

## **Study Concerning the Determination of Causal Components of Variance for Bioeconomic and Ecoeconomic Characters in Frasinet Carp Breed**

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**Abstract.** Increased competitiveness in the biological fish material market required the improving the quantitative characters of exploited species. One of the essential problems of heredity study quantitative characters is knowledge of the degree of hereditary transmission of characters from parents to offspring. This requires knowledge of the causal components of variance. The biological material studied consisted of 50 descendants who came from five mothers and 10 fathers. Each descendant was measured for three characters: body weight, maximum body height and body length at the end of the first three summers of growth. For variance components analysis was used BLUP (Best Linear Unbiased Prediction) methodology, applied to an individual animal model. The results showed that the characteristics considered their genetic determinism is low to medium. Thus, it was found that body weight is low genetic determinism (0.1662-0.1758). Maximum height of the body had an average genetic determinism after the first and the third summer of growth (0.3108, 0.2434) and low genetic determinism after the second summer (0.1697). Body length had an average genetic determinism (0.2698) after the first summer of growth and quite low genetic determinism afterwards (0.1293, 0.1297). A low value of heritability means a low genetic progress; due to the fact the selection effect is dependent on heritability. In conclusion, for maximizing the effect of heritability, implicitly the genetic progress of considered characters will have to practice a family selection witch, in addition to the candidate's own performance to contribute to family average intake.

**Keywords:** carp, genetic variance, morphological characters

**Introduction.** Intensive farming methods to obtain high yields of meat, located in the forefront of research and study of the genetic capacity for growth as the main factor that interferes with the development of high bio-economical and eco-economical production.

Making animal production is the result of simultaneous or separate action of three factors: the genetic potential of individuals, number of individuals and operating conditions.

Short-term increase animal production can be achieved by increasing the workforce, but long term, this approach is unfeasible, as crop production increases in arithmetic progression, and the animal in geometrical progression, leading to excess capacity support (Grosu *et al.*, 2005).

In the context of sustainable animal production, the way forward is to increase livestock production on improving the genetic potential, coupled with improved operating conditions (Grosu *et al.*, 2005).

The objectives pursued in growth of valuable species of fish, carp in our case, consist in transformation of bio-economic and eco-economic characters, so that they are useful to people (Nicolae, 2012).

**Aims and Objectives.** The research aims knowing the degree of transmission of hereditary quantitative characteristics from parents to offspring.

The objectives are the evidence of genetic determinism of quantitative characters, which are subject to genetic improvement programs to Frasinet carp breed and calculating their heritability.

**Materials and Methods.** The studied biological material consisted of 50 offspring of Frasinet carp, which belonged from five mothers and ten fathers. Each descendant has been measured for three characters: body weight (W), maximum body height (H) and body length (l), at the end of the first three summers of growth.

For the analysis of the variance components the BLUP (Best Linear Unbiased Prediction) methodology has been used, being applied to an individual animal model.

**Results and Discussions.** The carp, which as a wild species was, decades ago, the basic fishery production in the lower Danube basin, was, is and it will remain, at least as goal, the main fish species in Romania, regardless the economic circumstances.

After three summers of growth, it was found that body weight is low genetic determinism (0.1662-0.1758) (Tab. 1).

Maximum body height had an average genetic determinism after the first and the third summer of growth (0.3108, 0.2434) and low genetic determinism after the second summer (0.1697).

Tab. 1

Genetic determinism of the weight, maximum body height and body length in Frasinet carp, after three summers of growth

Breed/age	Characters	Error variation	Additive genetic variation	Phenotypic variation	Heritability
Frasinet 0+	W (g)	92.1904	18.3799	110.5703	0.1662
	H (mm)	11.7650	5.3046	17.0696	0.3108
	l (mm)	78.8522	29.1342	107.9864	0.2698
Frasinet 1+	W (g)	9568.1	1915.8	11484	0.1668
	H (mm)	52.9035	10.8156	63.7192	0.1697
	l (mm)	357.2083	53.0560	410.2643	0.1293
Frasinet 2+	W (g)	68978	14709	83687	0.1758
	H (mm)	87.3487	28.1010	115.4496	0.2434
	l (mm)	573.3314	85.4103	658.7416	0.1297

Body length had an average genetic determinism (0.2698) after the first summer of growth and quite low genetic determinism afterwards (0.1293, 0.1297).

**Conclusion.** The results showed that the characteristics considered their genetic determinism is low to medium.

A low value of heritability means a low genetic progress; due to the fact the selection effect is dependent on heritability. In conclusion, for maximizing the effect of heritability, implicitly the genetic progress of considered characters will have to practice a family selection witch, in addition to the candidate's own performance to contribute to family average intake.

The heritability values of the analyzed characters refer only to the study of the analyzed population and to the environmental conditions in which it has developed.

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