

CHARACTERISTICS OF ECONOMIC INDICATORS OF GROWING COMMON CARP X AMUR WILD CARP HYBRIDS OF DIFFERENT GENESIS IN THE CONDITIONS OF INDUSTRIAL HYBRIDIZATION

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Purpose. To determine main indicators of economic efficiency in the cultivation of age-1 common carp x Amur wild carp hybrids of different genesis in the conditions of industrial hybridization.

Methodology. The material for the study were yearlings of common carp x Amur wild carp hybrids produced from age-8 and 9 Amur wild carp males of different genesis. Cultivation of experimental yearlings was carried out in pond conditions of the Lviv Research Station of the Institute of Fisheries of NAAS. The calculations were performed according to generally accepted methods in economics. Analysis of economic efficiency was based on actual indicators of economic activity of the cultivation of yearlings of common carp x Amur wild carp hybrids taking into account current market prices for fish seeds.

Findings. The study identified factors, which affected profit obtained as a result of the production process of growing offspring of new genesis.

The most economically promising hybrids, which were obtained as a result of crossing common carp females and Amur wild carp males of different genesis were identified. Growing yearlings of common carp x Amur wild carp hybrids produced from crossing Galician and Lubin carp females with cryo-males of Amur wild carp allows the company to obtain higher conditional profit (6655 and 7412 UAH) and ensure an increase in profitability up to 27.74-28.12% by reducing a production unit cost to 46.8-47.0 UAH.

Originality. For the first time, the indicators of economic efficiency of growing yearlings of common carp x Amur wild carp hybrids produced from two genetically different groups of brood Amur wild carp (age-8 and 9) were analyzed.

Main indicators of the formation of the cost mechanism in production, which comprehensively characterize the efficiency of resource use and the technical level of the production process, were identified.

The economic expediency of growing yearlings of common carp x Amur wild carp hybrids of different genesis in the conditions of industrial hybridization was proved.

Practical value. Study results have both theoretical and practical importance and can be used in further studies to develop technology for growing common carp x Amur wild carp hybrids of different genesis in modern conditions.

Keywords: yearlings, productivity, cost elements, prime cost, profit, profitability.

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ХАРАКТЕРИСТИКА ЕКОНОМІЧНИХ ПОКАЗНИКІВ ВИРОЩУВАННЯ КОРОПО-САЗАНОВИХ ГІБРИДІВ () РІЗНОГО ГЕНЕЗИСУ В УМОВАХ ПРОМИСЛОВОЇ ГІБРИДИЗАЦІЇ

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Мета. Визначити основні показники економічної ефективності вирощування однорічок коропо-сазанових гібридів різного генезису в умовах промислової гібридизації.

Методика. Матеріалом для досліджень слугували однорічки коропо-сазанових гібридів, отриманих від 8- та 9-річних самців амурського сазана різного генезису. Вирощування дослідних однорічок проводили в ставових умовах Львівської дослідної станції Інституту рибного господарства НААН. Викладені розрахунки здійснено за загальноприйнятими в економіці методиками. Для аналізу економічної ефективності використані фактичні показники господарської діяльності за вирощування однорічок коропо-сазанових гібридів з урахуванням діючої ринкової ціни на рибопосадковий матеріал.

Результати. Встановлено чинники впливу на формування розміру прибутку, отриманого як результат виробничого процесу вирощування об'єктів нового генезису.

Визначено найбільш перспективні в економічному сенсі гібриди, одержані внаслідок схрещування самиць коропа та самців амурського сазана різного генезису. Вирощування однорічок коропо-сазанових гібридів, отриманих від схрещування галицьких і любінських самиць та кріо-самців амурського сазана, за рахунок зниження собівартості одиниці продукції до 46,8–47,0 грн, дозволяє підприємству отримати вищі показники умовного прибутку (6655 та 7412 грн), забезпечуючи зростання рівня рентабельності до 27,74–28,12%.

Наукова новизна. Вперше проаналізовано показники економічної ефективності вирощування однорічок коропо-сазанових гібридів, отриманих від двох генетично різних груп плідників амурського сазана у віці восьми та дев'яти років.

Визначено основні показники формування витратного механізму при виробництві, що комплексно характеризують ефективність використання ресурсів та технічний рівень виробничого процесу.

Доведено економічну доцільність вирощування однорічок коропо-сазанових гібридів різного генезису в умовах промислової гібридизації.

Практична значимість. Результати досліджень мають як теоретичне, так і практичне значення, та можуть бути використані в подальших дослідженнях щодо розроблення технології вирощування коропо-сазанових гібридів різного генезису в сучасних умовах.

Ключові слова: однорічки, продуктивність, елементи витрат, собівартість, прибуток, рентабельність.



ХАРАКТЕРИСТИКА ЭКОНОМИЧЕСКИХ ПОКАЗАТЕЛЕЙ ВЫРАЩИВАНИЯ КАРПО-САЗАНЬИХ ГИБРИДОВ РАЗЛИЧНОГО ГЕНЕЗИСА В УСЛОВИЯХ ПРОМЫШЛЕННОЙ ГИБРИДИЗАЦИИ

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Цель. *Определить основные показатели экономической эффективности выращивания годовиков карпо-сазаньих гибридов различного генезиса в условиях промышленной гибридизации.*

Методика. *Материалом для исследований послужили годовики карпо-сазаньих гибридов, полученных от 8- и 9-летних самцов амурского сазана различного генезиса. Выращивание исследуемых годовиков проводили в условиях прудов Львовской опытной станции Института рыбного хозяйства НААН. Изложенные расчеты проведены в соответствии с общепринятыми в экономике методиками. Для анализа экономической эффективности использованы фактические показатели хозяйственной деятельности при выращивании годовиков карпо-сазаньих гибридов с учетом действующей рыночной цены на рыбопосадочный материал.*

Результаты. *Установлены факторы, влияющие на формирование размера прибыли, полученной в результате производственного процесса выращивания объектов нового генезиса.*

Определены наиболее экономически перспективные гибриды, полученные в результате скрещивания самок карпа и самцов амурского сазана различного генезиса. Выращивание годовиков карпо-сазаньих гибридов, полученных путем скрещивания галицийских и любеньских самок и крио-самцов амурского сазана, за счет снижения себестоимости единицы продукции до 46,8–47,0 грн, позволяет предприятию получить высокие показатели условной прибыли (6655 и 7412 грн), обеспечивая увеличение уровня рентабельности до 27,74–28,12%.

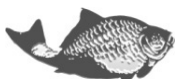
Научная новизна. *Впервые проанализированы показатели экономической эффективности выращивания годовиков карпо-сазаньих гибридов, полученных от двух генетически различных групп производителей амурского сазана в возрасте восьми и девяти лет.*

Определены основные показатели формирования затратного механизма при производстве, комплексно характеризующие эффективность использования ресурсов и технический уровень производственного процесса.

Доказана экономическая целесообразность выращивания годовиков карпо-сазаньих гибридов различного генезиса в условиях промышленной гибридизации.

Практическая значимость. *Результаты исследований имеют как теоретическое, так и практическое значение, и могут использоваться в дальнейших исследованиях относительно разработки технологии выращивания карпо-сазаньих гибридов различного генезиса в современных условиях.*

Ключевые слова: *годовики, продуктивность, элементы затрат, себестоимость, прибыль, рентабельность.*



PROBLEM STATEMENT AND ANALYSIS OF LAST ACHIEVEMENTS AND PUBLICATIONS

The costs of production and sale of products (works, services) occupy an important place among the components of the financial activities of enterprises. Regardless of the ownership forms, each company, while maximizing financial results, develops different measures to minimize costs. However, the variable tendency of the Ukrainians legislative field, which is inherent in the market conditions of the economy, as well as the negative impact of financial crisis, constantly infringe the financial strategy of the enterprise's development. Therefore, at present, the problem of reducing costs, which should take place at the enterprise through the implementation of measures of minimization, has become important [1].

The classic ways to reduce the cost mechanism at an enterprise are: introduction of new progressive technologies, compliance with the norms and standards for the use of raw materials and supplies, increase in the technical level of production, improvement in material and technical support, improvement in product quality, change in the structure and range of products and other ways to intensify production.

The search for ways to solve the issue of the mechanism of cost effectiveness, the economic efficiency of production is perhaps the most important factor that determines the feasibility of certain improvements in the production process. In addition, introduction of new, more efficient technologies in fish farming, especially in a free market economy, requires any farm to be profitable, providing the owner with a profit. At the same time, having no influence on the final cost of products, which is determined by complex market forces, the owner is able to influence the level of production costs. [1].

HIGHLIGHT OF THE EARLIER UNRESOLVED PARTS OF THE GENERAL PROBLEM. AIM OF THE STUDY

The basis for the high performance of fish farms is the level of use of the object for growing, which is maximally adapted to local environmental conditions and fish farming technology. Application of such new technological combinations in cultivation, as crossing of age-8 and age-9 Amur wild carp males of different genesis, in particular, reproduced from defrosting sperm, with Galician framed and Lubin scaly females, which are strains of the common carp, makes it possible to significantly increase the efficiency of using the natural bioproduction potential of ponds, improve quality of marketable products, really increase the profitability of production.

In order to confirm the feasibility of using the proposed technological improvements for the cultivation of common carp x Amur wild carp hybrids of a new genesis under industrial hybridization conditions, we attempted to analyse the main factors of the formation of a costly production mechanism when growing yearlings of common carp x Amur wild carp hybrids obtained from two genetically different groups of age-8 and age-9 brood Amur wild carp, its effectiveness and impact on the financial results of the enterprise.

MATERIALS AND METHODS

Experimental works were conducted at the State Enterprise «Experimental Fish Farm of Lviv Research Station» of the Institute of Fisheries of the National Academy of



Agrarian Sciences which is located in the Velykyi Lyubyn village, Horodok district, Lviv region. The enterprise is located in the forest-steppe zone, and the source of water supply is surface water from precipitation and water of the Vereschitsya river [2]. The object of the study were yearlings of common carp x Amur wild carp hybrids produced from two genetically different groups of age-8 and age-9 brood Amur carp. The first group are the descendants of the broodstock, which was brought to the «Experimental fish farm of Lviv Research Station» from the Lake Khanka (Amur River basin) in the 1970-80s and have undergone eight generations of reproduction [3]; the second group (experimental, cryo-carp) are fish obtained from the sperm of carp reproduced from defrosted sperm ($n = 15$) [4]. This sperm was obtained from males caught in the Amur River basin, cryopreserved on June 21–23, 1987 at a thermal fish farm of the Luchegorsk hydroelectric power station of the Khabarovsk Krai [5]. Males of age-8 Amur wild carp were crossed with Galician framed females, while 9-year-old males were crossed with Lubin scaly ones. As a result four experimental groups of young-of-the-years were produced:

♀C_G♂A_LY – young-of-the-years produced from crossing Galician framed females with Amur wild carp males of local origin;

♀C_G♂A_CY – young-of-the-years produced from crossing Galician framed females with Amur wild carp cryo-males;

♀C_L♂A_LY – young-of-the-years produced from crossing Lubin scaly females with Amur wild carp males of local origin;

♀C_L♂A_CY – young-of-the-years produced from crossing Lubin scaly females with Amur wild carp cryo-males.

Production of offspring and further growing of young-of-the-years and yearlings was carried out in breeding and wintering ponds, respectively, in compliance with all pond aquaculture standards, in accordance with generally accepted guidelines for fish farming [6].

The calculation of the economic efficiency of growing yearlings of common carp x Amur wild carp hybrids of different genesis was carried out in accordance with the recommendations of I.L. Friedman and S.Z. Moshensky [7, 8]. Calculations were performed according to generally accepted methods in economics.

The subject of the analysis of efficiency of work are actual economic indicators of economic activity during cultivation of yearlings of common carp x Amur wild carp hybrids, taking into account the operating market price for fish seeds.

The basis of the detailed study is the formation of the prime cost of product obtained during the work. The prime cost includes the main costs associated with the production of products at aquaculture enterprises [9].

The analysis of the efficiency of growing yearlings of common carp x Amur wild carp hybrids is based on the cost per one ha of experimental ponds.

For a detailed and in-depth study of the formation of individual costs and identification of reserves for their reduction in the cultivation of yearlings of common carp x Amur wild carp hybrids, we determined their structure, the share of individual



cost elements in total and estimated their changes over the growing period, which was calculated as the ratio of individual cost elements to total costs [10]:

$$S_c = \frac{C_e}{A_e} \cdot 100\%, \text{ where:}$$

S_c — share of costs, %;

C_e — cost elements, UAH ;

A_e — amount of expenses, UAH.

When calculating the profitability of growing yearlings of common carp x Amur wild carp hybrids of different genesis, we used the following formula, which characterizes the efficiency of work performed, costs consumed in the production process:

$$L = \frac{N}{C} \cdot 100\%, \text{ where:}$$

L — profitability level, %;

N — net profit, UAH;

C — costs related to fish cultivation, UAH.

Mathematical calculations were performed in "MS Excel".

STUDY RESULTS AND THEIR DISCUSSION

Functioning of fish farms in market conditions highlights the problem of rational use of resources, radical improvement of cost management in order to increase the competitiveness of fish products. The costs incurred in production form the cost of production and are an indicator of the business entity.

The more economically the company uses material, labour and financial resources in the manufacture of products, the more efficient the production process, the greater the profit and the level of profitability. Achieving the optimal level of costs will ensure the production of competitive products, and therefore production costs are a major factor in pricing and profit generation.

The basis of production by fisheries enterprises is the level of use of available resources, fixed assets. The main condition for their rational use is the intensification of fish farming at all technological stages of production. Production efficiency is directly dependent on the level of its intensification. This factor directly affects the growth of volumes, improving quality, reducing unit costs.

Material, labour, land and water resources form the basis of table fish farming, they are partially or completely consumed, and their value is transferred to the newly created products. The cost of consumed and transferred to the production of production resources and is the cost of production [11]. These include labour and material costs, namely artificial feed and other costs associated with the sale of marketable products and the maintenance of ponds. All of them constitute the cost of production, which is an indicator that comprehensively characterizes the efficiency of all resources and the technical level of the production process [12] (table 1).

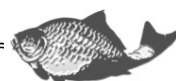


Table 1. Calculation of the cost of growing yearlings of common carp x Amur wild carp hybrids

Expense items	Experimental groups			
	♀C _G ♂A _L Y	♀C _G ♂A _C Y	♀C _L ♂A _L Y	♀C _L ♂A _C Y
Remuneration, UAH / ha	2150	2150	2300	2300
Expenditures on social benefits, UAH / ha	430	430	460	460
Fish feed, UAH / ha	15630	16386	17290	19012.5
Other expenses, UAH / ha	4697	4697	5000	5000
Total costs, UAH / ha	22907.0	23663.0	25050.0	26772.5

Table 1 shows the calculation of items, basic or direct costs of production costs. The calculations were carried out taking into account the same production conditions, so the cost of growing yearlings was characterized by almost the same amounts by cost items in each group of yearlings obtained from Galician and Lubin common carp x Amur wild carp hybrids with a difference in the cost of fish feeds.

The main role in the cost of yearlings was the cost of the fish feed. There have been significant changes in their value. It increased with each subsequent experimental group. Thus, the rate of increase in costs in each group was 4.8–10.0%, which significantly affected the prime cost, while the share of actual costs in the prime cost reached 68.23–71.02% (Table 2).

Table 2. The structure of costs for growing yearlings of common carp x Amur wild carp hybrids, %

Indicators	Experimental groups			
	♀C _G ♂A _L Y	♀C _G ♂A _C Y	♀C _L ♂A _L Y	♀C _L ♂A _C Y
Wages	9.39	9.09	9.18	8.59
Expenditures on social benefits	1.88	1.82	1.84	1.72
Fish feed	68.23	69.25	69.02	71.02
Other expenses	20.50	19.85	19.96	18.68
Total costs	100	100	100	100

If the costs increased by 3382.5 UAH/ha, the rate of change of its share in the groups was 1.0-1.5%, which indicated an increase in labour productivity in production [8].

Labour costs and their remuneration were the second largest and most important indicator that affected the level of costs in production, including in fish farming. The level of labour costs indicates the level of labour productivity, and their rational use affects the growth of productivity and reduces production costs. Thus, the share of labour costs and social benefits in the cost of growing yearlings for all experimental groups was 10–11%, with a difference in value between the groups of 180.0 UAH/ha. Despite an increase in the cost of labour costs and social benefits, their share decreased with each subsequent experimental group from 9.39 to 8.59% for wages and from 1.88 to 1.72% for social benefits, which characterizes changes in the complexity of the product and in these experiments indicates its growth.

Other costs in the cost of production, which do not transfer their value directly to production, but can be attributed to a specific cost object, are the cost of treatment and



prevention measures, repair of hydraulic structures, water use tax, marketing and logistics and others material costs. The amount for each of these articles is partially attributed to the products grown during the study period. The calculations are based on labour costs. The share of other costs in the cost was 18.68–20.50%, with a decrease in each subsequent experimental group of cultivation, and with a difference in costs in value terms at the level of 303 UAH/ha.

Recently, the aquaculture enterprise pays special attention to the development of marketing and production logistics. The owner constantly monitors sales of table fish. At the time of sale, the owner monthly pays for advertising and runs the own store. The costs of this services on average are 3% of total production costs.

Table 2 shows the structure of costs incurred during the cultivation of yearlings of common carp x Amur wild carp hybrids of different genesis, the change in the share of each element in the determined total costs.

In the prime cost of growing yearlings with the maximum value of the amount of consumed costs (26772.5 UAH/ha), the maximum was the value of the share of feeds (71.02%) and the lowest was the value of other shares of cost elements – 8.59; 1.72 and 18.68%, respectively. In the group where the minimum value of the amount of costs was 22907.0 UAH/ha, the lowest was the share of feed costs (68.23%), all other costs had the highest values among the experimental groups – 9.38; 1.88 and 20.50%, respectively.

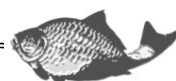
Profit and income are important generalizing indicators of economic efficiency of an enterprise. Under the conditions of the enterprise, the amount of profit or income should be sufficient for settlements with the state and employees of the enterprise, the creation of the necessary savings of the enterprise for the implementation of production expanded reproduction. Therefore, everyone is interested in increasing profits (increasing profitability).

Comprehensive analysis of profits and incomes is one of the important means of finding reserves to improve the efficiency and quality of work, strengthen the financial condition and the whole economy of an enterprise [13].

In order to confirm the feasibility of work on the cultivation of yearlings of common carp x Amur wild carp hybrids as a result of crossing common carp females with Amur wild carp males of different genesis, we identified and analysed the financial results of enterprise's economic activity (Table 3).

Table 3. Financial results of cultivation of yearlings of common carp x Amur wild carp hybrids

Indicators	Experimental groups			
	☉C _G :A _L Y	☉C _G :A _C Y	☉C _L :A _L Y	☉C _L :A _C Y
Produced yearlings, kg/ha	485.2	505.3	507.9	568.9
Revenue from a conditional sale, UAH/ha	29112	30318	30474	34134
Sales price of 1 kg of yearlings, UAH	60	60	60	60
Product prime cost, UAH/ha	22907	23663	25050	26722
Prime cost of 1 kg of yearlings, UAH	47.2	46.8	49.3	47.0
Contingent income, UAH/ha	6205	6655	5424	7412
Profitability level, %	27.09	28.12	21.65	27.74



The sum of financial results, according to table 3, indicates the efficiency of growing yearlings in all experimental groups, and the level of profitability corresponds to the average efficiency of growing carp of other genesis. Thus, the efficiency of growing yearlings obtained from crossing Antoninsko-Zozulenets and Lubin framed carp was 30.0–33.7% [14]. It should be noted that the decrease in profitability of about 10.0% when growing yearlings in the experimental groups was due to fish wintering.

The highest value of the level of profitability (28.12%) of the work was achieved in the group of crossing females of Galician framed carp with cryo-males of Amur wild carp. This group was characterized by the lowest cost of growing 1 kg of yearlings (46.8 UAH/kg) with a fairly high absolute rate of conditional profit (6655.0 UAH/ha) with low productivity among other experimental groups (505.3 kg/ha).

Given that fish productivity, as one of the important fishery and economic indicators of management, summarizes and affects the level of the enterprises economic indicators, the efficiency of pond fish farming, financial results of the work indicate that the most efficient in cultivation is a group of yearlings obtained from crossing females of Lubin scaly carp and cryo-males of Amur wild carp. The productivity of the obtained yearlings was the highest (568.9 kg/ha), the prime cost of cultivated products was the average in value (47.0 UAH/kg) among the experimental groups, and the profit and profitability indicators were practically the highest – 7412 UAH/ha and 27.74%, respectively.

CONCLUSION AND PERSPECTIVES OF FURTHER DEVELOPMENT

According to the calculations results, the cultivation of new genesis carp obtained from crossing two genetically different groups of age-8 and age-9 brood Amur wild carp, is economically feasible and can be used as an additional source of profit in the enterprises work.

Despite a significant amount of material costs involved in the production process (88.7–89.7%), especially in terms of feed costs (68.23–71.02%), this allows the farm to receive from 6205 to 7412 UAH/ha of conditional profit from growing common carp x Amur wild carp hybrids of various genesis and provide the enterprise with a sufficiently high level of production profitability in the amount of 21.65–28.12%.

The most cost-effective in cultivation are yearling hybrids produced from crossing females of Galician and Lubin carps with cryo-males of Amur wild carp. Due to the obtained high productivity of products (505.3 and 568.9 kg/ha) and a decrease in its prime cost (46.8 and 47.0 UAH/ha), the amount of the enterprise's profit increased by 6655 and 7412 UAH/ha, and the value of production profitability increased to 27.74–28.12%.

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