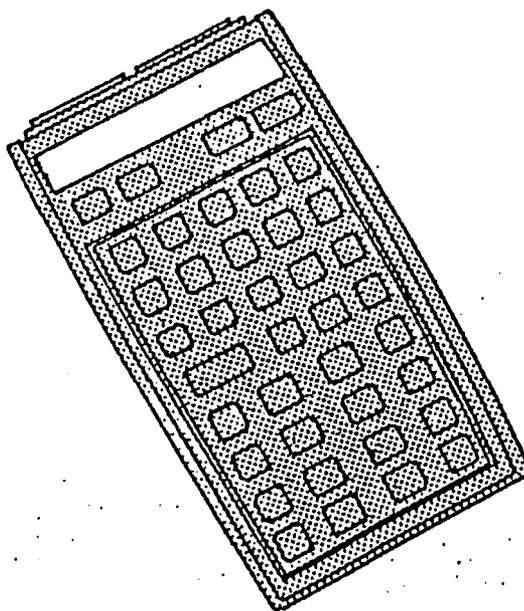
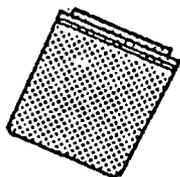


# ICLARM SOFTWARE 1

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## User's Manual for the Fish Population Dynamics Plug-in Module for HP41CV Calculators



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# **User's Manual for the Fish Population Dynamics Plug-in Module for HP41CV Calculators\***

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## **Abstract**

The mode of operation and contents of a custom-made plug-in memory device for Hewlett-Packard HP41CV calculators (or HP41C with Quad Memory Module) are briefly presented. The module contains 15 of the 30 programs for fish stock assessment documented in the manual by Vakily, J.M., M.L. Palomares and D. Pauly. 1986. Computer programs for stock assessments: applications for the HP41CV calculator. FAO Fish. Tech. Pap. 101, Suppl. 1, Rome, 255 p., namely FB 1-3, 6, 7, 9, 12, 14, 17, 18, 20-22, 25 and 26, covering length-weight relationship; gear selection; growth parameter estimation; total, natural and fishing mortality estimation; yield-per-recruit; and virtual population analyses as well as various length-structured and surplus-production models. The manual must be consulted when using this module.

## **Introduction**

This document was written to help users of the custom-made "Fish Population Dynamics" plug-in module for HP41CV calculators to handle and use this device. This document, on the other hand, is not an introduction to fish population dynamics and two manuals are cited below which should be used in conjunction with this device.

The Fish Population Dynamics plug-in modules (henceforth "module") that go with this manual were custom-made by Corvallis Microtechnology Inc. for ICLARM, herein supported by a grant from FAO.

The idea here was to produce an alternative to the 142 (!) magnetic cards and the card reader needed to run the 30 programs in the package of Vakily et al. (1986), or to the microdrive needed to run the corresponding microtape.

Unfortunately, it turned out that the 16 kilobytes available in modules such as the one presented here could not accommodate more

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than about half of the package of Vakily et al. (1986), for which reason a selection was made, and only 15 out of the originally 30 programs were included in the module (Table 1).

Table 1. Code and name of the 15 programs selected from FB1 to FB30 in Pauly (1984) and Vakily et al. (1986) for inclusion in plug-in module.

Code	Name	Documentation in Pauly (1984)		Page no. in Vakily et al. (1986)
		Theory: Chapter no.	Program Page no.	
FB1	Length-weight relationship	2	181-84	14-23
FB2	Gear selection	3	185-88	24-31
FB3	Von Bertalanffy plot	4	189-92	32-39
FB6	Munro plot	4	201-03	53-60
FB7	Seasonally oscillating growth	4	205-12	61-68
FB9	Generalized VBGF: solutions	4	217-20	77-85
FB12	Length-converted catch curves	5	229-32	102-09
FB14	F & M from tagging data	5	237-39	118-22
FB17	Leslie's equation	6	249-51	133-37
FB18	VPA & Cohort Analysis	7	253-56	138-44
FB20	Length-Structured VPA	7	261-64	152-59
FB21	Yield-per-recruit (special VBGF)	8	265-68	160-68
FB22	Yield-per-recruit (incomplete $\rho$ function)	8	269-72	169-74
FB25	Ricker's stock-recruitment curves	9	281-84	187-94
FB26	Schaefer and Fox' models	10	285-88	195-201

The manual of Vakily et al. (1986), which was extracted from the more comprehensive text of Pauly (1984), presents the key equations behind the models incorporated in these programs, as well as a description of the programs themselves and of their operation. Hence, this manual is indispensable to whomever wants to work with the module. The text of Pauly (1984) should be consulted for a detailed presentation of the models, of their areas of application, their limitations and for numerous references to the original literature.

### Connecting and Disconnecting the Module

To get started with the module:

- Turn the HP41CV calculator OFF before inserting (or removing) the module (or any other plug-in accessory). Failure to do so may damage both the calculator and the module,
- Remove the port cover, and save it,
- Do not attempt to insert the module into a lower-numbered port than a memory module; thus, if you have a Quad Memory Module (HP82170, which turns an HP41C to an HP41CV), insert it into port 1 and insert the Fish Population Dynamics module into port 2 (there is on the underside of the calculator a map showing which ports are No. 1, 2, 3, and 4),

- Insert the module with a 16K label up into the selected port and gently push it all the way in,
- Turn the calculator ON.

At this point, you may check that the FISHPOPDYN package is available by pressing **SHIFT CATALOG 2**; all programs in the application modules attached to the calculator will be displayed, including the FISHPOPDYN Package, in the sequence: FB 7, 17, 22, 25, 2, 3, 14, 26, 1, 6, 9, 12, 18, 20, and 21, as well as their "local ALPHA" labels (see next section for actual running of the programs).

To remove the module:

- Turn the calculator OFF,
- Grasp "handle" of module between two fingernails and gently pull it out,
- Insert port cover into the empty port,
- Store module in a cool, dry place (strong ultraviolet (UV) light or magnetic fields will destroy contents of module).

### Resetting the HP41CV

The HP41CV circuits are susceptible to disruptions caused by conditions which traumatize the calculator. When the calculator either fails to respond to keystrokes or the display blanks out, the following steps should be implemented:

First, check the battery pack. Make sure that the calculator is OFF and then remove the batteries. Examine the battery contacts for dirt; clean them if necessary. Then, replace the battery pack and turn the calculator ON. This procedure will not cause a MEMORY LOST condition and if the calculator responds when it is switched on, program execution can be continued.

If the first step does not work, then try to do a "master clear" by pressing the key  down while turning the calculator ON. A MEMORY LOST message will appear in the display and all of the calculator's memory will be cleared. It will then be necessary to re-load any program you want to use into memory (see below). More details on re-setting the HP41CV and on the prevention of calculator trauma may be found in page 242 of the HP41C/HP41CV User's Manual (Anon. 1983).

## Running Programs from the FISHPOPDYN Module

To run programs in the application module, follow instructions in Table 2 and refer to Vakily et al. (1986) for detailed instructions on the individual programs. Table 1 gives the list of programs included in this module together with the corresponding page numbers from Vakily et al. (1986) and Pauly (1984). The latter text should be consulted for more information on the fish stock assessment models described in Vakily et al. (1986).

Table 2. Sequence of operations needed to load a program (FB n) from the FISHPOPDYN module into the memory of the HP 41CV calculator.<sup>a</sup>

Step	Instructions	Keystrokes	Display	Remarks
1a.	Clear programs in memory with CLP command	XEQ ALPHA CLP ALPHA ALPHA FB SPACE n ALPHA	XEQ -- XEQ -- XEQ CLP -- CLP --  CLP FB n PACKING (Back to x-register)	This step is necessary to ensure that the program to be copied from the FISHPOPDYN application module will fit into program memory. All programs in memory (i.e., programs with labels which appear in the display when a CATALOG 1 is executed) must be erased.
1b.	An alternative CLP step	XEQ ALPHA CLP ALPHA ALPHA	XEQ -- XEQ -- XEQ CLP -- CLP (back to x-register)	This alternative step clears the program from any current register. It will be most useful in cases where only one program is stored in memory.
2.	Allocate data storage registers using SIZE	XEQ ALPHA S 1 2 E ALPHA 1 0 0	XEQ -- XEQ -- XEQ SIZE -- SIZE --- SIZE 100 (back to x-register)	All 15 programs included in the FISHPOPDYN application module will run with a SIZE 100 allocation; therefore, there is no need to execute SIZE 100 everytime a program is copied into memory. For more information on storage requirements refer to the section on "General Information on Programs" in Vakily et al. (1986).
3.	Copy the application module program into memory	XEQ ALPHA C O P Y ALPHA ALPHA FB SPACE n ALPHA	XEQ -- XEQ -- XEQ COPY -- COPY --  COPY FB n (back to x-register)	Copying the programs into memory might take a few seconds, please wait until calculator gets back to the x-register display.
4.	Initialize program	Shift C	* FB n * : :	To run program, refer to Vakily et al. (1986).

<sup>a</sup>Addressing the programs directly (as can be done, e.g., with the HP Stat Pac module) is not possible here, because the 15 programs on the FISHPOPDYN module have a number of local ALPHA labels in common.

## Disclaimers and Copyright Statements

This module was produced by

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based on chips manufactured by Fujitsu Corp., i.e., the MBM27C256 CMOS EPROM ( $V_{pp} = 21V$ ), and on pre-programmed magnetic cards supplied by ICLARM and containing 15 of the 30 programs in Vakily et al. (1986).

ICLARM and FAO assume no responsibility for malfunction of the module and any program it contains; they are supplied "as is".

The mention of names of products and firms in this document does not imply endorsement by either the International Center for Living Aquatic Resources Management or the Food and Agriculture Organization of the United Nations, of products manufactured by the Hewlett-Packard Company, Corvallis Microtechnology and/or Fujitsu Corporation.

### Acknowledgement

Thanks are due to FAO, especially to Dr. S. Garcia, for supporting the production of the FISHPOPDYN module.

### References

- Anon. 1983. Hewlett-Packard owner's handbook and programming guide. HP41C and CV. Hewlett-Packard Co., Corvallis, USA. 279 p.
- Pauly, D. 1984. Fish population dynamics in tropical waters: a manual for use with programmable calculators. ICLARM Studies and Reviews 8, International Center for Living Aquatic Resources Management, Manila. 325 p.
- Vakily, J.M., M.L. Palomares and D. Pauly. 1986. Computer Programs for fish stock assessment. Applications for the HP41CV calculator. FAO Fish. Tech. Pap. 101, Suppl. 1. Food and Agriculture Organization of the United Nations, Rome, Italy and International Center for Living Aquatic Resources Management, Manila, Philippines. 255 p.