

## Age, Growth, and Reproduction of the Spinner Shark, *Carcharhinus brevipinna*, in the Northeastern Waters of Taiwan

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**Shoou-Jeng Joung, Yih-Yia Liao, Kwang-Ming Liu, Che-Tsung Chen, and Len-Chi Leu (2005)** Age, growth, and reproduction of the spinner shark, *Carcharhinus brevipinna*, in the northeastern waters of Taiwan. *Zoological Studies* 44(1): 102-110. Age, growth, and reproduction of the spinner shark, *Carcharhinus brevipinna* (Müller and Henle, 1938), are described from 383 specimens (193 females and 190 males) collected from Oct. 1995 to Sep. 1996 in waters off northeastern Taiwan. Annuli in precaudal vertebrae form once a year and numbered up to 21 and 17 for females and males, respectively. The von Bertalanffy growth parameters estimates, based on age and back-calculated length data, were as follows: asymptotic ( $L_{\infty}$ ) = 288.2 cm total length (TL), growth coefficient ( $k$ ) = 0.151/yr, age at 0 length ( $t_0$ ) = -1.988 yr for females; and  $L_{\infty}$  = 257.4 cm TL,  $k$  = 0.203/yr,  $t_0$  = -1.709 yr for males. The growth rate for females was estimated to be 29.9 cm for the 1st year, and then decreased from 25.7 to 16.3 cm/yr for years 2~5, from 14.0 to 7.7 cm/yr for years 6~10, and from 6.6 to 1.7 cm/yr for years 11~20. Growth rate for males was 33.4 cm/yr for the 1st year, then decreased from 27.3 to 14.8 cm/yr for years 2~5, from 12.1 to 5.4 cm/yr for years 6~10, and from 4.4 to 0.7 cm/yr for years 11~20. The mean total lengths at maturity were estimated to be 222.5 and 220.5 cm for females and males, which corresponded to 7.8 and 7.9 yr, respectively. Evidence suggested a 2 yr reproductive cycle in females, with a gestation period of 10~12 mo. *Carcharhinus brevipinna* is viviparous, with a yolk-sac placenta. The number of embryos per litter (N) was 3~14 (mean, 8.5), and it increased with the size of the mother ( $N = -45.06 + 0.198TL$ ). TL at birth was estimated to be 65~70 cm, and the sex ratio of embryos was 1: 1. <http://www.sinica.edu.tw/zool/zoolstud/44.1/102.pdf>

**Key words:** Age and growth, Reproduction, Spinner shark, Taiwan.

The spinner shark, *Carcharhinus brevipinna* (Müller and Henle, 1938) is common in coastal warm-temperate, subtropical, and tropical regions worldwide (Compagno 1984). It is found abundantly off northeastern Taiwan, representing an important species for the commercial shark fishery in this area. According to catch statistics from the Nanfangao fish market, the biggest landing port for the shark fishery in northeastern Taiwan, annual landing of this species is about 115 tons, and ranks 6th (6%) in weight among all shark species

in the region. This species is caught mostly in Oct. to Apr. when waters are cooler in this region (Liu et al. 2001).

To date, biological information on the spinner shark is limited. Clark and von Schmidt (1965) documented the reproductive biology of this species in the Northwest Atlantic. Branstetter (1982) described the key characters of species identification for *C. brevipinna* and *C. limtatus*. Age, growth, and reproduction estimates are available for the northwestern Atlantic (Branstetter

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