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Research Application Summary

Maturity, age and growth of *Oreochromis karongae* (Teleostei: cichlidae) in Lake Malawi and Lake Malombe

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Abstract

Size-at-50% maturity, age and growth, of *Oreochromis (Nyasalapia) karongae* ('chambo') in Lakes Malawi and Malombe were studied. Similar size-at-50% maturity and growth patterns were found for populations in Lake Malawi, but differences were observed for Lake Malombe populations, suggesting that current chambo fisheries management regulations, based on findings from the southern part of Lake Malawi, may be applicable to the central and southern parts of that lake, but not to Lake Malombe.

Key words: Chambo, growth patterns, Malawi

Résumé

La maturité de la taille à 50%, l'âge et la croissance des *Oreochromis (Nyasalapia) karongae* ('chambo') dans les lacs Malawi et Malombe ont été étudiés. La maturité de taille à 50% et les modèles de croissance ont été trouvés semblables pour les populations du lac Malawi, mais des différences ont été observées pour des populations du lac Malombe, suggérant que les règlements courants de gestion des pêcheries de chambo, basés sur des résultats de la partie méridionale du lac Malawi, puissent être applicables aux parties centrales et méridionales de ce lac, mais pas au lac Malombe.

Mots clés: Chambo, modèles de croissance, Malawi

Background

The collapse of the chambo (*Oreochromis 'Nyasalapia'*) fishery in southern Lake Malawi and Lake Malombe as a result of unsustainable fishing effort (FAO, 1993) is an issue of national concern for Malawi. Chambo are the most valuable commercially harvested fish species in Malawi (Turner, 2003). In an attempt to manage the fishery, various fisheries management strategies were developed, based on research results from the shallow and productive southeast arm (SEA) of Lake Malawi and from Lake Malombe (Trewavas, 1983).

However, Lake Malawi is a large ecosystem (30,800 km², Hutchinson, 1957) and possible variations in life-history characteristics within one species require investigation in the development of a holistic management strategy. The aim of this study was to test the hypothesis that growth rates and maturity of *O. karongae* are dependent on geographic locality within the Lake Malawi system.

Literature Summary

The biology of chambo in Lakes Malawi and Malombe was reviewed by Lewis (1985) and FAO (1993). In the SEA and Lake Malombe, *O. karongae* matured at 250 mm total length (TL), with an average of 275 mm TL in the SEA and at 160–170 mm TL in Lake Malombe. The peak spawning period was from August to October in the SEA and from July to October in Lake Malombe. To protect juveniles from exploitation, a closed season was implemented from October to December in Lake Malombe and from November to January in Lake Malawi.

Study Description

Fish were collected from five localities along the lake axis: Lake Malombe, and Mangochi, Salima, Nkhotakota and Karonga in Lake Malawi. A total of 1,329 *O. karongae* ranging from 67–395 mm TL were collected over a one-year period from July 2001–December 2002 from Karonga (363), Nkhotakota (216), Salima (370) and Mangochi (192), and from Lake Malombe (188). Samples were collected once every two months from each site. Total length (TL) was measured and each fish was then dissected, and its sex determined by internal examination. Gonads were removed and macroscopically staged. Mean length-at-50% maturity was determined by fitting a logistic curve to the proportion of reproductively active (ripe and spent) fish sampled during the spawning season (Kaunda and Hecht, 2002). The proportion of mature fish for each stage of maturity was expressed as a percentage of the total number of fish in that category by plotting a cumulative frequency graph. All fish lengths corresponding to 50% cumulative frequency were then taken as the sizes at which 50% of the fish were mature (King and Etim, 2003). Age was determined from opercula bones using a dissecting microscope. Growth zones on the opercula were validated using marginal zone analysis (Bwanika et al., 2007).

Research Application

The study provided useful information regarding management of the chambo (tilapia) fish stocks that have been exploited nearly to extinction.

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