

# The Compleat ELEFAN, Version 1.1: Post-Release Blues

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## Abstract

This article discusses differences between the newly released Compleat ELEFAN Software Package (Vers. 1.1) (Gayanilo and Pauly 1989, Fishbyte 7(2): 20-21) and its predecessor (Vers. 1.0). Also, a number of "bugs" found in Version 1.1 are documented; this led to release 1.11, which costs US\$75.

## Introduction

For various reasons, notably lack of space, the two-page contribution in Vol. 7(2) of Fishbyte in which we announced Version 1.1 of the Compleat ELEFAN software package failed to describe some of its differences with the previous version 1.0.

As these differences may create confusion among users, (e.g., by leading to different estimates of some parameters), we shall list the most important of these differences. Then, we shall deal with "bugs".

The following text doesn't really make for fascinating reading but unfortunately, it is unavoidable.

## Differences between Versions 1.0 and 1.1

The differences between the two releases are presented by program, as they appear on the main menu. "Now" refers to Version 1.1

### ELEFAN 0

- The data entry routine of Version 1.1 automatically identifies and stores, for any file, the smallest and largest size classes with nonzero frequencies, as required for particular routines, especially those related to VPA. It is still possible to expand the size range covered by a file, by adjusting - using the edit routine - the smallest and/or largest midlength(s).
- Length-at-age data may now be entered and edited (the file this created can be used only within ELEFAN V).

- An option for an ASCII disk output has been incorporated in the PRINT ROUTINE of ELEFAN 0. The ASCII file saved on disk can be imported to a wordprocessor or an electronic spreadsheet (e.g., LOTUS 1-2-3).

### ELEFAN I

- The seasonally-oscillating form of the von Bertalanffy growth function proposed by Pauly and Gaschütz (1979) has been replaced as growth model for ELEFAN I to V by the related model suggested by Hoening and Choudary Hanumara (1982) and Somers (1988) (see also Hoening and Choudary Hanumara, Fishbyte, this issue).  
The differences between the growth curves generated by these two models are very small, generally on the third decimal place or less when dealing with fish length expressed in cm.
- The routine for computation of the Explained Sum of Peaks (ESP) was modified. The modification concerns the relationships between four quantities:
  - the current asymptotic length ( $L_{\infty}$ )
  - the midlength of the largest length class ( $L_{max}$ )
  - the upper limit of the largest length class included in the file ( $L'_{max}$ )
  - the largest fish included in the computation of ESP ( $L_t$ ).

In Version 1.0, the computation of ESP stopped, when  $L_{\infty} < L_{max}$ , as soon as  $L_t \geq 0.95 * L_{\infty}$ . Also, the computation stopped when  $L_t > L_{max}$ . Thus, in both cases,  $L'_{max}$  was not considered.

In Version 1.1, the computation of ESP stops when  $L_{\infty} < L'_{max}$ , as soon as  $L_t \geq 0.95 * L_{\infty}$ . Also, the computation stops when  $L_t > L'_{max}$ .

These modifications - which render the ESP computation routine consistent with our initial intentions - will not affect growth parameter estimates when  $L_{\infty} > L'_{max}$ , but may lead to changes when  $L_{\infty} < L'_{max}$ , particularly when

prominent peaks occur among the largest size groups.

#### ELEFAN IV

- A routine to allow temporal weighting of samples (i.e., to give more weight to samples isolated in time and hence, representing a longer time period than closely spaced, bunched-up samples) has been added as an option.
- Smoothing of estimating probabilities of capture can be performed to reduce "noise" prior to estimation of Z.

#### ELEFAN V

- The response surface analysis can be performed with a variable starting point.
- When available, length-at-age data can be used in combination with either length-frequency data and/or growth increment data to obtain growth parameters.

#### MPA

- The modal progression analysis routine now includes a submenu allowing users to work with Bhattacharya's method independently of the other MPA subroutines. Moreover, the means and standard deviations of the derived Gaussian components using the Bhattacharya's method are automatically saved on disk. This file can be accessed by the LINKING OF MEANS routine.

#### **Identification and Removal of Bugs**

The transition from Version 1.0 to 1.1 involved not only improvements and additions, but also corrections of faulty routines and removal of various bugs.

Also, after shipping a number of sets of Version 1.1 of the Compleat ELEFAN earlier this year, we discovered a number of bugs in that version.

They were corrected, and we shall refer to that version of the Compleat ELEFAN which incorporates the corrections of early 1990 as Version 1.11. Two-diskette packages with corrected routines have been sent to affected colleagues for upgrading their Version 1.1 to 1.11.

In the following, we shall use "A" for corrections of Version 1.0 leading to Version 1.1 and "B" for corrections of Version 1.1 leading to Version 1.11.

Again, we proceed by major programs:

#### HDINSTAL

- The hard disk installation routine was modified (A) such as to eliminate the sensitivity of the function keys.
- The routine for checking that the diskettes are inserted in the proper sequence was corrected (A).
- A problem was identified (B), which pertained to the non-functioning of HDINSTAL (on some computers that are not 100% compatible) when a memory-resident program is loaded.

If in doubt, remove such program from memory before running the HDINSTAL.EXE. If problems still occur, please let us know your computer's hardware specification, and the content of CONFIG.SYS and AUTOEXEC.BAT (if applicable).

#### ELEFAN 0

- A problem which occurred when one attempted to "regroup" data into *smaller* class, interval (e.g., from 1 to 0.5 cm) has been resolved (A). [Splitting data collected using a certain class interval into smaller intervals is not provided here to support attempts to gain information out of nothing. Rather, this routine may be used to standardize the class intervals of two files with different class intervals before they are pooled.]

#### ELEFAN I

- A problem, which occurred when one attempted to plot more than one year's worth of histograms, has been resolved (A).

#### ELEFAN II

- The routine for entering probabilities of capture had a bug which is now fixed (A);
- The same routine did not allow for length greater than 99.99 to be entered without the HERCULES screen to be disrupted; this is now fixed (A);
- The Wetherall plot routine was not reinitialized properly, leading to erroneous estimates when it was run repeatedly without returning to a higher menu. This was fixed (B).

#### ELEFAN III

- The equation for estimating, in VPA II, the mean weight of fish of a given (mid)length was not correctly implemented. This will have affected users who estimated their catch-at-

length data internally, rather than entering them (as length "frequency" data, via ELEFAN 0). This problem has been fixed (B).

- In VPA III, the [F8] function key did not allow printing of catch-at-length data (as intended), but rather led to the next screen. This has been fixed (B).
- In the same routine, an "Illegal Function Call" occurred when a printout of estimated recruitment was requested. This problem has been fixed (A).

#### ELEFAN IV

- When Moreau's modification of the Munro's method for estimation of M was selected, the points of the plot of Z vs. P were not properly plotted (this did not affect the underlying computations). This has been fixed (A).

#### ELEFAN V

- The routine to estimate the growth parameters of a seasonally-oscillating version of the VBGF from growth increment data did not converge in many cases where it should have, or converged toward sub-optimal estimates. This has been repaired (B). Previous estimates generated by users should be recomputed.

#### MPA

- The growth increments obtained by linking means were not passed properly to the routine for estimating the CV of  $L_{\infty}$ . This is now fixed (A) but previous estimates must be recomputed.

#### **Conclusions**

Three general points may conclude this rather gloomy article.

Three new software packages were recently released by the ICLARM Software Project. They are:

- MAXIMS: A computer program for estimating the food consumption of fishes from diet stomach contents data and population parameters. A. Jarre, M.L. Palomares, M.L. Soriano, V.C. Sambilay, Jr. and D. Pauly. 1990. ICLARM Software 4. Distributed with two 5-1/4" diskettes for US\$20.
- CDS Assistant. F.C. Gayanilo, Jr. 1990. ICLARM Software 5, 19 p. Distributed with one 5-1/4" diskette for US\$15 (airmail).
- A draft guide to the ECOPATH II program (ver. 1.0) 1990. ICLARM Software 6, 22 p. Distributed with one 5-1/4" MS-DOS diskette for US\$20 (airmail). Software 6 is available free of cost for cooperators of the ICLARM project "Global Comparisons of Multispecies Trophic Models". Please contact V. Christensen for further details.

Details on these packages - all for IBM personal computers and compatibles are given in the April 1990 issue of Naga, the ICLARM Quarterly. ECOPATH II, a much improved version of Polovina's ECOPATH program (see Fishbyte 2(2):5-7) for construction of trophic model of ecosystems and MAXIMS, a program for the estimation of daily ration and related statistics from stomach content data will be featured in the next issue of Fishbyte.

Address orders to the ICLARM Software Project, Capture Fisheries Management Program, ICLARM, MC P.O. Box 1501, Makati, Metro Manila, Philippines. Payment (payable to ICLARM) should be in US\$ by international money order, bankdraft or UNESCO coupons. We can accept US\$ checks only if from a US-based bank due to high clearance fees of other banks.

First, a convoluted apology: as stated when we presented Version 1.1 in December 1990, this package contains over 100,000 lines of programming, i.e., the Compleat ELEFAN has the size of a program for airline reservations (which, as we know, are often bug-ridden) or, even more depressing, the size of the programs that were anticipated to run the "battle stations" of the Strategic Defense Initiative (SDI) of "Star Wars" fame. SDI was put on the back burner because, among other things, software experts testified that one cannot write totally reliable programs of such size.

The second point, equally depressing, is that compilers such as, e.g., Microsoft's Quickbasic 4.0 contain rather big errors, as we discovered last year when preparing Version 1.1. We finally settled on Quickbasic 4.5, and its improved performance may lead to small difference in estimates. What other surprises this compiler contains is anyone's guess.

Finally, the biggest bug of all: The US\$50 we asked earlier to cover the material purchase, handling, airmailing and related costs of the Compleat ELEFAN are not enough; it should be US\$75 from now on. And updates will cost US\$35 if we receive the original diskettes of Version 1.0.

These were the post-release blues.

#### **References**

- Hoenig, N. and R. Choudary Hanumara. 1982. A statistical study of seasonal growth model for fishes. Tech. Rep. Dept. Computer Science and Statistics, University of Rhode Island, Kingston, 91 p.
- Pauly, D. and G. Gaschütz. 1979. A simple method for fitting oscillating length growth data, with a program for pocket calculator. I.C.E.S. CM 1979/G: 24 Demersal Fish Cttee, 26 p.
- Somers, I.F. 1988. On a seasonally oscillating growth function. Fishbyte 6(1):8-11.