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OCCURRENCE OF THE FINETOOTH SHARK, *CARCHARHINUS ISODON*, OFF DAUPHIN ISLAND, ALABAMA¹

Carcharhinus isodon (Valenciennes) is an infrequently encountered species with a poorly known life history. The literature on this species covering the western North Atlantic contains much information on juveniles, but very little on adults. All lengths discussed herein are total lengths.

Radcliffe (1916) reported a single specimen 50.8 cm in the Bureau of Fisheries collection at Beaufort, N.C. Burton's (1940) record of an immature male, 74.4 cm, was the first from South Carolina waters. Specimens examined by Bigelow and Schroeder (1948:304-308) ranged from 46 to 56.7 cm. Springer (1950) examined 20 adult females 147-155 cm collected in December off Salerno, Fla. Thirteen had from one to six embryos 43-48 cm; the remaining seven had enlarged flaccid uteri and medium-sized ovarian

¹Contribution No. 028, Dauphin Island Sea Lab.

eggs. He suggested a winter pupping period. Clark and von Schmidt (1965) recorded only a single female (76 cm) in 9 yr of shark research off Sarasota, Fla. Dahlberg and Heard (1969) reported the capture of 30 individuals from July through September 1968 off Georgia. Of these, 29 were between 52 and 94 cm. The other specimen (144 cm) was probably the only mature individual, although there was no mention of sex or reproductive development. Hoese and Moore (1977, appendix 5) listed *C. isodon* as a spring through fall spawner based on collections of juveniles at Port Aransas, Texas. Compagno (1978), in his review of the species, assigned this species to the genus *Carcharhinus*.

During longlining operations in the northern Gulf of Mexico in summer 1978, a gravid female and two males were collected off Dauphin Island, Ala. On 2 July 1979 one male and one female were collected in the mouth of Mobile Bay. With so few reports of mature *C. isodon*, these captures will serve to better define the reproductive life history of this species.

On 5 June 1978 the gravid female (139 cm) was collected by longline in water about 5 m deep, approximately 1 km southwest of Sand Island, a small barrier island approximately 5 km south of the east end of Dauphin Island. The shark carried four embryos ranging from 49 to 51 cm. These appeared to be near-term pups. There were two pups in each uterus, each positioned with the head toward the anterior end of the uterus. Each pup was enveloped by a membrane which was filled anteriorly with a translucent yellow fluid. Each had a highly vascularized placenta attached to the posterior portion of the uterus, and the connecting umbilical cords measured 20.6-30.0 cm. Where an umbilical cord attached to a placenta there were three saclike extensions containing a small amount of clear fluid. In earlier embryonic stages of other species of carcharhinid sharks these sacs contain the remaining unconsumed portion of the yolk (Gilbert and Schlernitzauer 1966). The left uterus contained two males; the right uterus one male and one female. The pups and jaws of the female were deposited in the

TABLE 1.—Measurements (centimeters; methods after Bass et al. 1973) of the gravid female *Carcharhinus isodon* and the four pups.

Item	Gravid female	Pup no. 1 male	Pup no. 2 male	Pup no. 3 male	Pup no. 4 female
Total length	139	49	51	50.5	50.5
Fork length	118	38.5	40.5	40	40.5
Standard length	106	35	37	36	36.5
Snout to:					
Dorsal 1	46	15.7	16.5	16.5	16.5
Dorsal 2	90	30.2	31.5	31	32.5
Pectoral fin	31.5	11	12.2	11.9	12.2
Pelvic fin	74	22.8	25.4	23.8	24.2
Anal fin	88	28.9	31.9	31.3	30.4
Mouth	9	3.9	3.9	3.8	3.8
Mouth breadth	13	4.1	4.4	4.2	4.1
Between nostrils	7	2.7	2.7	2.7	2.8
Eye diameter	1.8	.8	.8	.8	.7
Gill lengths:					
No. 1	8	2.5	2.3	2.2	2.3
No. 2	8.6	2.6	2.5	2.4	2.5
No. 3	9	2.7	2.7	2.6	2.6
No. 4	8.5	2.5	2.4	2.3	2.4
No. 5	7.5	2.1	1.8	1.8	1.8
Dorsal 1 height	14.7	3.9	3.8	3.5	3.8
Dorsal 1 base	14	4.3	4.6	4.6	5.1
Dorsal 1 free margin	5.5	2.0	2.2	1.8	2.0
Dorsal 2 height	4.0	1.2	1.4	1.4	1.1
Dorsal 2 base	6.5	1.9	2.2	2.2	2.1
Dorsal 2 free margin	5.5	2.0	2.2	1.9	1.9
Anal height	4.3	1.4	1.5	1.5	1.3
Anal base	7.4	2.2	2.4	2.4	2.1
Anal free margin	4.8	1.9	1.9	1.8	1.8
Pectoral height	22	6.0	6.9	6.3	6.5
Pectoral base	8	2.5	2.6	2.5	2.5
Pectoral free margin	6.5	2.2	2.4	2.4	2.4
Pelvic anterior margin	6.5	2.4	2.6	2.7	2.8
Pelvic distal margin	8.8	2.8	2.9	2.7	2.8
Upper caudal length	39	13.8	14.9	14.7	14.1
Lower caudal length	17.5	5.1	5.5	5.1	5.4
Interspace base dorsal 1 to origin dorsal 2	33	10.1	10.2	9.9	10.3
Interspace base dorsal 2 to caudal pit	10.5	3.8	3.9	3.4	3.4
Origin of pectoral to origin of pelvic	42	11.0	13.2	11.9	12.0
Origin of pelvic to origin of anal	16	6.1	6.5	7.5	6.2
Weight (g)	—	704	810	737	758

University of South Alabama Ichthyological Collection (USAIC 6278). Measurements and weights are found in Table 1.

Since most records of *C. isodon* are of juveniles, there is little information on the reproductive biology of the species. Based on the cited literature and these data, pups appear to be 45-55 cm at birth. However, seasonality is uncertain as the records of Springer (1950) are not in accord with those of either Hoese and Moore (1977) or this report.

Length at maturity can be closely estimated. One male (112 cm) collected 13 July 1978 was immature—based on incomplete calcification of the claspers and incompletely developed siphon sacs, each sac being 7.5 cm long and 1.0 cm wide. The other two males (120 and 127 cm) collected 2 July 1979 and 28 June 1978 had well-calcified claspers and fully developed siphon sacs. The only literature on mature males (Springer 1950) listed lengths of 140-152 cm. Males apparently mature between 115 and 120 cm. Maturity in females must be reached at a larger size. The female collected in July 1979 was 127 cm, yet was immature with only small undeveloped ovarian eggs. The gravid female reported here was 139 cm, and those reported by Springer (1950) were 147-155 cm.

Carcharhinus isodon was only collected when similarly sized specimens of blacktip shark, *C. limbatus*, were caught: 3 *C. limbatus* (126-166 cm) with the gravid female, 12 *C. limbatus* (102-117 cm) with the 112 cm male, 2 *C. limbatus* (111 and 124 cm) with the 127 cm male, and 12 *C. limbatus* (100-130 cm) with the two specimens caught in 1979. If *C. isodon* is an uncommon straggler into the northern Gulf of Mexico it may be schooling with other sharks of like size. Sharks that school have been noted to do so by sex or size (Ford 1921).

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SHEDDING RATES OF PLASTIC AND METAL DART TAGS FROM ATLANTIC BLUEFIN TUNA, *THUNNUS THYNNUS*¹

In 1971, the International Commission for the Conservation of Atlantic Tunas (ICCAT) recommended that a double-tagging experiment be conducted on Atlantic bluefin tuna, *Thunnus thynnus*, to determine whether plastic or metal dart tags were more efficient and to estimate immediate and instantaneous tag shedding rates. A knowledge of shedding rates is necessary so that appropriate adjustments can be made when estimating mortality rates from tag return data. This study was begun in 1971 by the National Marine Fisheries Service (NMFS), the Woods Hole Oceanographic Institution (WHOI), and the Fisheries Research Board of Canada (FRBC). The

¹ Southeast Fisheries Center Contribution Number 80-14M.