

Age and Growth Estimates of the Blacktip Sawtail Catshark *Galeus sauteri* in Northeastern Waters of Taiwan

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Kwang-Ming Liu, Chia-Ping Lin, Shoou-Jeng Joung, and Shyh-Bin Wang (2011) Age and growth estimates of the blacktip sawtail catshark *Galeus sauteri* in northeastern waters of Taiwan. *Zoological Studies* 50(3): 284-295. The blacktip sawtail catshark *Galeus sauteri* is a small, demersal species that inhabits tropical and subtropical coastal waters of the western Pacific region. It is one of the most important small shark species in terms of catch biomass for the trawl fishery in Taiwanese waters, but its stock status is poorly known. In this study, age and growth of this species were described from 739 specimens (388 females and 351 males, 8.5-49.8 cm in total length; TL) collected from Nov. 2007 to Oct. 2008 in waters off northeastern Taiwan by demersal or shrimp trawlers. Sex-specific relationships between the weight (TW) and TL significantly differed and could be expressed as: $TW = 2.09 \times 10^{-3} TL^{3.10}$ ($n = 1052$, $p < 0.05$) for females and $TW = 3.45 \times 10^{-3} TL^{2.94}$ ($n = 884$, $p < 0.05$) for males. Age was determined using band-pair reading of sectioned vertebrae. A single growth band pair (comprising translucent and opaque bands) is formed each year, and up to 14 and 12 band pairs were respectively observed for females and males. An edge analysis indicated that the translucent bands formed from July to Aug. Four growth functions, the traditional von Bertalanffy (VBGF), VBGF with a fixed size-at-birth (L_0), Gompertz, and Robertson (logistic) were used to model the observed length-at-age data. The sex-specific growth equations significantly differed. The logistic function had the best fit for both sexes, and the growth parameters including the 95% confidence intervals with a bootstrap method were estimated as follows: asymptotic length $L_\infty = 48.30$ (47.16-49.47) cm TL, and growth coefficient $k = 0.374$ (0.344-0.402) yr^{-1} for females, $L_\infty = 44.29$ (42.91-45.88) cm TL and $k = 0.392$ (0.356-0.429) yr^{-1} for males. The ages at maturity were respectively estimated to be 9.14 and 7.57 yr for females and males, by substituting the mean sizes at maturity into the Robertson growth equation. Longevities of females and males were respectively estimated to be 20.9 and 12.4 yr. <http://zoolstud.sinica.edu.tw/Journals/50.3/284.pdf>

Key words: Life history parameters, Vertebra, Robertson function, Bootstrap method, Longevity.

Sharks are the top predators and play important roles in marine ecosystems; however, their catch statistics are generally lacking due to the low economic value of their meat. This situation is even worse for small sharks, with species-specific catch data of such sharks generally unavailable. For example, the leafscale gulper shark *Centrophorus squamosus* and Portuguese dogfish *C. coelolepis* were recorded as the same species, *siki*, by the French demersal trawl fishery (Anon 2002, Figueiredo et al. 2005).

Sharks smaller than 150 cm in total length (TL) are grouped as *cazon* in Mexico. In Taiwan, shark catch statistics are categorized into (1) large, pelagic sharks and (2) small, demersal sharks in the *Fisheries Statistics Yearbook Taiwan* (Anon 2009). The latter includes the young of large sharks such as scalloped hammerhead *Sphyrna lewini*, silky shark *Carcharhinus falciformis*, and small sharks, i.e., blacktip sawtail catshark *Galeus sauteri*, whitespotted bamboo shark *Chiloscyllium plagiosum*, and starspotted smoothhound *Mustelus*

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