

# Growth parameters for *Lates niloticus* (L.), *Bagrus docmak* (Forsskål), *Oreochromis niloticus* (L.), *Clarias gariepinus* (Burchell) and *Synodontis* species derived from tag returns

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**Abstract:** In a tagging experiment carried out in the Kenyan waters of Lake Victoria, an annual growth increment of 29 cm yr<sup>-1</sup> was obtained for *Lates niloticus* (L.). Growth parameters obtained using the von Bertalanffy model on the growth curve fitted by eye were L<sub>∞</sub> = 122 cm yr<sup>-1</sup> and k = 0.26 yr<sup>-1</sup>. Data for other species tagged were inadequate to obtain meaningful results.

## Introduction

Stock size and growth parameters are traditionally obtained from analysis of hard structures or length frequency data. However, in tropical regions where no obvious seasonal growth patterns occur in fish, this can prove ineffective. One possible way of overcoming the problem of obtaining growth data is to individually tag fish and recapture them sometime later. The change in size is a measure of the growth during the interim period and can be used as a basis for determining the growth parameters of the population.

This short note presents the findings of a large scale tagging experiment carried out on Kenyan waters of Lake Victoria to determine growth parameters of the larger species of fish present.

## Materials and methods

Specimens and different species of fish were obtained from trawl catches and transferred to a holding tank to recover. Those individuals which showed little evidence of injury were measured (nearest cm), weighed (nearest g), individually tagged, and then released. The location and time of release was noted.

During subsequent trawling exercises, all fish were examined for tags. Any tagged fish caught were again measured and their location and time of recapture recorded. The change in length for the time between marking and recapture was used to determine the annual length increment using

$$G = ((\text{length at recapture} - \text{length at tagging}) / \text{days out}) \times 365$$

## Results

With the exception of Nile perch, *Lates niloticus* (L.), the incremental growth achieved by each fish species was highly variable, and no obvious growth patterns were discernible (Fig. 1).

The incremental growth rate determined for each species also shows considerable variability (Fig. 1), primarily because too few fish were captured after an extended period in the wild (i.e. >100 days); the notable exceptions being Nile perch and *Clarias gariepinus* (Burchell). As a result, the growth increments determined for the major of the species were considered small and below the growth potential of the species.

For Nile perch an annual growth increment of 29 cm yr<sup>-1</sup> was obtained and the growth parameters obtained using the von Bertalanffy growth model on the growth curve fitted by eye (Fig. 1) were  $L_{\infty} = 122$  cm and  $k = 0.26$  yr<sup>-1</sup>.

## Discussion

Despite the stressful method of capture of fish for tagging, the large number of recaptures suggests that trawling can be used to obtain fish for this type of exercise. Notwithstanding this, care must be taken to select fish that recover from the capture experience and do not exhibit signs of damage or inversion of the swim bladder.

Little meaningful data were obtained for the majority of species and growth increments of less than 10 cm yr<sup>-1</sup> seem poor for big-sized tropical species. However, in the absence of comparative growth data this is difficult to assess.

The growth parameters obtained for Nile perch were somewhat different from those determined by Asila and Ogari (1988) for Kenyan waters of Lake Victoria ( $L_{\infty} = 205$  cm and  $k = 0.19$  yr<sup>-1</sup>). The variation probably arises because the growth analysis was based on too few tagged fish that persisted in the wild for an extended period of time, and these fish were possibly affected by the capture and tagging experience, thereby reducing their growth potential.

As the majority of fish tagged were small (< 30 cm) the annual growth increment (29 cm yr<sup>-1</sup>) represents that achieved in the early stages of life and is indicative of that derived from length frequency analysis (Mkumbo 1999, Okaronon, Muhoozi & Bassa 1999; Getabu 1999).

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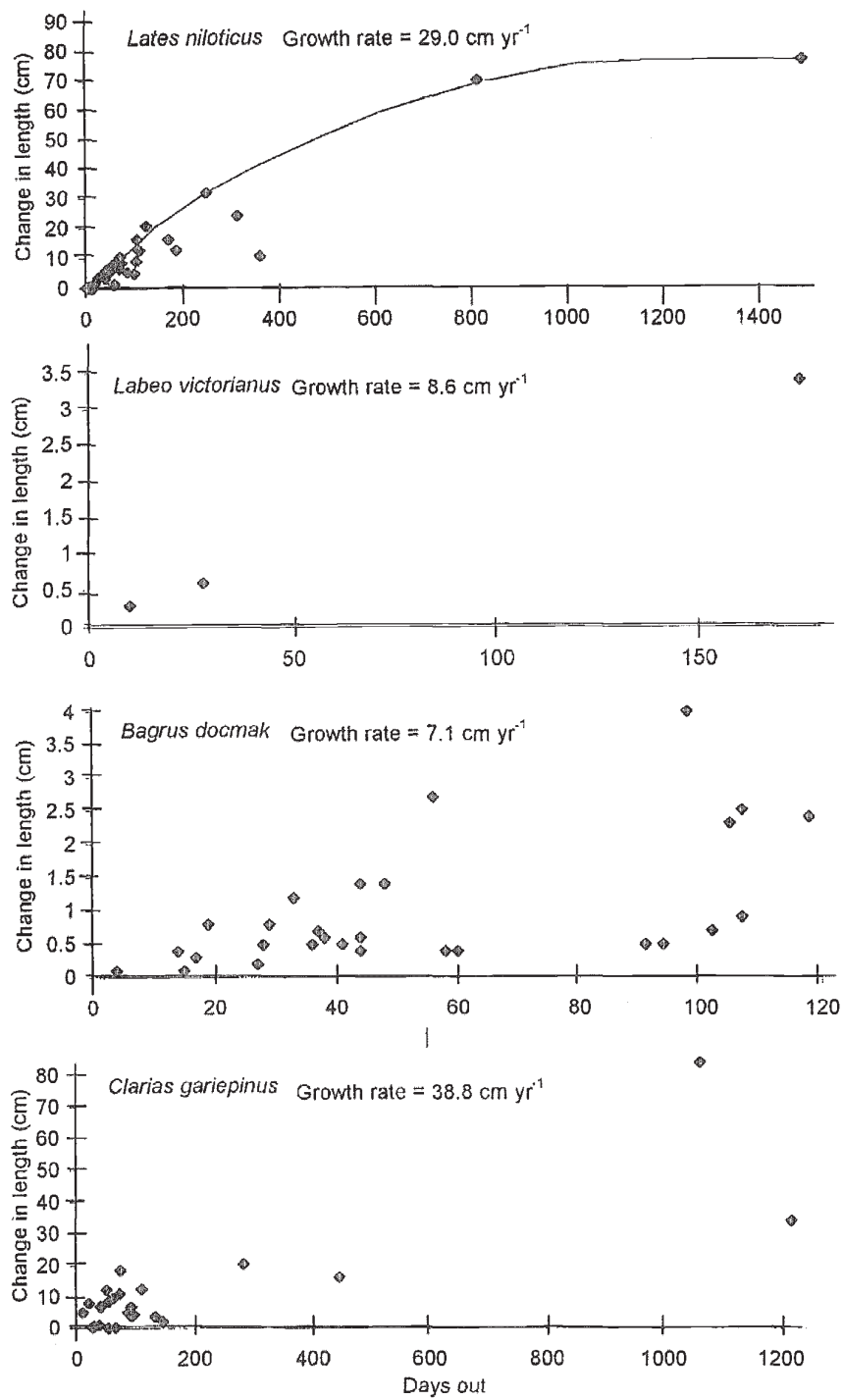


Fig. 1. Incremental growth of various fish species between tagging and recapture

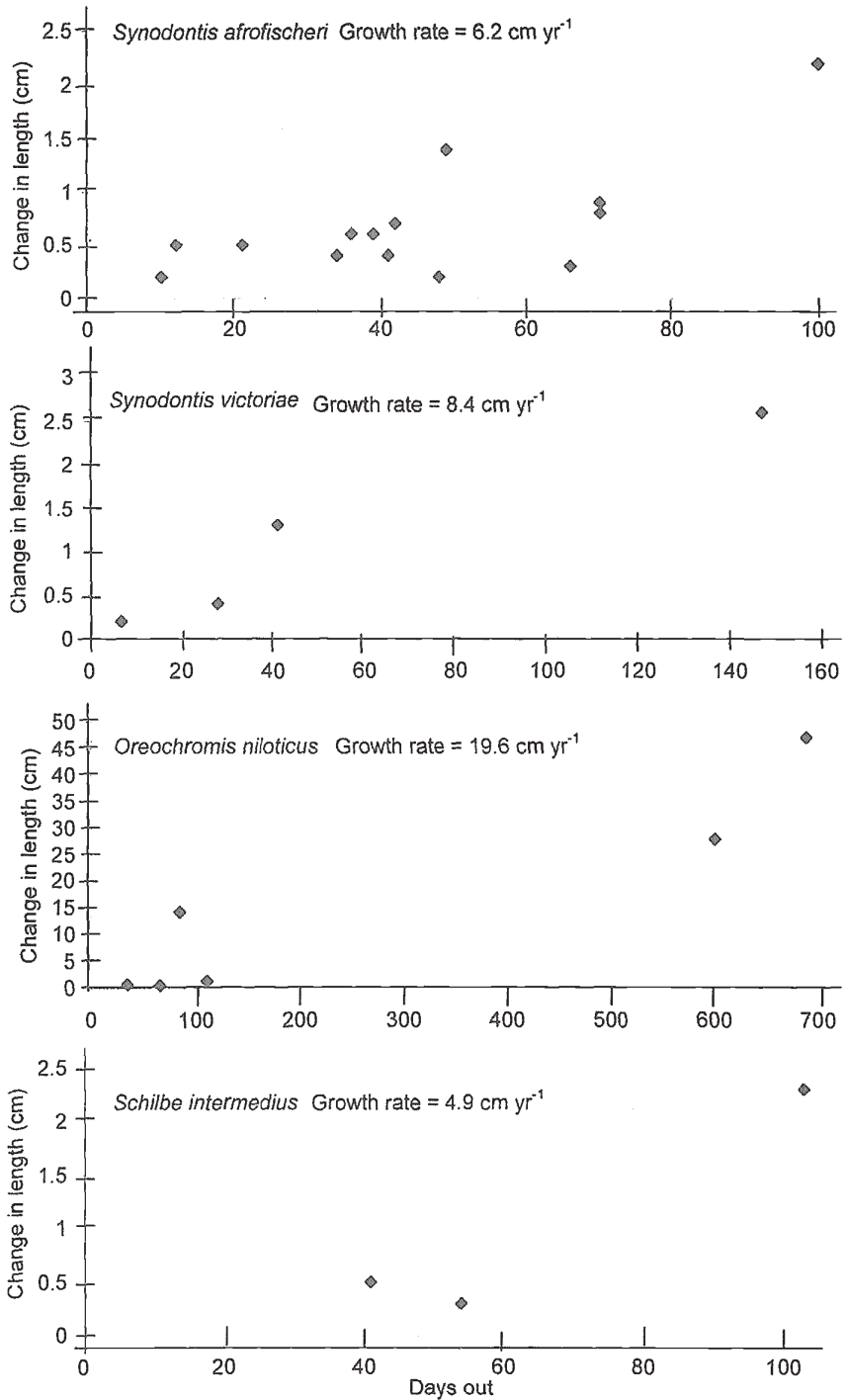


Fig. 1 cont. Incremental growth of various fish species between tagging and