A COMPUTER PROGRAM FOR ANALYSIS OF POLYMODAL FREQUENCY DISTRIBUTIONS (ENORMSEP), FORTRAN IV

Program ENORMSEP (Extended Normal Separator Program) separates a polymodal frequency distribution into its component groups where aging studies have not been or cannot be performed. The program calculates preliminary estimates of the number of size groups and their points of overlap using probit analysis and polynomial regression techniques. These preliminary estimates are then entered into NORMSEP (Normal Separator Program) (Hasselblad 1966), used as a subroutine, in order to complete the analysis.

Output data are generated both as listings and punched cards. Listings include at the option of the user: 1) table of values of the standardized normal distribution; 2) table of values of probabilities, standardized normal variables, and probits; 3) polynomial regressions and analyses of variance of probits; 4) table of residuals for the final regression; 5) table of roots corresponding to all regressions after taking second derivative; 6) tables for analyses for the separation of modes; 7) plots of observed and predicted values for the final regression; and 8) plot of the original frequency distribution. Punched card output includes the number of observed frequency distributions with their intervals and probits and regression coefficients for the polynomials.

Input data require the observed size frequency together with values for identification and control purposes. No more than nine size groups may be separated because of limits on the efficiency of parameter estimate in the polynomial regression.

This computer program was developed on an IBM 360/65I computer[1] using release 20.7 MVT/HASP system at the Statistical and Computing Center at the University of Hawaii. This computer program is capable of processing multiple sets of data. For a "typical" problem, the program takes about 1 min of central processing unit time and a total machine unit time of 1.5 min to run a single problem "individually." The requirement for core storage is 168K, where K is 1,024 bytes and where a byte is an address collection consisting of eight binary bits or binary digits.

A description of the program, including program listing as well as input and output for two examples, is available from the authors upon request.

[1]Reference to this particular computer system does not imply endorsement of the product by the National Marine Fisheries Service, NOAA, but is given to provide the reader with a base for determining the cost of performing jobs with the particular computer system at his disposal.

Literature Cited

HASSELBLAD, V.
1966. Estimation of parameters for a mixture of normal distributions. Technometrics 8:431-444.

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RECORDS OF LARVAL, TRANSFORMING, AND ADULT SPECIMENS OF THE QUILLFISH, *PTILICHTHYS GOODEI*, FROM WATERS OFF OREGON

This report extends the southern range of the quillfish, *Ptilichthys goodei* Bean 1881, in the northeast Pacific to waters off the central coast of Oregon where larval, transforming, and adult specimens have been collected. The previously reported range of this species in the North Pacific was from the Okhotsk and Bering seas to northern Washington and Puget Sound (DeLacy et al. 1972; Quast and Hall 1972; Hart 1973). The life history of the quillfish is poorly understood and nothing is known of the early stages (Walker 1953; Makushok 1958; Grinols 1965; Hart 1973).

Materials and Methods

Three larvae (20.3, 24.7, 36.0 mm SL–standard length) and one transforming specimen (114 mm SL) of *P. goodei* came from plankton collections made with large-mouth (0.7 m) bongos having 0.571-mm mesh nets. Tows were made in a step-oblique or oblique manner from near the bottom or 150 m (at deeper stations) to the surface at a vessel speed of 2 knots. Tow times were 16 to 25 min. The specimens were fixed in 10% and stored in 5% buffered Formalin.[1]

[1]Reference to trade names does not imply endorsement by the National Marine Fisheries Service, NOAA.