

RESEARCH NOTE

First record of total albinism in southern stingray *Dasyatis americana*

Primer reporte de albinismo total en la raya *Dasyatis americana*

Armando T. Wakida-Kusunoki¹

¹Centro Regional de Investigación Pesquera de Yucalpetén, Instituto Nacional de Pesca, Carretera a Chelem, Blvd del pescador s/n Puerto de abrigo, C.P. 97320, Yucalpetén, Yucatán, México. armandowakida@yahoo.com.mx

Abstract. This paper describes the first record of total albinism in the southern stingray *Dasyatis americana*. The disc width of the albino sub adult female specimen was 640 mm and the total weight was 9,850 g. It was captured in the coast of Tabasco, southeastern Mexico.

Key words: Albinism, *Dasyatis americana*, elasmobranchs, Tabasco, southeast Mexico

INTRODUCTION

Albinism is a genetically inherited condition in which the pigment protein melanin is either absent or nonfunctional (Reum 2008). Individuals with total albinism exhibit total absence of melanin involving the entire body; on the other hand, partial albinism (or leucism) is phenotypically characterized by absence of melanin in part of the body or reduction of melanin in the entire body or a part of it (Lutz 2001). Albinism appears to be more common in bony fishes than in elasmobranchs, in which it has been reported in at least 26 shark and 15 ray species (Table 1).

The southern stingray *Dasyatis americana* (Hildebrand & Schroeder, 1928) is a coastal marine and estuarine species with a wide distribution in the Western Atlantic (McEachran & Fechhelm 1998). Its geographic distribution is from New Jersey to Florida in the United States, throughout the Gulf of Mexico, Bahamas, and the Greater and Lesser Antilles, and bordering the northern coast of South America to southeastern Brazil (McEachran & Fechhelm 1998). In the western Campeche Bank, in southern Gulf of Mexico, *D. americana* is the most frequently landed among elasmobranch species, with mean landings of 1,400 tons per year in the state of Campeche, Mexico (Ramírez-Mosqueda *et al.* 2012).

This paper describes the first report of total albinism in southern stingray *D. americana* in southeastern Mexico.

MATERIALS AND METHODS

An albino subadult female *Dasyatis americana* was found during a sampling conducted on January 25, 2014 to estimate distribution sizes and yields of different species caught by commercial small scale fisheries in San Pedro,

Tabasco, in the Southern Gulf of Mexico (18°39'32.35" N, 92°28'13.45"W). The specimen was caught on a bottom-long line with circle hooks at a depth between 18 and 25 m on sandy substrate. According to information provided by the fishermen, other species were included in the same catch, such as *Bagre marinus*, *Ariopsis felis*, and *Rhizoprionodon terranova*. The specimen was collected and transported to the laboratory where it was identified using the criteria described by Hoese & Moore (1998). The disc width of the fresh specimen was measured with a metric tape and total weight (g) with electronic portable digital weight scale. The specimen was deposited in the Ichthyology Collection of the Colegio de la Frontera (ECOSUR) under catalog number ECOSC 7561.

RESULTS AND DISCUSSION

The albino southern stingray *Dasyatis americana* measures 640 mm in disc width and its total weight is 9,850 g. This specimen size corresponds to a sub adult stingray (Ramírez-Mosqueda *et al.* 2012). The entire stingray was completely white in color and devoid of any pigmentation (Fig. 1a). In pigmented specimens of *D. americana* the top of the body normally varies between olive brown and green in adults, dark grey in juveniles, whilst the underside is predominantly white (Fig. 1b).

Already 41 species of elasmobranchs have been reported with albinism (Clark 2002, Ishihara *et al.* 2001, Sandoval-Castillo *et al.* 2006, Ben-Sousii 2007, Hoare 2009, Escobar-Sanchez *et al.* 2014).

Schwartz & Safrit (1977) reported an albino specimen of *D. americana* from the coast of North Carolina, USA. This specimen was not a total albino because certain parts of the body had coloration. Until now, no record of total albino

Table 1. Albinism reports in elasmobranchs. (1): in Clark (2002); (2): in Ishihara *et al.* (2001); (3): in Sandoval-Castillo (2006); (4): in Ben-Souissi (2007); (5): in Escobar-Sanchez *et al.* (2014) / Reportes de albinismo en elasmobranchios. (1): en Clark (2002); (2): en Ishihara *et al.* (2001); (3): en Sandoval-Castillo (2006); (4): en Ben-Souissi (2007); (5): en Escobar-Sanchez *et al.* (2014)

Record	Family	Species	Albinism	Capture site	Reference
1	Hexanchidae	<i>Notorynchus cepedianus</i>	partial	California	Herald (1953)(1)
2	Cetorhinidae	<i>Cetorhinus maximus</i>	?	Norway	Froiland (1975)(1)
3	Ginglymostomatidae	<i>Nebrius concolor</i>	total	Japan	Taniuchi & Yanagisawa (1987)(1)
4	Stegostomatidae	<i>Stegostoma fasciatum</i>	total	Indian Ocean	Nakaya (1973)(1)
5	Lamnidae	<i>Carcharodon carcharias</i>	partial	?	Smale & Heemstra (1997)(1)
6		<i>Lamna nasus</i>	total		Froiland 1975(1)
7	Triakidae	<i>Mustelus californicus</i>	total	Monterey Bay	Herald <i>et al.</i> (1960)(1), Talent (1973)(1), Cohen (1973)(1)
8		<i>Mustelus schmittii</i>	total	Brazil	Ferreira Teixeira & Goes de Araújo (2002)(1)
9		<i>Triakis semifasciata</i>	total	California	Follett (1976)(1)
10		<i>Hemitriakis japonica</i>	partial	Japan	Furuta (1985)(2)
11	Hemiscyllidae	<i>Chiloscyllium plagiosum</i>	total	USA	Clark 2002 (1)
12		<i>Galeorhinus galeus</i>	total	Channel	Deynat (2003)(4)
13	Carcharhinidae	<i>Carcharhinus amboinensis</i>	partial	Australia	McKay & Beinssen (1987-1988)(1)
14		<i>Carcharhinus elanopterus</i>	total	India	Manojkumar (2011)
15		<i>Carcharhinus isodon</i>	partial	Alabama, USA	Jones <i>et al.</i> (2006)
16		<i>Carcharhinus plumbeus</i>	partial	Gulf of Gabès, Tunisia	Saïdi <i>et al.</i> 2006
17		<i>Carcharhinus obscurus</i>	total	Gulf of California	Bejarano-Álvarez & Galván-Magaña (2013)
18		<i>Galeocerdo cuvier</i>	total	Baja California sur, Mexico	Rider <i>et al.</i> 2002, (3) Sandoval-Castillo <i>et al.</i> 2006 (4)
19		<i>Scoliodon laticaudus</i>	partial	Gulf of Mexico	
20	Sphyrnidae	<i>Sphyrna lewini</i>	total	Arabian Sea	Veena <i>et al.</i> 2011
21	Orectolobidae	<i>Orectolobus japonicus</i>	total	Georgia	McKenzie (1970)(1)
22		<i>Orectolobus japonicus</i>	total	Japan	Iwamasa & Okano 1980(3)
23	Squalidae	<i>Squalus acanthias</i>	partial	Georgia	Froiland (1975)(2), Coad & Gilhen (2002)(3)
24		<i>Squalus megalops</i>	total	?	Sanda & De Maddalena (2003)(4)
25	Squatinae	<i>Squatina californica</i>	partial	Gulf of California	Escobar-Sanchez <i>et al.</i> (2014)(5)
26	Somniosidae	<i>Centroscyrmus coelolepis</i>	partial	NE Atlantic	Deynat (2003)(3)
27	Dalatidae	<i>Dalatias licha</i>	partial	Italy	Bottaro <i>et al.</i> (2005)(4)
28	Rhinobatidae	<i>Rhinobatos halavi</i>	total	Tunisia	Ben-Souissi <i>et al.</i> (2007)
29	Rajidae	<i>Raja clavata</i>	partial/tot al	Scotland	Traquair (1893)(1) Ball <i>et al.</i> (2013)
30		<i>Raja montagui</i>	total	North Sea and English Channel	Ball <i>et al.</i> 2013
31		<i>Raja brachyura</i>	total	North Sea and English Channel	Ball <i>et al.</i> 2013
32		<i>Raja naevus</i>	partial	Scotland	Wilson 1951(2)
33		<i>Dipturus batis</i>	partial	Scotland	Wilson 1951(2)
34		<i>Dasyatis americana</i>	partial	North Carolina, USA	Schwartz & Safrir Jr.(1977)(1)
35		<i>Dasyatis pastinaca</i>	partial	Tunisia	Capapé & Pantoustier (1975)(1)
36		<i>Okamejei kenojei</i>	partial	West Pacific	Ishihara <i>et al.</i> (2001)(3)
37	Rhinopterae	<i>Rhinoptera bonasus</i>	partial	Maryland Chesapeake Bay	Schwartz (1959)(1) and Joseph (1961)(3)
38		<i>Zanobatus schoenleinii</i>	partial	Senegal	Diatta <i>et al.</i> 2013
39	Myliobatidae	<i>Myliobatis californica</i>	total	California	Jesus-Roldan (1990)(3)
40	Torpedinidae	<i>Torpedo torpedo</i>	total	Tunisia	Ben Brahim <i>et al.</i> (1998)(3)
41	Mobulidae	<i>Manta birostris</i>	partial	West Pacific	Ishihara <i>et al.</i> 2001(2), Marshall <i>et al.</i> (2009)
42	Narcinidae	<i>Narcine entemedor</i>	total	Baja California Sur, Mexico	Sandoval-Castillo <i>et al.</i> 2006

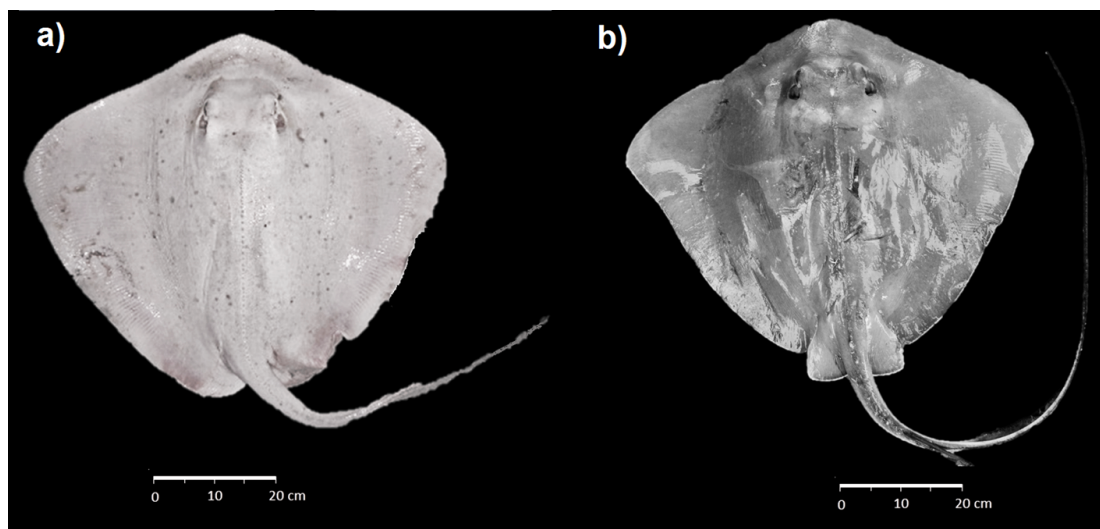


Figure 1. Dorsal view of the southern stingray *Dasyatis americana*. a) albino and b) normal. (Photo by A.T. Wakida-Kusunoki). Photographs were taken to fresh specimens / Vista dorsal de la raya sureña *Dasyatis americana*. a) albino y b) normal. (Fotografía de A.T. Wakida-Kusunoki). Fotografías tomadas de un espécimen en estado fresco

southern stingray has been reported. On Mexican Gulf coast, albinism has been reported only in catfish *Bagre marinus* (Wakida-Kusunoki & Amador del Angel 2013).

The occurrence of albinism in fishes might be caused by three factors: random genetic alterations, contamination effects, or genetic alteration due to small population size (Evangelista-Leal *et al.* 2013). The coastal zone of Tabasco and Campeche is impacted by oil extraction and discharge of rivers. The main sources of heavy metals in the area include mineral deposits, chronic natural oil seep (natural sources) rivers and municipal discharges and oil (anthropogenic sources) (Ponce-Velez *et al.* 2006). Recent studies indicate that the concentrations of heavy metals in sediment south of the Gulf of Mexico are in the range reported for other coastal regions of the Gulf of Arabia, Jordan, Kuwait and England (Ponce-Velez *et al.* 2006). Also, reports of heavy metal concentrations in muscle tissue of organisms such as fish and crustaceans are below thresholds of international standards (Vázquez *et al.* 2008).

The fishing pressure on *Dasyatis americana* of this region has been high. Its mean landings are 1,964 tons per year in the state of Campeche and Tabasco (CONAPESCA 2012)¹. The lack of fishery management measures in bottom long line fishery might have caused a decline in the abundance of this species. The small effective population size might have favored inbreeding and increased the homozygosity in the albinism gene (Sanabria *et al.* 2010).

The lack of coloration in albinos has been suggested to increase susceptibility to predation or render them less attractive for reproduction (Sandoval-Castillo *et al.* 2006); higher susceptibility to disease and poor vision may decrease the viability of albinos. This is the second report of albinism in fishes from the southeastern Gulf of Mexico. Both reports are species subject to commercial fishing with a high number of individuals being captured for decades with no previous record of albinism. This, then, is a rare event still undetected in most wild fish species, at least regarding adult individuals.

Although the albinism events recorded might be the result of random events, the fact remains that human factors such as pollution and excessive fishing pressure might be involved, thereby warranting a thorough investigation of these aspects in the region.

ACKNOWLEDGMENTS

The author would like to thank to Mario Dominguez Rodriguez, worker of the fish reception center in San Pedro, Tabasco, for donating the specimen, to Fernando T. Wakida for proofreading the last version of the manuscript, to Alexandra Toro Ramírez, Claudia Moreno Miranda and Jose Luis Cruz Sanchez for your help in the sampling survey and photographs and the anonymous reviewers for the useful comments to the manuscript.

¹CONAPESCA. 2012. Anuarios Estadísticos de Pesca. Comisión Nacional de Pesca, México. <http://www.conapesca.sagarpa.gob.mx/wb/cona/anuario_2012_zip>

LITERATURE CITED

- Ball RE, CS Jones, A Lynghammar, LR Noble & AM Griffiths. 2013.** The first confirmed cases of full albinism in rajid species. *Journal of Fish Biology* 82: 1433–1440.
- Bejarano-Álvarez OM & F Galván-Magaña. 2013.** First report of an embryonic dusky shark (*Carcharhinus obscurus*) with cyclopia and other abnormalities. *Marine Biodiversity Records* 6: e11 <doi:10.1017/S1755267212001236>
- Ben-Sousi J, D Golani, H Méjri, M Ben-Salem & C Capapé. 2007.** First confirmed record of the Halave's Guitarfish, *Rhinobatos halavi* (Forsskal, 1775) (Chondrichthyes: Rhinobatidae) in the Mediterranean Sea with a description of a case of albinism in elasmobranchs. *Cahiers de Biologie Marine* 48(1): 67-75.
- Clark S. 2002.** First report of albinism in the white-spotted bamboo shark, *Chiloscyllium plagiosum*, with review of reported color aberrations in elasmobranch. *Zoo Biology* 21(6): 519-524.
- Diatta Y, C Reynaud & C Capapé. 2013.** First case of albinism recorded in striped panray *Zanobatus schoenleinii* (Chondrichthyes: Platyrrhinidae) from the coast of Senegal (eastern tropical Atlantic). *Journal of Ichthyology* 53(11): 1007-1012.
- Escobar-Sánchez O, XG Moreno-Sánchez, CA Aguilar-Cruz & LA Abitia-Cárdenas. 2014.** First case of synophthalmia and albinism in the Pacific angel shark *Squatina californica*. *Journal of Fish Biology* 85(2): 494-501.
- Evangelista-Leal M, U Horst-Schulz, P Lehmann-Albornoz, R Machado & PH Ott. 2013.** First record of partial albinism in two catfish species of *Genidens* (Siluriformes: Ariidae) in an estuary of Southern Brazil. *Brazilian Archives of Biology and Technology* 56(2): 237-240.
- Hoare D. 2009.** First record of albinism in the lesser spotted dogfish *Scyliorhinus canicula* (L.1758) (Chondrichthyes Scyliorhinidae) and a review of albinism in the others elasmobranch. *Irish Naturalist Journal* 30(2): 115-118.
- Hoese D & R Moore. 1998.** *Fishes of Gulf of Mexico: Texas, Louisiana, and adjacent waters*, 422 pp. Texas A & M University Press, College Station.
- Jones L, M Shipp & L Robert. 2006.** Oculocutaneous albinism in a finetooth shark, *Carcharhinus isodon*, from Mobile Bay, Alabama. *Gulf of Mexico Science* 24(2): 81-82.
- Ishihara H, K Homma & R Nakamura. 2001.** The occurrence of albinism in individuals of the manta ray and Japanese common skate found in the western Pacific. *IOP Diving News* 12: 6-20.
- Lutz CG. 2001.** *Practical genetics for aquaculture*, 256 pp. Blackwell Science, Oxford.
- Manojkumar PP. 2011.** First record of albinism in the blacktip reef shark *Carcharhinus melanopterus* from Malabar Coast. *Marine Fisheries Information Service, T & E Series* 208: 36. <<http://eprints.cmfri.org.in/8907/1/208-26.pdf>>
- Marshall AD, LV Compagno & MB Bennett. 2009.** Redescription of the genus *Manta* with resurrection of *Manta alfredi* (Krefft, 1868) (Chondrichthyes; Myliobatoidei; Mobulidae). *Zootaxa* 2301: 1-28.
- McEachran JD & JD Fechhelm. 1998.** *Fishes of the Gulf of Mexico, Vol 1: Myxiniiformes to Gasterosteiformes*, 1112 pp. University of Texas Press, Austin.
- Ponce-Vélez G, AV Botello & G Díaz-González. 2006.** Organic and inorganic pollutants in marine sediments from northern and southern continental shelf of the Gulf of Mexico. *International Journal of Environmental and Pollution* 26 (1/2/3): 295-304.
- Ramírez-Mosqueda E, JC Pérez-Jiménez & M Mendoza-Carranza. 2012.** Reproductive parameters of the southern stingray *Dasyatis americana* in southern gulf of Mexico. *Latin American Journal of Aquatic Research* 40(2): 335-344.
- Reum JCP, CE Paulsen, TW Pietsch & SL Parker-Stetter. 2008.** First record of an albino chimaeriform fish, *Hydrolagus colliei*. *Northwestern Naturalist* 89(1): 60-62.
- Saïdi B, MN Bradain, S Marouni, O Guélorget & C Capapé. 2006.** Atypical characteristics of an albino embryo of *Carcharhinus plumbeus* (Chondrichthyes: Carcharhinidae) from the Gulf of Gabès (southern Tunisia, central Mediterranean). *Acta Adriatica* 47(2): 167-174.
- Sanabria EA, LB Quiroga & A Laspiur. 2010.** First record of partial albinism and scoliosis in *Odontophrynus occidentalis* tadpoles (Anura: Cycloramphidae). *Brazilian Archives of Biology and Technology* 53(3): 641-642.
- Sandoval-Castillo JE, C Mariano-Melendez & C Villavicencio-Garayzar. 2006.** New records of albinism in two elasmobranchs: the tiger shark *Galeocerdo cuvier* and the giant electric ray *Narcine entemedor*. *Cybio* 30(2): 191-192.
- Schwartz FJ & GW Safrir Jr. 1977.** A white southern stingray, *Dasyatis americana*, (Pisces, Dasyatidae), from Pamlico Sound, North Carolina. *Chesapeake Science* 18(1): 83-84.
- Vázquez F, TR Florville-Alejandre, M Herrera & LM Díaz de León. 2008.** Metales pesados en tejido muscular del bagre *Ariopsis felis* en el sur del golfo de México (2001-2004). *Latin American Journal of Aquatic Research* 36: 223-233.
- Veena S, S Thomas, SG Raje & R Durgekar. 2011.** Case of leucism in the spadenose shark, *Scoliodon laticaudus* (Müller and Henle, 1838) from Mangalore Karnataka. *Indian Journal of Fisheries* 193(58): 109-112.
- Wakida-Kusunoki AT & LE Amador del Ángel. 2013.** First record of albinism in gafftopsail catfish *Bagre marinus* (Pisces: Ariidae) from southeast Mexico. *Revista de Biología Marina y Oceanografía* 48(1): 203-206.

Received 2 July 2014 and accepted 26 December 2014

Editor: Claudia Bustos D.