Age and Growth of Lionfish from the Western North Atlantic

KEY WORDS: Lionfish, *Pterois volitans* and *P. miles, age,* growth, otoliths

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Edad y Crecimiento del Pez Leon *Pterois volitans* del Atlantico Norte Occidental

PALABRAS CLAVE: Pez león, *Pterois volitans* and *P. miles,* crecimiento, edad

Âge et la Croissance des Rascasses Volantes de l'Atlantique Nord Ouest

MOTS CLÉS: Rascasses volantes, *Pterois volitans* and *P. miles*, croissance, âge

EXTENDED ABSTRACT

An age and growth study of lionfish, *Pterois volitans* and *P. miles*, was conducted using sagittal otoliths collected from 2004-2009 from Onslow Bay, North Carolina. Specimens were collected primarily by research divers using nets and spears. A few fish were caught on commercial and recreational hook and line gear. Sagittal otoliths (n = 814) were removed from lionfish ranging in size from 90 – 464 mm total length (TL). When viewed whole, the sagittal otoliths were highly opaque making the annuli difficult to discern; therefore, the otoliths needed to be sectioned for age determination. Otoliths were relatively small and fragile, and required embedding in epoxy to be sectioned. Based on marginal increment analysis and consistency in radial measurement to the first presumed annulus, the alternating pattern of opaque and translucent zones appeared annular in nature. Annuli counts were adjusted to calendar age based on month of capture and formation of the opaque zone. Thus, lionfish ranged from calendar age 0 to 8 years, and most of the fish (90%) were age 3 or younger. Growth was rapid during the first and second year of life, attaining on average 150 mm TL within the first year, but also reaching up to 220 mm TL. During the second year, lionfish averaged 230 mm TL, but were as large as 318 mm TL. The von Bertalanffy growth equation based on observed TL at age is $L_t = 455.1(1 - e^{-0.32(t + 1.22)})$.

Based on this assessment, the earliest back-calculated spawning year is 1998 (n = 1) which corresponds well with the first report of lionfish in Onslow Bay, NC which was in 2000. The lionfish collected for this study are from the early time period of their invasion to the southeastern US. We cannot infer their maximum age at this time. A specimen from the Seattle Aquarium was examined after it had died. Aquarium personnel estimated the specimen's age to be 30 years and the opaque zone count on the sectioned otolith corroborates the age to be 30 - 33 years old (Figure 1; pers. comm. Charles Hutchinson and Delsa Anderl, NOAA/NMFS/Alaska Fisheries Science Center, Seattle, WA). Coupled with recently published reproductive data, we conclude that lionfish can reach sexual maturity within one year. Lionfish do not appear to recruit to hook and line gear often until they attain at least 300 mm TL. Most of our specimens from the commercial and recreational fisheries (13 of 18) were greater than 380 mm TL. These characteristics may partly explain the rapid establishment of lionfish in the Atlantic.

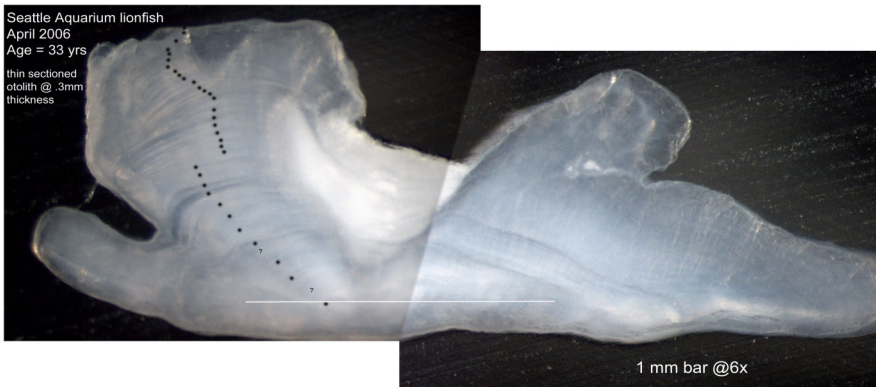

Figure 1. Thin section from sagittal otolith of a lionfish that was held at the Seattle Aquarium. Age estimated to be 30 - 33 years.