ANIMAL SCIENCE AND FOOD TECHNOLOGY

Journal homepage: https://animalscience.com.ua/en
Animal Science and Food Technology, 15(4), 25-35
Received 26.07.2024 Revised 28.10.2024 Accepted 27.11.2024

UDC (639.3.032:597-116):639.371.52
DOI: 10.31548/animal.4.2024.25

Fishery and biological evaluation of breeders of Galician and scaleless inbred types of the Ukrainian frame breed carp

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Abstract. Identifying the most optimal combinations of existing carp breeds enables achieving a desirable balance between growth, development, reproductive performance, resistance to various disease agents, and adaptability to cultivation conditions. Therefore, this study aimed to conduct a fishery and biological evaluation of breeders belonging to the Galician and the newly developed scaleless Lebedyn factory line inbred types of the Ukrainian frame carp breed. The research was carried out at the state enterprise Experimental Farm "Nyvka". For the evaluation of external and productive characteristics, breeders of the Galician and scaleless Lebedyn factory line inbred types of the Ukrainian frame carp breed were selected. Based on measurement indicators, selection indices were calculated, including the condition factor, relative mass index, body length-to-height ratio, girth index, head index, and body thickness index. For the reproductive assessment of females, individual working fecundity and the average egg weight were measured. An analysis was conducted on the characteristics of male sexual products, including ejaculate volume, overall motility, the proportion of spermatozoa exhibiting linear progressive and circular movements, and the percentage of non viable spermatozoa. The findings revealed that females of the scaleless and Galician types demonstrated superior high-backed indices and relatively smaller heads based on morphological traits. However, no significant differences were observed in critical parameters such as body mass, body length-to-height ratio, and condition factor. Under factory reproduction conditions, females of both inbred types exhibited positive responses to hormonal stimulation. Fertility indicators for Galician-type females showed a working fecundity range of 476.0-576.0 thousand eggs, with an average relative fecundity of 89.55 ± 2.25 thousand eggs/kg. In scaleless females, working fecundity ranged from 372.0 to 543.6 thousand eggs, with an average

Suggested Citation:
Kolesnyk, R. (2024). Fishery and biological evaluation of breeders of Galician and scaleless inbred types of the Ukrainian frame breed carp. *Animal Science and Food Technology*, 15(4), 25-35. doi: 10.31548/animal.4.2024.25.

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relative fecundity of 74.83 ± 2.89 thousand eggs/kg. The practical significance of these findings lies in their application to further research on the cultivation and performance evaluation of hybrid offspring produced through reciprocal crossbreeding, compared to the original forms

Keywords: Lebedyn factory line; carp external appearance; reproductive indicators; selective breeding in fish farming

Introduction

In 2021, the Food and Agriculture Organization of the United Nations (FAO, 2024b) adopted the "Blue Transformation" program, a key priority enshrined in the FAO Strategic Programme for 2022-2031. This program aims to maximise the potential of aquatic resources to ensure food security and to sustain these achievements for the continued sustainable development of aquaculture as a sector. According to FAO production data on aquaculture, published in March 2024 reports, 731 statistical units, technically identified as species of aquatic organisms cultured in aquaculture, were reported, which is more than the 652 units reported in 2022. The list includes 564 species identified at the species level and 7 interspecific hybrids; 99 groups of species identified at the genus level and 61 groups identified at the family level or higher. Given this biodiversity of aquatic organisms cultured in aquaculture, carp accounted for approximately 51.6% (31,788 thousand tonnes) in 2022 (FAO, 2024a).

Carp has been a dominant aquaculture species in Ukraine for centuries, with records of its cultivation dating back to the 14th-16th centuries (Hrytsynyak *et al.*, 2021). Scientifically based selective breeding of local Ukrainian carp populations began in earnest between 1927 and 1930, initiated by O. Kuzoma (Grynzhevsky & Sherman, 2006; Martseniuk & Martseniuk, 2021). Consequently, scientific research into the selective breeding of Ukrainian carp has been ongoing for nearly a century. These studies aim to improve the productive traits of carp through cross-breeding individuals with not only desirable characteristics but also maximal genetic diversity, a strategy that remains relevant today (Gjedrem & Baranski, 2009; Janssen *et al.*, 2017; Kurinenko *et al.*, 2024). The technological approaches to fish farming (intensification level) and reproductive strategies (natural or induced spawning) impose specific requirements on the expression of economically important traits in selected breeding units, as highlighted by C. Boyd *et al.* (2020). For instance, research on Nesvych carp has yielded impressive results in terms of growth and reproductive performance, which, coupled with resistance to *Aeromonas*, could be used as a breed characteristic, as noted by H. Kurinenko *et al.* (2024).

The Galician inbred type of the Ukrainian frame carp breed is characterised by key selective traits such as winter hardiness (87%) and fecundity (1,181 thousand eggs at 6-8 years of age). Conversely, the genetic basis of the scaleless carp from the Lebedyn factory line provides high productive qualities, including rapid growth, vitality, high fecundity, early maturation, winter hardiness, and resistance to bacterial diseases. Moreover, the scaleless carp type, according to the Ministry of Agrarian Policy order No. 24/4, 2010, meets all European standards for market appearance – a meaty body, body length-to-height ratio, and scaleless. Therefore, the parental broodstocks are characterised by improved productive traits and increased resistance of offspring to adverse environmental factors. Building on the previous research of the research team at the Institute of Fisheries of the National Academy of Agrarian Sciences of Ukraine on the aforementioned selective stocks, the author of this study aims to conduct a fishery and biological evaluation of breeders of the Galician and new scaleless Lebedyn factory line inbred types of the Ukrainian frame carp breed and to assess their combining ability in terms of heterosis expression under reciprocal crosses in the offspring. Simultaneously, the study aimed to develop practical applications of current data on the genetic characteristics of structural units of Ukrainian carp breeds in breeding and commercial fish farming.

Materials and Methods

The research was conducted at the state enterprise Experimental Farm "Nyvka", located in the Polissia region of Ukraine, between 2023 and 2024. For the assessment of external appearance and productive traits, breeders (8 females and 10 males) of the Galician (GFC) and scaleless Lebedyn factory line (SLFL) inbred types of the Ukrainian frame carp (*Cyprinus carpio*) were selected. In spring, the wintering ponds were drained, and the experimental groups were inventoried. Galician frame carp breeders were tagged with electronic intramuscular tags on the left side under the dorsal fin.

Following individual assessment, the broodstock of the parental forms underwent morphometric and reproductive evaluation. Fisheries indicators were determined according to the guidelines for conducting selective breeding work with pond fish (Tomilenko *et al.*, 1995). The assessment of breeders for morphometric traits was carried out during bonitation, and for reproductive traits during the spawning season.

The following measurements were used as external appearance indicators:

W, kg – body weight of the individual fish;

l, cm – body length from the tip of the snout to the beginning of the caudal fin ray rosette;

C, cm – head length from the tip of the snout to the end of the gill cover;

H, cm – maximum body height of the individual fish;

O, cm – body girth at the highest point of the body of the individual fish;

Br, cm – maximum body width.

Based on the measurements, the following selection indices were calculated: condition factor (C_F), relative weight index (*W/l*), body length-to-height ratio (*l/H*), girth index (*l/O*), head index (*l/C*), and body thickness index (*l/Br*). For the reproductive assessment of females, individual fecundity and average egg weight were measured (Martseniuk & Martseniuk, 2020). For a more comprehensive characterisation of females, V. Nikandrov & N. Shindavina (1995) proposed using the reproductive index, which serves as an integrated indicator measured by the ratio of the total weight of the selected eggs to the unit body weight of the female. Egg density was calculated using the formula of V. Zhukinsky & I. Dyachuk (1964):

$$d = \frac{6P}{\pi D^3}, \qquad (1)$$

where *d* is the egg density, mg/mm^3; *P* is the egg weight, mg; *D* – egg diameter, mm.

Egg size and weight were determined using a standard method in ichthyology: samples were fixed in a 4% formalin solution. For the reproductive assessment of males, a microscope connected to a computer with the Sperm Vision program was used. Analysis of male reproductive products included: ejaculate volume, overall activity, percentage of spermatozoa with progressive linear and circular movements, and percentage of non-viable spermatozoa. Kinetic parameters of spermatozoa were determined using the computer-assisted sperm analysis (CASA) system Sperm Vision by setting the parameters of sperm movement (Yaremchuk & Sharan, 2012; Özgür & Okumuş, 2019).

For the biometric processing of the obtained data, MS Excel 2016 was used with built-in statistical functions. In the process of processing experimental data, the following were calculated: *M* (arithmetic mean) and ± *m* (standard error of the mean), σ (standard deviation), and C_V (coefficient of variation). The following symbols were used in the table to denote the level of significance: t_d (Student's t-test) and P (probability) (Mincer *et al.*, 1991): P ⩽ 0.95, P ⩾ 0.95, P ⩾ 0.99 compared to the control group.

Results and Discussion

In selective breeding to improve the qualities of inbred types of scaleless carp, the assessment of their external appearance measurements plays a crucial role. Comparing the main external appearance characteristics provides an opportunity to determine whether there are significant differences between the breeders of the Galician and scaleless Lebedyn factory line inbred types of the Ukrainian freme carp. During bonitation (Table 1), it was found that the average weight of SLFL females was 6.09 kg. The minimum weight of a female was 5.4 kg, and the maximum was 7.2 kg. The weight of GFC females was 5.84 kg, ranging from 5.1 to 6.2 kg.

According to Table 1, there is a significant difference in certain external appearance characteristics between SLFL and GFC female carp, specifically in the body length-to-height ratio, head index, and thickness index. Table 2 also shows a significant difference in the external appearance characteristics of male SLFL compared to male GFC in terms of commercial length and thickness index.

Table 1. *Weight and external appearance characteristics of female carp (n = 8)*

Indicator		Origin		t_d	P
		SLFL	GFC		
Weight (*W*), kg	$M \pm m$	6.10 ± 0.20	5.84 ± 0.19		
	σ	0.56	0.54	0.85	⩽0.95
	C_V, %	9.22	9.24		
Commercial length (*l*), cm	$M \pm m$	57.75 ± 0.80	57.70 ± 1.02		
	σ	2.25	2.88	0.00	⩽0.95
	C_V, %	3.9	4.98		
Condition factor (C_F)	$M \pm m$	3.16 ± 0.09	3.04 ± 0.11		
	σ	0.26	0.31	0.81	⩽0.95
	C_V, %	8.07	10.17		
Relative weight index (*W*/*l*), g/cm	$M \pm m$	105.31 ± 2.53	101.00 ± 2.38		
	σ	7.16	6.73	1.16	w⩽0.95
	C_V, %	6.79	6.66		
Body length-to-height ratio (*l*/*H*)	$M \pm m$	2.64 ± 0.06	2.83 ± 0.04		
	σ	0.18	0.10	2.39	**⩾0.95**
	C_V, %	6.90	3.61		
Girth index (*l*/*O*)	$M \pm m$	1.12 ± 0.03	1.17 ± 0.01		
	σ	0.11	0.04	1.22	⩽0.95
	C_V, %	2.69	3.49		
Head index (*l*/*C*)	$M \pm m$	4.37 ± 0.08	3.89 ± 0.06		
	σ	0.23	0.17	4.48	**⩾0.99**
	C_V, %	5.27	4.25		
Thickness index (*l*/*Br*)	$M \pm m$	5.23 ± 0.13	4.65 ± 0.07		
	σ	0.37	0.21	3.65	**⩾0.99**
	C_V, %	7.09	4.43		

Note: $M \pm m$ – arithmetic mean and standard error; σ – standard deviation; C_V – coefficient of variation; t_d – Student's t-test criterion; P – probability

Source: compiled by the author based on the method by O. Mincer *et al.* (1991)

Table 2. *Weight and external appearance characteristics of male carp (n = 10)*

Indicator		Origin SLFL	Origin GFC	t_d	P
Weight (W), kg	$M \pm m$	4.47 ± 0.13	4.85 ± 0.16		
	σ	0.41	0.50	1.78	≤0.95
	C_V, %	9.24	10.33		
Commercial length (l), cm	$M \pm m$	52.1 ± 0.58	54.2 ± 0.53		
	σ	1.85	1.69	2.48	**≥0.95**
	C_V, %	3.54	3.11		
Condition factor (C_F)	$M \pm m$	3.16 ± 0.09	3.04 ± 0.006		
	σ	0.30	0.20	0.96	≤0.95
	C_V, %	9.36	6.70		
Relative weight index (W/l), g/cm	$M \pm m$	85.59 ± 2.10	89.35 ± 2.31		
	σ	6.63	7.30	1.14	≤0.95
	C_V, %	7.75	8.18		
Body length-to-height ratio (l/H)	$M \pm m$	2.76 ± 0.03	2.74 ± 0.03		
	σ	0.11	0.09	0.08	≤0.95
	C_V, %	3.99	3.29		
Girth index (l/O)	$M \pm m$	1.13 ± 0.05	1.07 ± 0.04		
	σ	0.11	0.09	0.03	≤0.95
	C_V, %	9.48	8.58		
Head index (l/C)	$M \pm m$	3.91 ± 0.05	3.90 ± 0.04		
	σ	0.5	0.13	0.08	≤0.95
	C_V, %	3.96	3.27		
Thickness index (l/Br)	$M \pm m$	5.13 ± 0.15	4.32 ± 0.10		
	σ	0.47	0.31	4.35	**≥0.99**
	C_V, %	9.11	7.12		

Note: $M \pm m$ – arithmetic mean and standard error; σ – standard deviation; C_V – coefficient of variation; t_d – Student's t-test criterion; P – probability

Source: compiled by the author based on the method by O. Mincer *et al.* (1991)

Therefore, the results of the study have shown that SLFL and GFC females have higher body length-to-height ratio indices and smaller head indices. However, no significant differences were found in important parameters such as weight, condition factor, and body length-to-height ratio.

The development of the reproductive system in carp is determined by both genetic factors and environmental influences (Martseniuk & Martseniuk, 2021). It is known that temperature plays a key role in this process. For example, according to I. Valdebenito *et al.* (2015), in southern regions with a hot climate, carp mature much faster and at a significantly lower individual weight than in northern regions with a cooler climate and shorter growing season. At the same time, sexual maturation in carp is accompanied by a slowdown in growth rate. According to research by Y. Tuchapskyy (2013) in the Forest-Steppe zone, the turning point in the maturity coefficient for frame carp females occurs only in the fourth year of life. At this time, the period of trophoplasmic growth of the gonads ends, and their mass in four-year-olds reaches 20.6% of the body weight.

In all the females studied, the gonads were at Stage IV of maturity and, under favourable weather conditions, successfully spawned under controlled reproduction conditions (Table 3). All responded positively to hormonal stimulation. The fecundity indices for GFC females were as follows: absolute fecundity ranged from 476,000 to 576,000 eggs, and relative fecundity averaged 89.55 ± 2.25 thousand eggs/kg. In SLFL females, absolute and relative fecundity ranged from 372,000 to 543,600 eggs and 74.83 ± 2.89 thousand eggs/kg, respectively. A significant difference ($P \geq 0.95$) was observed in the weight of selected eggs, with 678.0 ± 16.25 g for GFC compared to 588.0 ± 38.94 g for SLFL. For relative fecundity and reproductive index, a high level of significant difference was also observed at $P \geq 0.99$ in favour of GFC females. The egg density in SLFL females at 0.75 ± 0.03 mg/mm³ was slightly higher than that in GFC females – 0.68 ± 0.01 mg/mm³, but the difference was not significant.

Table 3. *Characteristics of reproductive indices of female carp (n = 5)*

Indicator		**Origin**		t_d	P
		GFC	**SLFL**		
Weight (W), kg	$M \pm m$	5.84 ± 0.223	6.12 ± 0.25		
	σ	0.51	0.56	0.73	≤0.95
	C_V, %	8.86	9.22		
Mass of selected eggs, g	$M \pm m$	678.0 ± 16.25	588.0 ± 38.94		
	σ	36.33	87.10	1.91	**≥0.95**
	C_V, %	5.36	14.81		
Working fecundity, thousand eggs	$M \pm m$	522.4 ± 22.0	459.1 ± 30.15		
	σ	49.33	67.42	1.52	≤0.95
	C_V, %	9.44	14.68		
Relative working fecundity, thousand eggs/kg	$M \pm m$	89.55 ± 2.25	74.83 ± 2.89		
	σ	5.02	6.47	3.59	**≥0.99**
	C_V, %	5.61	8.65		
Reproductive index, %	$M \pm m$	11.65 ± 0.26	9.59 ± 0.440		
	σ	0.59	0.90	3.80	**≥0.99**
	C_V, %	5.07	9.42		
Egg weight, mg	$M \pm m$	1.30 ± 0.04	1.28 ± 0.04		
	σ	0.09	0.8	0.35	≤0.95
	C_V, %	6.55	6.12		
Egg diameter, mm	$M \pm m$	1.54 ± 0.01	1.49 ± 0.03		
	σ	0.02	0.07	1.48	≤0.95
	C_V, %	1.59	4.63		
Egg density, mg/mm³	$M \pm m$	0.68 ± 0.01	0.75 ± 0.03		
	σ	0.03	0.07	1.79	≤0.95
	C_V, %	4.87	9.26		

Note: $M \pm m$ – arithmetic mean and standard error; σ – standard deviation; C_V – coefficient of variation; t_d – Student's t-test criterion; P – probability

Source: compiled by the author based on the method by O. Mincer *et al.* (1991)

In selective breeding, the evaluation of breeders based on sperm quality and fertilisation ability is crucial (Kuts *et al.*, 2021). The quality of male sexual products is one of the most important factors ensuring successful fertilisation and subsequent embryo development. The study of sperm motility has become widely used in reproduction technology, as this method allows for the determination of the quality of the obtained gametes, the timely detection of anomalies, and the prevention of inefficient fertilisation (Fauvel *et al.*, 2010). Among current research, a relevant direction is the study of the quality characteristics of sperm concentration, sperm density, and sperm activity (motility). The weight of the studied GFC males ranged from 5.2 to 6.1 kg (average 5.52 ± 0.16 kg), and for SLFL males, it was 4.5 to 5.6 kg (average 5.02 ± 0.22 kg) (Table 4).

Table 4. *Characteristics of reproductive indices of male carp (n = 5)*

Indicator		Origin		t_d	P
		GFC	SLFL		
Weight (*W*), kg	$M \pm m$	5.52 ± 0.16	5.02 ± 0.22		
	σ	0.37	0.50	1.61	⩽0.95
	C_V, %	6.62	9.90		
Ejaculate volume, mm³	$M \pm m$	14.74 ± 0.65	15.62 ± 0.90		
	σ	1.46	2.10	0.71	⩽0.95
	C_V, %	9.87	12.88		
Overall activity, %	$M \pm m$	87.20 ± 1.36	87.60 ± 1.33		
	σ	3.03	22.97	0.19	⩽0.95
	C_V, %	3.8	3.39		
Relative content of spermatozoa with progressive linear movement, %	$M \pm m$	64.74 ± 2.84	67.40 ± 1.58		
	σ	2.84	3.52	0.73	⩽0.95
	C_V, %	6.34	5.23		
Relative content of spermatozoa with circular movement, %	$M \pm m$	24.16 ± 2.68	21.90 ± 2.27		
	σ	5.99	5.08	0.58	⩽0.95
	C_V, %	24.81	23.21		
Relative content of immotile spermatozoa, %	$M \pm m$	11.18 ± 1.16	10.70 ± 0.94		
	σ	2.60	2.10	0.29	⩽0.95
	C_V, %	23.26	19.59		

Note: $M \pm m$ – arithmetic mean and standard error; σ – standard deviation; C_V – coefficient of variation; t_d – Student's t-test criterion; P – probability

Source: compiled by the author based on the method by O. Mincer *et al.* (1991)

The results of the study showed that the average ejaculate volume of GFC males was 14.74 ± 0.65 mm³, while for SLFL males it was 15.62 ± 0.90 mm³. The total number of active spermatozoa was 87.20 ± 1.36% and 87.60 ± 1.33%, respectively. However, the relative content of spermatozoa with circular movement was 10.03% higher in GFC males compared to SLFL males. However statistical calculations did not reveal a significant difference between the reproductive parameters of males of both inbred types.

The usefulness of evaluating animals based on their external appearance in selective breeding has been proven by long-standing Ukrainian and international practice (Tomilenko, 2001). Selective breeding to form highly productive stocks of breeders of various carp breeds, productivity directions, characterised by sufficient productivity and survival, and adequately adapted to the requirements of intensive farming technology, is impossible without a systematic evaluation of animals based on their external appearance (Jeney & Bekh, 2020). The process of creating and further improving the Ukrainian frame carp breed was based on target external appearance parameters. Particular attention was paid to shaping the desired body shape in fish. Galician carp were better adapted to the harsh climatic conditions of Central Europe than other European carp (Krasnopolska, 2021).

In comparison with similar studies conducted on the Nesvych inbred type of Ukrainian frame and scaled carp breeds (Kurinenko *et al.*, 2024), notable distinctions were observed. The average body length-to-height ratio (l/H) of frame females was 2.96% higher than that of males, reaching 2.7 units, with a range of 2.68-2.72 units, while for males it was 2.78 units, with a range of 2.732.89 units. In scaled females, the body length-to-height ratio (l/H) was also at a level of 2.70 units. The girth index (l/O) in females ranged from 1.10 to 1.21 units, with an average value of 1.18 units for frame carp individuals and 1.17 units for scaled individuals. In males, the range of this index was 1.14-1.20 units, with an average value of 1.16 units for both frame and scaly individuals. The average weight of selected eggs in frame females was 530.0 ± 34.76 g, and in scaly females, it was 535.0 ± 31.12 g (Kurinenko *et al.*, 2024).

According to B. Grishin (2021), breeders from the Antoninsko-Zozulenets (AZFC) and Lubin (LFC) inbred types of the Ukrainian frame carp met the expected morphometric values. Specifically, the body length-to-height ratio of 5-6-year-old AZFC breeders was 2.73-2.78, and the girth index was 1.17-1.26. LFC breeders of the same age were more body length-to-height ratio with indices of 2.65-2.68 and 1.16-1.19, respectively. The condition factor of males in both lines significantly exceeded that of females – 3.14-3.73 versus 3.02-3.06. At the same time, the relative fecundity of females of different origins was similar – 88.4-98.7 thousand eggs/kg. However, the relative fecundity of eight-year-old females was lower – 88.4-90.4 thousand eggs/kg – compared to five-year-old females – 96.1-98.7 thousand eggs/kg. On average, for both age groups, the relative fecundity of AZFC females was 92.4 thousand eggs/kg, and for LFC females – 91.9 thousand eggs/kg.

Therefore, the studied breeders of the Galician and scaleless Lebedyn factory line inbred types of carp were not inferior in terms of both morphometric and reproductive indicators. Thanks to such selective breeding, a progressive heterogeneous structure of Ukrainian breed groups is formed, taking into account both regional aquaculture conditions and intensification practices.

Conclusions

In the study comparing breeders of the Galician and scaleless Lebedyn factory line inbred types of Ukrainian frame carp, significant differences were found in the following external appearance characteristics: body length-to-height ratio ($P \geqslant 0.95$), head index ($P \geqslant 0.99$), and thickness index ($P \geqslant 0.99$). Between the male carp of the SLFL and GFC lines, there was a significant difference in commercial length ($P \geqslant 0.95$) and thickness index ($P \geqslant 0.99$).

Under factory reproduction conditions, females of both inbred types responded positively to hormonal stimulation. The fecundity indices of GFC females were as follows: absolute fecundity ranged from 476,000 to 576,000 eggs, and relative fecundity averaged 89.55 ± 2.25 thousand eggs/kg. In SLFL females, absolute and relative fecundity ranged from 372,000 to 543,600 eggs and 74.83 ± 2.89 thousand eggs/kg, respectively. A significant difference ($P \geqslant 0.95$) was observed in the weight of selected eggs, with 678.0 ± 16.25 g for GFC compared to 588.0 ± 38.94 g for SLFL. For relative fecundity and reproductive index, a high level of significant difference was also observed at $P \geqslant 0.99$ in favour of GFC females.

Regarding the reproductive indicators of the males, the average ejaculate volume of GRC males was 14.74 ± 0.65 mm^3, while for SLFL males it was 15.62 ± 0.90 mm^3. The total number of active spermatozoa was 87.20 ± 1.36% and 87.60 ± 1.33%, respectively. Statistical analysis did not reveal any significant differences between these reproductive parameters of males from both inbred types. Further research should focus on the quality of offspring from various combinations of the original forms.

Acknowledgements

Oleh Striletskyi – Head of the Peasant (farm) enterprise "Korop"; Ruslan Palamarchuk – Candidate of Agricultural Sciences, Director of the State Enterprise Experimental Farm "Nyvka" of the Institute of Fisheries of the NAAS; Denys Syrovatka – Leading Researcher of the Fish Breeding Laboratory, Candidate of Agricultural Sciences, Senior Researcher; Hanna Kurinenko – Head of the Fish Breeding Laboratory, Candidate of Agricultural Sciences, Senior Researcher; Tetiana Hryhorenko – Head of the Laboratory of Hydrobiology and Technology for Cultivating

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Conflict of Interest

None.

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Рибницько-біологічна оцінка плідників галицького та малолускатого внутрішньопородних типів української рамчастої породи коропа

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Анотація. Пошук найоптимальніших поєднань наявних порід коропа дозволяє досягти бажаного балансу між ростом, розвитком, репродуктивними показниками, стійкістю до різноманітних збудників хвороб та умовами культивування риби. Тому метою виконання даних досліджень була рибницько-біологічна оцінка плідників галицького та нового малолускатого лебединської заводської лінії внутрішньопородних типів української рамчастої породи коропа. Дослідження проводилися на державному підприємстві «Дослідне господарство «Нивка»». Для проведення оцінки екстер'єрних та продуктивних показників були обрані плідники галицького та малолускатого лебединської заводської лінії внутрішньопородних типів української рамчастої породи коропа. За показниками промірів було розраховано селекційні індекси: коефіцієнт вгодованості, індекс відносної маси, індекс високоспинності, індекс обхвату, індекс голови, індекс товщини тіла. Для репродуктивної оцінки самиць вимірювали індивідуальну робочу плодючість і середню наважку ікринки. Проведено аналіз показників статевих продуктів самців: об'єм еякуляту, загальна активність; відсоток сперматозоїдів з прямолінійно-поступальним та манежним рухами, а також неживих сперматозоїдів. За результатами дослідження екстер'єрних параметрів встановлено, що самиці малолускатого та галицького типів виявилися вищими за показником високоспинності, а за індексом голови – з меншою головою. При цьому достовірної різниці за такими важливими показниками, як маса, індекс високоспинності та коефіцієнт вгодованості, не зафіксовано. За умов заводського відтворення самки обох внутрішньопородних типів позитивно реагували на гормональну стимуляцію. Показники плодючості у самок галицького типу були наступними: робоча плодючість – в межах 476,0-576,0 тис. ікринок, а відносна плодючість в середньому склала 89,55 ± 2,25 тис. ікринок/кг. В самиць малолускатого типу робоча і відносна плодючість перебувала в межах 372,0-543,6 тис. ікринок та 74,83 ± 2,89 тис. ікринок/кг відповідно. Практична значимість результатів дослідження полягає у подальшому отриманні та визначенні ефективності вирощування помісних нащадків за умов реципрокних схрещувань у порівнянні з вихідними формами

Ключові слова: лебединська заводська лінія; екстер’єр коропа; репродуктивні показники; селекційно-племінна робота в рибництві