

Morphological Traits of Brown Trout (*Salmo Trutta Fario*) from Fiad Trout Farm, Bistrița-Năsăud County

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ABSTRACT

The purpose of this study was to complete the data from the specialized literature regarding some morphological characters of male and female breeders of brown trout (*Salmo trutta fario*), exploited in Fiad trout farm, Bistrița-Năsăud County, Romania. The body mass (Bm) of males ranged from 0.67 kg to 1.39 kg with a mean value of 0.96 ± 0.07 kg. The body mass of females (Bm) ranged from 0.50 kg to 0.90 kg with a mean value of 0.73 ± 0.04 kg. In terms of descriptive statistics, the values of variability of studied characters, both males and females, are low. This low variability shows the existence of a good homogeneity of the breeding group from Fiad trout farm. The One-Way ANOVA analysis showed that there is no statistically significant difference for the means of studied characters, except for commercial length and small perimeter of fishes. The results of t-test showed that there is a statistically significant difference between the measurements and the gender of the specimens.

Keywords: body mass, phenotypic characterization, somatic measurements

INTRODUCTION

The Brown trout (*Salmo trutta fario*) is a species which is representative for repopulation of mountain waters and is not predominantly grown in trout farms for commercialization due to the low growth rate and high consumption of feed. Annual potential production in Romania of Brown trout is estimated at about 12 million juveniles for repopulating mountain waters (Pricope F. *et al.*, 2012). The purpose of this paper was to perform the phenotypic characterization of the Brown trout studied specimens (males and females, age 6 and respectively 4 years old), characteristic's which help for a better selection of the breeding groups.

MATERIALS AND METHODS

The specimens used in this study were from Fiad trout farm, Bistrița-Năsăud County. The number of specimens for which measurements were made

was 10 males (age 6 years) and 10 females (age 4 years). The study took place during December 2015-January 2016. To obtain the gravimetric measurement and the digital photography, the trout specimens were anesthetized with clove oil (a solution used as a local antiseptic and anesthetic) to avoid stressful situations. For the phenotypic characterization of the species a total of 11 somatic measurements were made for both females and males based on photographs taken, with the ToupView-AmScope software. All data were statistically analyzed with IBM. SPSS. Statistics. v19 software. Drafting, graphics and spreadsheets were edited in Microsoft Word v. 2013.

RESULTS AND DISCUSSIONS

In table 1 are related all the somatic measurements made in brown trout specimens to phenotypically characterize the breeding groups. The body weight (Bm) of males ranged from 0.67

Tab. 1. The mean values of somatic measurements in brown trout (*Salmo trutta fario*) males and females (n=10)

Specification	Abb.	MU	X ± SEM		Minimum		Maximum		V%		SD	
			M	F	M	F	M	F	M	F	M	F
Body mass	Bm	kg	0.96 ±0.07	0.73±0.04	0.67	0.50	1.39	0.90	22.23	18.03	0.21	0.13
Total length	Tl	cm	42.37±0.92	39.71±0.62	38.90	37.13	48.82	42.82	6.84	4.93	2.90	1.96
Standard length	Sl	cm	38.84±0.85	35.82±0.65	35.53	32.40	44.64	38.65	6.91	5.76	2.68	2.06
Commercial length	Cl	cm	29.13±0.71	29.03±0.57	26.26	26.50	33.71	31.87	7.70	6.21	2.24	1.80
Maximum height	H	cm	9.99±0.29	8.93±0.21	8.48	7.38	11.57	9.80	9.34	7.38	0.93	0.66
Minimum height	h	cm	4.03±0.08	4.09±0.09	3.54	3.68	4.48	4.61	6.18	7.53	0.25	0.31
Head length	Hl	cm	10.08±0.20	8.07±0.15	9.21	7.29	11.63	9.02	6.34	5.87	0.64	0.47
Caudal peduncle length	Cpl	cm	5.95±0.12	4.69±0.19	5.41	3.57	6.66	5.36	6.45	13.22	0.38	0.62
Large perimeter	P	cm	30.56±1.09	22.09±0.45	25.53	18.89	36.81	24.04	11.34	6.43	3.47	1.42
Small perimeter	p	cm	12.47±0.31	10.63±0.22	10.70	9.60	13.83	11.54	7.78	6.49	0.97	0.69
Body depth	Bd	cm	6.59±0.38	4.09±0.07	5.23	3.72	8.88	4.36	18.31	5.19	1.21	0.21

kg to 1.39 kg with a mean value of 0.96 ±0.07 kg and a variability of 22.23%. The body mass of females ranged from 0.50 kg to 0.90 kg with a mean value of 0.73±0.04 kg and a variability of 18.03%. In the case of the other somatic measurements, low variabilities were also recorded. Overall, these low variability values indicate that this group of breeders is homogeneous, and that frequent sorting of breeding groups is performed within the Fiad trout farm.

From the results of t-test for Equality of Means (Tab.2.), the Sig. (2-Tailed) value for the Means of

body mass, total length, standard length, maximum height, head length, caudal peduncle length, large and small perimeter and body depth, values which are less than 0.05. Because of these we can conclude that there is a statistically significance difference between the measurements and gender of the specimens. For the commercial length and minimum height, the Sig. (2-Tailed) values were bigger than 0.05, there is no statistically significance difference between them and the gender of the specimens.

Table 3 shows the output of the ANOVA analysis that we made. In the case of body mass, we

Tab. 2.Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means		
		F	Sig.	Sig. (2-tailed)	95% Confidence Interval of the Difference	
					Lower	Upper
Body mass	Equal variances assumed	1.447	0.245	0.010	-0.394695	-0.063105
Total length	Equal variances assumed	0.492	0.492	0.027	-4.986757	-0.340843
Standard length	Equal variances assumed	0.287	0.598	0.011	-5.262372	-0.765828
Commercial length	Equal variances assumed	0.126	0.727	0.911	-2.014967	1.809567
Maximum height	Equal variances assumed	1.846	0.191	0.009	-1.818960	-0.300840
Minimum height	Equal variances assumed	1.397	0.253	0.614	-0.198846	0.327246
Head length	Equal variances assumed	0.168	0.686	0.000	-2.542082	-1.484918
Caudal peduncle length	Equal variances assumed	2.419	0.137	0.000	-1.743590	-0.775010
Large perimeter	Equal variances not assumed	6.685	0.019	0.000	-11.045687	-5.881313
Small perimeter	Equal variances assumed	0.627	0.439	0.000	-2.622807	-1.041793
Body depth	Equal variances not assumed	10.720	0.004	0.000	-3.377960	-1.639040

Tab. 3.One-way ANOVA - Between Groups ($p < 0.05$)

Specification	F	Sig.
Body mass	8.413	0.010
Total length	5.804	0.027
Standard length	7.933	0.011
Commercial length	0.013	0.911
Maximum height	8.606	0.009
Minimum height	0.263	0.614
Head length	64.047	0.000
Caudal peduncle length	29.845	0.000
Large perimeter	51.053	0.000
Small perimeter	23.714	0.000
Body depth	41.851	0.000

can see that the significance value is 0.010 which is below 0.05 and, therefore, there is no statistically significance difference in the mean body mass of males and females by gender. By following the significant values in the table 3, there are only two values above the cutoff value (0.05), so, there are significant differences between fish genres in terms of means of commercial length and small perimeter measurements.

REFERENCES

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