvannya grain moth eggs; trichogramma their infection; collection and purification parazytovanyh eggs; definition of quality indicators preparation and storage.

Recent studies that have been associated with determining the economic efficiency of entomological drug Trichogramma showed that most of the costs comprise depreciation (Fig. 2) - 60%, wages - 26%, raw materials - 9% and 5% up utilities, overhead and overhead costs.

Volumes of production of Trichogramma entomological drug, taking into account the market, depending on the orders, but the calculations presented in this paper related to the maximum capacity of the laboratory. Actual production in drug manufacturing laboratories depend on the number of lines and the number sytotrozhnyh sides that are part of these lines. In educational research and production laboratories for biological plant protection NUBiP Ukraine is one line that consists of 5 blocks.

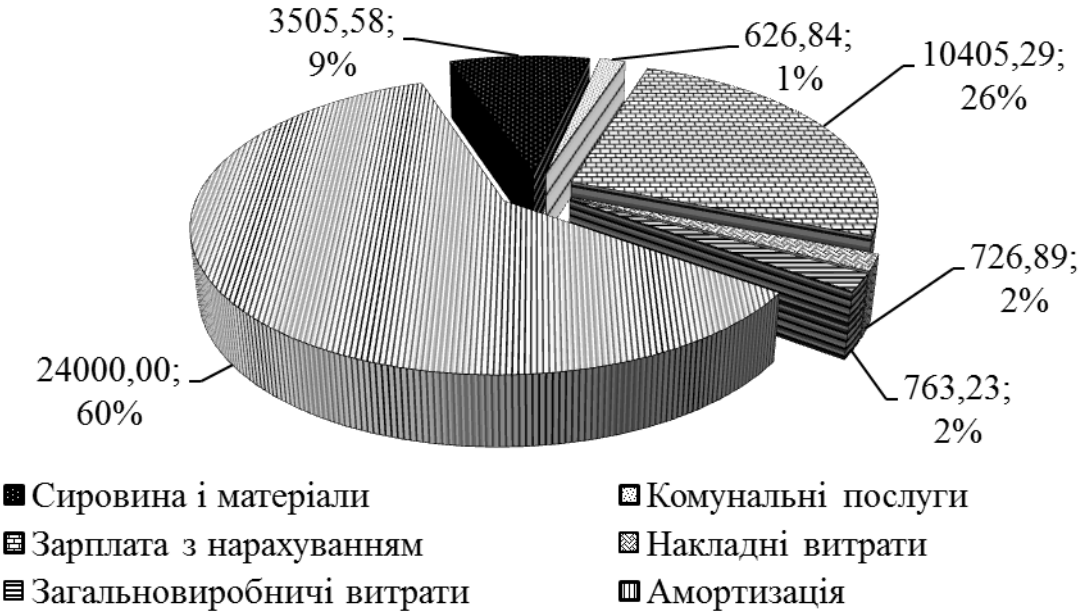

Fig. 2. Structure production costs entomological drug Trichogramma.

To run the production entomological drug Trichogramma necessary starting colony. The initial culture for industrial breeding Trichogramma entomological drug is collected in nature biomaterial (no less than 1500 eggs of insects that were infected trichogramma). Cost of production of entomological drug Trichogramma calculated taking into account the fact that the annual start of mass production of the drug he can not be bought and taken on its own colony, which was introduced in diapause.

To the main raw material used in the production of Trichogramma entomological drug include: paper used to make packages for storing grain moth eggs and Trichogramma; detergents and disinfectants; personal protective equipment; manganese, which is used for disinfection of grain; 3 liters of banks, which diluted trichogramma.

Costs for utilities include: electricity and water used for steam and moisture grain and cleaning of process equipment. The volume of entomological drug for a year does not take into account the amount of Trichogramma goes to diapause and is 400 g

The cost of entomological drug Trichogramma in Ukraine ranges from 20 to 30 hr., Because the calculations were taken the average price - 25 USD. Thus, the cost of production 1 g Entomological drug Trichogramma was 5.53 USD.

Biotechnological production process entomological drug Trichogramma provided an opportunity for profit 10.95 USD. 1 g of the drug produced, and the payback period equipment and facilities while was 4.4 years.

Note that the cost estimates for the production of entomological drug Trichogramma carried out by the final implementation.

The purpose of research is to analyze the efficiency of production and use of entomological drug Trichogramma.

Results. It should be noted that one reason for the partial elimination of the use of the drug Entomological Trichogramma was low logistics means making it easier to move because the chemical plant protection. As a result of these changes need trichogramma began to drop, and laboratory disappear.

At this stage, manufacturers Entomological drugs, most of them engaged in the production of the drug only as a gap formed between the manufacturer of the drug and those who use it as a biological plant protection.

Adding Trichogramma carried out in various ways: manual, which is effective but has lost its relevance in large areas; mechanized method is to use pollinators that are installed on the tractor that goes along the

plot. Today this method is hardly used, as it is time consuming and causes damage entomological material, also refers to this method of settlement Trichogramma capsules [7], using agricultural machinery. The most common in our time is the way to making aviation originally used Antonov An-2 [8], but this method of settlement should be used on fields that have at least 500 m length, and at this stage of biological protection technologies conducted using drones (Fig. 3), airborne electronic system which provides control plane in automatic and radio-controlled flight modes. To operate the drones do not need equipped runway and parking space, which makes it possible to use it much more quickly and efficiently than other means. The use of air entering Trichogramma allows deadlines to process large areas, which is important when dealing with pest / crop. Advantage Aviation way of settlement is that at one time produced trichogramma different terms revival, which increases during its protective effect.

Fig. 3. Unmanned aircraft R-100.

Training Research and Production Laboratory of Biological Plant Protection National University of Life and Environmental Sciences of Ukraine equipped with means for Trichogramma, such as drones, because calculations were performed to determine the cost of production and the introduction of the drug and payback of equipment and facilities, the used (Table . 1).

1. Calculate the cost of producing and making entomological drug Trichogramma.

Indicator	Tariff		Cost of production		
	Ed. measurement	Means-ing	Ed. measurement	Means-ing	Price, UAH.
1	2	3	4	5	6

The main raw materials and components						
Barley		UAH / t	1500,00	t	2	3000,00
Paper		USD / Patsch.	31.50	Patsch.	1	31.50
Detergents and disinfectants:	Washing powder	USD / Patsch.	7.00	Patsch.	5	35,00
	Cute state-poddarske	USD / pcs.	1.98	pcs.	10	19,80
	washing	USD / pcs.	6.66	pcs.	8	53.28
Individual, no protection	kerosene	UAH / bottle.	20,00	Sq.	1	20,00
	gloves	USD / pcs.	12,00	pcs.	10	120.00
	respirators	USD / pcs.	16.50	pcs.	4	66,00
Manganese		USD / g	3.00	g	40	120.00
Banks (3 L)		USD / pcs.	8.00	pcs.	5	40,00

Extension Table. 1

1	2	3	4	5	6
Gasoline	UAH / liter	11.25	l	100	1125.00
Total, UAH					4630.58
Utility payments					
Electricity	USD / kWh	0.62	kW	622	385.64
Water	USD / m3	6	m3	40.20	241.20
In total, USD.					626.84
Salary					
Production preparation	USD / nation-hours	8,73	man-hours.	870	7595.10
Adding the drug	USD / nation-hours	8,73	man-hours.	870	7595.10
Interest on salary	%	37	USD.	7595.10	5620.37
Total labor costs with taxes, UAH.					20810.57
Total direct costs USD.					26067.99
Overhead costs for all	%	5	USD.	26067.99	1303.40
In total, USD.					27371.39
Total expenditures	%	5	USD.	27371.39	1368.57
Total costs USD.					28739.96
Cost of 1 g Trichogramma UAH.					9,91
Depreciation, maintenance, repair and storage costs					
Machinery	%	10	USD.	200000	20000.00
Building construction	%	4	USD.	100000	4000.00
Car	%	10	USD.	80000	8000.00
Unmanned aircraft	%	10	USD.	60000	6000.00

In total, USD.					38000.00
Average price of 1 g of Trichogramma UAH.					25,00
The volume of Trichogramma	g	6266	USD.	25,00	156,650.00
Adding the drug, ferro-monitoring, evaluation, fotosa-sanitary condition of crops	ha	3760	USD.	17,00	63920.00
Total for the production and submission of Trichogramma UAH.					220,570.00
Profit USD.					22,63
Profit after taxation USD.					15,84
Payback period, years					3.0

Costs for production entomological drug Trichogramma, on condition of his making further laboratory staff, added fuel costs for the vehicle by which made visits to farms or enterprises of feromonitorynhu emergence of mass fly pests assessment phytosanitary condition of crops. Also added to the cost of employee salaries, which deals with the introduction of the drug. Before depreciation costs are added to the vehicle and drone.

Thus, the structure of production costs and making entomological drug Trichogramma affected (Fig. 4): depreciation - 57%, wages - 31%, raw materials - 7% and 5% are utilities, overhead and overhead costs

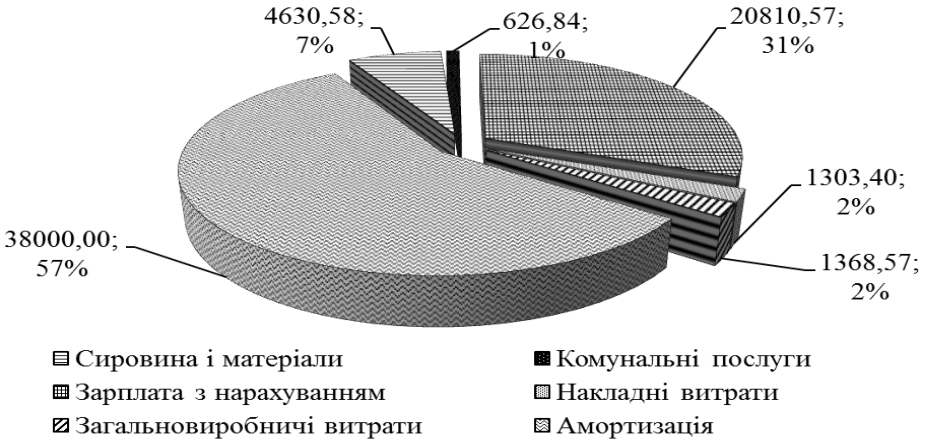

Fig. 4. Structure the cost of producing and making entomological drug Trichogramma.

It should be noted that the calculations on volumes entering drug Trichogramma entomological laboratory staff amounted to 75% of the total output, and the rest went right for implementation for small farms.

Conclusion. Given the cost to make the entomological drug Trichogramma cost of its production was 9,91 USD, and the payback period equipment and facilities is not exceeded 3 years.

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In dannoy Article navedenы byotehnolohycheskyy production process and vnesenyya эntomolohycheskoho drug tryhohramы with the results of the effectiveness and definitions эkonomycheskoy okupaemosty equipment, kotoroe at this yspolzuetsya.

Byotehnolohycheskyy process эntomolohycheskyy drug tryhoramы, sebestoymost, Economic effectiveness.

In given paper are directed production and importation bioprocess entomological specimen trihogramme with outcomes of definition of economic efficiency and pay-back of equipment which is thus used.

Bioprocess, entomological specimen trihogramme, cost price, economic efficiency.

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Review of stationary TERMS AND CHANGE OF ACCIDENTAL normality
RESOURCE machine parameters