

RESEARCH ARTICLE

Some biological aspects and molecular variations in frigate tuna, *Auxis thazard* of the coastal waters around Sri Lanka[†]

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Abstract: *Auxis thazard* (frigate tuna), is a commercially important fish species in Sri Lanka. Although Sri Lanka is fortunate to have a large resource of tuna, little information is available on the biology, genetics and stock structure of *A. thazard*. Hence, the present study was conducted to study the biology, genetics and stock structure of *A. thazard* in coastal waters around Sri Lanka. The fish samples were collected from October 2015 to September 2017 from day-boats operating in the Western, North Western, Eastern and Southern Provinces of Sri Lanka. For this period, the length-weight relationship and Fulton's condition factor (K) calculated for *A. thazard* using standard length measured in centimetres and weight measured in grams were shown as $W = 0.1091L^{3.3385}$ and 1.93, respectively, indicating a relatively healthy growth pattern and a comparatively unpolluted habitat. Studies on the stomach contents revealed that *A. thazard* are non-selective carnivores, feeding on diverse animal prey items such as small fish species, shrimps and cephalopods available in the surrounding waters. The fecundity of female *A. thazard* was shown to be 48,056 to 267,000 eggs. The calculated GSI values showed that the peak spawning period for male *A. thazard* extends from May to August and for the females from May to July. The phylogenetic analysis of the mitochondrial D-loop region sequences of 75 selected samples representing all the geographical regions studied showed that the fish of different regions are clustering together. Hence, for fisheries management strategies, *A. thazard* found in the coastal waters of the Western, North Western, Eastern and Southern Provinces of Sri Lanka could be considered as a single stock.

Keywords: *Auxis thazard*, feeding, frigate tuna, growth, stock identification.

INTRODUCTION

Auxis thazard (frigate tuna), also called *Alagoduwa* in the local market, is a very important neritic tuna species in Sri Lanka. There are three species of neritic tuna, *Euthynnus affinis* (kawakawa), *Auxis thazard* (frigate tuna) and *Auxis rochei* (bullet tuna), commonly occurring in the coastal waters of Sri Lanka. The neritic tunas constitute approximately 13 % of the total tuna production of the country (Bandaranayake & Maldeniya, 2012). In 2015, *A. thazard* has contributed 38 % while *A. rochei* and *E. affinis* have contributed 39 % and 23 %, respectively to the total neritic tuna catch of Sri Lanka (Rathnasuriya *et al.*, 2017). A higher percentage of neritic tuna production has been recorded from the Southern and Southeastern parts of the country (Perera *et al.*, 2014). It has been reported that in the recent past, Sri Lanka, India, Indonesia and Iran together have accounted for 90 % of *A. thazard* catch of the world (IOTC, 2014). Frequently, *A. thazard* is misidentified as *A. rochei* and the catch is reported as a combination of these two species. Neritic tunas are caught by a variety of gear types, such as gillnets, handline and troll-line in the coastal waters around the country (IOTC, 2016).

However, there is very limited information available on the biology and stock structure of *A. thazard* of the Indian Ocean (IOTC, 2016). The biology, genetics and fishery of *A. thazard* have been studied in India

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