

Update to maximum observed age of Atlantic sharpnose sharks
(*Rhizoprionodon terraenovae*) in the western North Atlantic Ocean
based on a direct age estimate of a long term recapture

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Update to maximum observed age of Atlantic sharpnose sharks (*Rhizoprionodon terraenovae*) in the western North Atlantic Ocean based on a direct age estimate of a long term recapture

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Introduction

Direct age estimates were obtained from sectioned vertebrae from a recaptured male Atlantic sharpnose shark that had been at liberty for 12.2 years. The specimen was tagged and recaptured by biologists from the South Carolina Department of Natural Resources' (SCDNR) Adult Red Drum longlining program, therefore, accurate length measurements at both initial capture and recapture were recorded. In addition to the direct age estimate, three other long term recaptures provide additional evidence to increase maximum observed age for the Atlantic sharpnose shark population in the South Atlantic Bight (SAB, defined as the coastal waters of the western North Atlantic Ocean off of the southeastern United States).

Methods

Original tagging and recapture took place as part of the SCDNRs adult red drum longlining program (see Ulrich et al (2007) for longlining protocol). Vertebrae were sectioned and aged following the protocol of Frazier et al. (SEDAR 34 WP-07). Age estimates at recapture were assigned using calculated ages at initial tagging based on von Bertalanffy parameters from Carlson and Loefer (2007) plus time at liberty. The von Bertalanffy equation (Beverton and Holt 1957) was rearranged to solve for age as follows:

$$\text{Age} = \left(\frac{\ln(1 - \frac{L_t}{L_\infty})}{-k} \right) + t_0$$

Where:

L_t = length at age t ,

L_∞ = theoretical maximum length,

k = coefficient of growth,

t_o = theoretical age at which length equals zero.

Results

Three male, and one female Atlantic sharpnose were recaptured with liberties ranging from 2,806 to 4,678 days (\bar{x} =3,715 days) lengths are listed in Table 1. Age estimates at initial tagging ranged from 3.8-10.3 years corresponding to 11.8 to 22.9 years at recapture (Table 1). Direct age estimates were obtained from recapture FMP-L5242. Consensus age was 18+ years old (Figure 1).

Discussion

Three of the four calculated age estimates exceed the current maximum observed age for Atlantic sharpnose sharks (11.4 based on direct age estimate, and 12.0 based on recaptures). However, calculated age gives an estimate of average age at length based on von Bertalanffy growth function parameter estimates, therefore, specimens could have been younger or older than the average estimate at time of tagging. Given the uncertainty in the calculated initial age estimates, we recommend using the direct age estimate of 18+ years from recapture FMP-L5242 as the maximum observed age for both male and female Atlantic sharpnose in the SAB.

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Figure 1. Sectioned vertebra from recapture FMP-L5242 (A.), and same vertebral sectioned under greater magnification (B.). Arrows denote winter bands (19 total including the birthmark), dashed arrow denotes a reference band found in A. and B.

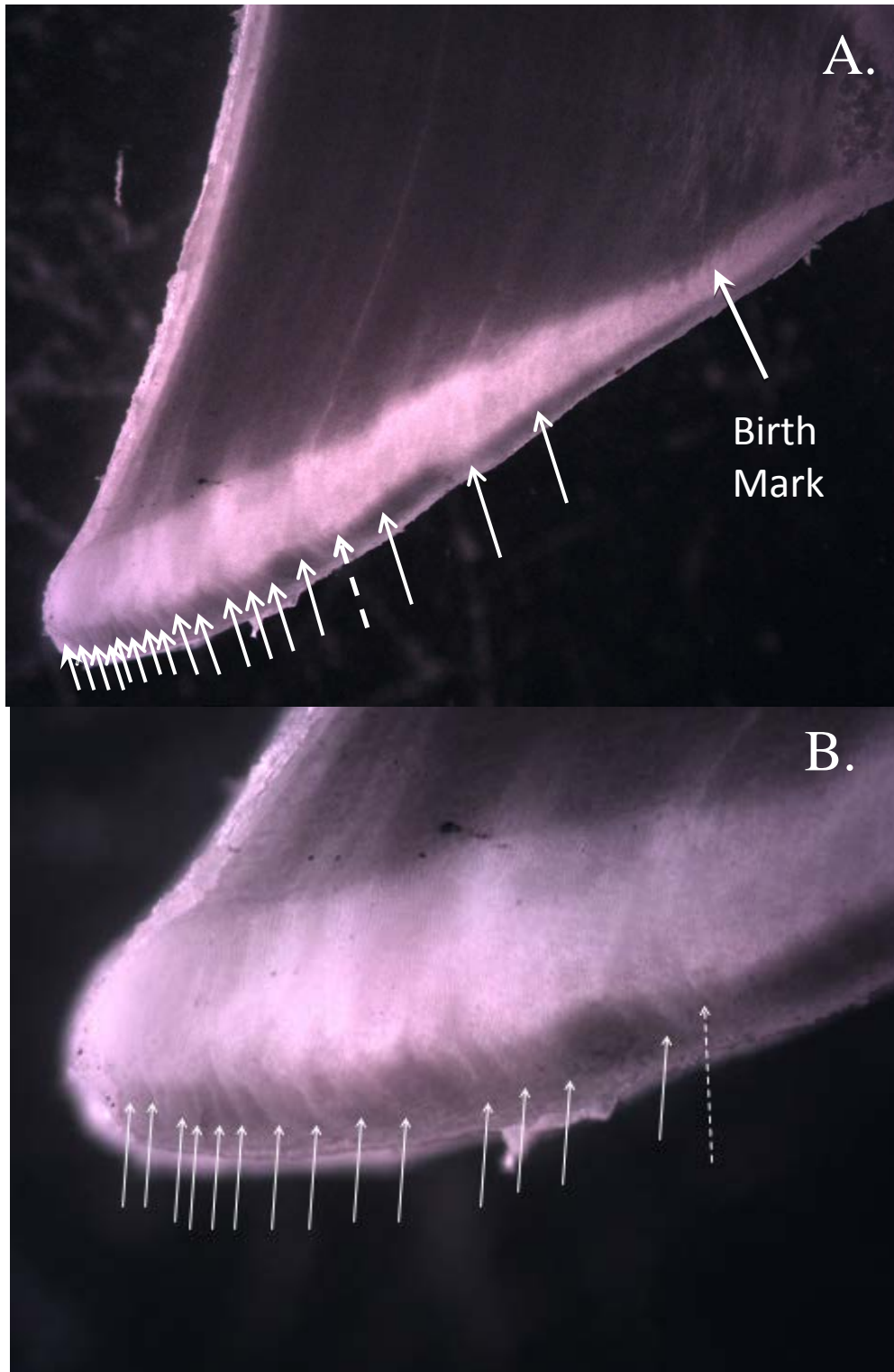


Table 1. Initial tagging and recapture information from four long-term recaptures from the South Carolina Department of Natural resources adult red drum longlining program. Fork length (FL) at initial tagging, length at recapture, growth, days and years at liberty, calculated age at initial tagging and recapture and direct age estimates are provided.

*Denotes approximate measurements as provided by recreational anglers.

Tag #	Initial FL (mm)	Recapture FL (mm)	Growth (mm)	Days at Large	Years at large	Sex	Calculated Age at Initial Tagging	Age at Recapture	Age from Vertebra Section
FMP-L4774	815	883*	68	4678	12.8	Female	10.1	22.9	
FMP-L5173	737			2937	8.0	Male	3.8	11.8	
FMP-L5242	802	830	28	4438	12.1	Male	7.7	19.8	18
FMP-L7250	810	838*	28	2806	7.7	Male	10.3	18	