Extending electronic length frequency analysis in R

Electronic length frequency analysis (ELEFAN) is a system of stock assessment methods using length-frequency (LFQ) data. One step is the estimation of growth from the progression of LFQ modes through time using the von Bertalanffy growth function (VBGF). The option to fit a seasonally oscillating VBGF (soVBGF) requires a more intensive search due to two additional parameters. This work describes the implementation of two optimisation approaches ("simulated annealing" and "genetic algorithm") for growth function fitting using the open-source software "R." Using a generated LFQ data set with known values, the accuracy of the soVBGF parameter estimation was evaluated. The results indicate that both optimisation approaches are capable of finding high scoring solutions, yet settings regarding the initial restructuring process for LFQ bin scoring (i.e. "moving average,") and the fixing of the asymptotic length parameter (L-infinity) are found to have significant effects on parameter estimation error. An outlook provides context as to the significance of the R-based implementation for further testing and development, as well as the general relevance of the method for data-limited stock assessment.

General information
Publication status: Published
Organisations: National Institute of Aquatic Resources, Section for Ecosystem based Marine Management, Thunen-Institut
Contributors: Taylor, M. H., Mildenberger, T. K.
Pages: 330-338
Publication date: 2017
Peer-reviewed: Yes

Publication information
Journal: Fisheries Management and Ecology
Volume: 24
Issue number: 4
ISSN (Print): 0969-997X
Ratings:
BFI (2017): BFI-level 1
Scopus rating (2017): CiteScore 1.59 SJR 0.746 SNIP 0.854
Web of Science (2017): Impact factor 1.624
Web of Science (2017): Indexed yes
Original language: English
Keywords: FISHERIES, MANAGEMENT PROCEDURES, EXPERIENCES, PACKAGE, data-limited stock assessment, ELEFAN, growth model, length-frequency data, von Bertalanffy growth function
DOIs:
10.1111/fme.12232
Source: FindIt
Source ID: 2372834391
Research output: Contribution to journal › Journal article – Annual report year: 2017 › Research › peer-review