ASSESSING GROWTH BAND COUNTS FROM DORSAL-FIN SPINES FOR AGEING THE LONGNOSE SPINY DOGFISH

Vasiliki Kousteni 1 * and Persefoni Megalofonon 1

1 Department of Biology, Section of Zoology-Marine Biology, University of Athens, Greece - bkousten@geol.uoa.gr

Abstract

Age and growth of longnose spiny dogfish (Squalus blainville, Risso 1826), from the Eastern Mediterranean Sea, was studied by counting the bands at the external surface of the second dorsal-fin spines. The von Bertalanffy parameters were estimated separately for females and males.

Keywords: North-Eastern Mediterranean, Elasmobranchii, Growth

Introduction

In previous studies the age and growth of the longnose spiny dogfish were investigated by counting either the vertebral rings [1] or the growth bands in sections of the second dorsal-fin spine [2]. The aim of this study is to estimate the age and growth of the species using the external growth bands of the whole dorsal-fin spine and to compare the results of the method used with those of the previous studies in the Mediterranean Sea.

Materials and Methods

Out of 810 longnose spiny dogfishes that were sampled between 2004 and 2012 in the Greek Seas, 685 specimens were used for age estimation. Since the tip of the first dorsal-fin spine tends to be more worn down, leading to an underestimation of age, the second dorsal-fin spine was chosen for age estimation. All spines were read three independent times by the same reader. Out of the three readings the first one was rejected. Consequently, when the two last readings differed by 1 year the estimates were selected alternately, when they differed by 2 years the mean of the two readings was taken into account while those that differed for more than 2 years the spines were excluded from the analysis (±2-yr criterion). For large individuals with worn or broken spines, age was calculated according to Ketchen’s method (1975) [3]. Since, Ketchen’s correction curve was made for Squalus acanthias from the Pacific Ocean, a new correction curve was developed for Squalus blainville from the Eastern Mediterranean Sea. The precision of age estimations was calculated using both the coefficient of variation (CV) and the average percent error (APE). The total length-at-age data were fitted to the von Bertalanffy growth model.

Results and discussion

Our results showed that the point where the first annulus is formed was not affected by the fish size. The examination of embryos revealed also that spines were formed during the early stages of embryonic development. The obtained CV and APE precision indices, confirmed that the two last readings of the whole spines (CV= 8, APE= 5.7) were more reliable than the first one and the comparison between them indicated no appreciable bias (Fig. 1). Age estimations of large specimens with broken spines was obtained using modified Ketchen’s correction curve Y= 0.5634X2.3429 (where X= the diameter of the spine base in mm and Y= the missing annuli of the spine due to being worn).

Finally, age estimations of 2 specimens with broken spines as well as of 567 specimens that met the ±2-yr criterion were used in growth analysis (Fig. 2). It was noticed that females reached higher age (28 yrs) than males (22 yrs). Differences were also found in the von Bertalanffy growth parameters between females and males (females: L∞= 1097 mm, K = 0.031, t0 = -5.58 yrs; males: L∞= 665 mm, K = 0.080, t0 = -3.35 yrs). The comparison of the growth parameters for longnose spiny dogfish from the Greek Seas with those from the Sicilian Channel [1] and the Gulf of Gabes [2], revealed differences that could be attributed either to the different ageing methods followed or to the differences in growth rates between different stocks.

Acknowledgements

This research has been co-financed by the European Union (European Social Fund - ESF) and Greek national funds through the Operational Program “Education and Lifelong Learning” of the National Strategic Reference Framework (NSRF) - Research Funding Program: Heracleitus II. Investing in knowledge society through the European Social Fund.