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Analysis of Kawakawa (*Euthynnis affinis*) landings in Sri Lanka and estimate the length-weight and length-length relationships

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Abstract

Large Pelagic fish landings including neritic tuna landings made by the fishing vessels operated in Sri Lankan waters and high seas were monitored during 2005-2012 period at fishery harbours and major fish landing centres. The neritic tuna is one of the important groups in the commercial marine fish landings of Sri Lanka since it contribute more than 10% of the total landings of tuna and tuna like species. Four species of neritic tunas are frequently found in Sri Lankan waters namely *Auxis thazard* (frigate tuna), *Auxis rochei* (bullet tuna), *Euthynnis affinis* (kawakawa) and *Scomberomorus commerson* (narrow- barred spanish mackerel). Kawakawa contributes only about 15% of the neritic tuna production. Gillnet has effectively been contributing for catching kawakawa since around 68% of the total landings are coming from gillnets. Ring net and gillnet - long line combination contribute about 17% and 8% of the total kawakawa landings respectively. However, the highest average kawakawa catch (catch per boat) was recorded for the boats operated with ring nets (31 Kg per trip). The boats operated with gillnets catch only about 17Kg per trip. A considerable variation of kawakawa catch was also noted among the different vessels. The vessels mostly operated in offshore waters reported more catches than the vessels operated in coastal waters and high seas. Different length measurements (Total length – TL, Fork length – FL and Standard length – SL) and weight measurements of the fish were obtained and they were used to derive the Length - Weight and Length - Length relationships of kawakawa. All relationships were significant at 0.01.

Introduction

Sri Lanka is one of the oldest and most important tuna producing island nations in the Indian Ocean. Skipjack tuna (*Katsuwonus pelamis*), and Yellowfin tuna (*Thunnus albacares)* are the key tuna species found in Sri Lankan waters. The neritic tuna is one of the important groups in the commercial landings of Sri Lanka since it contribute more than 10% of the total landings of tuna and tuna like species. Four species of neritic tunas are frequently found in Sri Lankan waters namely *Auxis thazard* (frigate tuna), *Auxis rochei* (bullet tuna), *Euthynnis affinis* (kawakawa) and *Scomberomorus commerson* (narrow- barred spanish mackerel). The most frequently found neritic tuna species is frigate tuna and this species contributes more than 50% of the total neritic tuna production in the country. However, Kawakawa contributes only about 15% of the neritic tuna production.

Fishing crafts and Catch rates of Kawakawa

A range of fishing crafts catches kawakawa too while they are targeting key tuna species. Both single day boats and multiday fishing boats catch kawakawa. In general, single day boats engaged in tuna fishery may target either oceanic tunas or neritic tunas (mainly frigate tuna and bullet tuna). However, the fishery is seasonal. Multiday fishing vessels mostly target yellowfin tuna and skipjack tuna. A classification of single day and multiday vessels which may catch kawakawa is shown in Table 1. UN1 and UN2A are single day boats whereas others are multiday boats. In general, single day boats operate within the continental shelf. The catch rates of the different vessels in terms of kawakawa catch in Kg per trip is shown in Table 2. The vessels operate in coastal waters (UN1 and UN2A) reported less catch rates of kawakawa. Also, the catch rates of the vessels mostly operated in high seas (UN4) was the lowest.

Table 1. Classification of single day and multiday fishing vessels in Sri Lanka

Boat category	Boat Description
UN1	
UN2A	
UN2B	8.8 - 9.8 m (28' - 34'). FRP or wooden, Inboard engine (single) - 40 HP Insulated fish hold - no gear hauler, may have GSP/sounder/fish finder
UN3A	9.8 - 12.2 m (34' - 40'). FRP or wooden. Inboard engine (single) - 60 HP Insulated fish hold and may have gear- hauler/ GSP/sounder/fish finder
UN3B	12.2 m – 15.2 m (40' - 50'). FRP or wooden. Inboard engine (single) - 60 + HP. Insulated fish hold and may have freezer facilities. Gear Hauler/GSP/sounder/fish finder
UN4	15.2 - 18.3 m (50' - 60') Inboard engine, fish storage facility, may have RSW or CSW or freezing facility, gear hauler, GPS, echo-sounder/fish finder, radio communication

Table 2. Kawakawa catch rates (catch in Kg per trip) of different craft types

Craft type	Catch rate (in Kg per trip)
UN1	2.95
UN2A	8.25
UN2B	23.39
UN3A	13.70
UN3B	5.47
UN4	0.80

Length-Weight relationship of Kawakawa

The length (total length) and weight measurements of around hundred fish were measured for estimating the length – weight relationship of kawakawa. Log transformed weight vs. log transformed length were plotted in order to derive the length – weight relationship (Figure 1).

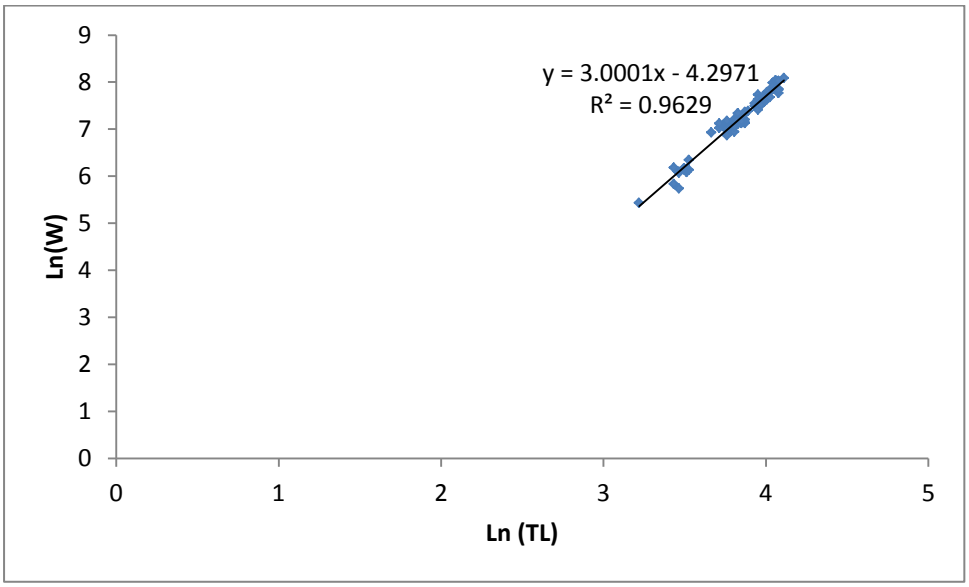


Figure 1. Log transformed weight vs. log transformed length

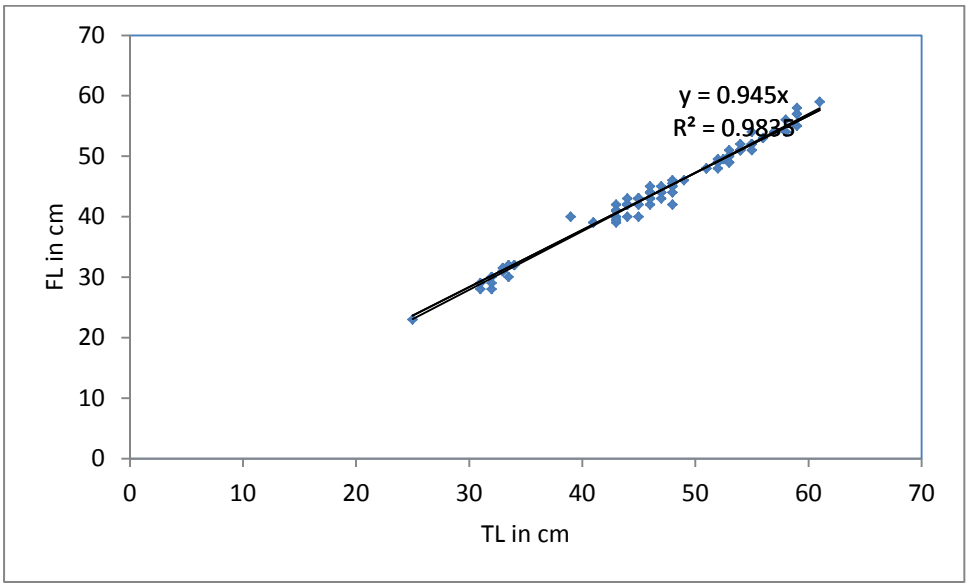
Following length – weight relationship was obtained:

$$W = 0.013L^3$$

Length – Length relationships of Kawakawa

Different length measurements (Total length – TL, Fork length – FL and Standard length – SL) of the fish were obtained and they were used to derive the Length - Length relationships of kawakawa (Figure 2).

(a)



(b)

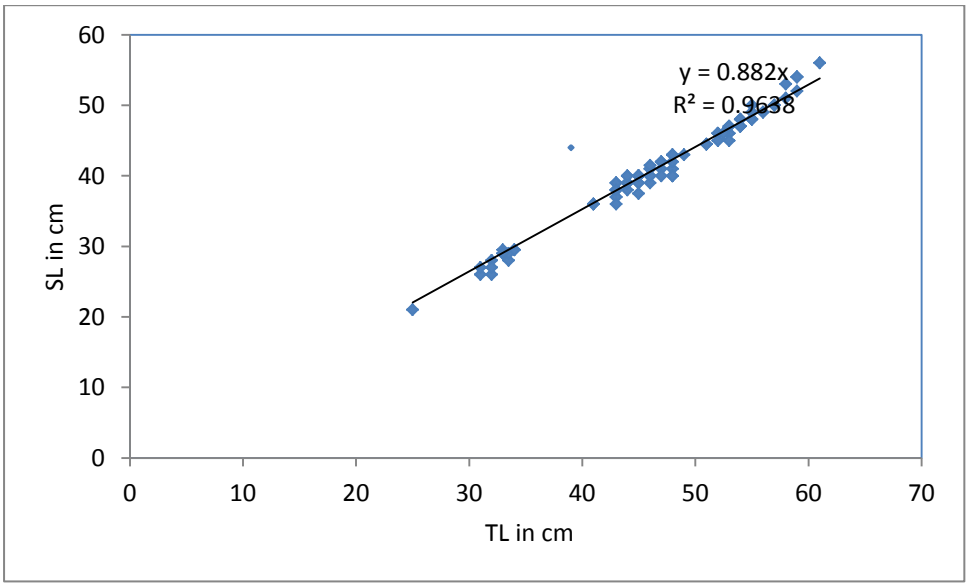
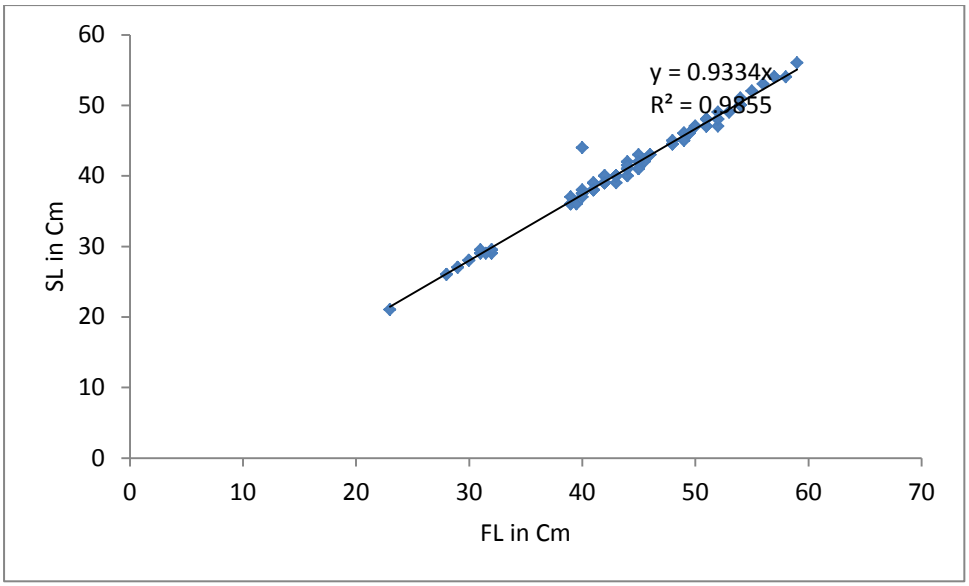


Figure 2. Length –Length relationships of Kawakawa: (a) TL & FL (b) TL & SL and (c) FL & SL

(c)



Following L-L relationships were obtained:

FL= 0.945TL

SL= 0.882TL

FL= 0.9934SL