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An Albino Zebra Shark *Stegostoma fasciatum* from the Indian Ocean, with Comments on Albinism in Elasmobranchs

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A white colored zebra shark identified as *Stegostoma fasciatum* (Hermann) was captured on Jan. 4, 1964 in the Indian Ocean, 11°23′S, 117°17′E by the T. S. Oshoro Maru of Hokkaido University. The shark's appearance fitted the descriptions of the species (Tanaka, 1911) except for its lack of body pigmentation. In this paper, the albino zebra shark was compared with natural colored specimens of about the same size.

Albinism is known for many animals and is relatively common in teleostean fishes, especially in the Pleuronectiformes. Its occurrence among elasmobranchs, however, has been rarely reported (Table 1).

Specimens examined were preserved in 10% formalin after storage in freezing chambers and have been deposited in the Fisheries Museum of the Faculty of Fisheries, Hokkaido University, Japan. Sampling data, sex and size were listed in Table 2. All the measurements were taken after the fixation in formalin. Measurements were made according to Bigelow and Schroeder (1948) and proportional dimensions were expressed as percent of total length. Morphometric comparisons were made between the albino and normal specimens of about same length in order to eliminate effect of sexual dimorphism and growth.

Table 1. Albinisms in elasmobranch fishes reported up to the present.

Species	Source	Sex	Size	Type	Locality
Lamniformes			Total length		
Hexanchidae					
Notorynchus maculatus	Herald (1953)	?	870 mm	Partial	San Francisco Bay
Orectolobidae					
Stegostoma fasciatum	Present paper	♀	1850 mm	Partial	Indian Ocean
Triakidae					
Mustelus californicus	Herald et al. (1960)	♂	340 mm	?	Monterey Bay
Sphyrnidae					
Sphyrna lewini	McKenzie (1970)	♂	605 mm	Complete	Georgia
Rajiformes			Disc width		
Rajidae					
Raja clavata	Traquair (1893)	♀	525 mm	Partial	Scotland
R. naevus	Wilson (1951)	♀	35 cm	?	Aberdeen
R. batis	Wilson (1951)	♀	416 mm	Partial	Aberdeen (?)
R. batis	Wilson (1951)	♂	735 mm	Partial	Aberdeen
Myliobatidae					
Rhinoptera bonasus	Schwartz (1959)	♂	775 mm	Partial	Maryland
R. bonasus	Joseph (1961)	♀	875 mm	Partial	Chesapeake Bay

Table 2. Sampling data of specimens of the zebra shark, *Stegostoma fasciatum*.

Specimen	Albino (F-751*)	Normal (F-1464*)	Normal (F-2499*)
Locality	11°23′S, 117°17′E	South China Sea	03°06′N, 109°39′E
Date	January 4, 1964	November, 1966	November 29, 1971
Gear	Otter trawl	Otter trawl	Otter trawl
Sex	Female	Female	Male
Total length	1850 mm	1805 mm	1728 mm

* Catalogue number of the fish collection of Fisheries Museum, Faculty of Fisheries, Hokkaido University.

Observations

Proportional dimensions are shown below in order of white and normal female. As the origins of the dorsal and anal fins were obscure, some measurements could not be made.

Trunk at origin of pectorals: width 9.7, 11.1; height 14.1, 13.1

Snout in front of: orbit 5.1, 4.8; outer nostrils 0.9, 1.1; mouth 3.6, 3.1

Head: width 13.5, 13.9; height 11.9, 12.5

Distance from tip of snout to: spiracle 7.4, 7.3; 1st gill opening 11.6, 11.1; 5th gill opening 16.4, 15.4; origin of pectorals 14.2, 14.0; posterior tip of 1st dorsal 41.0, 42.3; posterior tip of 2nd dorsal 53.7, 53.6; origin of upper caudal 58.4, 58.3; origin of lower caudal 58.5, 59.1

Eye: horizontal diameter 1.0, 1.0

Mouth: width 5.4, 5.6; height 0, 0

Labial furrow: upper 1.4, 1.4; lower 1.2, 1.4

Nostrils: distance between inner ends 5.1, 5.2

Gill opening lengths: 1st 2.3, 2.5; 2nd 2.8, 2.6; 3rd 2.8, 2.8; 4th 2.4, 2.4; 5th 2.4, 2.2

Pectoral fin: outer margin 18.8, 19.1; inner margin 5.4, 5.0; distal margin 15.6, 15.4

First dorsal fin: vertical height 5.6, 5.4

Second dorsal fin: vertical height 2.8, 2.8

Anal fin: vertical height 4.5, 4.9

Caudal fin: upper lobe 42.6, 42.2; lower lobe 5.3, 5.2

Interspace between: 2nd dorsal and caudal 8.1, 8.9; anal and caudal 3.2, 3.6

Distance from origin to origin of: pectoral and pelvics 20.4, 20.8

Morphological characters except body color, of the albino specimen are within the range of intraspecific variation of normal zebra sharks.

White specimen: Body color uniformly white with very slight red tint; none of black spots or blotches present above and below; margin of fins greyish. Iris blackish brown.

Normal specimens: Ground body color dirty yellow; many blackish brown spots somewhat larger or smaller than orbit present on dorsal and lateral parts of body, dorsal fins, caudal fin, and upper sides of pectoral and pelvic fins. Blackish brown spots on head smaller anteriorly, without spots near tip of snout. Yellowish white on ventral part of body and lower sides of pectoral and pelvic fins. Iris blackish brown.

Discussion

In spite of the difficulties in obtaining body measurements, no morphometric differences

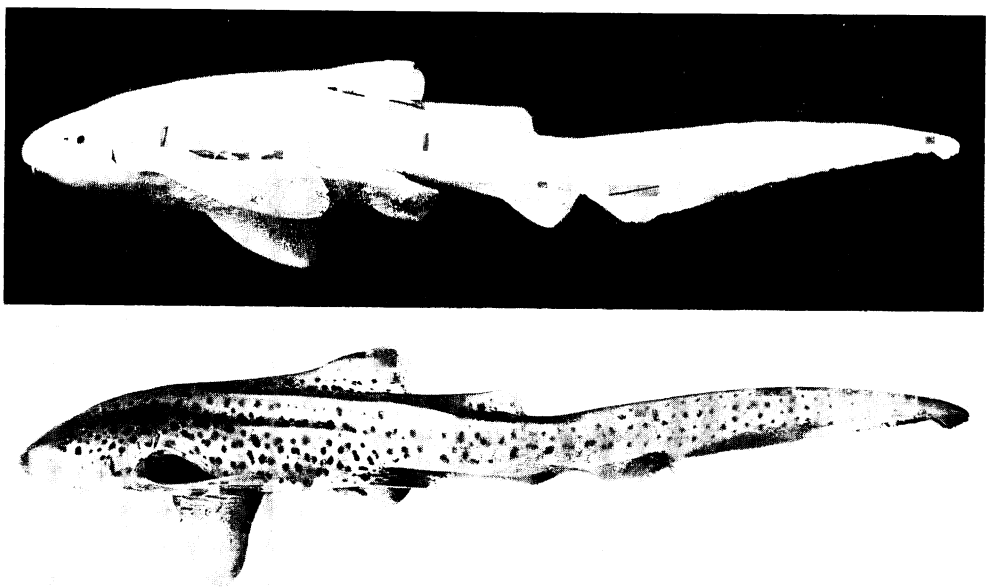

Fig. 1. Albino and normal zebra shark, *Stegostoma fasciatum*. Top: Albino specimen, 1850 mm TL, female, collected from the Indian Ocean (F-751). Bottom: Normal specimen, 1728 mm TL, male, collected from the South China Sea (F-2499).

were found between the specimens examined. Most proportional differences were within one percent. The greatest difference was 1.4% in trunk breadth, a factor which may have been an artifact of preservation.

On examining the albino specimen, it would have been helpful to know the color of the eyes on capture. Though the color of the eyes of the white specimen was not investigated when captured, the specimen must have had normal eyes, because the white specimen had blackish-brown iris similar to that of "normal" preserved specimens in formalin. Hence I conclude the Indian Ocean specimen was a partial albino, which is the largest albino elasmobranch fish reported.

It is interesting that this albino zebra shark has grown so large in spite of its white color which appears to be disadvantageous to the specimen in making it more conspicuous at the bottom.

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Literature cited

Bigelow, H. B. and W. C. Schroeder. 1948. Sharks. *In* Fishes of the Western North Atlantic. pt. 1. Sears Found. Mar. Res., 59～576, figs. 6～106.

Herald, E. S. 1953. The 1952 shark dervies at Elkhorn Slough, Monterey Bay and at Coyote Point, San Francisco Bay. California Fish Game, 39(2): 237～243, figs. 1～3.

Herald, E. S., W. Schneebeli, N. Green, and K. Innes. 1960. Catch reports for seventeen shark dervies held at Elkhorn Slough, Monterey Bay, California. California Fish Game, 46(1): 59～67.

Joseph, E. B. 1961. An albino cownose ray, *Rhinoptera bonasus* (Mitchill) from Chesapeake Bay. Copeia, 1961 (4): 482～483, fig. 1.

McKenzie, M. D. 1970. First record of albinism in the hammerhead shark, *Sphyrna lewini* (Pisces; Sphyrnidae). J. Elisha Mitchell Sci. Soc., 86(1): 35～37, fig. 1.

Schwartz, F. J. 1959. White cownose ray, *Rhinoptera bonasus*, from Tangier Sound, Maryland. Maryland Tidew. News, 15(3): 12.

Tanaka, S. 1911. Figures and descriptions of the fishes of Japan. Daichi Shoin, Tokyo. 4: 51～70, pls. 16～20.

Traquair, R. H. 1893. An unusually coloured example of the thornback, (*Raia clavata*, Linn.). Ann. Scot. Nat. Hist., 1893: 25, pl. 1.

Wilson, E. 1951. Colour deficiency in skate (Raiidae). Proc. Zool. Soc.London, 121: 557-559, pl. 1.

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インド洋産トラフザメの白子　　仲谷　一宏

1964 年 1 月，インド洋で全長 1850 mm の白いトラフザメが捕獲された．この個体と正常なトラフザメを比較した結果，この白いトラフザメと正常なトラフザメの間の唯一の差は体色で，眼の色を含め他の形質にはまったく差異が見られなかった．したがって，本個体をトラフザメの不完全な白子 (partial albino) と断定した．

現在まで板鰓魚類の白化現象は本例を含め 10 例が報告されているが，本例のように大きな個体は珍らしく興味深い．

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