

# Growth and Mortality of Snapper *Etelis carbunculus* in Vanuatu<sup>a</sup>

ALBERT H. CARLOT  
Vanuatu Fisheries Department  
Private Mailbag  
Port Vila  
Vanuatu

## Abstract

This paper presents estimates of the parameters  $L_{\infty}$  and  $K$  of the von Bertalanffy equation, as obtained from length-frequency data on the lutjanid *Etelis carbunculus* from Vanuatu, analyzed using the Complot ELEFAN software. These estimates are compared with values of  $L_{\infty}$  and  $K$  obtained for other stocks of the same species elsewhere in the South Pacific.

## Introduction

This paper deals with the deepwater red snapper *Etelis carbunculus* (Fam. Lutjanidae) caught on the outer reef slope of Vanuatu.

Vanuatu (Fig. 1) consists of about 80 islands most of which are "high islands" of volcanic origin. The archipelago is situated in the tropics, and the sea surface temperatures vary in the course of a year between 24 and 29 °C.

The exploitable sea surface for bottom fish is estimated to be around 7,360 km<sup>2</sup>, about half of the total land area of 13,480 km<sup>2</sup>.

## Materials and Methods

In the past, village fishing enterprises were obliged to keep a daily record for each fishing trip in order to qualify for duty free fuel. Data collected indicated the

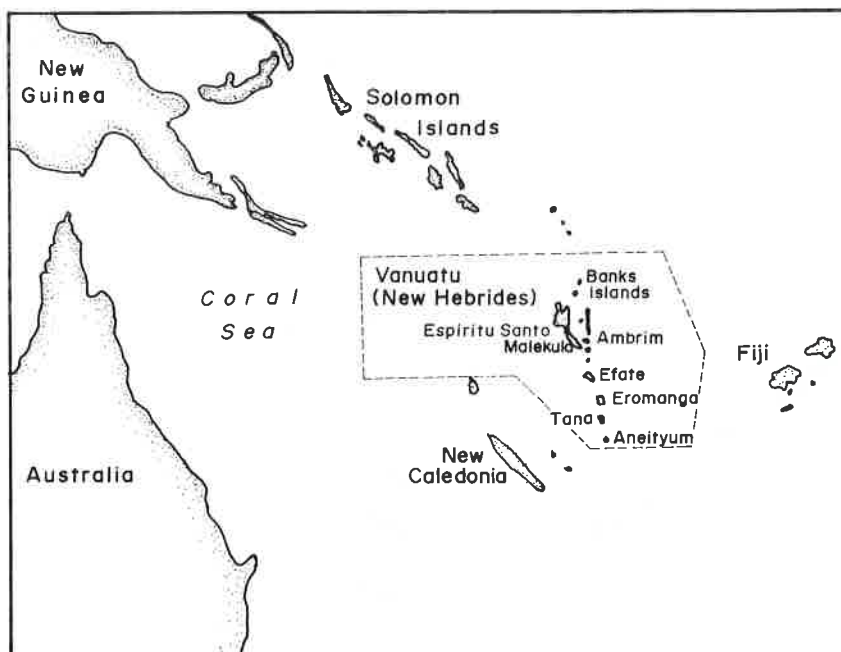


Fig. 1. The location of Vanuatu in the South Pacific.

<sup>a</sup>Preliminary results based on a paper written during a workshop on Length-Based Methods in Fish Analysis, 5-17 December 1988, Honiara, Solomon Islands (see Fishbyte 7(1):11-12).

total catch, duration of fishing trip, fish sales and other sales as well as expenses incurred for the particular trip. About 11,000 fishing trips were recorded in this form from 1982 to early 1987 (Schaan et al. 1987).

Daily record forms are also available from the Institut Francais de la Recherche Scientifique pour le Development en Cooperation (ORSTOM) and a premium of 50VT is provided for completed daily forms as an incentive to the fishermen. These forms provide information on the location of fishing area, fishing depth in meters, catch, by fishing

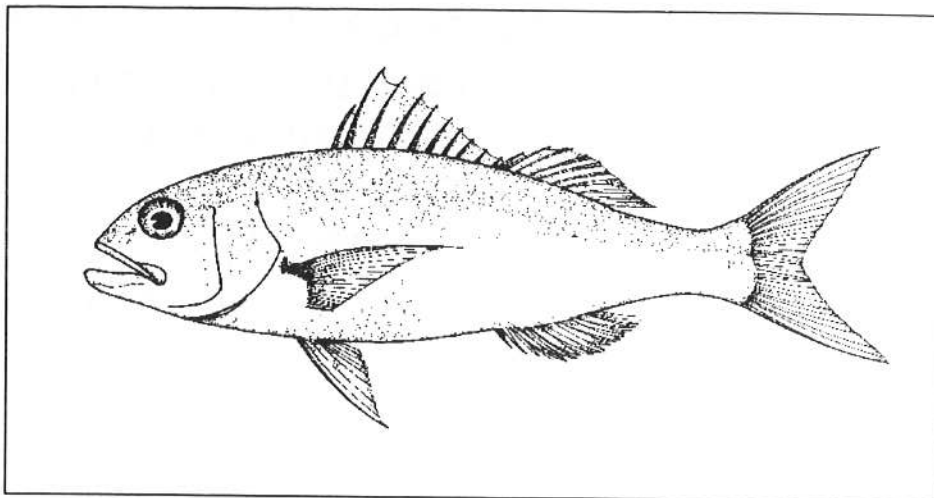


Fig. 2. The ruby snapper *Etelis carbunculus* (Lutjanidae).

Table 1. Growth parameters estimates and growth performance index for various populations of *Etelis carbunculus* (Fam. Lutjanidae) in the South Pacific.

| Location  | $L_{\infty}$ (cm) | K(year <sup>-1</sup> ) | $\phi'$ | Method              | Source                         |
|-----------|-------------------|------------------------|---------|---------------------|--------------------------------|
| Marianas  | 40.3              | 0.347                  | 2.75    | Otoliths ages       | Ralston and Williams (1988)    |
| Marianas  | 62.8              | 0.127                  | 2.70    | Otoliths and length | Ralston and Williams (1988)    |
| NH Hawaii | 63.9              | 0.36                   | 3.17    | Otoliths            | Uchida et al. (1982)           |
| Vanuatu   | 94.0              | 0.07                   | 2.79    | Otoliths            | Brouard and Grandperrin (1984) |
| Vanuatu   | 132.4             | 0.22                   | 3.59    | ELEFAN I            | This study                     |
| Tonga     | 136.0             | 0.31                   | 3.75    | ELEFAN I            | Sua (this issue of Fishbyte)   |

$\phi' = \log_{10}K + 2\log_{10}L_{\infty}$  (Pauly and Munro 1984).

method, duration of trip and measurement of all fish belonging to the major eleven species. Altogether, 3,000 fishing trips were recorded in these forms, which contain records of 30,000 measured fish.

It was decided to merge the two forms into one to avoid conflicting information and misreporting. This new form now records over 2,700 fishing trips and over 33,000 fish measurements.

The length-frequency data on *Etelis carbunculus* (Fig. 2) used in this study, which covered almost the entire country, were obtained from catches by village fishing enterprises from January 1987 to October 1988.

The analysis of these data was performed using the Compleat ELEFAN software of Gayanilo et al. (1988), as outlined in Sua (this issue of Fishbyte).

## Results and Discussion

Table 1 presents the estimate of  $L_{\infty}$  and K obtained here, along with estimates from other areas of the South Pacific.

As might be seen, the values of  $L_{\infty}$  and K obtained here, and those of Sua (this issue of Fishbyte) lead to

values of  $\phi'$  of 3.59 and 3.75, much higher than the values of 2.70 - 3.17 obtained from otolith studies.

This suggests that the high values of K obtained here and even more that of Sua (this issue of Fishbyte) may be biased upward and in need of reevaluation.

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