

THE MOST RELIABLE VERTEBRAE FOR AGE DETERMINATION IN *DASYATIS PASTINACA*

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Abstract

This study was aimed to determine the most reliable vertebrae for age determination in *Dasyatis pastinaca*. For this purpose, total 23 fish samples were used. The first 32 vertebrae in the abdominal cavity were removed and prepared for age determination. Age readings were made by three independent readers. According to results, the vertebrae between 22 and 32 in the abdominal cavity were found more reliable for age determination in *D. pastinaca*. Because the lowest mean age, standard errors, ageing errors and absolute difference were obtained after 22nd vertebra. Precision of readers has been estimated from the percentage agreement of 3 readings. The agreement of 3 readers was found higher than 70% after 22nd vertebra. The highest agreement amongst readers was 78% in only 4 vertebrae.

Keywords: *Elasmobranchii, North-Eastern Mediterranean*

Introduction

Age determination is very important for fisheries biology research. Usually, vertebrae are used for age determination in cartilaginous fishes (Basusta et al., 2008; Basusta and Sulikowski, 2012). But all vertebrae could not suitable for age determination. So, this study was aimed to determine the most reliable vertebrae for age determination in *Dasyatis pastinaca*.

Materials and Methods

In this study, total 23 *Dasyatis pastinaca* samples were provided from a commercial fishery trawler in Iskenderun Bay. The samples were transferred to Firat University Fisheries Faculty Fish Ecophysiology Laboratory in a freezer. The first 32 vertebrae in abdominal cavity were removed from each fish and prepared for ageing according to procedure (Turkmen et al., 2005). The vertebrae were examined under a binocular microscope with 2x magnification and top lighting. Each vertebra was examined by three readers. A total of 2208 readings were made (32 vertebrae x 23 fish samples x 3 readers). The readers examined each bony structure independently without getting any information about fish such as length, weight and sex. Mean ages for each vertebra were estimated from readings of three readers (23 fish x 3 readers = 69 readings). Standard errors, ageing errors, absolute difference and percentage of precision of readers on each vertebra were calculated.

Results Discussion

This study was aimed to determine the most reliable vertebrae for age determination. According to results given in Table 1, the vertebrae between 22 and 32 in the abdominal cavity were found more reliable for age determination in *D. pastinaca*. Because the lowest mean age, standard errors, ageing errors and absolute difference were obtained after 22nd vertebra. Precision of readers has been estimated from the percentage agreement of 3 readings (Table 2). The agreement of 3 readers was found higher than 70% after 22nd vertebra. The highest agreement amongst readers was 78% in only 4 vertebrae (see Table 1).

Table 1. Mean age, standard errors, ageing errors, absolute difference and precision of readers on abdominal cavity vertebrae of *Dasyatis pastinaca*.

Vertebrae Number	Mean age (n=69)	Standard errors	Ageing errors	Absolute difference*	Percentages of precision of readers on each vertebra (Agreement of readers/number of readers)		
					3/3	2/3	1/3
1	3.94	0.31	2.57	1.40	39	52	9
2	4.29	0.31	2.57	1.05	35	43	22
3	4.46	0.31	2.57	0.88	30	61	9
4	4.61	0.31	2.55	0.73	26	65	9
5	4.68	0.31	2.58	0.66	26	61	13
6	4.81	0.31	2.56	0.53	22	70	9
7	5.75	0.27	2.25	0.41	35	57	9
8	5.75	0.31	2.55	0.41	26	65	9
9	5.75	0.31	2.54	0.41	26	61	13

10	5.74	0.31	2.55	0.40	43	43	13
11	5.74	0.31	2.55	0.40	43	48	9
12	5.74	0.27	2.25	0.40	39	57	4
13	4.96	0.30	2.52	0.39	39	52	9
14	5.71	0.31	2.54	0.37	57	35	9
15	5.70	0.31	2.55	0.35	57	35	9
16	5.68	0.30	2.50	0.34	52	43	4
17	5.68	0.30	2.53	0.34	52	43	4
18	5.01	0.30	2.53	0.33	52	43	4
19	5.67	0.29	2.45	0.32	52	43	4
20	5.67	0.30	2.49	0.32	57	43	0
21	5.65	0.29	2.41	0.31	61	39	0
22	5.64	0.27	2.28	0.30	70	30	0
23	5.62	0.29	2.38	0.28	70	30	0
24	5.61	0.28	2.35	0.27	70	26	4
25	5.10	0.28	2.34	0.24	78	22	0
26	5.58	0.28	2.30	0.24	74	26	0
27	5.58	0.23	1.89	0.24	78	22	0
28	5.49	0.26	2.19	0.15	74	22	4
29	5.23	0.25	2.05	0.11	78	17	4
30	5.41	0.25	2.06	0.06	78	17	4
31	5.38	0.26	2.12	0.03	74	22	4
32	5.32	0.27	2.25	0.02	74	22	4
Total mean (n=2208)	5.34	0.29	2.40	0.40			

*Absolute differences were obtained by subtracting the total mean value (5.34) from mean age value.

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