



Population dynamics and yield estimation of Common Carp (*Cyprinus carpio*, Linnaeus, 1758) in Ayalew reservoir, Gamo Zone, Southern Ethiopia

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Condition factor;
Cyprinus carpio;
Length-weight relationship;
Population dynamics parameters

ABSTRACT

Common carp (*Cyprinus carpio*) is an introduced fish species in Ayalew reservoir. This study provides the first results on fishery dynamics of the species in the reservoir. The study was aimed at estimating important population dynamics parameters and production potential. Total length (TL) and total weight (TW) data were collected from a total of 276 fish samples (141 females and 135 males). The obtained data were analyzed using FiSAT II software. Jones length based cohort analysis model and length-based Thompson and Bell yield prediction models were employed to estimate the population and production potential. The mean total length was 26 cm and the dominant length groups ranged from 17 to 33 cm were 87%. The length-weight relationship parameters were ($TW = 0.0565TL^{2.53}$, $R^2 = 0.95$) and the condition factor $K = 1.29$. The parameters of von Bertalanffy growth curve were $L_{\infty} = 41$ cm, $k = 0.52$, $t_0 = -2.29$, $\alpha = 2.9$ and $A_{0.95} = 5.5$ years. The estimated values of the total, natural and fishing mortalities were $Z = 1.23$, $M = 0.55$ and $F = 0.68$, respectively. The current exploitation rate was 0.55 which indicates slightly overexploitation. The estimated fish population and the annual fish yield were 59,304 and 1.5 tons, respectively. However, investigation on reproductive biology, limnological aspects and stock enhancements should be required for the sustainability of these resources.

INTRODUCTION

Common carp (*Cyprinus carpio*) is considered to be a very important aquaculture species in many Asian and some European countries. It is widely distributed and frequently considered a nuisance species outside its native range (Penne and Pierce, 2008; Mohammad, 2015). The Common carp is one

of the most common freshwater fish invaders worldwide, creating adverse effects on water quality and impacting ecosystem structure and function (Letvin *et al.*, 2017). It is highly adaptable to new environments and can alter the abiotic and biotic integrity of aquatic ecosystems (Bajer *et al.*, 2012).

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