

RESEARCH ARTICLE

Age Determination of *Barbus Arabicus* (Trewavas, 1941) in Saudi Arabia Using the Vertebral Bones

Hakami AH, Al-Balawi HFA and Suliman EM*

Department of Zoology, College of Science, King Saud University, Riyadh, Kingdom of Saudi Arabia

*Corresponding author: Suliman EM, Department of Zoology, College of Science, King Saud University, P.O. Box 2455, Riyadh 11451, Kingdom of Saudi Arabia, E-mail: elaminsuliman@yahoo.co

Citation: Hakami AH, Al-Balawi HFA, Suliman EM (2018) Age Determination of *Barbus Arabicus* (Trewavas, 1941) in Saudi Arabia Using the Vertebral Bones. *J Aqua Sci Oceanography* 1: 103

Abstract

Barbus arabicus is an endemic freshwater fish of the Arabian Peninsula. The present study investigated the *B. arabicus* age using vertebral growth rings as a means of age determination. A total of 305 specimens were collected from the Baish dam reservoir, Jazan region of Saudi Arabia with hooks and lines for one year. The reliability study of the vertebrae showed an annual ring formation where the back-calculated lengths of the vertebral rings showed values that coincided with the annual growth of this fish. The maximum age of *B. arabicus* in this study was found to be 7 years. The mean values of the back-calculated lengths of ring-I to ring-VII were found in the range between 5.76±0.77 cm and 52.67 ±2.28 cm, respectively. The predicted equation of bone radii was measured from the fish length and the back-calculated lengths showed a very high Correlation coefficient ($r>0.99$) which is statistically significant ($p<0.001$). As a result, the vertebral rings were found to be useful ageing structures for *B. arabicus*. The results of this study will help in planning for the rational exploitation of *B. arabicus* and for their management and conservation in Saudi Arabia. However, additional research can offer important benefits if different methods of age determination of *B. arabicus* are used, especially the use of fin spines because this method will not sacrifice the fish. In addition, these studies will emphasize the present findings.

Keywords: *Barbus Arabicus*; Age; Growth; Vertebral Bone; Back Calculation

Introduction

Growth in weight and length of the fish over a period of time have been studied in several species of fishes [1]. The information on age, growth, mortality and exploitation rates is crucial for the fish stock assessment [2]. Several authors have used different hard structures for age determination in different fish species [3-5]. The use of vertebral rings as a means of age determination has been reported in various studies [6-11]. Other studies also demonstrated the use of opercular bones in their investigation [12-15]. Otoliths were used by Jia Y, 2011 and Espino-Barr E, 2013 [16,17].

Environmental changes of freshwater streams in the Arabian peninsula occur as a result of natural draught, damping, pesticides and sanitary wastes. Environmental changes have negative effects on fish species and their existence. Biological studies such as age and growth rate of *B. arabicus* might be a necessity because they are highly needed for the models of population dynamics that used in the stock assessment for this fish. Fish stock assessments can form the bases of fish conservation studies. Vertebrae and fin spines have been used in determining the age of fish species but different authors have indicated that the use of the spines of the dorsal and anal-fins are more reasonable in terms of the ease of collection and processing [18-26]. Back-calculation methods have been used by a large number of authors, and are used here to confirm or dispute the annularity of the growth rings on the bony structures of this fish species. The back-calculation technique is specifically useful for determining the growth of the fish during each year of life before date of sampling. Back calculations of length at age were estimated in two ways [27-30].

Very little is known about *B. arabicus* in the southern part of the Arabian Peninsula, and there is lack of information about their biology, age and growth and their economic aspects. It is difficult to study the age of tropical fishes as the ring formation on hard structures do not depend on temperature in the case of temperate water fish, but their ring formation largely depends on other biological and physiological factors such as food availability and breeding seasons [31]. Thus, unless annual nature of these growth rings are established for these fishes, their age study is doubtful [12, 32-34]. So, the objectives of this study was to estimate the age and growth of a freshwater fish (*B. arabicus*) by counting the growth rings on the vertebrae. In this work, the method of growth rings on the vertebral bones was tried to determine the age of *B. arabicus* in Baish dam in Saudi Arabia.