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DETERMINATION OF LENGTH, WEIGHT AND HEALTH STATUS FACTOR IN RAINBOW TROUT (*Oncorhynchus mykiss* WALBAUM, 1972) CULTIVATED IN THE FISH FARM IN ISTOG (PEJE REGION-KOSOVO)

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Abstract

Length, weight and health status factors were determined in rainbow trout obtained from aquaculture. The research included 136 individuals with different lengths and weights, divided into three groups. The first group included 25 individuals with a weight of >100 g, the second group 150 individuals with a weight of >150 g, and the third group 59 individuals with a weight of >200 g. The average value of the morphometric parameters was determined based on the number of individuals analysed for each group. In the first group, the average total length (TL) was 22.6 cm; in the second group, it was 24.8 cm; and in the third group, it was 27.3 cm. The average fork length (FL) in the first group was 21.1 cm, in the second group 23 cm, and in the third group 25.5 cm. The average value of body weight in the first group was 126 g; in the second group, it was 176.8 g; and in the third group, it was 227.6 g. In the group of fish weighing more than 100 g, the average value of the health status factor was 1.27; in the group of fish weighing more than 150 g, 1.36; and in the group of fish weighing more than 200 g, 1.41.
This study provides us for the first time with basic information on length, weight and health status factors for rainbow trout cultured on the Istog fish farm, which may be useful for fisheries management on other farms in Kosovo and beyond.

Keywords: length, weight, health status factor, morphometry, rainbow trout.

INTRODUCTION

Trout, which belongs to the Salmonidae family, is known for its highly nutritious meat and for recreational fishing. This type of fish prefers cold and soft waters, with temperature fluctuations of 10-18°C. It is an indigenous inhabitant of the northern areas of the globe, and, unlike other species, this species is probably one of the oldest aquaculture fish. (Gall and Crandell, 1990).

It adapts well to the environment in which it lives and for this reason is characterised by a wide distribution (Wolf and Rumsey, 1985; Laird and Needham, 1988). Its flexibility and adaptability to different environments, including lakes, rivers, ponds and artificial aquatic environments, has influenced this species to be the most popular type of aquaculture.

In Kosovo, trout farming began in the first years after the war (DHTIK, 2019), while studies on it were done in the past three years (Iseni et al., 2022).

Knowledge of length and weight is very important for adequate management of all species, which has been applied to assess the status of fish and their populations (King, 2007). This is also important for morphological comparison of their populations at the local and regional level (Froese, 2006; Ali et al., 2013).

The health status factor (K) is an important ecological parameter that tells us about the condition of the aquatic environment, whether it is suitable or not for fish growth, and is an indicator of the average size of fish (Alam et al., 2014). The values of this factor depend on the physiological characteristics of the fish, especially its maturity, reproduction, life cycle, external environmental factors, and the presence of food in the aquatic environment (Ujjania et al., 2012; Dan-Kishiya, 2013).

According to the Fulton index for health status, values of 1.41-1.60 indicate excellent health condition, values of 1.21-1.40 for good health condition, values of 1.01-1.20 for average health condition, values of 0.80-1.00 for poor health condition and values ≤ 0.80 for very poor health condition (Carlander, 1969; Adams et al., 1992a).

This study aimed to determine the health status factor, based on weight and length, in rainbow trout cultivated in aquaculture.

MATERIALS AND METHODS

This research was conducted in the spring and summer periods— May and August 2023/24. The research included the pools of the trout fish farm, which is owned by the "Trofta" hotel in Istog (Kosovo), located at the geographical position 42°78'02689" N, 20°48'03915' E and at an altitude of 288 m. Its total annual production is 530,000 kg, while the water flow speed of the supply source is 2.66 m/s (Fig. 1).

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Fig. 1. Geographical position of the fish farm in Istog with the cultivation ponds.

The study included 136 fish of different weights and lengths, categorised into three groups (Gr. I – with body weight > 100 g, Gr. II – with body weight > 150 g and Gr. III – with body weight > 200 g). Their capture was carried out using a net (fig. 2A) by the person responsible for the farm, and after determining their weight and length (fig. 2B), they were returned to the tanks. In order to avoid hypoxia (decrease in the oxygen level in the blood of the fish), the determination of weight and length, including the macroscopic observation of their body (to determine any possible disease), was carried out for a duration of 15 sec., and after this time the fish were thrown back into the tanks.

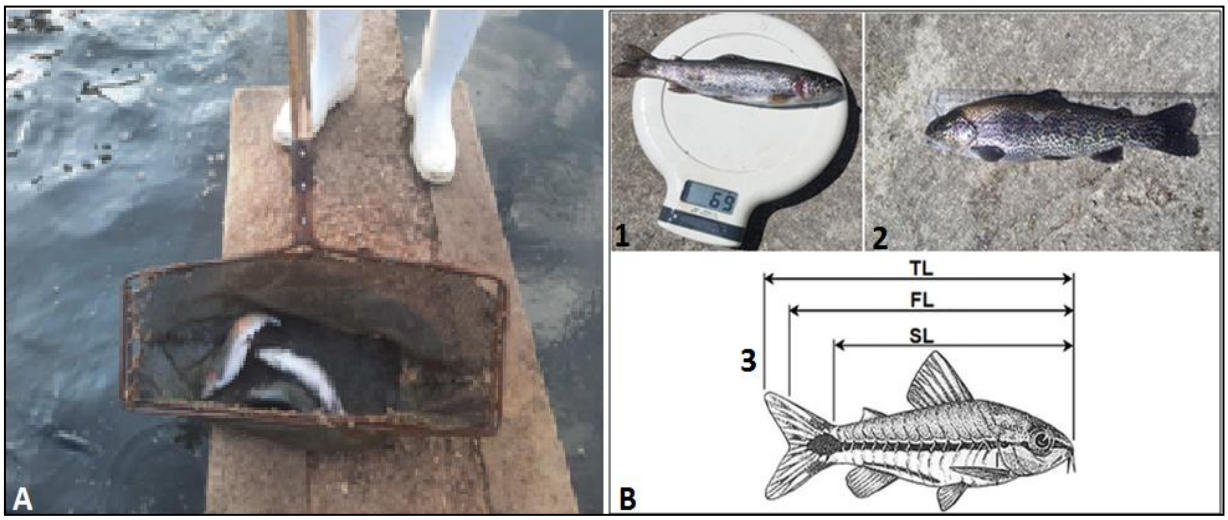

Fig. 2. A-Method of catching fish (by net); B-Determination of weight and length. 1-determination of weight; 2-determination of length. 3-determination of three body lengths:TL-body length from mouth to end of caudal fin (total length); FL-length from mouth to fork of caudal fin (fork length); SL-length from mouth to beginning of caudal fin (standard length).

The average values for weight, length and health status factor for each group were calculated based on the number of individuals analysed, using the Microsoft Office Excel 2007 computer program.

The health status factor was calculated using the formula provided by Sloof et al., 1983: CF = [body weight (g)/length (cm^3)] x 100

RESULTS

We present the results graphically from this study. The average body length values of the three analysed groups of fish are presented in figure 3. In the group of fish weighing more than 100 g, the average total length (TL) was 22.6 cm, the fork length 21.1 cm and the standard length 20 cm. In fish weighing more than 150 g, the total length was 24.8 cm, the fork length 23 cm and the standard length 22.1 cm. The total length of fish weighing more than 200 g was 27.3 cm, the fork length 25.5 cm and the standard length 23.7 cm.

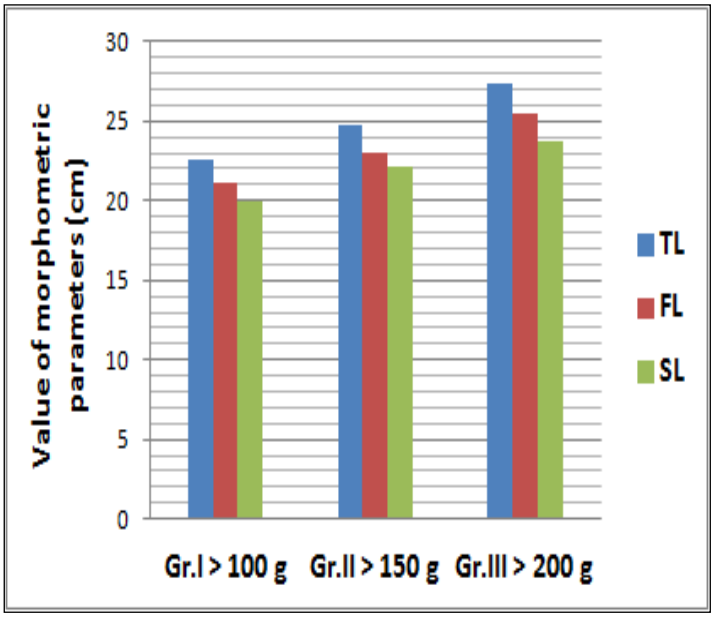

Fig. 3. Average values of morphometric parameters
(TL-total length, FL-fork length, SL-standard length) of the three analysed groups of fish.

Figure 4 presents the average body weight values of the three groups of fish. In the group of fish with a body weight greater than 100 g, the average weight value was 126 g; in the group with a weight greater than 150 g, 176.8; and in the group with a weight greater than 200 g, 227.6.

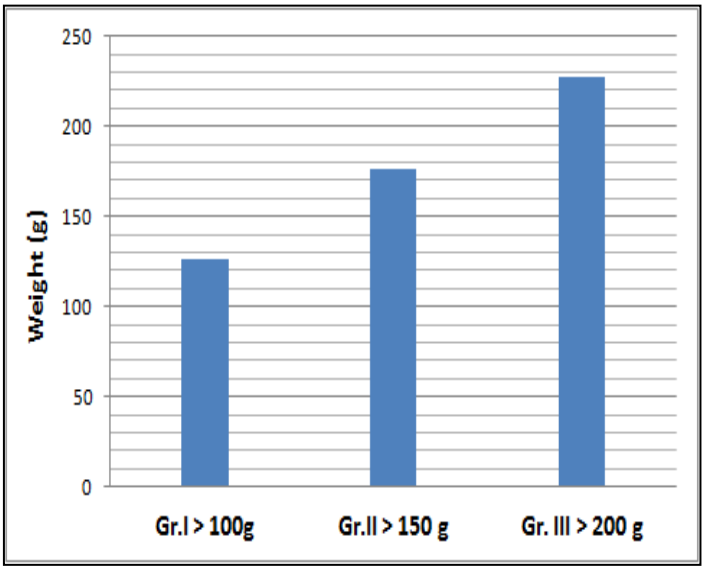

Fig. 4. Average weight values of the three analysed groups of fish.

The data obtained from the analysis of the health status factors of the three groups of fish included in the study are presented in figure 5. From the graphic presentation, it is observed that, in the group of fish weighing more than 100 g., the average value of the health status factors is 1.27; in the group of fish weighing more than 150 g., the average value of the health status factor is 1.36; while in the group of fish weighing more than 200 g., the average value of the health status factors is 1.41.

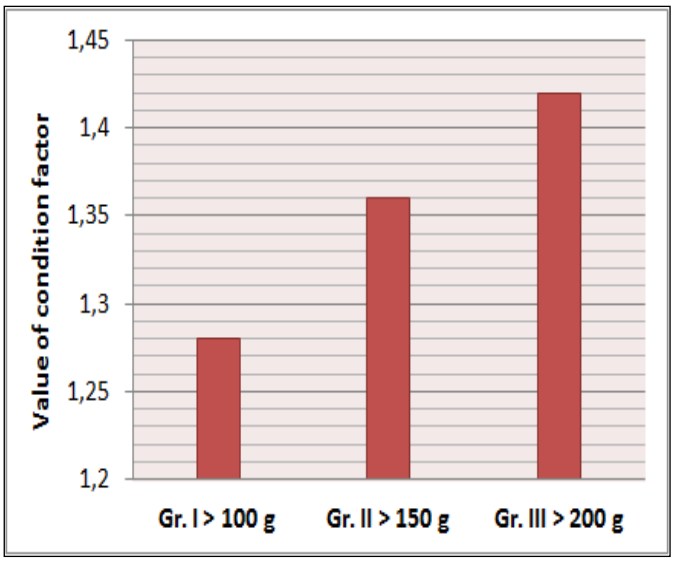

Fig. 5. Average values of the health status factor of the three analysed groups of fish

The first and second fish groups are healthy, while the third is excellent, according to the health status factor reference values.

DISCUSSION

The determination of length and weight is very important in assessing the health status of fish (Haimovidici and Velasco, 2000; Arslan et al., 2004), and also the biomass of aquatic cultures can be estimated based on these parameters (Morey et al., 2003).

There are many reports of length and weight measurements of rainbow trout in the world (Siglar, 1953; Van Woert, 1957; McAfee, 1966; Kwain, 1981; Pidgeon, 1981; Campos et al., 1997; Zimmerman, 1999; Esmaeli and Ebrahimi, 2006; Tasaduq et al., 2011, 2022; Asadi et al., 2017), and the values recorded for these parameters in this study are presented in figures 3 and 4. These recorded values can serve as indicators of the level of feed intake in the farm, as a model of fish growth, and can vary depending on climatic and biological factors, such as water temperature, food availability and type of environment (Wootton, 1992).

Fish health status factor is an indicator that reflects the interaction between biological and climatic factors of fish (Blackwell et al., 2000).

The health status factor of fish relies on whether the heaviest fish at a given length are in good condition. It also serves as an indicator of development and nutrition (Seher and Suleyman, 2012). A condition factor ≥ 1 indicates adequate nutrition and satisfactory health (Ujjania et al., 2012).

Fulton's health status factor values presented in this study ranged from 1.27 to 1.44 (fig. 5), indicating that the fish are in excellent condition. Approximate results for this factor have been identified by different authors (Rabe 1967; Cada et al. 1987; Murphy 1988; Ensign et al. 1990; Zimmerman 1999; Tasaduq et al. 2011; Asadi et al. 2017).

CONCLUSION

The values obtained showed that the morphometric parameters, length, weight and health status factor of rainbow trout from aquaculture are within the range of values recorded in other populations of the same species.

In the first group of fish weighing more than 100 g, the average value of total length (TL) was 22.6 cm; in the second group weighing more than 150 g, 24.8 cm; and in the third group weighing more than 200 g, 27.3 cm. The average fork length (FL) in the first group was 21.1 cm, in the second group 23 cm, and in the third group 25.5 cm. The average value of body weight in the first group was 126 g; in the second group, it was 176.8 g; and in the third group, it was 227.6 g.

In the group of fish weighing more than 100 g, the average value of the health status factor is 1.27; in the group of fish weighing more than 150 g, 1.36; and in the group of fish weighing more than 200 g, 1.41.

If such values applied to any other study of this nature, we must consider that the samples were taken in different seasons and that the number of fish examined was limited.

In conclusion, the study of fish morphometry can provide us with useful information for fisheries management and the study of fish population dynamics.

Therefore, the values identified after this study can be used as basic data for this type of fish and for comparison with further studies.

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