

---

**PRESENCE OF TWO KINGFISH SPECIES *Scomberomorous plurilineatus* AND *Scomberomorous commerson* CAUGHT BY HAND LINES IN THE KENYAN MARINE ECOSYSTEM.**

**Isaac Wafula Barasa.**

Division of Marine and Coastal Fisheries  
Kenya Fisheries Service.

**Stephen Ndegwa**

Head of Statistics  
Kenya Fisheries Service.

---

**Abstract:**

A study was conducted in Kenyan marine catches of kingfish noted that there are two distinct species caught by artisanal fishers in the Kenyan Marine Ecosystem. The study also compared the length frequency ratio for the two species *Scomberomorous plurilineatus* and *Scomberomorous commerson*. *Scomberomorous* are caught predominantly by hand lines, thus this fishing method was used during the survey. The main objective of this study was to identify the lengths at which the two species are caught and monitor the impact of the gear on stock recruitment of the two species. This study will inform on the need to treat the species as separate and not one as far as the Management of kingfish populations is concerned.

The survey was undertaken in two landing sites, Viz Mkunguni and Old port in Mombasa from June to December 2017 on diverse dates. The lengths frequency of *S. plurilineatus* and *S. commerson* were obtained from 70 individuals for both the species. Lengths frequency for *S. plurilineatus* varied from 82cm for the smallest to approximately 120 cm for the largest, while *S. commerson* length frequency varied from 68 cm for the smallest to 130 cm for the largest. Length at first maturity ( $L_M$ ) for *S. commerson* in the region ranges between 55- 82cm. Ref; Fish base). Results; This study shows that the two *Scomberomorus* species are captured having attained maturity. The presence of the two species in Kenyan waters means that there is a possibility of the same in the

neighboring countries. A further assessment of the species through genetic study would enrich the IOTC management of the species in this area of competence.

### **Introduction:**

The queen mackerel, *Scomberomorus plurilineatus* is an epipelagic summer migrant occurring in coastal waters of the western Indian Ocean (Collette and Nauen, 1983; van der Elst, 1981). Its distribution is known to extend south along the East African coast from Kenya to KwaZulu-Natal in South Africa and it is also known from the west coast of Madagascar (Collette and Russo, 1984; van der Elst and Collette, 1984). *S. plurilineatus* constitutes an important component of catches by hand lines. The most important Scombridae in the fishery was *S. commerson*.

A recent study of the hand line fishery in Kenya at two landing sites has indicated that another species, *S. plurilineatus* is the most preferred species targeted by hand lines.

This study provides information on the age and growth of two important species, *Scomberomorus plurilineatus* and *S. commerson*. For the age-based method various growth models were evaluated to determine which growth function best described the age-length data, whilst Shepherd's Length Composition Analysis was used to estimate growth parameters from length-frequency data. As validation by marginal increment analysis was inconclusive because of the seasonal occurrence of this species in Kenyan waters.

However, from the age-length data, growth was adequately modelled by the von Bertalanffy growth equation:  $L_t = 935\text{mm FL} (1 - e^{-0.583\text{yr}^{-1}(t + 0.991\text{ yrs})})$ , (1)

*S. plurilineatus* are fully recruited to the fishery at the age of 1 + year. Preliminary per-recruit analyses indicated that the spawner biomass of *S. plurilineatus* is at 50% of its unfished level. Von Bertalanffy growth

parameters could not be adequately estimated from length frequency data because of the slow growth and longevity of this species. However, from the length data, no difference in growth rate between the species was observed.

### Materials and Methods;

For six months from June 2017, Lengths frequency and weights sampling was undertaken in two landing sites in Kenya. Sampling was for fishermen using hand line fishery targeting the two species. Species identification was undertaken using identification features obtained from Fish base.

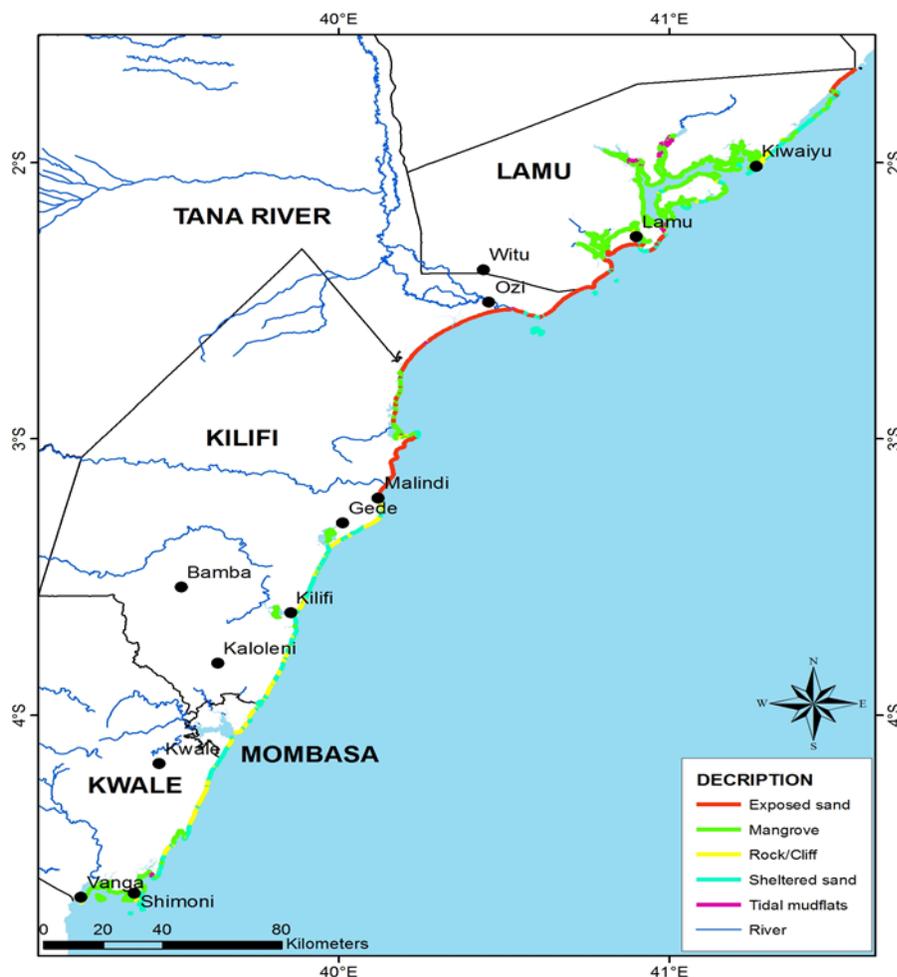


Figure. 1. Kenya shore line.

Results:

Table.1.

Summary of data for *S. plurilineatus* used in the study.

Type	Total	Uses	Source
Length Frequency	n= 1818	Length-based growth	This study
Weight frequency	n =174	Weight frequency distribution	This study
Maxillary lengths with corresponding fork lengths	n = 205	Fork length maxillary length relationship	Chale-matsau 1996
Otoliths	n = 547	Age estimation; validation; growth mode	Fisheries research 44(1999) 121±127.

Discussion:

Considerable lengths frequency data for *S. plurilineatus* was obtained from the samples taken for the six months. This shows that *S. commerson* is not the only species in the Kenyan ecosystems as has been the case before. The figure below shows the relation between length in (mm) and age in years for *S. plurilineatus*.

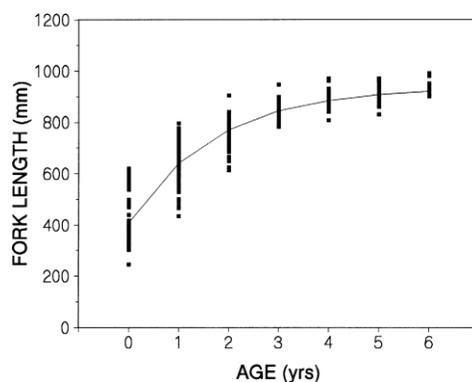


Figure. 2. The relationship between length and age in *S. plurilineatus* (Obtained by fitting the special von Bertalanffy growth model)

Source: Fisheries Research 44 (1999) 121±127

The special von Bertalanffy model was thus selected as it had fewer parameters and is described by the following equation  $L_t = 935\text{mm FL} (1 - e^{-0.583\text{yr}^{-1}(t + 0.991 \text{ yrs})})$ , (1) where  $L_t$  is the mean fork length at age  $t$ . The age length relationship for *S. plurilineatus* is an asymptotic one and shows wide variation in length-at-age, particularly in the higher age classes (Figure 2). This is typical maturity characteristics where allot of energy is used for reproduction rather than growth. In smaller age classes, more energy is used to enhance rapid growth.

#### Conclusion:

This study has revealed that *S. plurilineatus* is a major species in Kenya alongside *S. commerson*. Further studies are required for this species to determine age at recruitment through otolith analysis and modeling and simulation.

#### References:

1. Chale-Matsau, J.R., 1996. Age and growth of the queen mackerel (*Scomberomorus plurilineatus*) and seventy-four (*Polysteganus undulosus*) off KwaZulu-Natal, South Africa. M.Sc. thesis. University of Natal, Durban, 110 pp.
2. J.R. Chale-Matsau et al./Fisheries Research 44 (1999) 121±127.
3. Govender, A., 1994. Growth of the king mackerel (*Scomberomorus commerson*) off the coast of Natal, South Africa ± from length and age data. Fish. Res. 20, 63±79.
4. Govender, A., 1995. Mortality and biological reference points for the king mackerel (*Scomberomorus commerson*) fishery off Natal, South Africa (based on a per-recruit assessment). Fish. Res. 23, 195±208.
5. Holden, S., Bravington, M.V., 1992. Length frequency distribution analysis. The LFDA Package User manual, LFDA version 3.10; developed under the Fish Management Science Programme of the Overseas Development Administration of the UK Government. MRAG Ltd., London, 68 pp.
6. Fish base.