Some Population Parameters of Commercially-Important Fishes in the Philippines

by

F. Lavapie-Gonzales
S.R. Ganaden
F.C. Gayanilo, Jr.

Fisheries Resources Research Division
Bureau of Fisheries and Aquatic Resources
Arcadia Building, 860 Quezon Ave., Quezon City
Metro Manila, Philippines

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Felimon C. Gayanilo, Jr.

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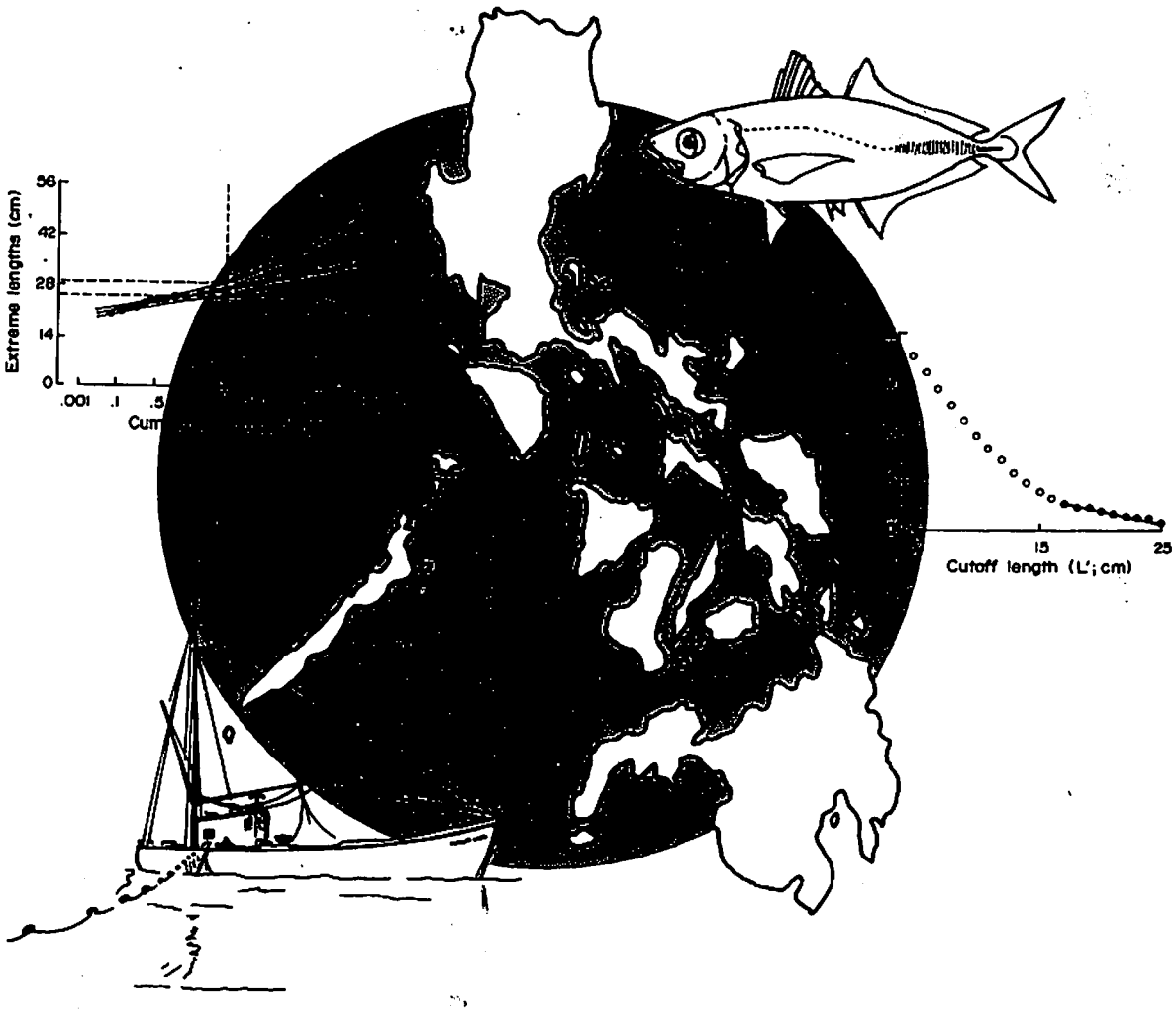

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Metro Manila, Philippines

Contents

Preface

The vision of institutionalizing resource assessment activities in the Regional Offices was conservatively initiated in 1982 whereby collection of information of major species, mostly small pelagics from a major gear in one of the Region's fishing grounds, was undertaken in the succeeding one to six years (1983-1988). The goal of the program was to develop a core group/unit for resource assessment in each of the Regional offices. However, the change in the political administration in the country became a deterrent to the attainment of the goal. The fisheries institution has become just a staff Bureau abolishing its regional offices, hence the program for fisheries was significantly changed.

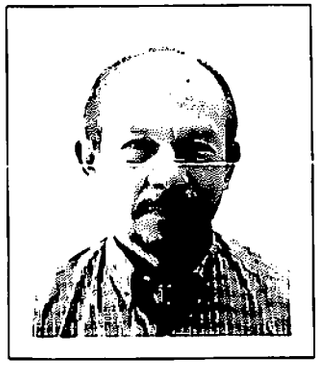
The length measurements collected, no matter how inadequate, have been processed and is hereby published. The regional biologists who were trained and have collected the sets of length data deserved a special recognition for these works.

The estimated biological parameters derived from the data submitted by the regional core groups for resource assessment are hereby published by the Bureau of Fisheries and Aquatic Resources to serve as reference material of stock assessment managers and students.

DENNIS ARAULLO
Director
Bureau of Fisheries and Aquatic Resources
Department of Agriculture (Philippines)

Foreword

Previous resource assessments made on the marine fisheries of the country were based on the available catch and effort data, results of which have been very useful in supporting fisheries policies for development and management. However, the complimentary information on the biological parameters for further management measures on the perceived growth and recruitment overfishing are almost always unavailable. There was then an urgent need to establish a collection system for the biological information. Therefore, a resource assessment training for regional biologists of the BFAR Regional Offices was held in 1982. Thereafter, sampling for fish measurements was initiated through them. Considering the limited manpower to do the collection, it was limited to the catch of purse seine, ringnet or trawl in a representative landing center of one fishing ground under the jurisdiction of the regions concerned. However limited or inadequate these data were, this initial attempt by the staff from the BFAR Central Office and by the Regional biologists are worth for publication.



JOSE ORDONEZ
Chief
Fisheries Resources Research Division
Bureau of Fisheries and Aquatic Resources
Department of Agriculture (Philippines)

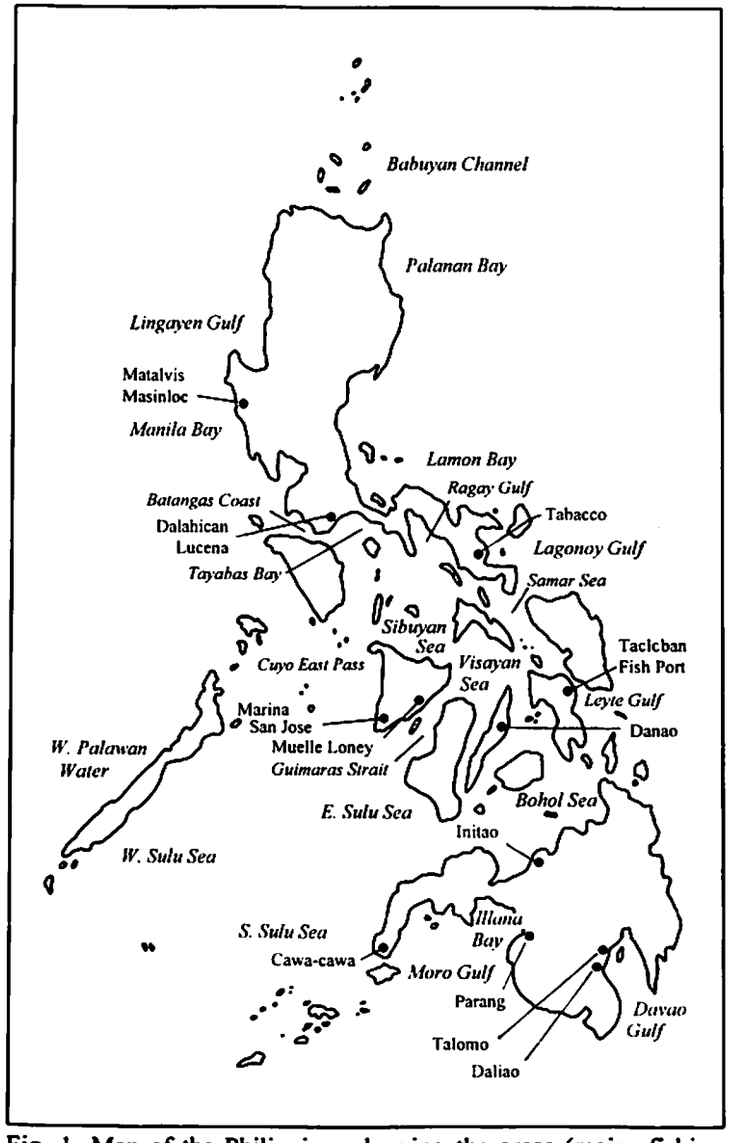


Fig. 1. Map of the Philippines showing the areas (major fishing grounds) were the length-frequencies were colected by BFAR regional offices covering the period 1983 to 1988.

Abstract

The estimates of the von Bertalanffy Growth Function (VBGF) parameters (L∞ and K) and mortality parameters (Z and M) for some of the commercially-important species caught in the Philippine waters are presented using the FAO-ICLARM Stock Assessment Tools (FiSAT) software. The data collected from various major fishing grounds in the Philippines were utilized in the analysis. Whenever possible, the ELEFAN I method, Shepherd's method, Powell-Wetherall's Plot, Modal Progression Analysis (MPA), Length-converted catch curve, as well as, the method to estimate the maximum possible length (L_{max}), were utilized to compute for the population parameters.

Introduction

The growing concern for resource assessment was strongly motivated in mid-1900s. The objective in principle focused mainly in knowing the status of the fisheries and to have proper management recommendations with which to formulate and put into action management measures. However, fish stock-specific biological parameter in the Philippines are usually not available.

Great strides have been made along this assessment activity in 1976 to 1979 with the guidance of the FAO-sponsored South China Sea Programme. Years of length-frequency data were collected from several major fishing grounds in the Philippines through the regional offices of the Bureau of Fishery and Aquatic Resources (BFAR), Philippines (see Fig. 1) each having jurisdiction over different fishing grounds. These areas include the Leyte Gulf, Samar Sea, Sulu Sea, Moro Gulf, Visayan Sea, Guimaras Strait, Camotes Sea, Davao Gulf, Illana Bay, Pujada Bay, Tayabas Bay, Bohol Sea and the Cuyo-East Pass.

In 1994, BFAR with the assistance from the International Center for Living Aquatic Resources Management (ICLARM) in the analysis of the length frequencies, embarked in a project to analyze the accumulated data and to publish an atlas of growth parameters supplementing the atlas of growth parameters earlier published by ICLARM (Ingles and Pauly, 1984) and the University of the Philippines in the Visayas (Corpuz et al. 1985). This also coincide with the release of the FAO-ICLARM Stock Assessment Tools (FiSAT; Gayanilo et al. 1996) that incorporate the routines of The Compleat ELEFAN (Gayanilo et al. 1987) and the Length-base Fish Stock Assessment software or LFSA (Sparre 1987). The new software incorporates the tools appropriate to analyze the length frequencies.

Methodology

At about 10 days per month, samples of fish landed from major ports were collected by trained field officers of BFAR. Length measurements, species composition, total landed boat, total landed catch were recorded. Usually, the catch from which the samples were randomly collected were pre-sorted by the fishermen into genus groupings, facilitating the sorting procedures by species.

Length measurement for every sampling day were made whenever the species is available at the pre-determined sampling center (i.e., landing sites). The lengths were measured from the snout to the tip of the caudal fin (total length) for the individual fish in the sample, except for tunas (fork length).

The number of samples collected for each sampling date was not enough to analyze the data in an annual basis. The same is true if analysis is made by gear. Also, it was difficult to establish the various stocks. Hence, the length frequency data (L/F) were pooled into single year for all fishing gears of nearby fishing areas (see Appendix for the length frequencies; readers may request for the un-pooled length frequencies from the authors).

Recognizing the difficulties and problems in the collection of the length frequencies, it was anticipated that additional file manipulation may be necessary bearing in mind the implications the procedure will have in the final analysis as to the confidence limits of the estimates. Except for some of the data (see caption in each plate for details), running average of three was used to reduce the 'noise' and thus emphasizing the modes.

The FAO-ICLARM Stock Assessment Tools (FiSAT; Gayanilo et al. 1996) was used to store the original length frequencies and, eventually, for the estimation of the population parameters. One of the assumptions of the models to be used in the estimation of the growth parameters is that growth is the same year after year (Pauly and David 1981), hence, when more than a year of data was available, the length frequencies were pooled to form a one-year data. This was done since the annual length frequencies were not enough to infer growth. In as far as the mortality estimates are concerned, they then refers to mean annual rates in these cases.

The Modal Progression Analysis (MPA) was used whenever possible (see Plates 1.6.4 and 3.2.2). The MPA involves the use of the Bhattacharya's method (Bhattacharya 1967) to separate age groups, linking the mean lengths in time series and non-linear fit of the von Bertalanffy Growth Function (VBGF) using the relative ages as generated by the linking of the mean lengths. This procedure allows the estimation of the growth parameters and the standard of errors of the estimates (Gayanilo and Pauly, in press).

In majority of the cases, however, the method of Powell-Wetherall Plot (Powell 1979; Wetherall 1986) was used to estimate L_∞. In cases when the Powell-Wetherall's Plot fails to establish a reasonable L_∞ (e.g. Plate 2.5.1) largely associated with insufficient data gathered in the large classes, the resulting estimate of the method to approximate the L_{max} using the extreme value theorem (Formaccion et al. 1991) was applied. If we assume that L_∞ is close to L_{max}, the result of the extreme value theorem provides a reasonable approximation of L_∞.

The curvature parameter (K) of the VBGF, when L_∞ is given, was estimated using the K-scan routine of the ELEFAN I methodology (Pauly and David 1981). When the results of the ELEFAN I was not convincing, in that, the plot of the scores (i.e., Rn) does not display a clear 'peak', the Shepherd's method (Shepherd 1987) was used to validate the results.

Using the estimates of the growth parameters, an analysis of the seasonal recruitment pulse was performed using the Recruitment Pattern methodology as proposed by Pauly (1984). When two distinctive pulses are exhibited, the histograms of length frequencies, plotted in time series, were superimposed with two growth curves (solid lines and broken lines). Otherwise, only one growth curve is superimposed (solid line).

The natural mortality (M) was estimated using the Pauly's M-empirical equation (Pauly 1980), i.e.,

$$\log(M) = -0.0066 - 0.279 \log(L_\infty) + 0.6543 \log(K) + 0.4634 \log(T)$$

where L_∞ (in cm) and K are as defined above, and T is the mean annual habitat temperature, taken as 28.0°C for all the areas considered in this study. The length converted catch curve (Pauly 1984; Edralin et al. 1988) was employed to estimate the total mortality (Z), where the fishing mortality (F) of the fully-exploited length groups, can be deducted (i.e., F=Z-M).

Results

Table 1 (below) is a summary of the results arranged according to Families. The graphical representations of the major results for each of the fish stocks are given in **Appendix A** and the length frequencies used in the analysis are given in **Appendix B**.

Table 1. Summary of the results of the length frequency analysis.

Plate No.	Species Name	Area	L_∞ (cm)	L_{max} (cm)	K (yr^{-1})	M (yr^{-1})	Z (yr^{-1})	Year(s)
Carangidae								
1.1.1	*Decapterus macrosoma*	Leyte Gulf	27.30	27.62	1.40	2.28	4.67	1983-1988
1.1.2	*Decapterus macrosoma*	Visayan Sea	31.30	29.57				1984-1988
1.1.3	*Decapterus macrosoma*	Guimaras Strait	31.70	30.23				1984-1986
1.1.4	*Decapterus macrosoma*	Samar Sea	27.00	27.11				1985-1987
1.1.5	*Decapterus macrosoma*	Camotes Sea	28.00	30.02	1.60	2.47	5.13	1985-1987
1.1.6	*Decapterus macrosoma*	Davao Gulf	29.90	31.21				1983-1986
1.1.7	*Decapterus macrosoma*	South Sulu Sea	27.80	26.80	1.20	2.05	7.25	1983-1988
1.1.8	*Decapterus macrosoma*	Moro Gulf/Illana Bay	21.40	24.48	2.30	3.38	4.25	1983-1988
1.2.1	*Decapterus kurroides*	Visayan Sea	29.80	30.47				1983-1988
1.2.2	*Decapterus kurroides*	Samar Sea	31.40	30.29				1983-1986
1.2.3	*Decapterus kurroides*	Davao Gulf	24.80	25.97				1983-1988
1.3.1	*Decapterus russelli*	Visayan Sea	36.50	38.64				1984-1987
1.3.2	*Decapterus russelli*	Camotes Sea	35.10	34.50	1.40	2.13	6.71	1985-1988
1.4.1	*Decapterus macarellus*	Pujada Bay	24.30	24.36	1.80	2.78	3.66	1986
1.4.2	*Decapterus macarellus*	Davao Gulf	33.60	33.59				1986
1.5.1	*Decapterus maruadsi*	Tayabas Bay	27.30	26.69	1.10	1.95	5.39	1987
1.5.2	*Decapterus maruadsi*	South Sulu Sea	25.00	24.03	1.20	2.11	3.51	1984-1986
1.5.3	*Decapterus maruadsi*	Camotes Sea	31.17	29.56	1.30	2.10	6.86	1987-1988
1.6.1	*Selar crumenophthalmus*	Illana Bay	18.10	18.90	0.72	1.66	2.01	1988
1.6.2	*Selar crumenophthalmus*	Pujada Bay	23.30	23.43	1.20	2.16	2.37	1986
1.6.3	*Selar crumenophthalmus*	Davao Gulf	28.60	28.80	1.90	2.75	8.34	1983-1987
1.6.4	*Selar crumenophthalmus*	South Sulu Sea	24.60	26.52	1.49	2.45	4.14	1987
1.6.5	*Selar crumenophthalmus*	Leyte Gulf	26.40	27.31	1.50	2.41	3.86	1985-1987
1.6.6	*Selar crumenophthalmus*	Camotes Sea	28.50	28.88	2.00	2.85	7.41	1983-1987
1.7.1	*Atule mate*	Leyte Gulf	30.50	31.11	0.92	1.68	2.19	1987
Scombridae								
2.1.1	*Rastrelliger kanagurta*	South Sulu Sea	24.70	25.26	1.20	2.12	2.36	1987
2.1.2	*Rastrelliger kanagurta*	Illana Bay	25.00	25.58				1983-1984
2.1.3	*Rastrelliger kanagurta*	Leyte Gulf	31.90	32.35	2.00	2.76	7.42	1986-1987
2.1.4	*Rastrelliger kanagurta*	Samar Sea	37.40	36.45	1.00	1.68	4.33	1983-1986
2.1.5	*Rastrelliger kanagurta*	Guimaras Strait	33.90	34.11	1.00	1.72	2.83	1984-1986
2.1.6	*Rastrelliger kanagurta*	Visayan Sea	33.10	33.90				1983-1988
2.1.7	*Rastrelliger kanagurta*	Camotes Sea	30.30	30.48				1987

Continued

Table 1 (continued)

Continued

Table 1 (continued)

Plate No.	Species Name	Area	L_∞ (cm)	L_{max} (cm)	K (yr^{-1})	M (yr^{-1})	Z (yr^{-1})	Year(s)
2.2.1	*Rastrelliger faughni*	Visayan Sea	28.10	28.21	1.50	2.37	3.60	1983-1987
2.2.2	*Rastrelliger faughni*	Camotes Sea	27.03	27.45	2.20	3.08	5.22	1987
2.2.3	*Rastrelliger faughni*	Leyte Gulf	30.10	30.91	2.00	2.80	3.79	1986-1987
2.2.4	*Rastrelliger faughni*	Tayabas Bay	28.10	29.21				1987
2.3.1	*Rastrelliger brachysoma*	Guimaras Strait	28.50	29.89	1.40	2.25	4.33	1984-1986
2.3.2	*Rastrelliger brachysoma*	Visayan Sea	31.80	31.81				1983-1988
2.3.3	*Rastrelliger brachysoma*	Leyte Gulf	27.30	27.08				1983-1987
2.4.1	*Auxis thazard*	Camotes Sea	36.60	38.23	1.20	1.90	4.78	1983-1987
2.5.1	*Auxis rochei*	Camotes Sea		36.69				1983-1987
2.6.1	*Katsuwonus pelamis*	Tayabas Bay/Bohol Sea/Illana Bay	88.90	87.93				1983,1984, 1987 & 1988
2.7.1	*Thunnus albacares*	Tayabas Bay/Bohol Sea/Illana Bay/ Cuyo East Pass	157.30	163.53				1983-1988
Clupeidae								
3.1.1	*Sardinella fimbriata*	Tayabas Bay	24.80	26.91	1.20	2.12	5.30	1987
3.1.2	*Sardinella fimbriata*	Visayan Sea	21.60	21.88				1986-1988
3.1.3	*Sardinella fimbriata*	Guimaras Strait	22.30	20.69	0.90	1.78	2.49	1984-1986
3.1.4	*Sardinella fimbriata*	Leyte Gulf	23.70	23.75	0.99	1.89	3.29	1983-1986
3.1.5	*Sardinella fimbriata*	South Sulu Sea	20.10	21.41				1983-1988
3.2.1	*Amblygaster sirm*	South Sulu Sea	25.20	26.74	2.10	3.04	6.99	1983-1988
3.2.2	*Amblygaster sirm*	Camotes Sea	31.00	24.28	1.35	2.15	6.88	1987
3.3.1	*Sardinella albella*	Visayan Sea	26.40	25.40				1983-1986
3.3.2	*Sardinella albella*	Guimaras Strait/ Samar Sea	23.00	23.93				1983-1986

Continued

Table 1 (continued)

Plate No.	Species Name	Area	L_∞ (cm)	L_{max} (cm)	K (yr^{-1})	M (yr^{-1})	Z (yr^{-1})	Year(s)
3.4.1	*Sardinella longiceps*	South Sulu Sea	19.40	20.82	1.00	2.01	2.54	1987
3.4.2	*Sardinella longiceps*	Visayan Sea	30.40	27.14				1983-1987
3.5.1	*Herklotsichthys quadrimaculatus*	Camotes Sea	16.50	17.04	0.98	2.08	1.38	1987
Engraulidae								
4.1.1	*Stolephorus commersonii*	Illana Bay	13.30	11.54				1983
4.2.1	*Stolephorus punctifer*	Tayabas Bay	11.60	12.10				1987
4.2.2	*Stolephorus punctifer*	South Sulu Sea	12.40	12.60	1.20	2.57	3.51	1987
4.3.1	*Stolephorus heterolobus*	Tayabas Bay	11.60	12.00	2.30	4.01	5.78	1987
4.3.2	*Stolephorus heterolobus*	South Sulu Sea	12.30	12.70	1.50	2.98	5.34	1987
4.4.1	*Engraulis japonicus*	Tayabas Bay	12.90	13.50				1987
4.4.2	*Engraulis japonicus*	South Sulu Sea	13.40	14.20				1987
Exocoetidae								
5.1.1	*Cheilopogon negricans*	Camotes Sea	22.20	21.95	1.70	2.75	5.90	1987
5.2.1	*Cheilopogon atrisignis*	Camotes Sea	29.90	27.30	0.88	1.64	5.52	1987
5.3.1	*Cheilopogon cyanopterus*	Camotes Sea	29.90	26.80	0.86	1.62	5.53	1987
5.4.1	*Cypselurus negripinnis*	Bohol Sea	33.90	39.07				1987-1988
5.5.1	*Oxyporhampus convexus*	Camotes Sea	22.50	22.91	1.20	2.18	4.97	1984-1987
5.5.2	*Oxyporhampus micropterus*	Bohol Sea	24.00	24.03				1985 & 1987

Continued

Table 1 (continued)

Plate No.	Species Name	Area	L_∞ (cm)	L_{max} (cm)	K (yr^{-1})	M (yr^{-1})	Z (yr^{-1})	Year(s)
Nemipteridae								
6.1.1	*Nemipterus japonicus*	Tayabas Bay	28.30	29.25				1987-1988
6.1.2	*Nemipterus japonicus*	Leyte Gulf	29.30	29.04	0.84	1.60	2.63	1984-1987
6.2.1	*Nemipterus marginatus*	Tayabas Bay	36.30	36.43				1987
Mullidae								
7.1.1	*Upeneus sulphureus*	Leyte Gulf	15.30	16.18				1984-1986
7.1.2	*Upeneus sulphureus*	Visayan Sea	16.60	16.85				1987
Leognathidae								
8.1.1	*Leiognathus equulus*	Leyte Gulf	28.80	27.42				1985-1987
8.2.1	*Leiognathus elongatus*	Guimaras Strait	12.30	12.68	1.40	2.85	4.06	1986
8.3.1	*Secutor ruconius*	Visayan Sea	16.40	14.88				1987
Apogonidae								
9.1.1	*Apogon quadrifasciatus*	Guimaras Strait	15.50	16.13				1987
Menidae								
10.1.1	*Mene maculata*	Camotes Sea	22.30	23.39				1987

Continued

Table 1 (continued)

Plate No.	Species Name	Area	L_∞ (cm)	L_{max} (cm)	K (yr^{-1})	M (yr^{-1})	Z (yr^{-1})	Year(s)
Pomadasyidae								
11.1.1	*Scolopsis taeniopterus*	Guimaras Strait	17.90	16.62				1986
Synodontidae								
12.1.1	*Trachinocephalus myops*	Visayan Sea	29.70	30.43				1986-1987

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Appendix A: Graphical Presentation of the Results

The following presents the graphical representation of the results. The plates are arranged as presented in Table 1.

The lower portion of the Plates is a plot of the histograms of the length frequencies. When growth parameters can be estimated from the length frequencies, the growth curve, in solid lines, is superimposed (e.g., Plate 1.1.1). When two pulses are exhibited (see recruitment plot in Plates 1.6.4 and 3.2.2), two growth curves are drawn with the growth curve of the expected minor pulse drawn in broken lines (e.g., Plates 1.1.7 and 1.1.8). There were a number of files where the length frequencies were insufficient to infer growth (e.g., Plates 1.1.2 and 1.1.3).

Powell-Wetherall Plots (e.g., Plate 1.1.1) are labeled '**A**'. Solid lines are the points used in the analysis and the resulting Type II (i.e., geometric mean) regression line is superimposed where the L_∞ is estimated at the intersection of the regression line and the x-axis where the $\bar{L}$-L' (difference between the mean length and the cut-off length) is equal to zero.

The K-scan plot to estimate the VBGF curvature parameter is labeled '**B**'. In the case when the results of the ELEFAN I (solid line) is not convincing or the results of ELEFAN I and the Shepherd's methods exhibits slight deviation of results, the plot of the Shepherd's method (broken line) is also superimposed (e.g., Plates 1.1.1 and 1.1.7). Otherwise, only the result of the ELEFAN I is plotted (e.g., Plate 1.4.1) though the Shepherd's method was also used to reconfirm the results.

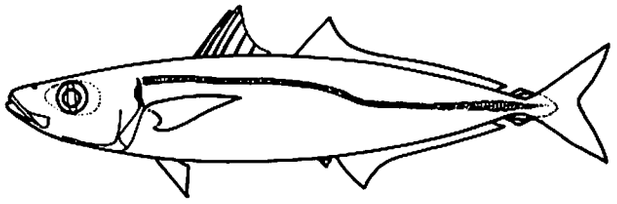
The plot of the Length-converted catch curve is labeled '**C**'. The points used in the analysis are drawn with solid circles and the the slope of regression line (with signs changed to positive) represents the total mortality (Z).

The graph of the extreme value theorem to approximate L_{max} is labeled '**D**'. The vertical (dotted) line projecting from the x-axis is the point at which the estimated L_{max} was computed. Also, displayed is the confidence belt of the regression line and hence, the estimate. This procedure was performed to all the data files (see Table 1).

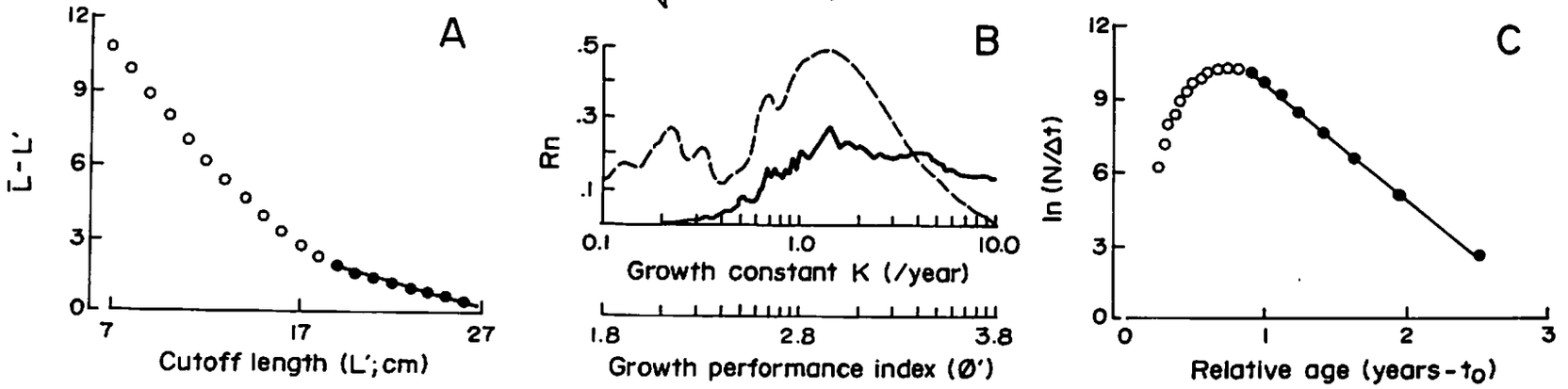
When the Modal Progression Analysis (MPA) is applicable (e.g., Plate 1.6.4), the plot of the Relative age vs. Length is displayed, here labeled '**E**'. Although the recruitment pattern analysis was done for all the data files where the growth parameters were able to be estimated, only the data files where the MPA was applicable that a recruitment plot is presented (see Plates 1.6.4 and 3.2.2). The recruitment pattern analysis is labeled '**F**'.

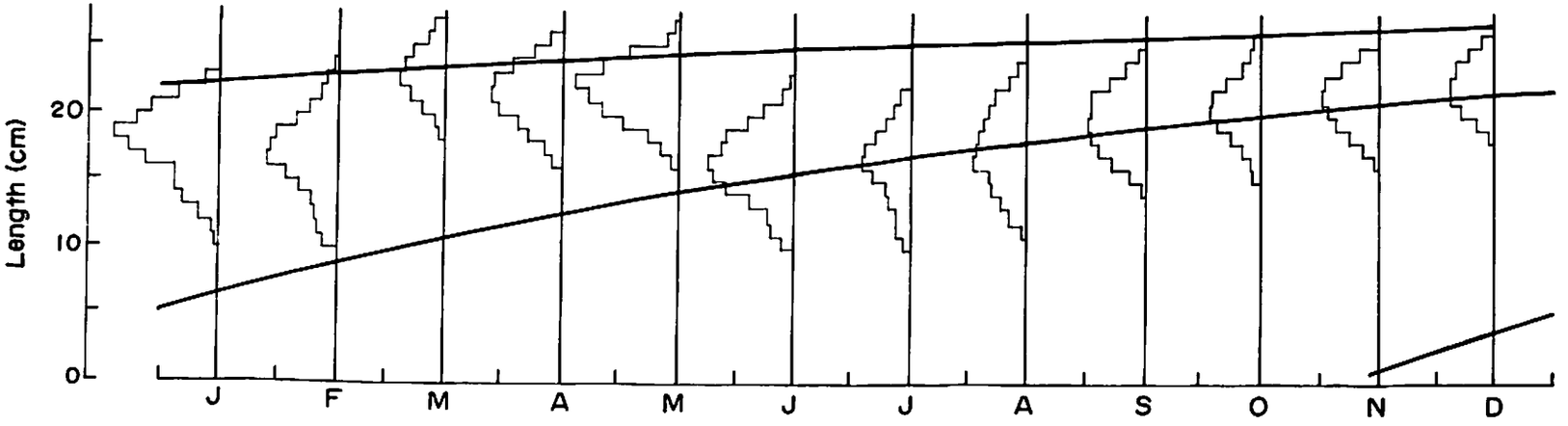
Plate 1.1.1

Family : Carangidae
Species name : *Decapterus macrosoma* (Bleeker 1851)



Area : Leyte Gulf
Year : 1983-1988

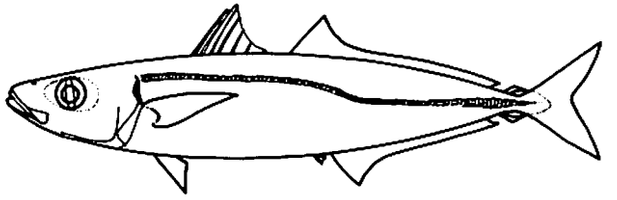




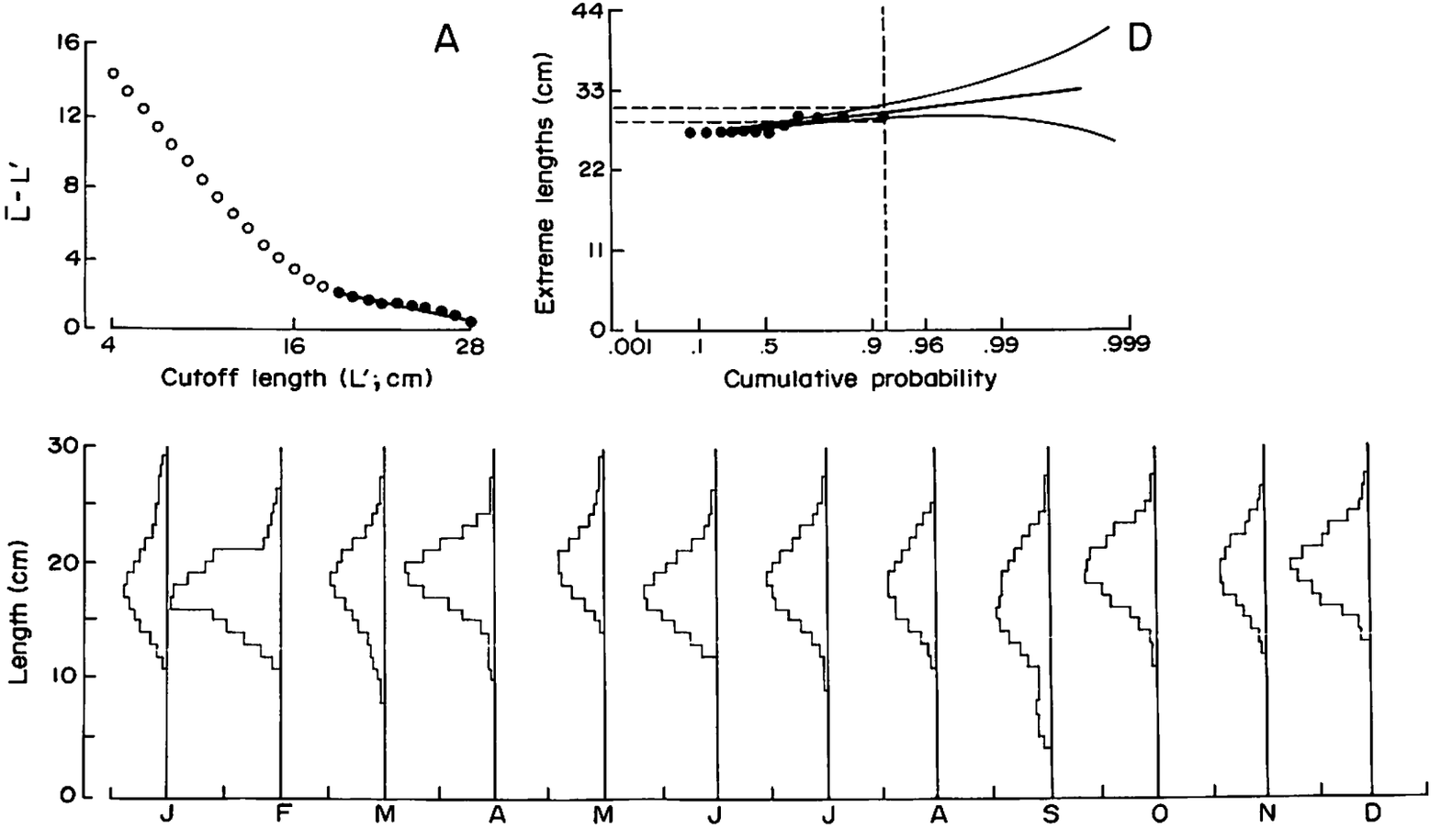
The Powell-Wetherall's Plot estimates the L_∞ to be about 27.3 cm from the data collected largely from purse seine and trawl. The results of both the ELEFAN I and the Shepherd's method K-scan routines reveal K to be about 1.4 year^{-1}. Note that the plot generated by the ELEFAN I routine does not clearly define the VBGF curvature parameter. The total mortality (Z) was estimated to be about 4.67 year^{-1} using the length-converted catch curve. The recruitment pattern analysis exhibits two pulses per year (plot not shown). However, the secondary cohort is not well defined.

Plate 1.1.2

Family : Carangidae
Species name : *Decapterus macrosoma* (Bleeker 1851)



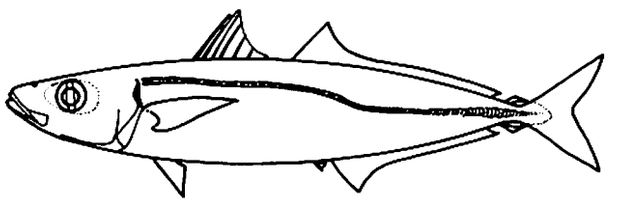
Area : Visayan Sea
Year : 1984-1988



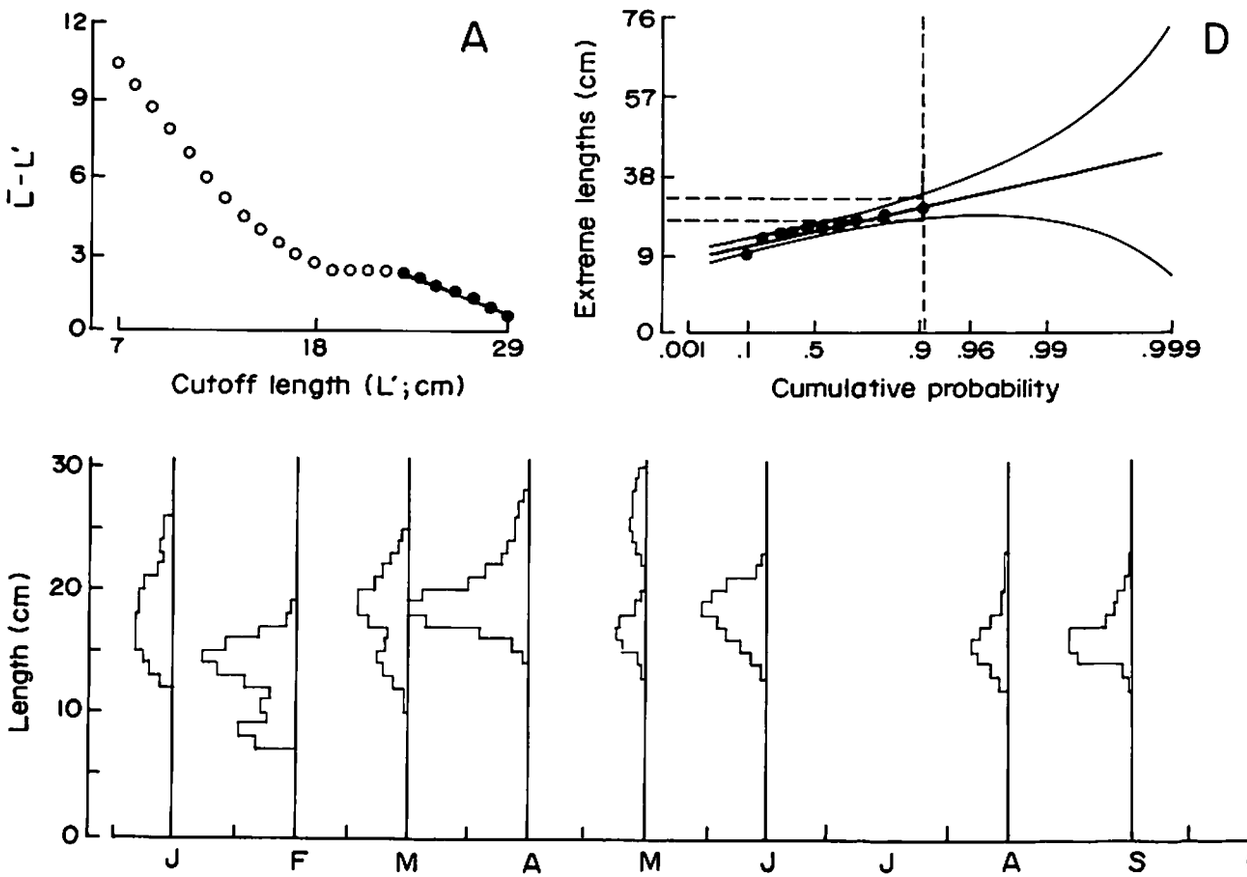
The time series of length frequencies does not exhibit clear modal progression to infer growth. However, the L_{∞} as estimated using the Powell-Wetherall's Plot, is about 31.3 cm. The L_{max} result of 29 to 30.5 cm.(at 95% confidence interval) indicates that sufficient data, in terms of the size ranges collected, is available.

Plate 1.1.3

Family : Carangidae
Species name : *Decapterus macrosoma* (Bleeker 1851)



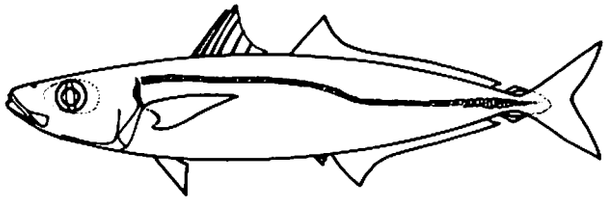
Area : Guimaras Strait
Year : 1984-1986



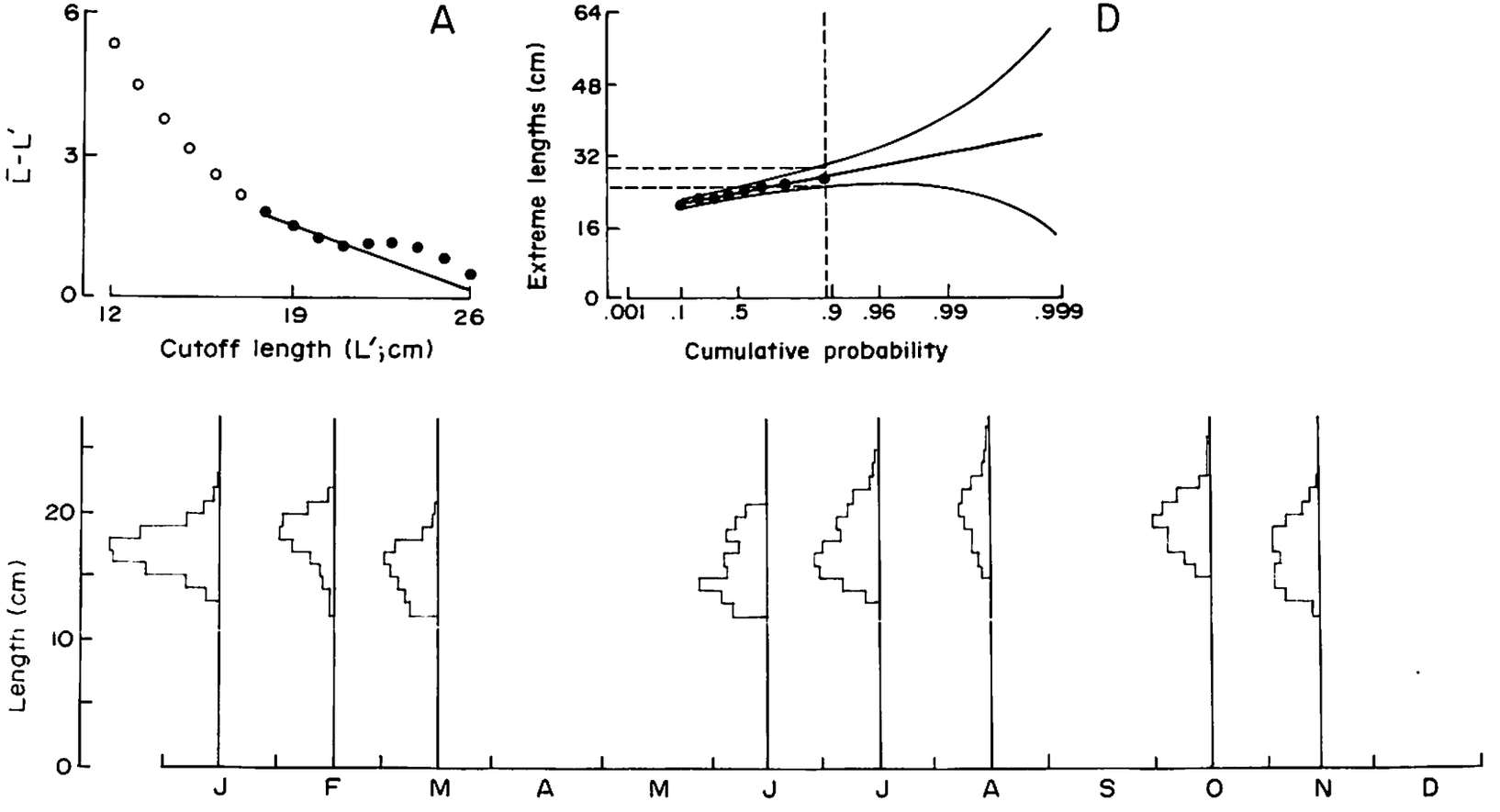
The time series of length frequencies does not exhibit clear modal progression to infer growth. The results of the ELEFAN I K-scan routine (not shown) failed to estimate the curvature parameter of the VBGF. The L_{∞} was estimated, using the Powell-Wetherall's Plot, to be about 31.7 cm. The L_{max} result of 27 to 33 cm. (at 95% confidence interval) indicates that sufficient data, in terms of the size ranges collected, is available.

Plate 1.1.4

Family : Carangidae
Species name : *Decapterus macrosoma* (Bleeker 1851)



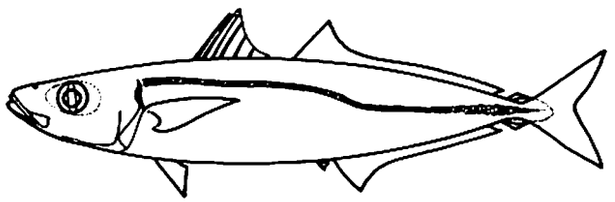
Area : Samar Sea
Year : 1985-1987



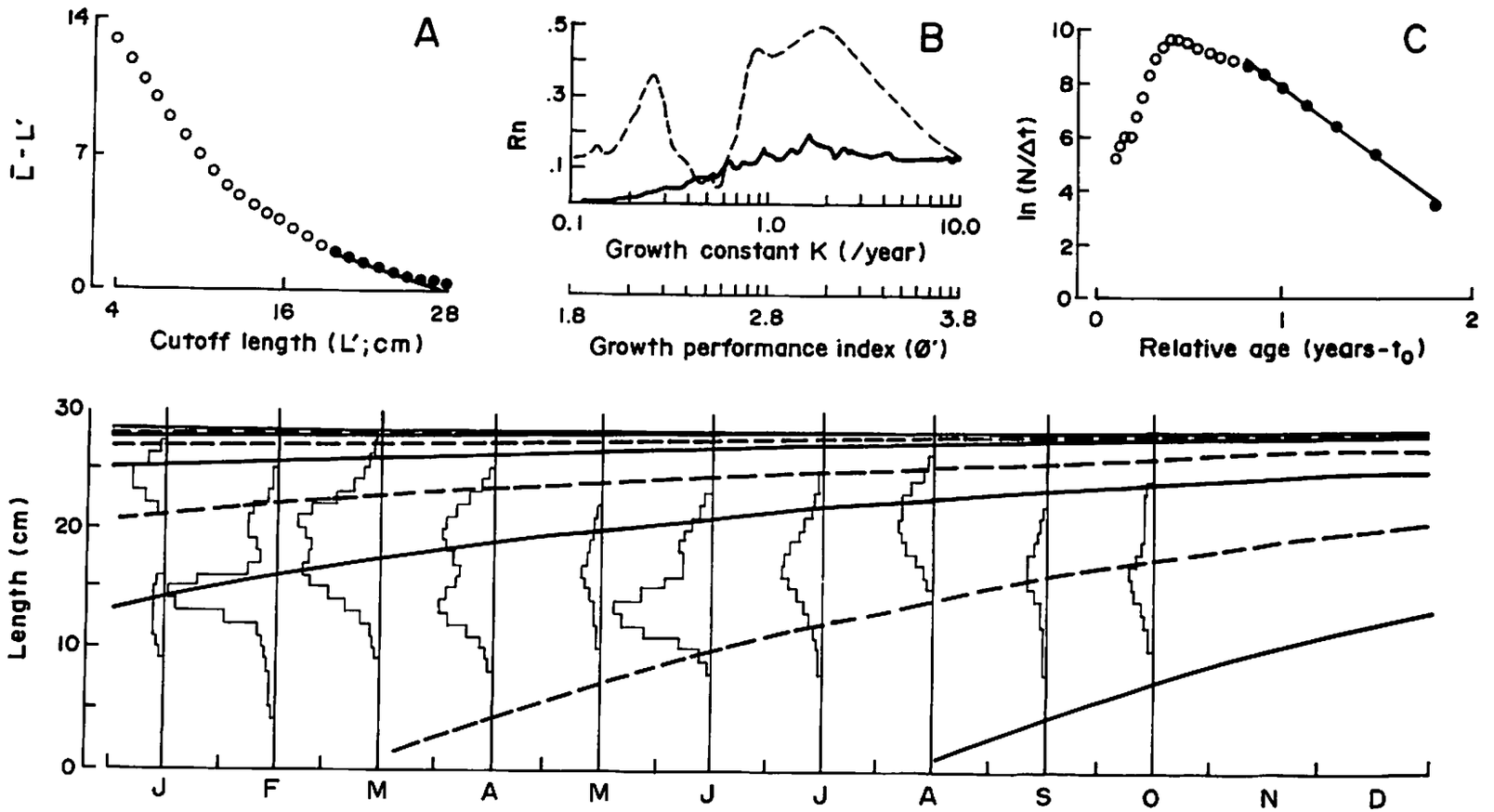
The time series of length frequencies does not exhibit clear modal progression to infer growth. The L_∞ was estimated, using the Powell-Wetherall's Plot, to be about 27 cm. The results of the ELEFAN I K-scan routine (not shown), using the L_∞ as computed in the Powell-Wetherall's plot, failed to establish a reasonable estimate of K. The L_{max} result of 25 to 29 cm. (at 95% confidence interval) indicates that sufficient data, in terms of the size ranges collected, is available.

Plate 1.1.5

Family : Carangidae
Species name : *Decapterus macrosoma* (Bleeker 1851)



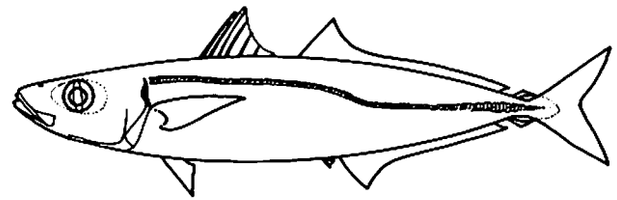
Area : Camotes Sea
Year : 1985-1987



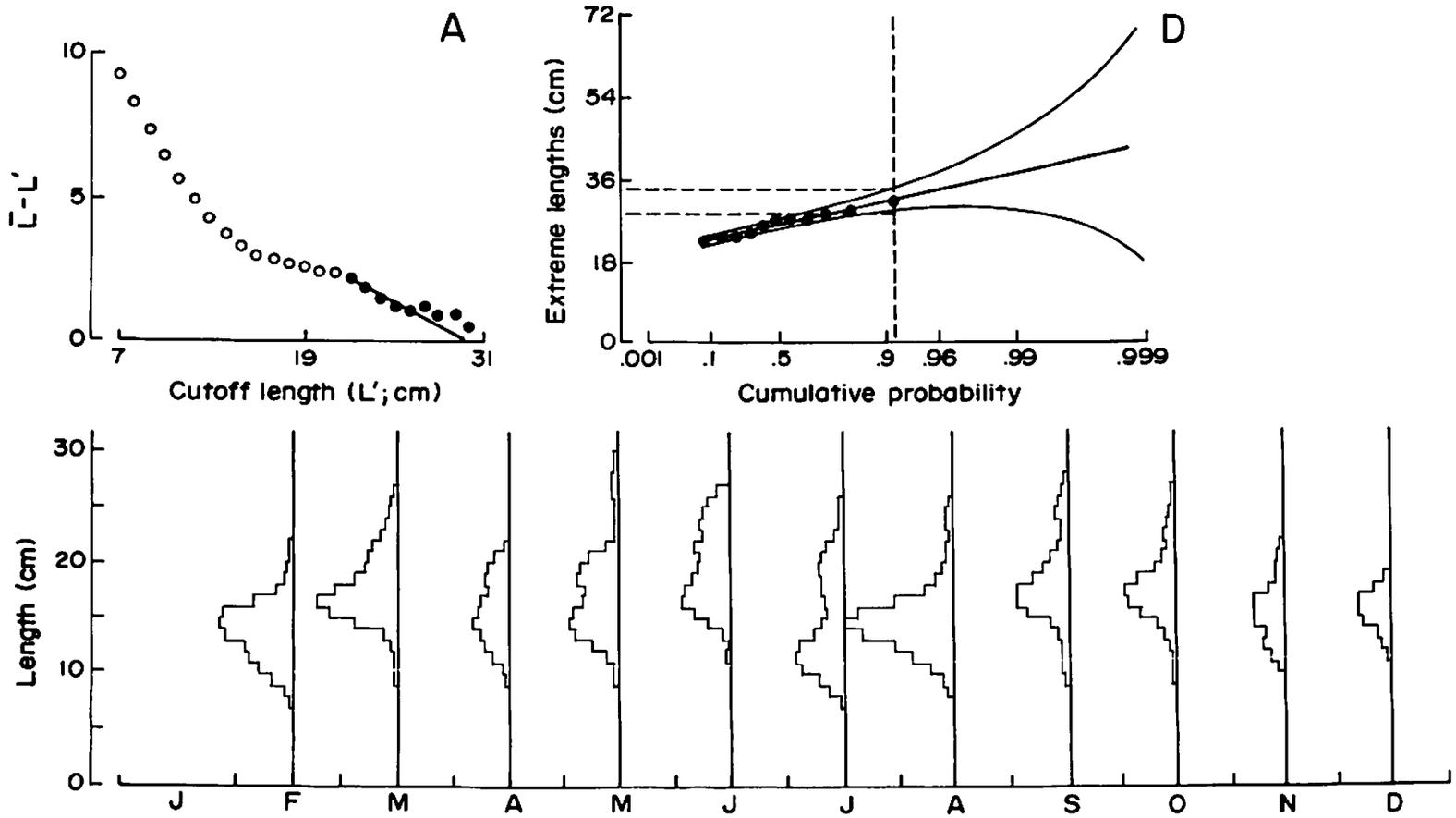
The Powell-Wetherall's Plot estimates the L_∞ of the short-fin scad (locally called *galonggong*) to be about 28 cm. The results of both the ELEFAN I and the Shepherd's method K-scan routines reveal K to be about 1.6 year^{-1}. The plot of the Shepherd's method closely coincides with the resulting plot of the ELEFAN I K-scan routine. The total mortality (Z) was estimated to be about 5.13 year^{-1} using the length-converted catch curve which is slightly higher than what is presented in Plate 1.1.1. The recruitment pattern analysis exhibits two pulses per year (plot not shown). However, the secondary cohort is not well defined.

Plate 1.1.6

Family : Carangidae
Species name : *Decapterus macrosoma* (Bleeker 1851)



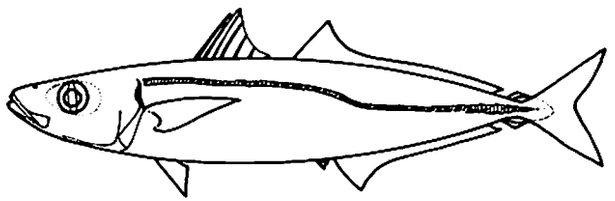
Area : Davao Gulf
Year : 1983-1986



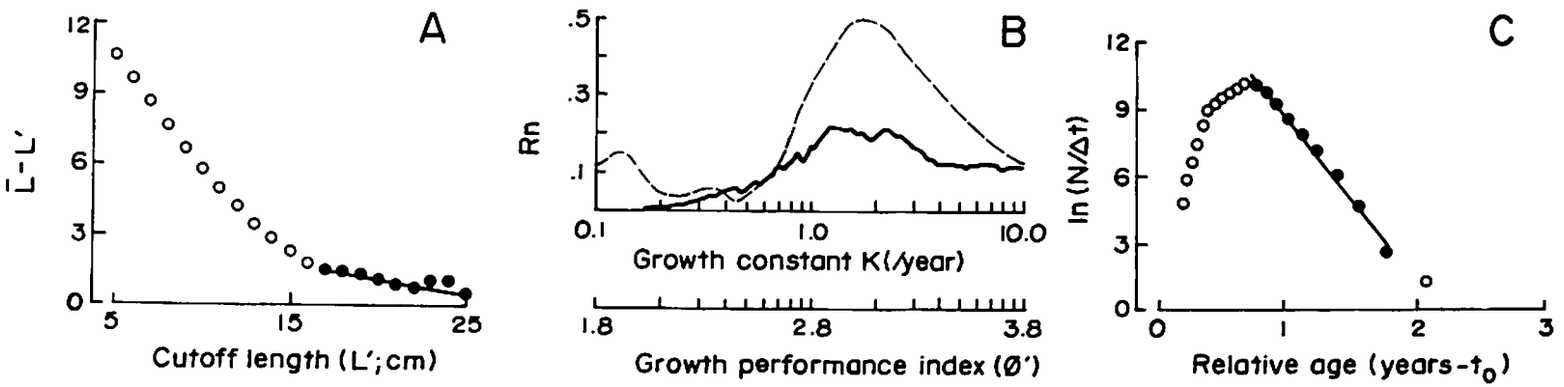
The time series of length frequencies collected from Daliao and Talomo landing port, does not exhibit clear modal progression to infer growth. The L_∞ was estimated, using the Powell-Wetherall's Plot, to be about 29.9 cm. The results of the ELEFAN I K-scan routine (not shown), using the L_∞ as computed in the Powell-Wetherall's plot, failed to establish a reasonable estimate of K. The L_{max} result of 28.4 to 34 cm (at 95% confidence interval) indicates that sufficient data, in terms of the size ranges collected, is available.

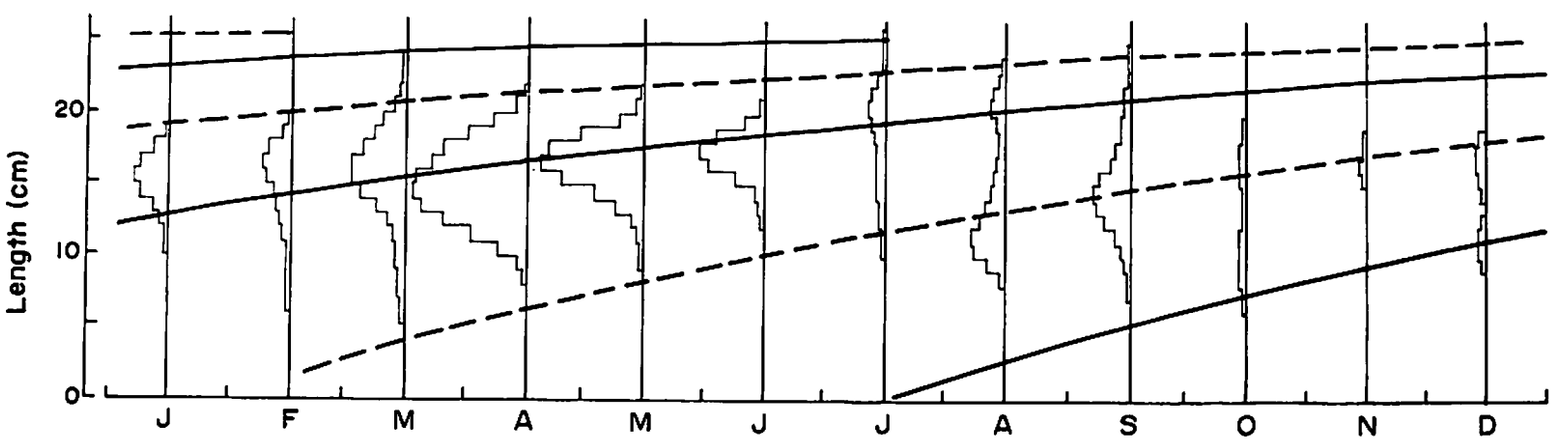
Plate 1.1.7

Family : Carangidae
Species name : *Decapterus macrosoma* (Bleeker 1851)



Area : South Sulu Sea
Year : 1987-1988

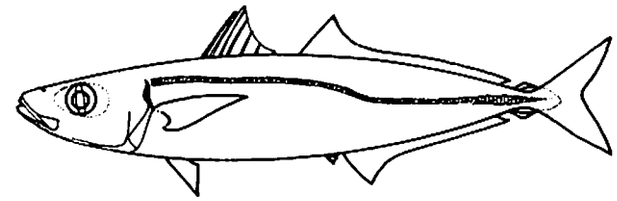




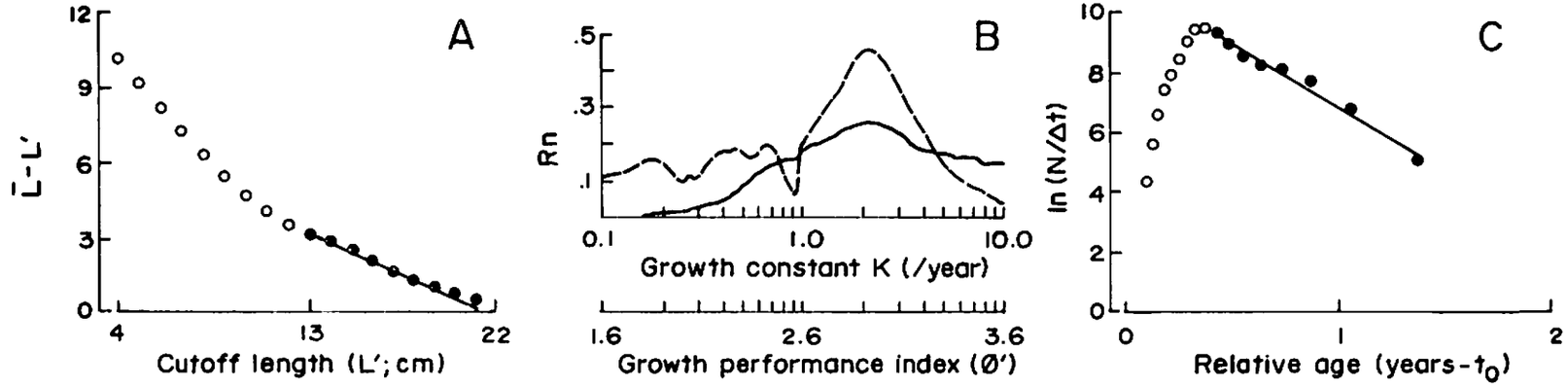
The time series of length frequencies indicates two cohorts (as compared to length frequencies for Plates 1.1.1 and 1.1.5) and the recruitment pattern analysis (not shown here) also indicates two distinctive pulses per year. The L_∞ was estimated using the Powell-Wetherall's plot and the K was estimated to be about 1.2 year^{-1}. Although the result of the ELEFAN I K-scan routine does not clearly define the K growth constant (i.e., with wide confidence region), the Shepherd's plot supports the ELEFAN I results and clearly identifies the region. The total mortality (Z), as computed using the length-converted catch curve, is around 7.25 year^{-1} which is the highest value compared to previously estimated mortalities (Plates 1.1.1, 1.1.5 and 1.1.8).

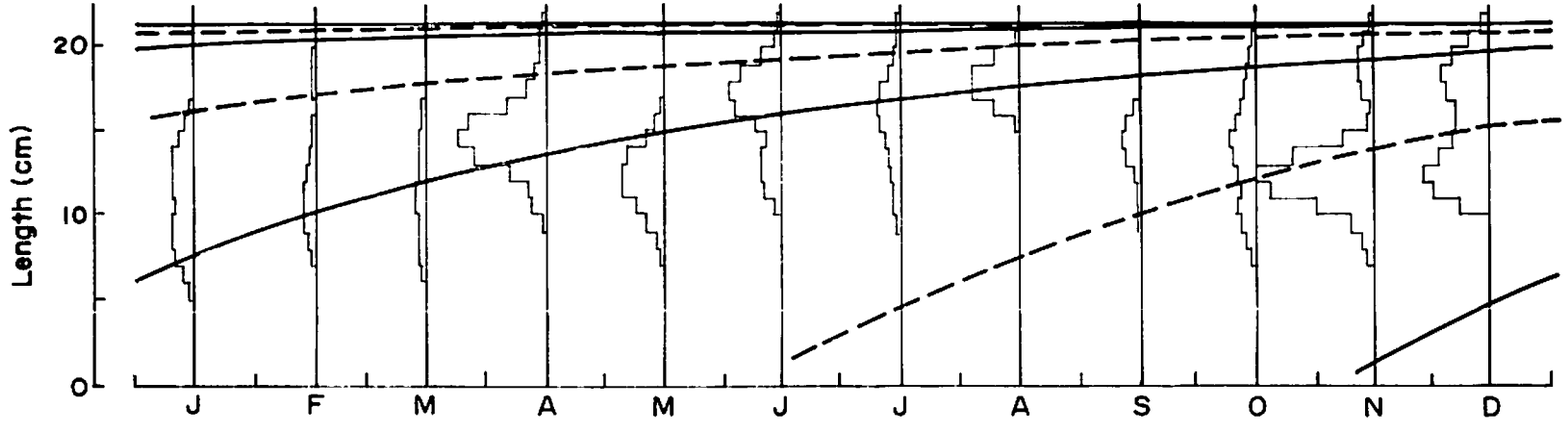
Plate 1.1.8

Family : Carangidae
Species name : *Decapterus macrosoma* (Bleeker 1851)



Area : Moro Gulf/Illana Bay
Year : 1983-1988

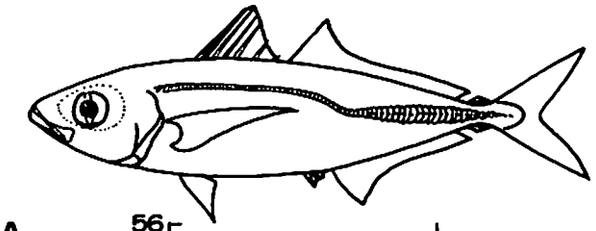




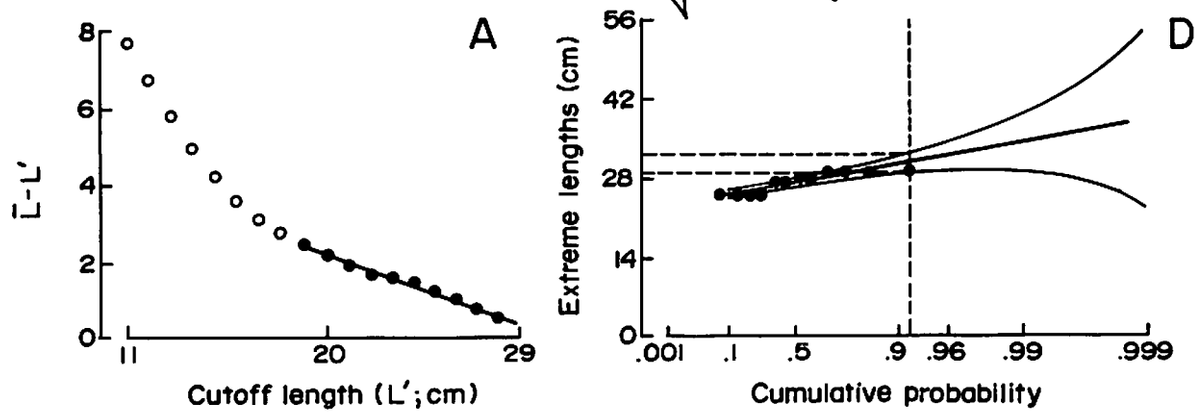
The catches in the Moro Gulf and Illana Bay (adjacent water bodies) is assumed to come from only one stock. The L_∞ was estimated to be around 21.4 cm using the Powell-Wetherall's plot and the K is around 2.3 year^{-1}. The ELEFAN I K-scan results failed to clearly identify the K growth constant, with wide confidence region. However, this was supported by the Shepherd's plot which identified the same K value as that computed using the ELEFAN I method. The total mortality was computed to be around 4.25 year^{-1} using the length-converted catch curve.

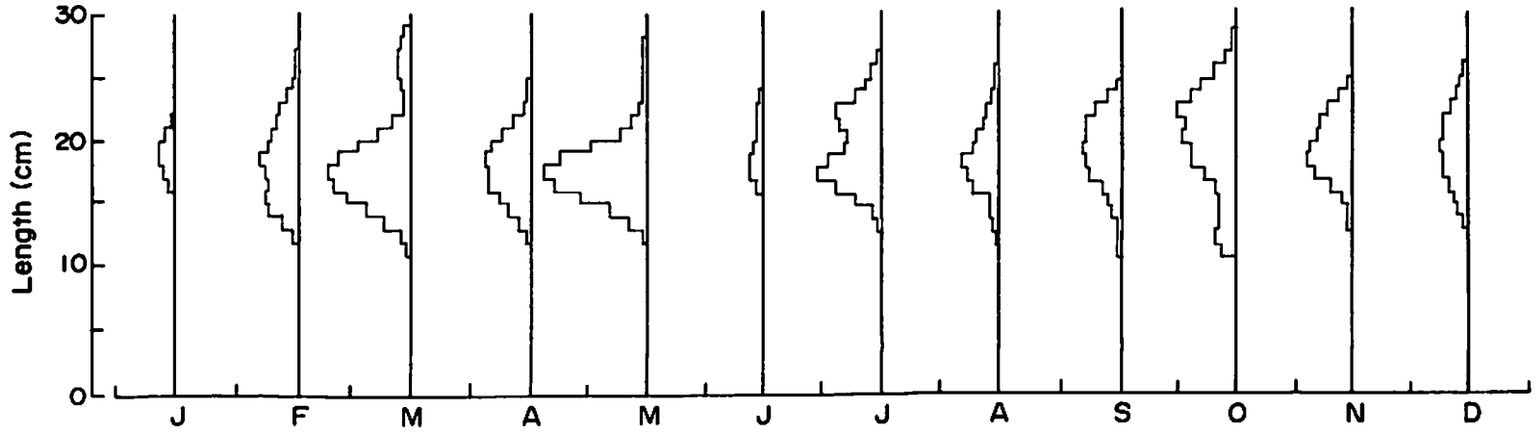
Plate 1.2.1

Family : Carangidae
Species name : *Decapterus kurroides* (Bleeker 1855)



Area : Visayan Sea
Year : 1983-1988

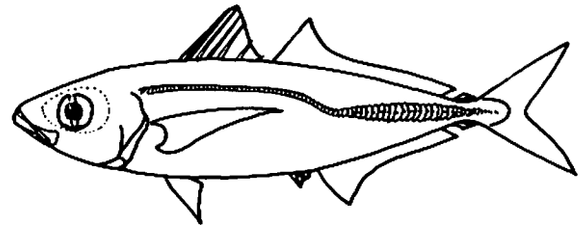




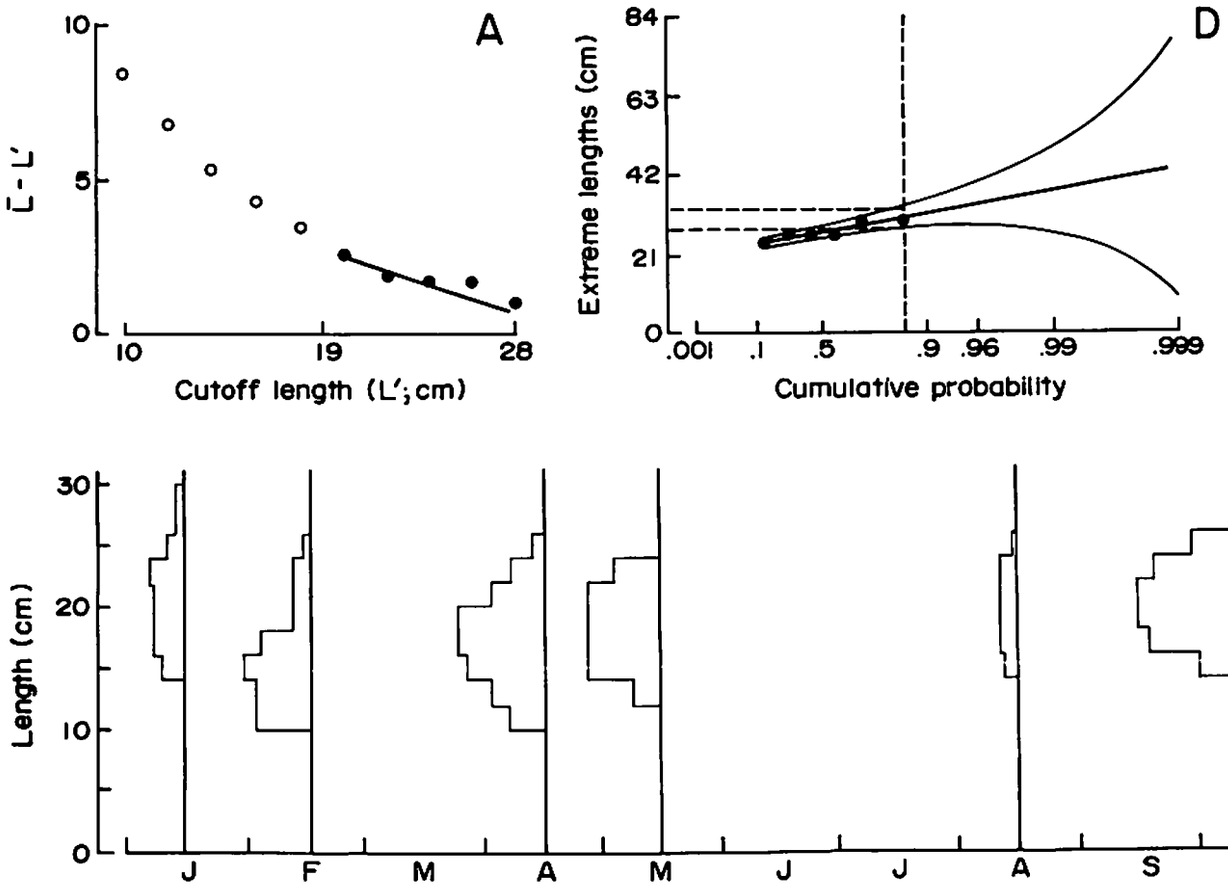
The estimate of the asymptotic length L_∞ of the red-tail scad gathered from Muelle Loney Fish Port (catches from the Visayan Sea) is about 29.8 cm from the Powell-Wetherall's Plot. The maximum length (L_{max}) estimated was about 28.8 to 32 cm (at 95% probability of occurrence). The K-scan routine of the ELEFAN I approach did not result to a convincing result of K associated to the absence of clear modal progression in the length frequencies.

Plate 1.2.2

Family : Carangidae
Species name : *Decapterus kurroides* (Bleeker 1855)



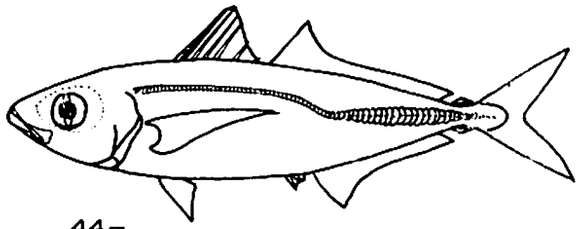
Area : Samar Sea
Year : 1983-1986



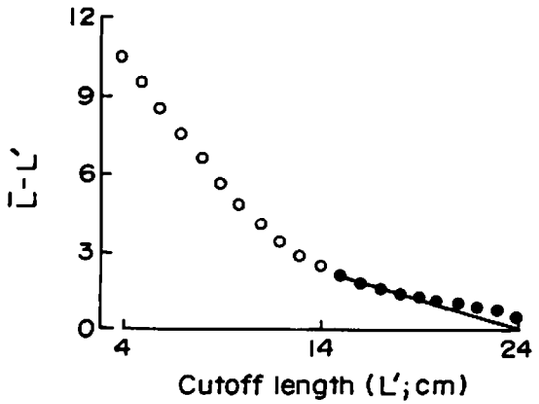
There is insufficient data to approximate the growth parameters. However, the L_{max} estimate of 27.6 to 33 cm indicates that the range at which the data has been collected were well-covered and from the Powell-Wetherall's Plot, the L_{∞} was approximated to be about 31.4 cm.

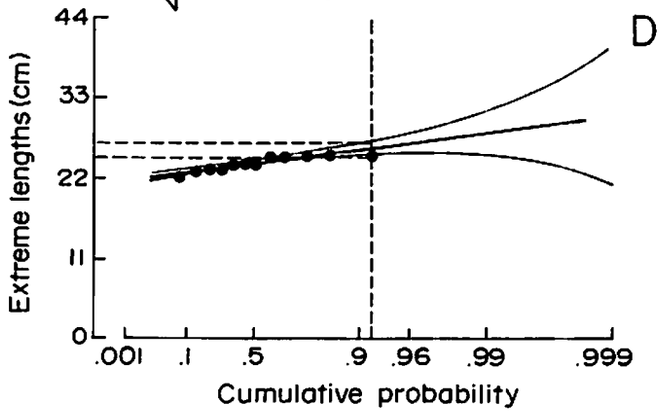
Plate 1.2.3

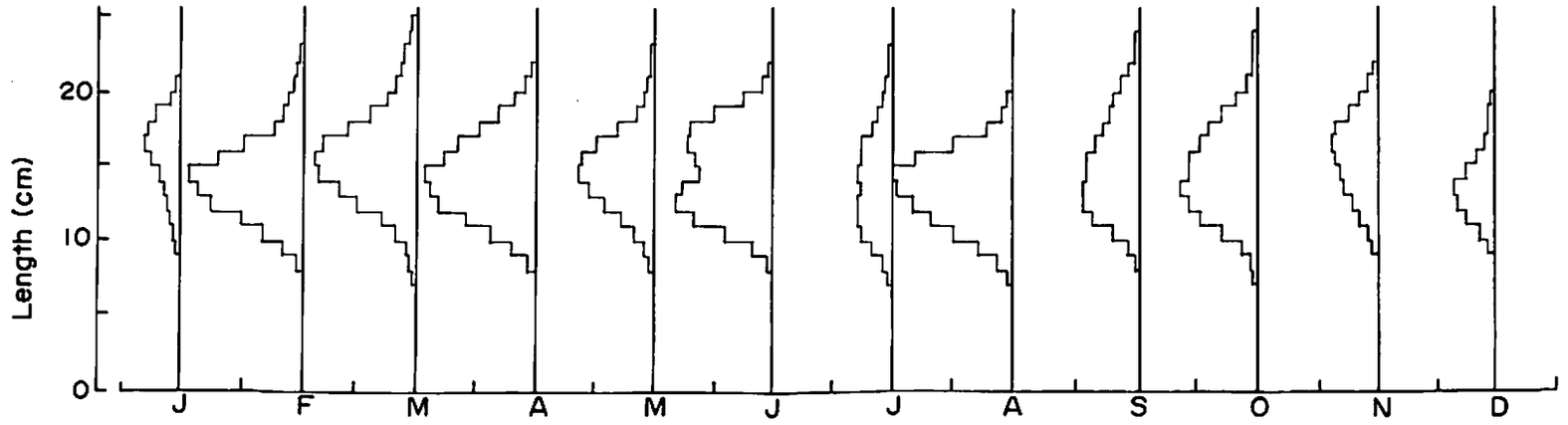
Family : Carangidae
Species name : *Decapterus kurroides* (Bleeker 1855)



Area : Davao Gulf
Year : 1983-1988



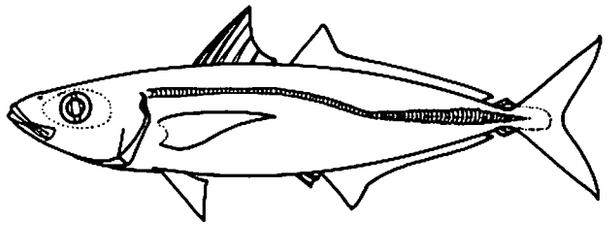




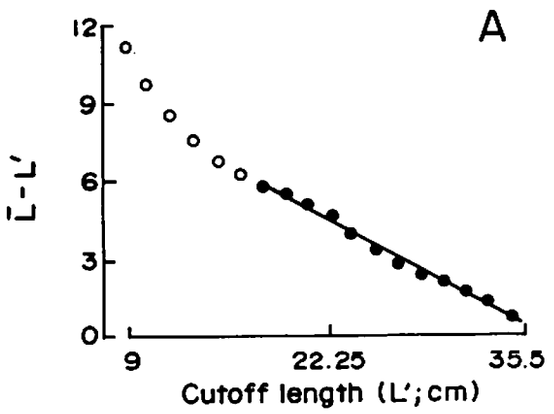
The time series of length frequencies, collected from two landing centers monitored for 6 years, does not exhibit clear modal progression to vividly infer growth. However, the L_{∞}, as estimated using the Powell-Wetherall's Plot, is about 24.8 cm. The L_{max} result of 25 to 27 cm (at 95% confidence interval) indicates that sufficient data, in terms of the size ranges collected, is available.

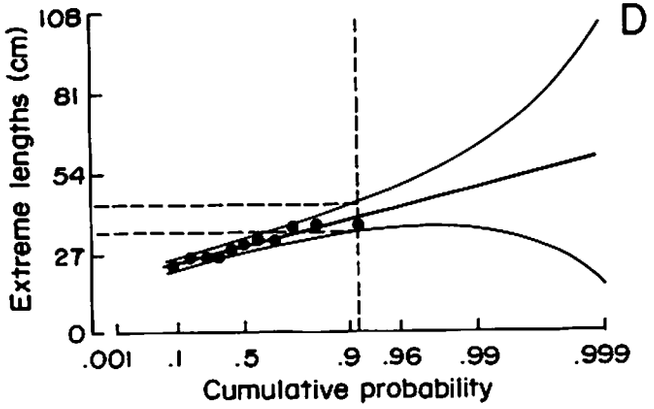
Plate 1.3.1

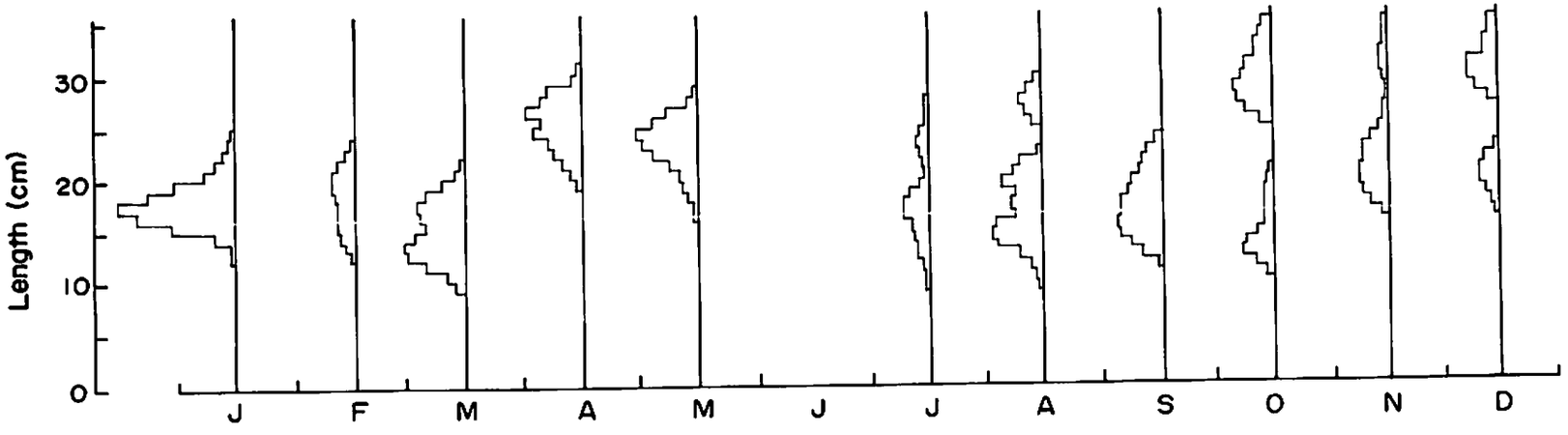
Family : Carangidae
Species name : *Decapterus russelli* (Rüppell 1830)



Area : Visayan Sea
Year : 1984-1987



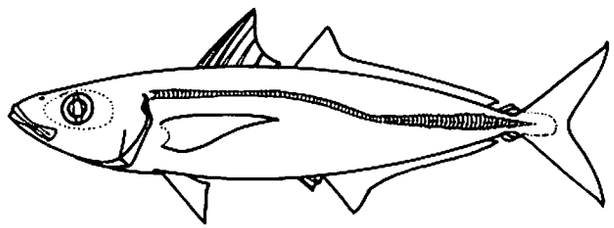




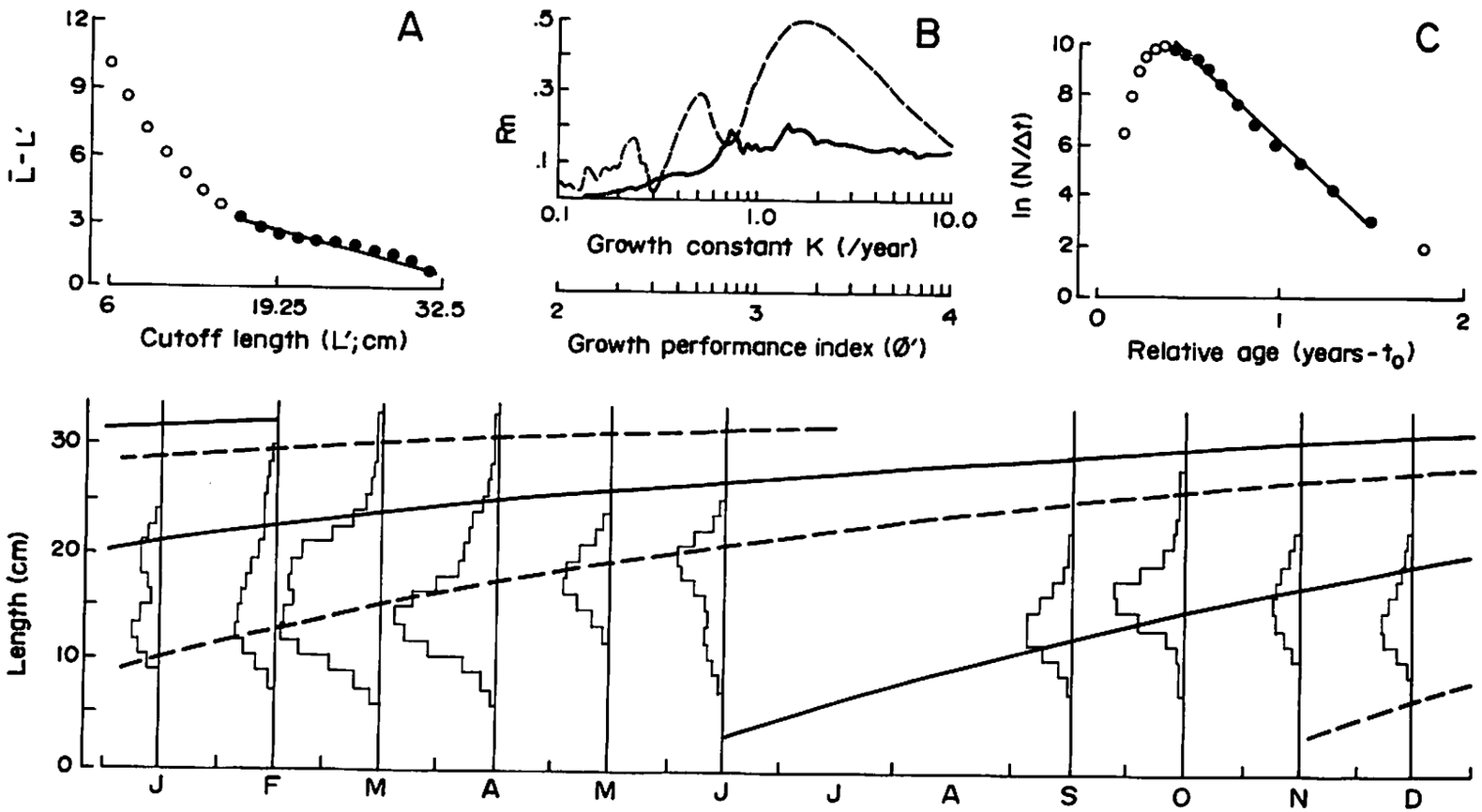
The time series of length frequencies does not exhibit clear modal progression to infer growth. The L_{max} result of 34 to 43.4 cm (at 95% confidence interval) indicates that sufficient data, in terms of the size ranges collected, is available allowing the use of the Powell-Wetherall's Plot which estimates L_{∞} to be about 36.5 cm.

Plate 1.3.2

Family : Carangidae
Species name : *Decapterus russelli* (Rüppell 1830)



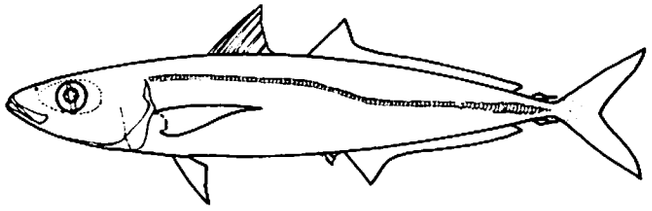
Area : Camotes Sea
Year : 1985-1988



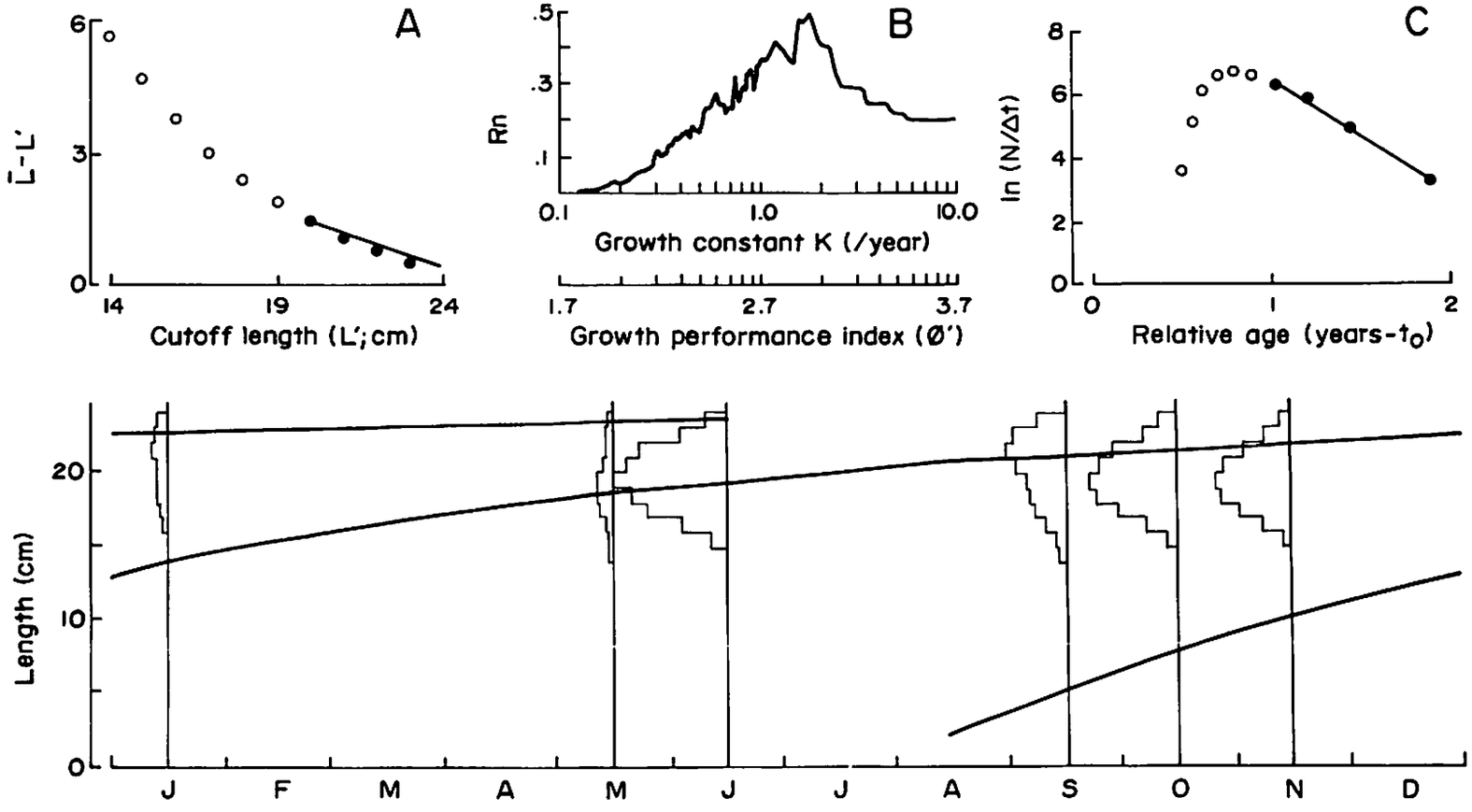
The Powell-Wetherall's Plot estimates the L_∞ to be about 35 cm from the data collected. The results of both the ELEFAN I and the Shepherd's method K-scan routines reveal K to be about 1.4 year^{-1}. Note that the plot generated by the ELEFAN I routine does not clearly define the VBGF curvature parameter. The total mortality (Z) was estimated to be about 6.7 year^{-1} using the length-converted catch curve. The recruitment pattern analysis indicates two pulses per year (plot not shown), with wide variation.

Plate 1.4.1

Family : Carangidae
Species name : *Decapterus macarellus* (Cuvier 1833)



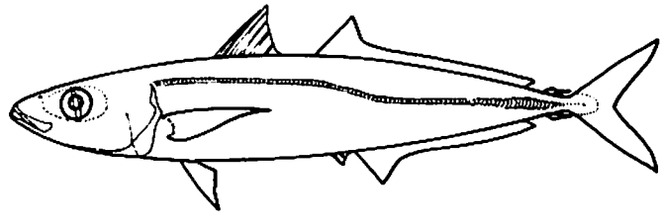
Area : Pujada Bay
Year : 1986



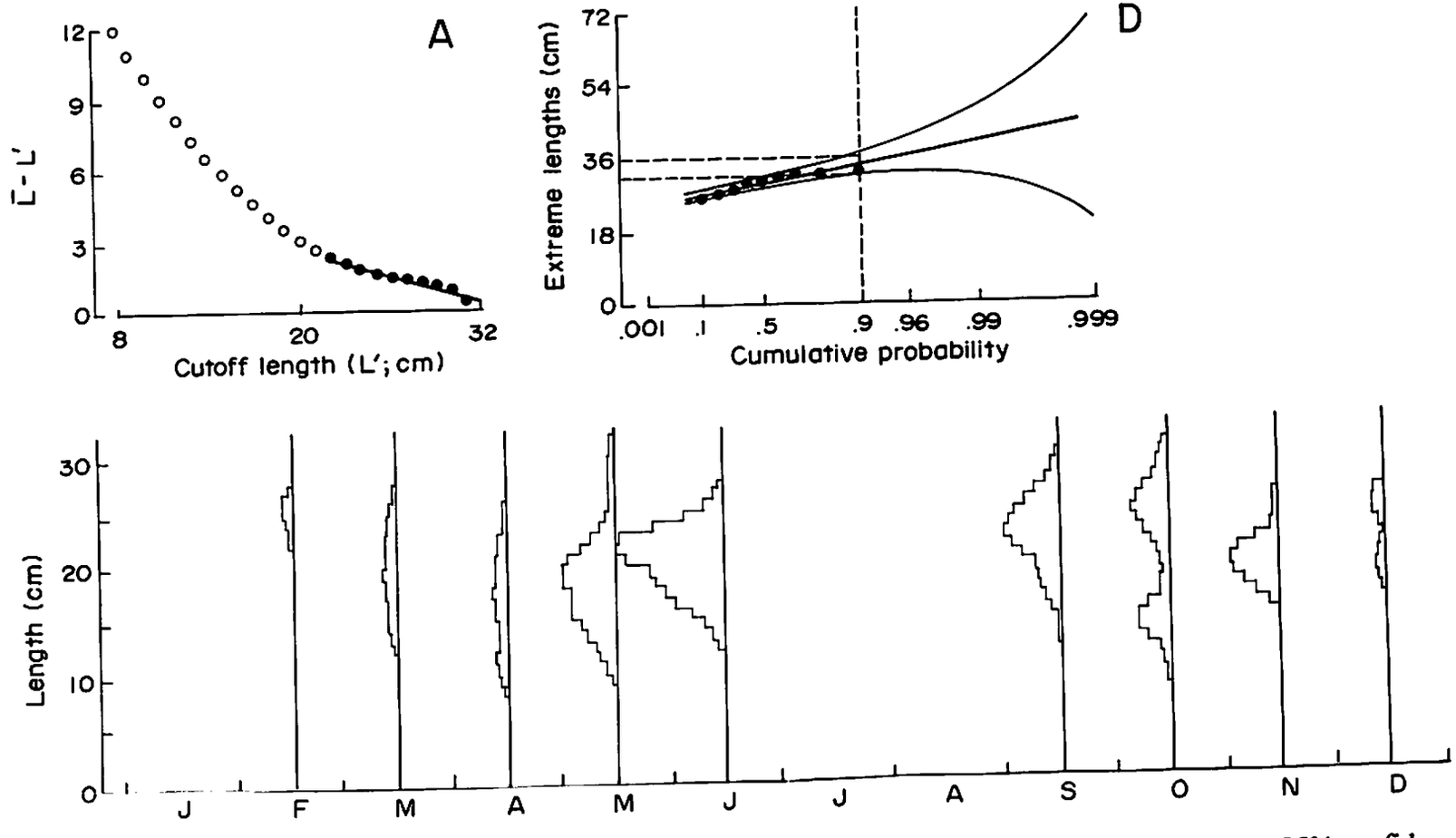
The Powell-Wetherall's Plot estimates the L_∞ to be about 24.3 cm. The results of the ELEFAN I K-scan routines clearly identify K to be about 1.8 year^{-1}. The results of the Shepherd's approach also confirm the findings (plot not shown here). The total mortality (Z) was estimated to be about 3.7 year^{-1} using the length-converted catch curve. The recruitment pulse was unimodal (also not shown).

Plate 1.4.2

Family : Carangidae
Species name : *Decapterus macarellus* (Cuvier 1833)



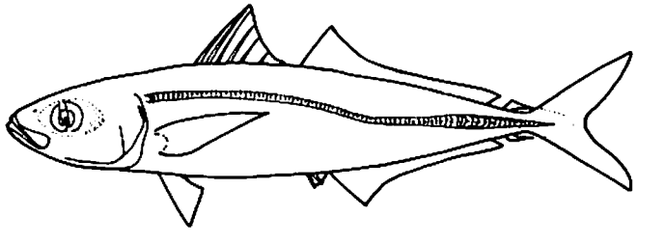
Area : Davao Gulf
Year : 1986



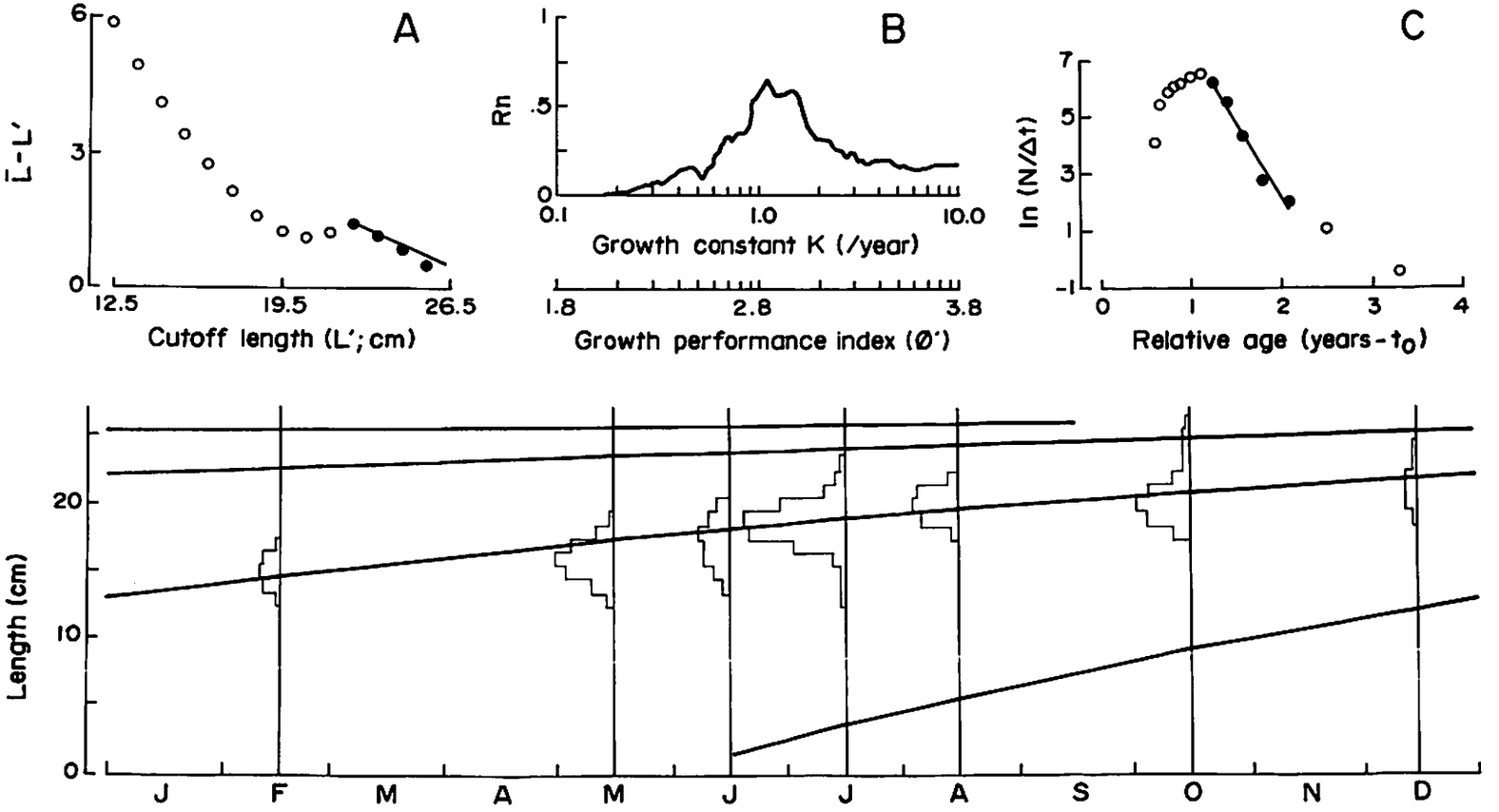
The time series of length frequencies does not exhibit clear modal progression to infer growth. The L_{max} result of 31.3 to 36 cm (at 95% confidence interval) indicates that sufficient data, in terms of the size ranges collected, is available allowing the use of the Powell-Wetherall's Plot which estimates L_{∞} to be about 33.6 cm.

Plate 1.5.1

Family : Carangidae
Species name : *Decapterus maruadsi* (Temminck & Schlegel 1844)



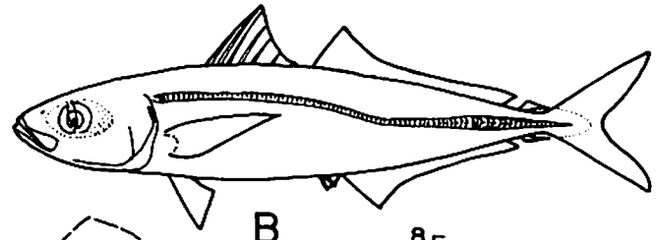
Area : Tayabas Bay
Year : 1987



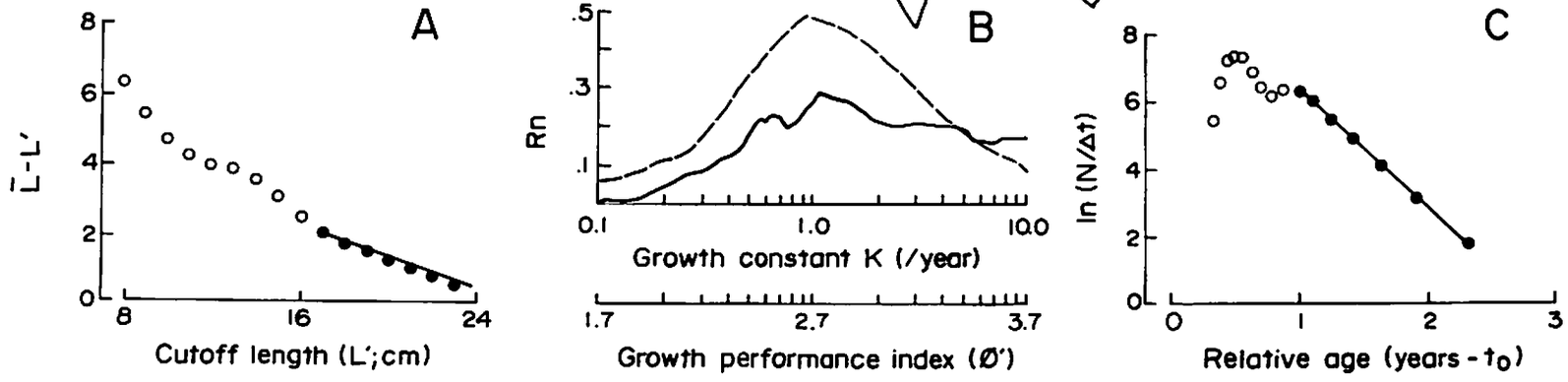
The Powell-Wetherall's Plot estimates the L_∞ to be about 27.3 cm. Using the predicted extreme length value (L_{max}) = 26.7 cm , the results of the ELEFAN I K-scan routines clearly identify K to be about 1.1 year^{-1}. The results of the Shepherd's approach also confirm the findings (plot not shown here). The total mortality (Z) was estimated to be about 5.4 year^{-1} using the length-converted catch curve.

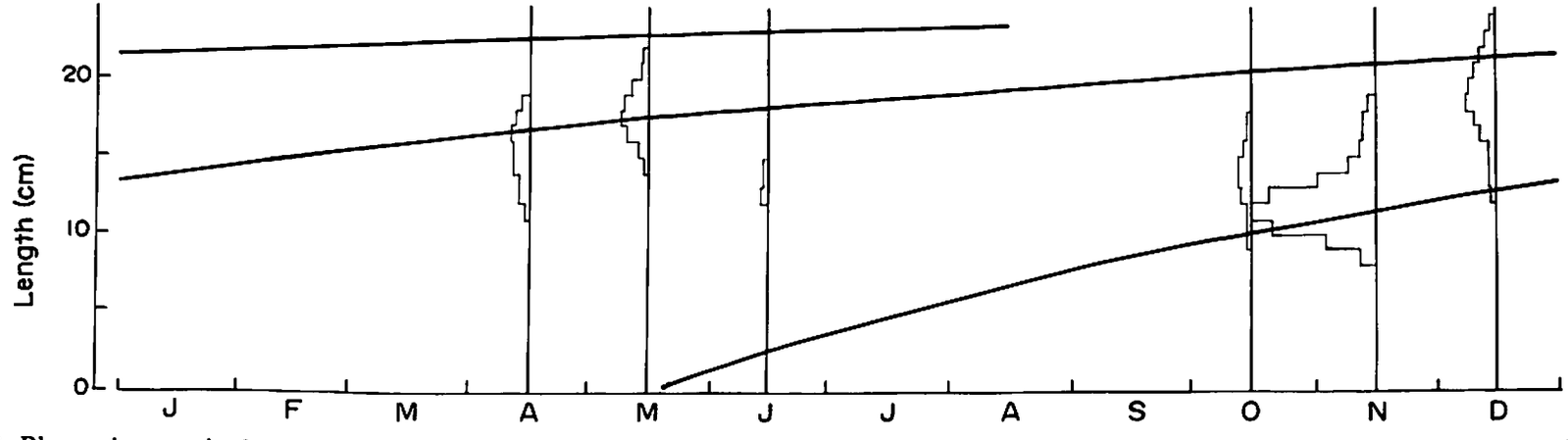
Plate 1.5.2

Family : Carangidae
Species name : *Decapterus maruadsi* (Temminck & Schlegel 1844)



Area : South Sulu Sea
Year : 1984-1986

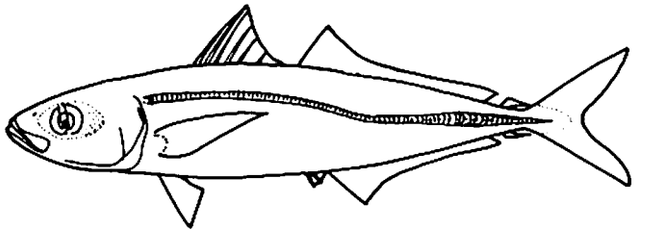




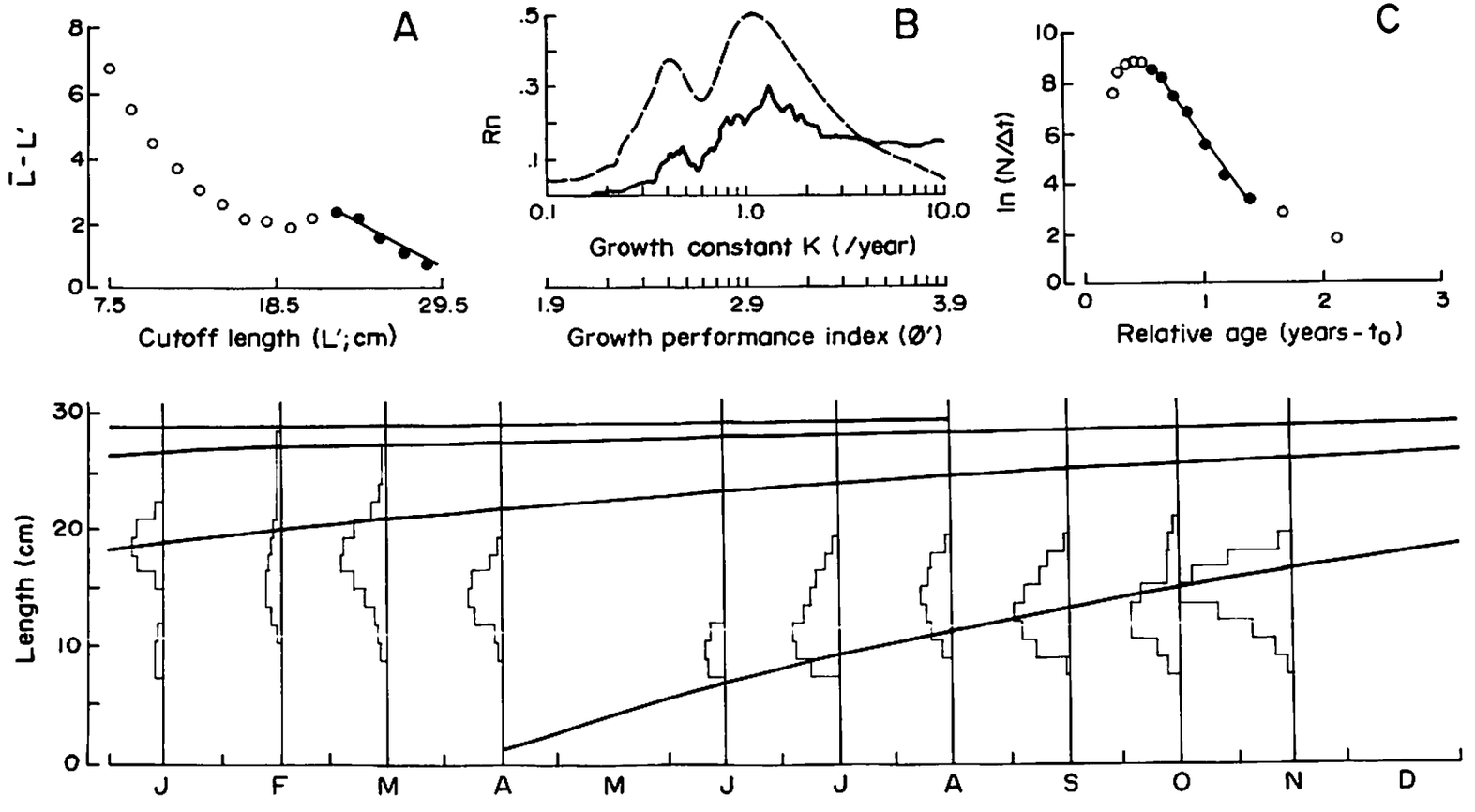
The Powell-Wetherall's Plot estimates the L_∞ to be about 25 cm from the data collected. The results of both the ELEFAN I and the Shepherd's method K-scan routines reveal K to be about 1.2 year^{-1}. Note that the plot generated by the ELEFAN I routine does not clearly identify the VBGF curvature parameter and the same is true for the plot of the scores as obtained from the Shepherd's method (i.e., wide standard deviation). The total mortality (Z) was estimated to be about 3.5 year^{-1} using the length-converted catch curve. The recruitment pattern analysis indicates only one pulse per year (plot not shown).

Plate 1.5.3

Family : Carangidae
Species name : *Decapterus maruadsi* (Temminck & Schlegel 1844)



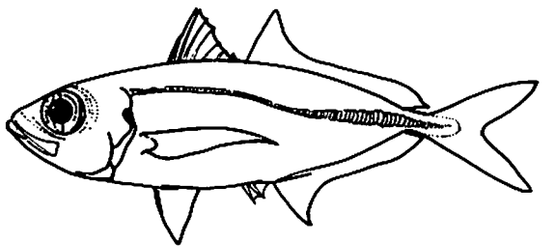
Area : Camotes Sea
Year : 1987-1988



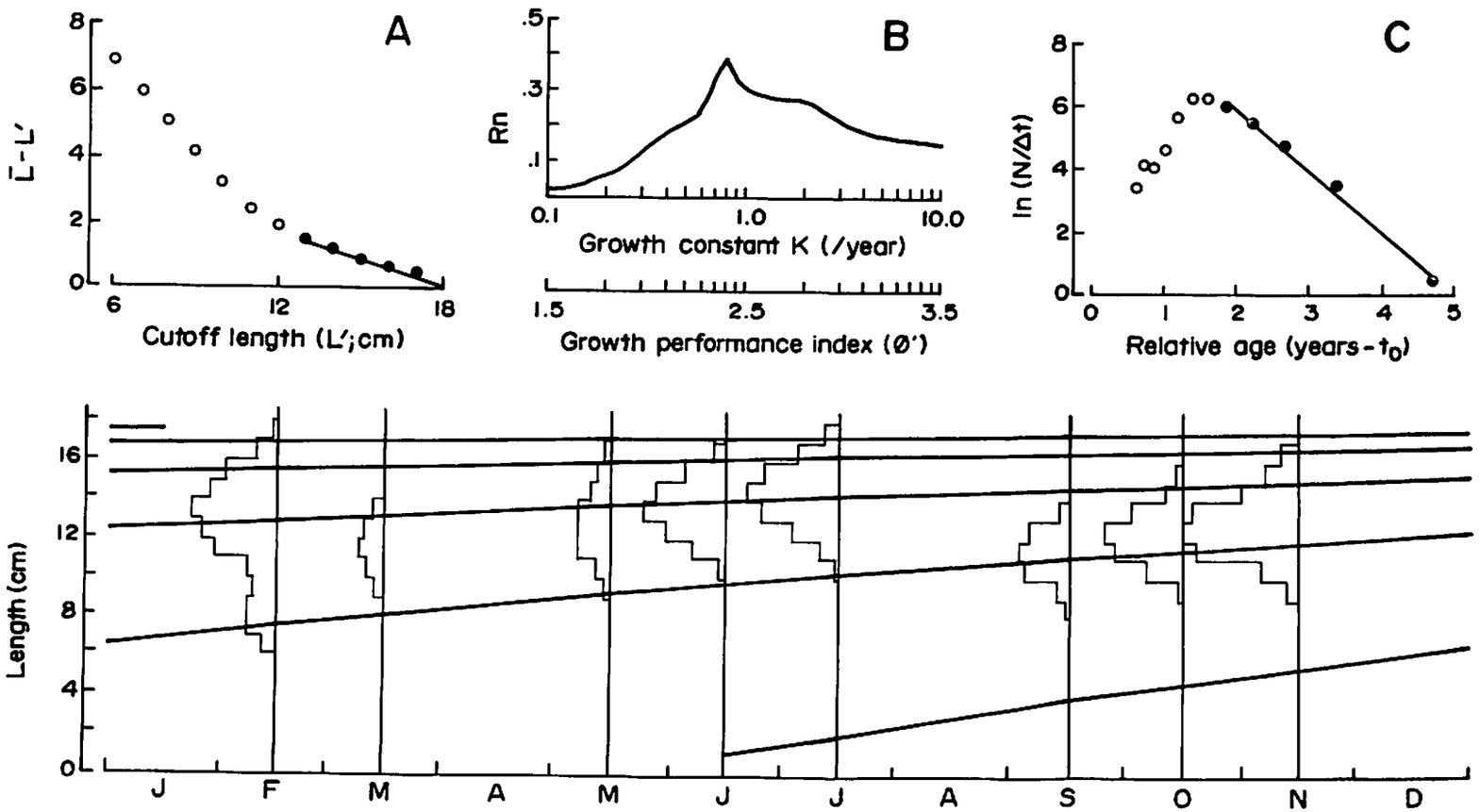
The Powell-Wetherall's Plot estimates the L_∞ to be about 31.2 cm from the data collected. The results of both the ELEFAN I and the Shepherd's method K-scan routines reveals K to be about 1.3 year^{-1}. The total mortality (Z) was estimated to be about 6.9 year^{-1} using the length-converted catch curve. The recruitment pattern analysis indicates a possibility of two pulses per year (plot not shown). However, the second pulse is not well-defined.

Plate 1.6.1

Family : Carangidae
Species name : *Selar crumenophthalmus* (Bloch 1793)



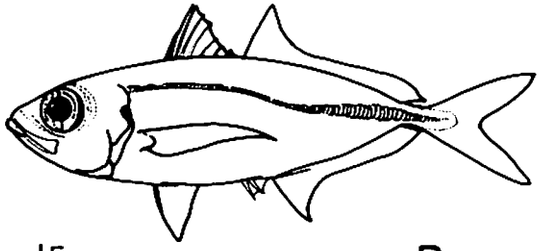
Area : Illana Bay
Year : 1988



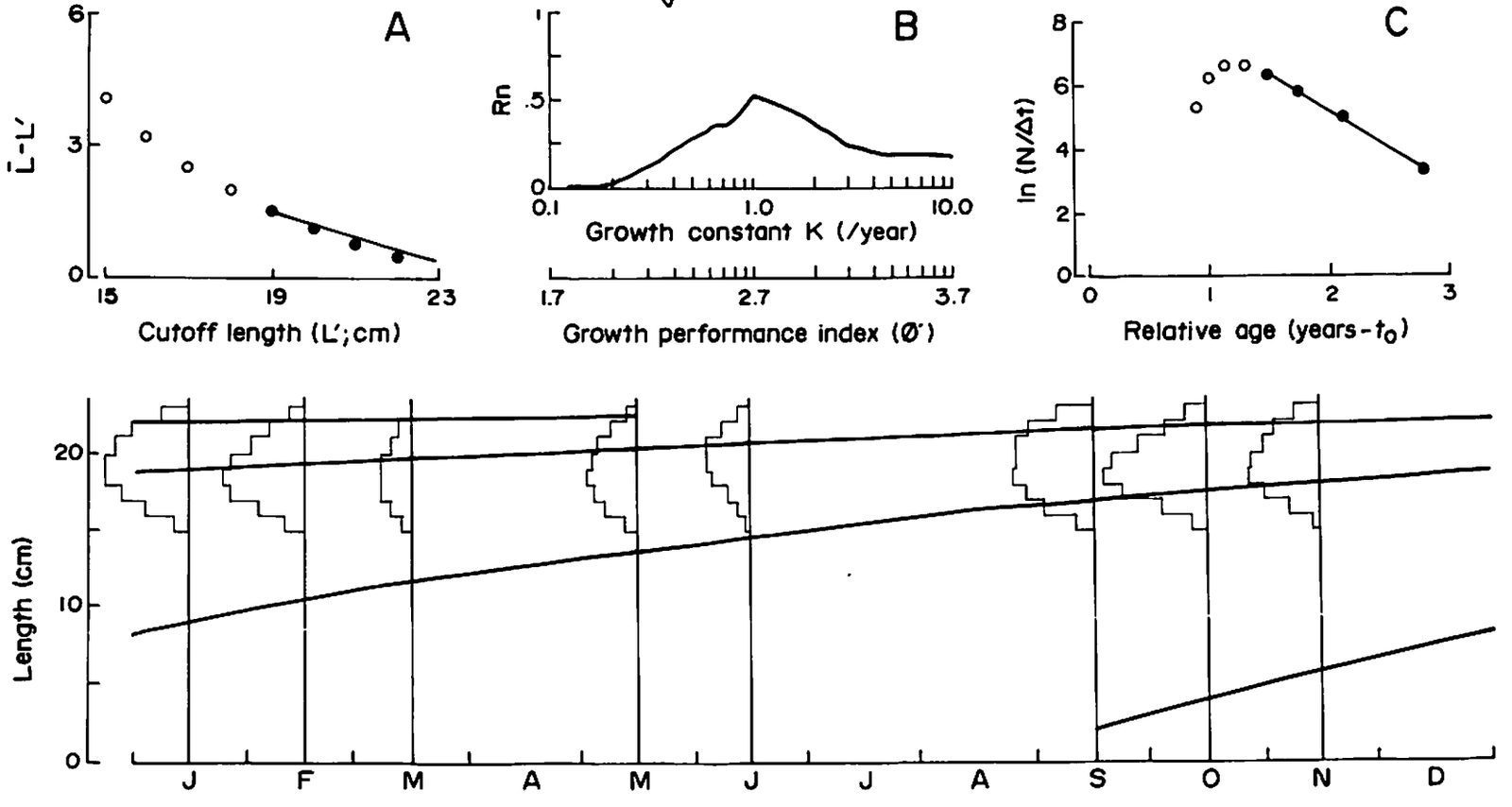
The Powell-Wetherall's Plot estimates the L_∞ to be about 18.1 cm. The results of the ELEFAN I K-scan routines clearly identify K to be about 0.72 year^{-1}. The results of the Shepherd's approach also confirm the findings (plot not shown here). The total mortality (Z) was estimated to be about 2 year^{-1} using the length-converted catch curve.

Plate 1.6.2

Family : Carangidae
Species name : *Selar crumenophthalmus* (Bloch 1793)



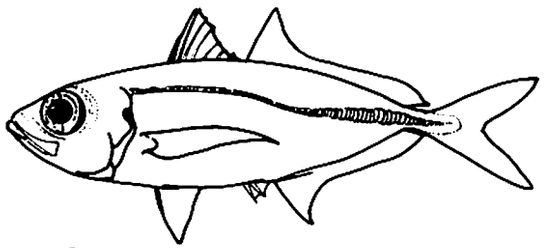
Area : Pujada Bay
Year : 1986



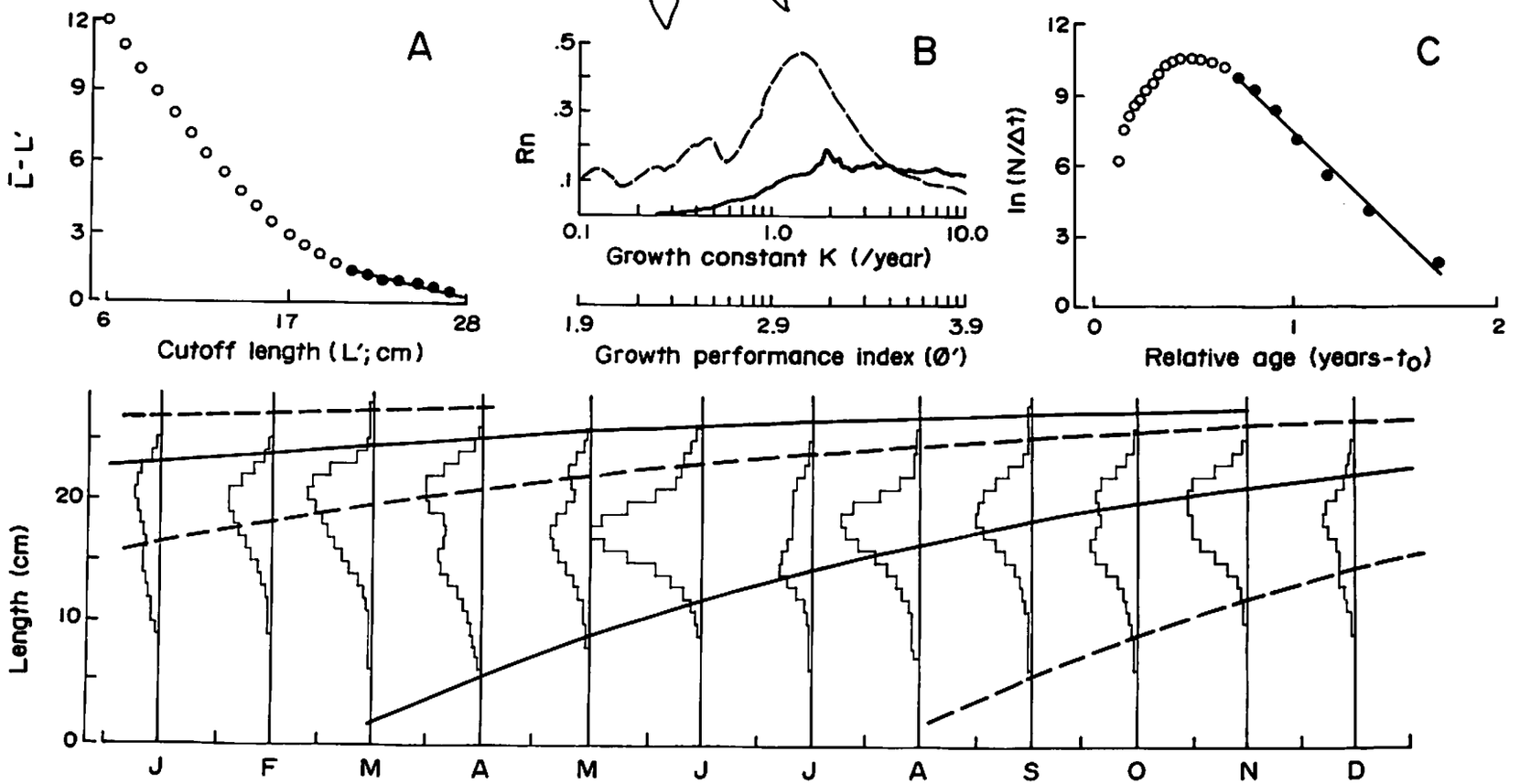
The Powell-Wetherall's Plot estimates the L_∞ to be about 23.3 cm. The results of the ELEFAN I K-scan routines clearly identify K to be about 1.2 year^{-1}. The results of the Shepherd's approach also confirm the findings (plot not shown here). The total mortality (Z) was estimated to be about 2.4 year^{-1} using the length-converted catch curve.

Plate 1.6.3

Family : Carangidae
Species name : *Selar crumenophthalmus* (Bloch 1793)



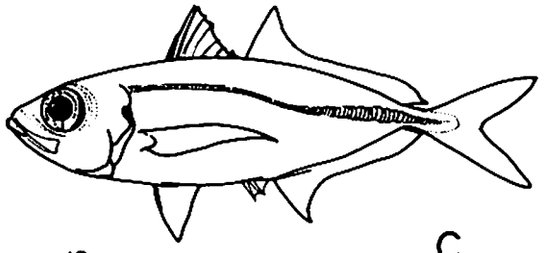
Area : Davao Gulf
Year : 1983-1987



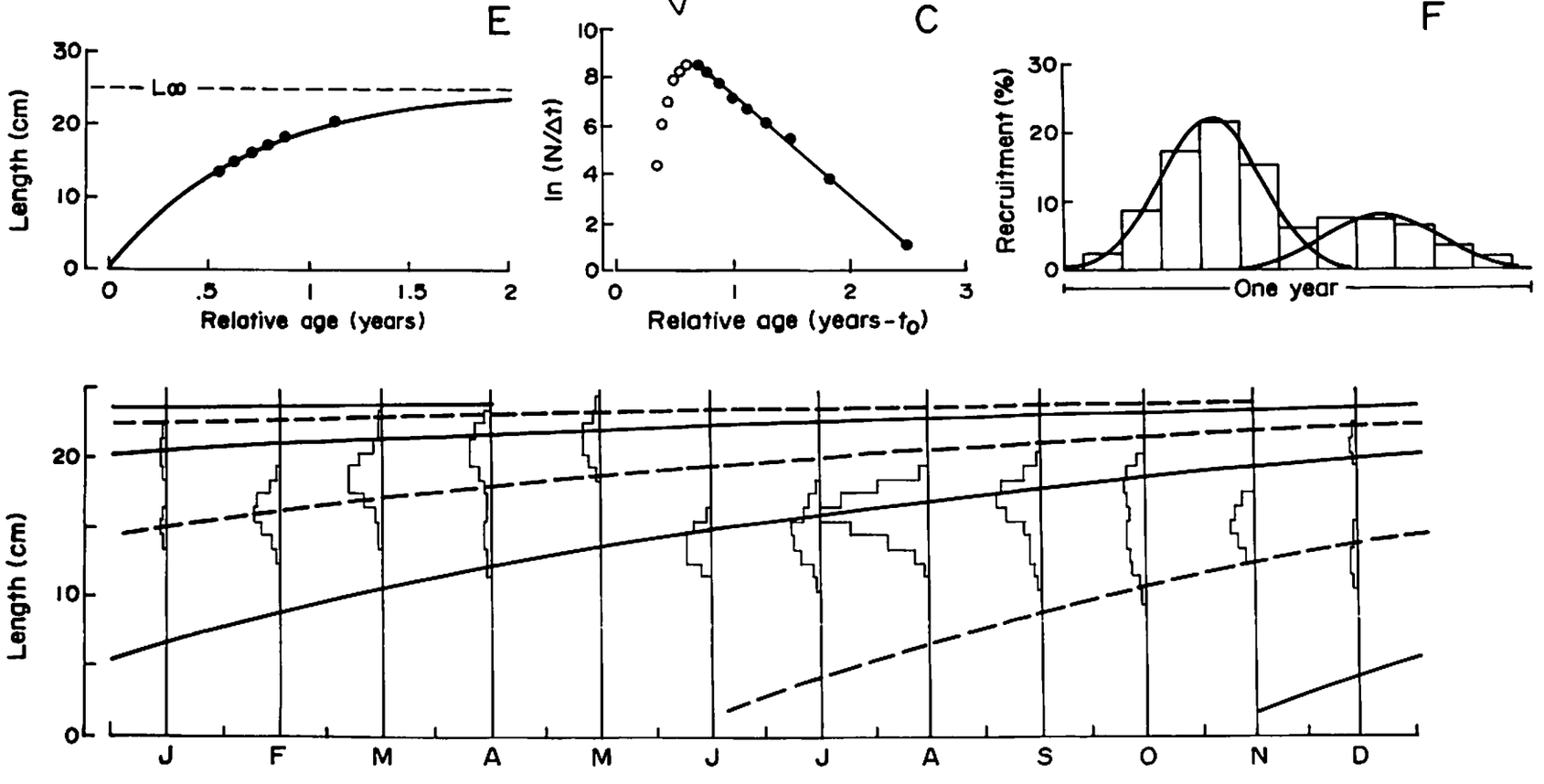
The Powell-Wetherall's Plot estimates the L_∞ to be about 28.6 cm from the data collected. The results of both the ELEFAN I and the Shepherd's method K-scan routines reveal K to be about 1 to 2 year^{-1}. Note that the plot generated by the ELEFAN I routine does not clearly define the VBGF curvature parameter. The total mortality (Z) was estimated to be about 8.3 year^{-1} using the length-converted catch curve which is the highest compared to results obtained in Plates 1.6.1, 1.6.2, 1.6.4. The recruitment pattern analysis indicates two pulses per year (plot not shown).

Plate 1.6.4

Family : Carangidae
Species name : *Selar crumenophthalmus* (Bloch 1793)



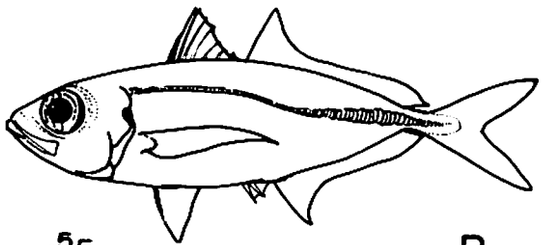
Area : South Sulu Sea
Year : 1987



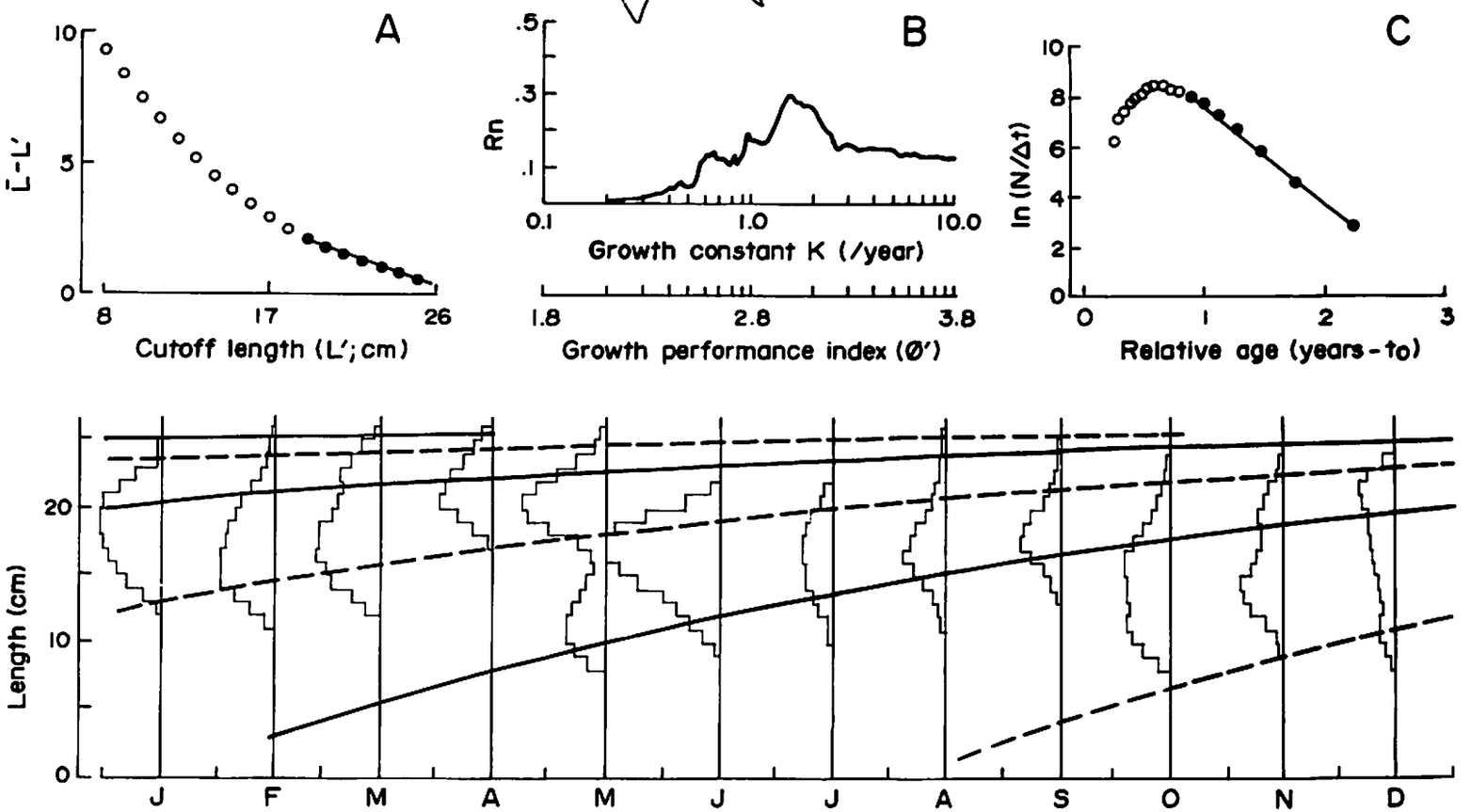
The clear progression of modes exhibited by the length frequencies allows the use of the Modal Progression Analysis (MPA) technique to identify the growth parameters. Non-linear fit of relative age data derived from the MPA procedure defines the L_∞ to be about 24.6 cm and the K to be about 1.5 year^{-1}. The total mortality was computed to be about 4.14 year^{-1} using the length-converted catch curve.

Plate 1.6.5

Family : Carangidae
Species name : *Selar crumenophthalmus* (Bloch 1793)



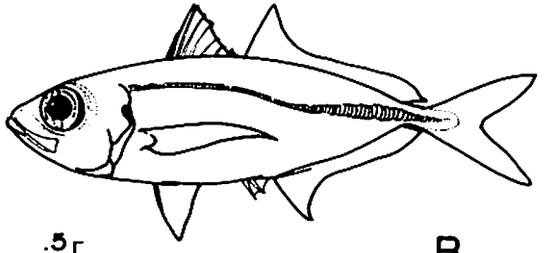
Area : Leyte Gulf
Year : 1985-1987



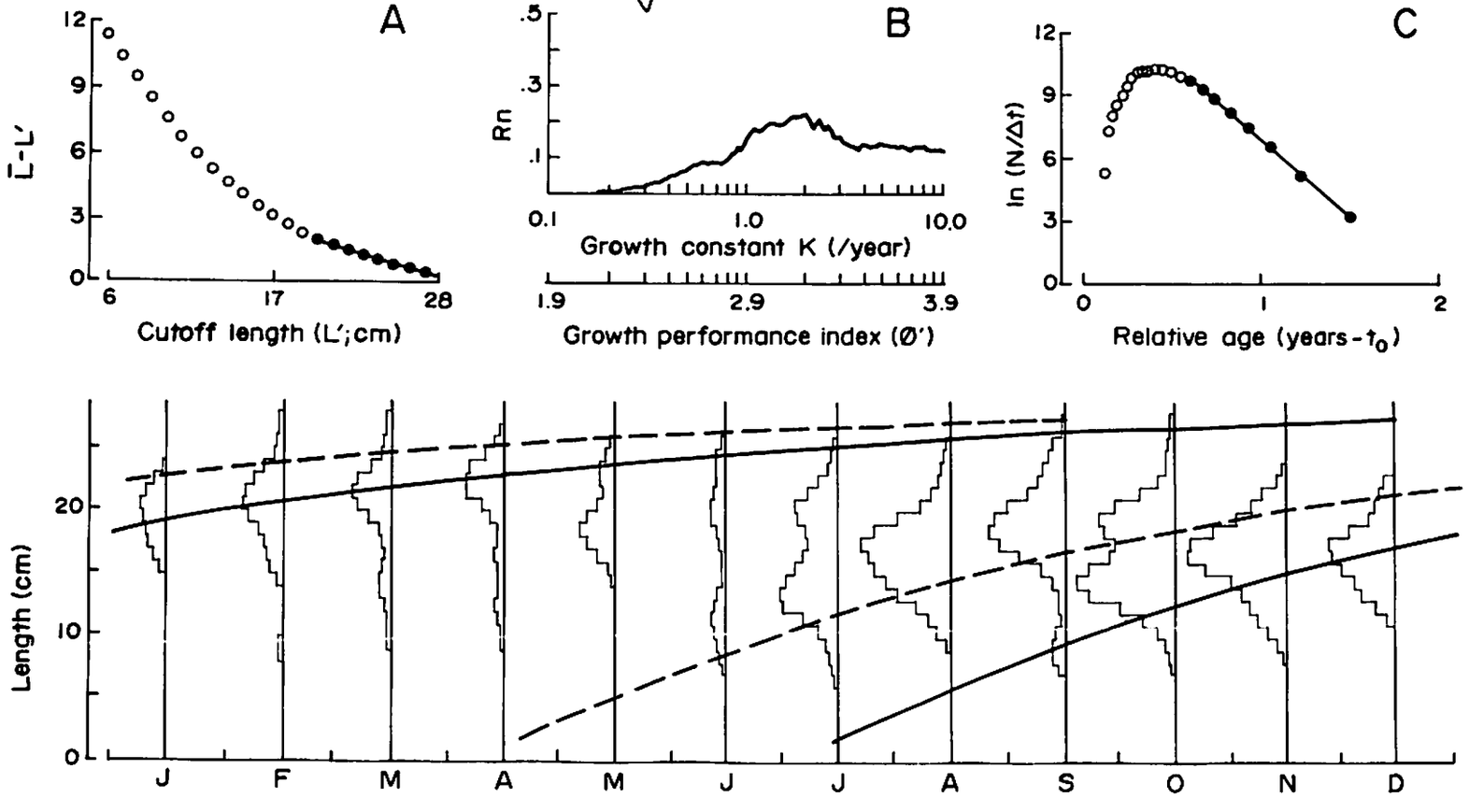
The Powell-Wetherall's Plot estimates the L_∞ to be about 26.4 cm. The results of the ELEFAN I K-scan routines clearly identify K to be about 1.5 year^{-1}. The results of the Shepherd's approach also confirm the findings (plot not shown here). The total mortality (Z) was estimated to be about 3.9 year^{-1} using the length-converted catch curve. The recruitment pattern analysis (plot not shown) also reveals two pulses per year.

Plate 1.6.6

Family : Carangidae
Species name : *Selar crumenophthalmus* (Bloch 1793)



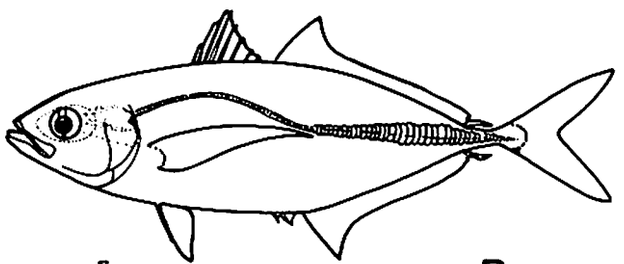
Area : Camotes Sea
Year : 1983-1987



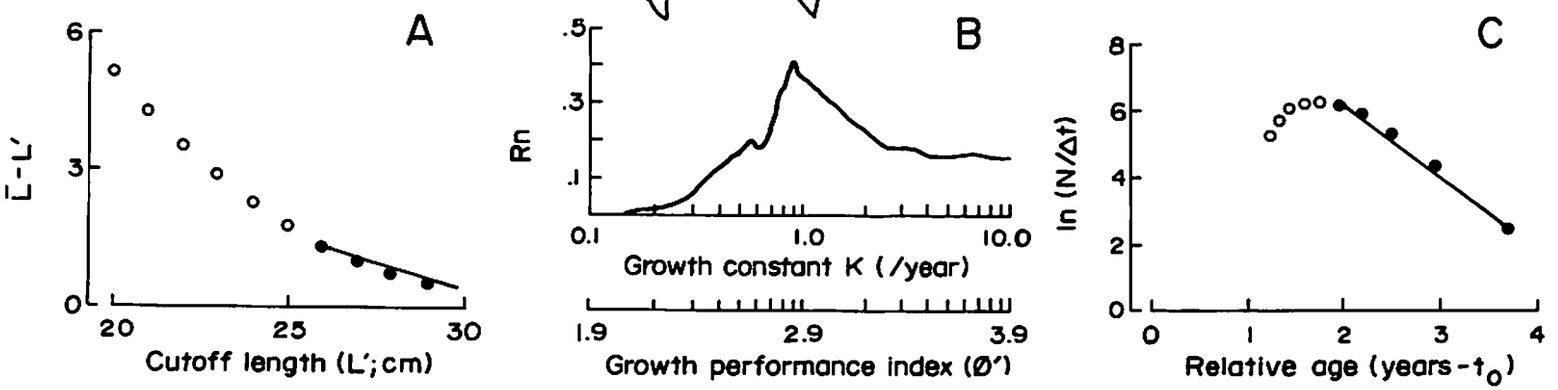
The Powell-Wetherall's Plot estimates the L_∞ to be about 28.5 cm. The results of the ELEFAN I K-scan routines identify K to be about 2 year^{-1} and the results of the Shepherd's approach (plot not shown here) did not fare any better in the identification of the K parameter. The total mortality (Z) was estimated to be about 7.4 year^{-1} using the length-converted catch curve. The recruitment pattern analysis (plot not shown) also reveals two pulses per year.

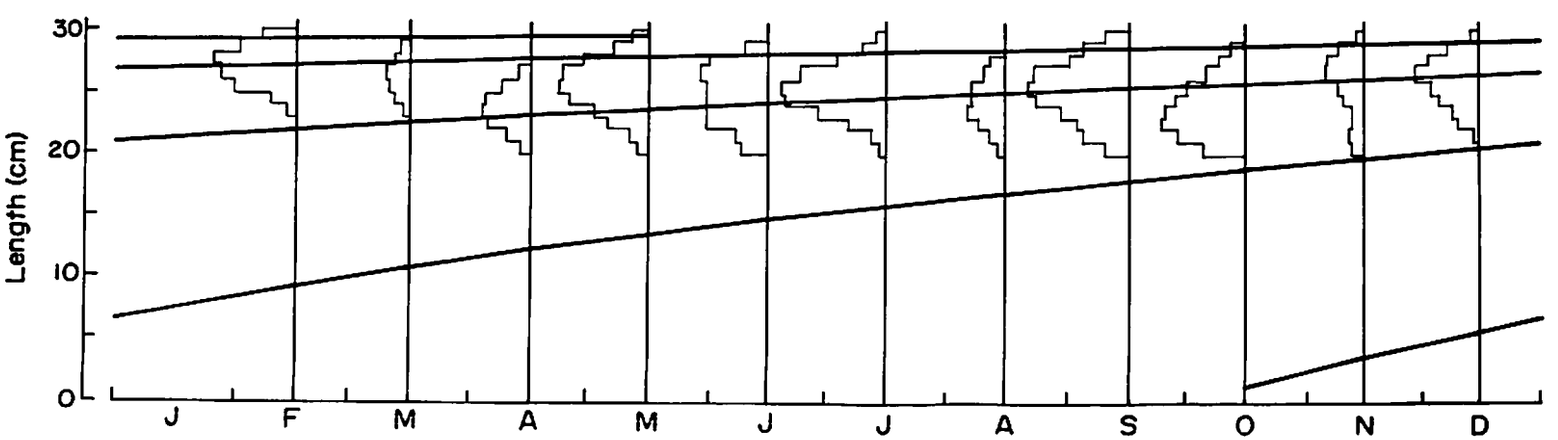
Plate 1.7.1

Family : Carangidae
Species name : *Atule mate* (Cuvier 1833)



Area : Leyte Gulf
Year : 1987

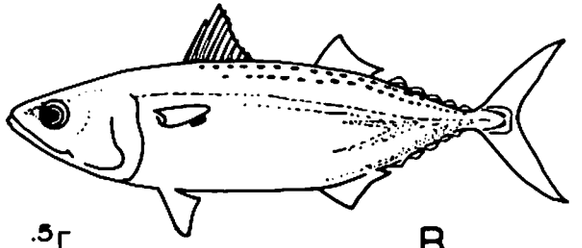




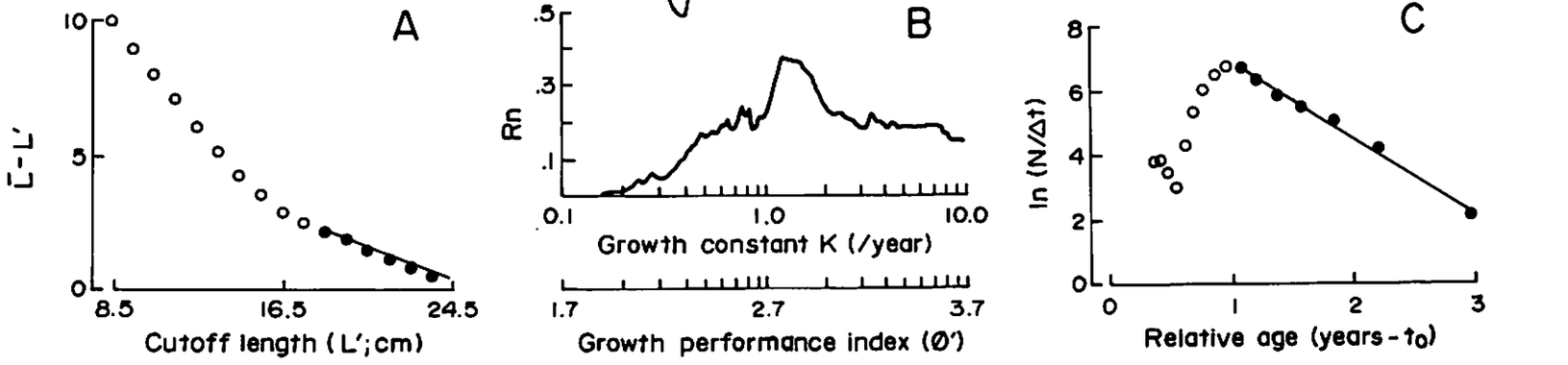
The Powell-Wetherall's Plot estimates the L_∞ to be about 30.5 cm. The results of the ELEFAN I K-scan routines clearly identify K to be about 0.9 year^{-1}. The results of the Shepherd's approach also confirm the findings (plot not shown here). The total mortality (Z) was estimated to be about 2.2 year^{-1} using the length-converted catch curve.

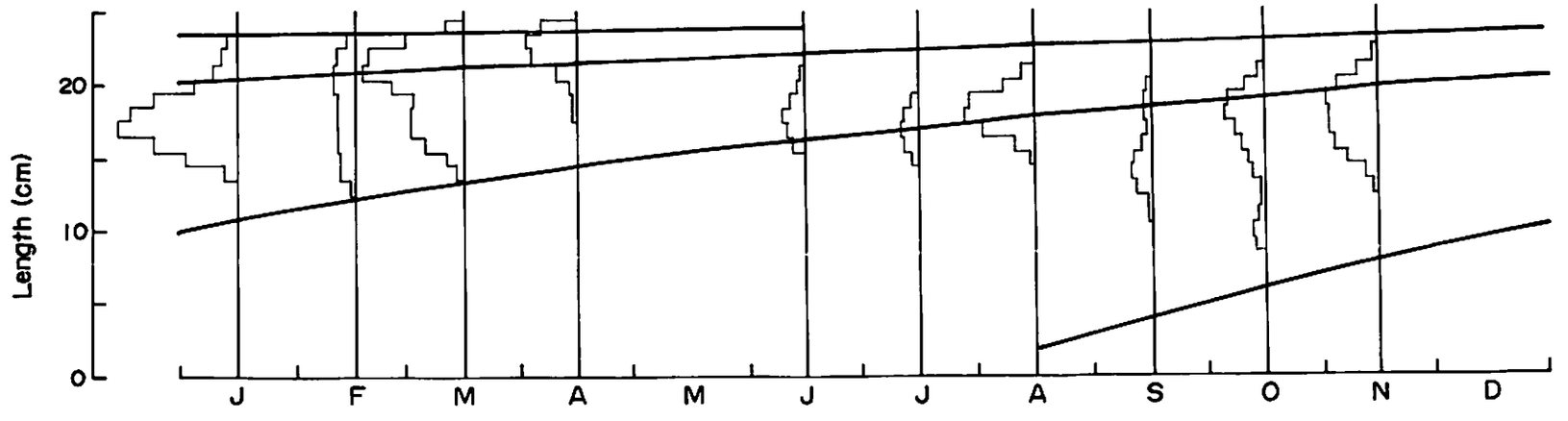
Plate 2.1.1

Family : Scombridae
Species name : *Rastrelliger kanagurta* (Cuvier 1816)



Area : South Sulu Sea
Year : 1987

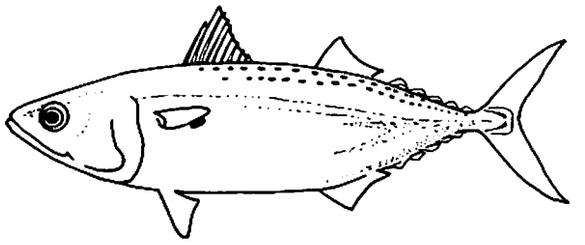




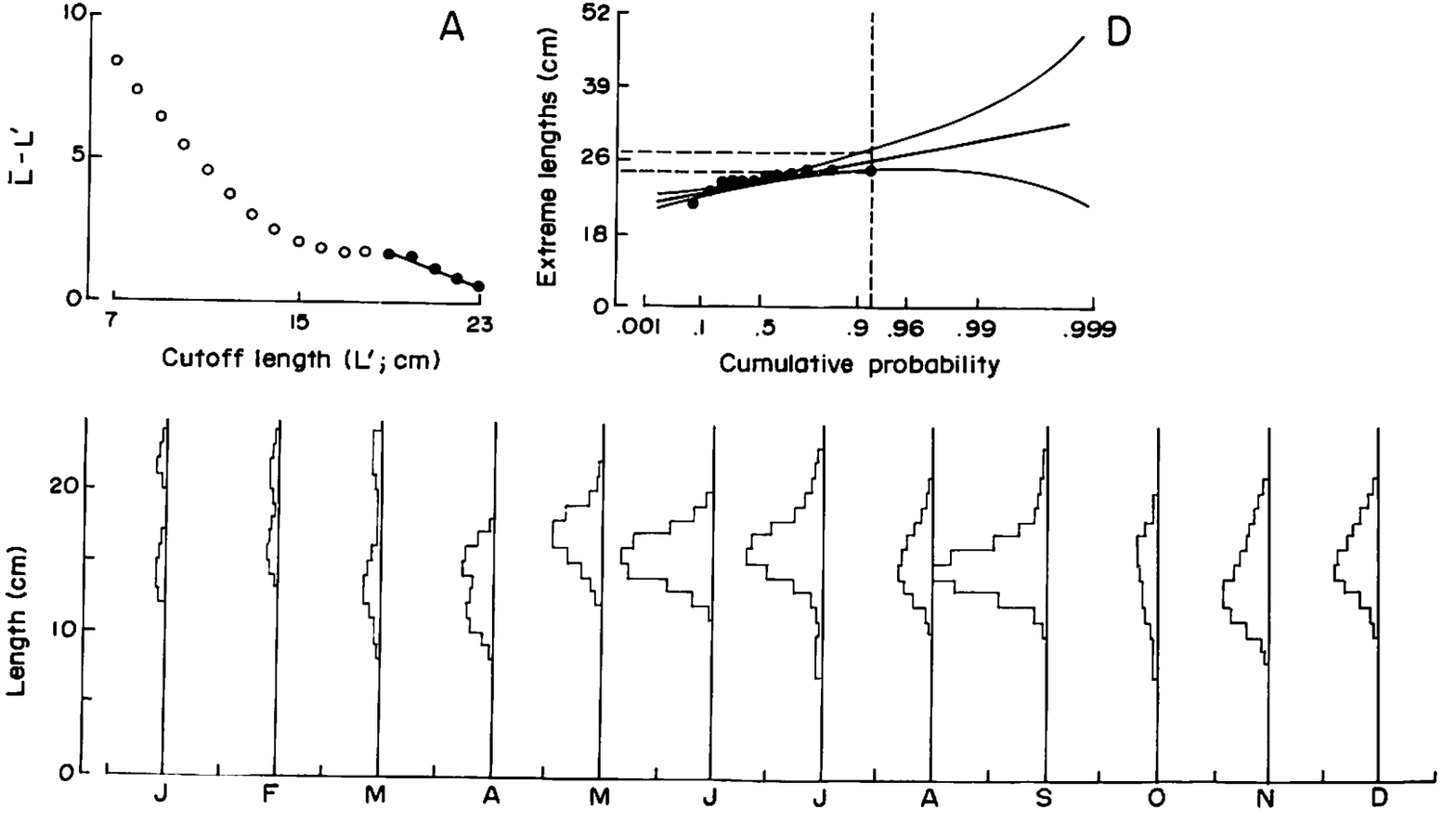
The Powell-Wetherall's Plot estimates the L_{∞} to be about 24.7 cm. The results of the ELEFAN I K-scan routines clearly identify K to be about 1.2 year^{-1}, using the estimated value of L_{max} = 25.3 cm. The results of the Shepherd's approach also confirm the findings (plot not shown here). The total mortality (Z) was estimated to be about 2.36 year^{-1} using the length-converted catch curve.

Plate 2.1.2

Family : Scombridae
Species name : *Rastrelliger kanagurta* (Cuvier 1816)



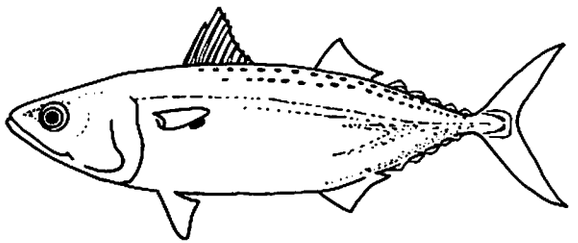
Area : Illana Bay
Year : 1983-1984



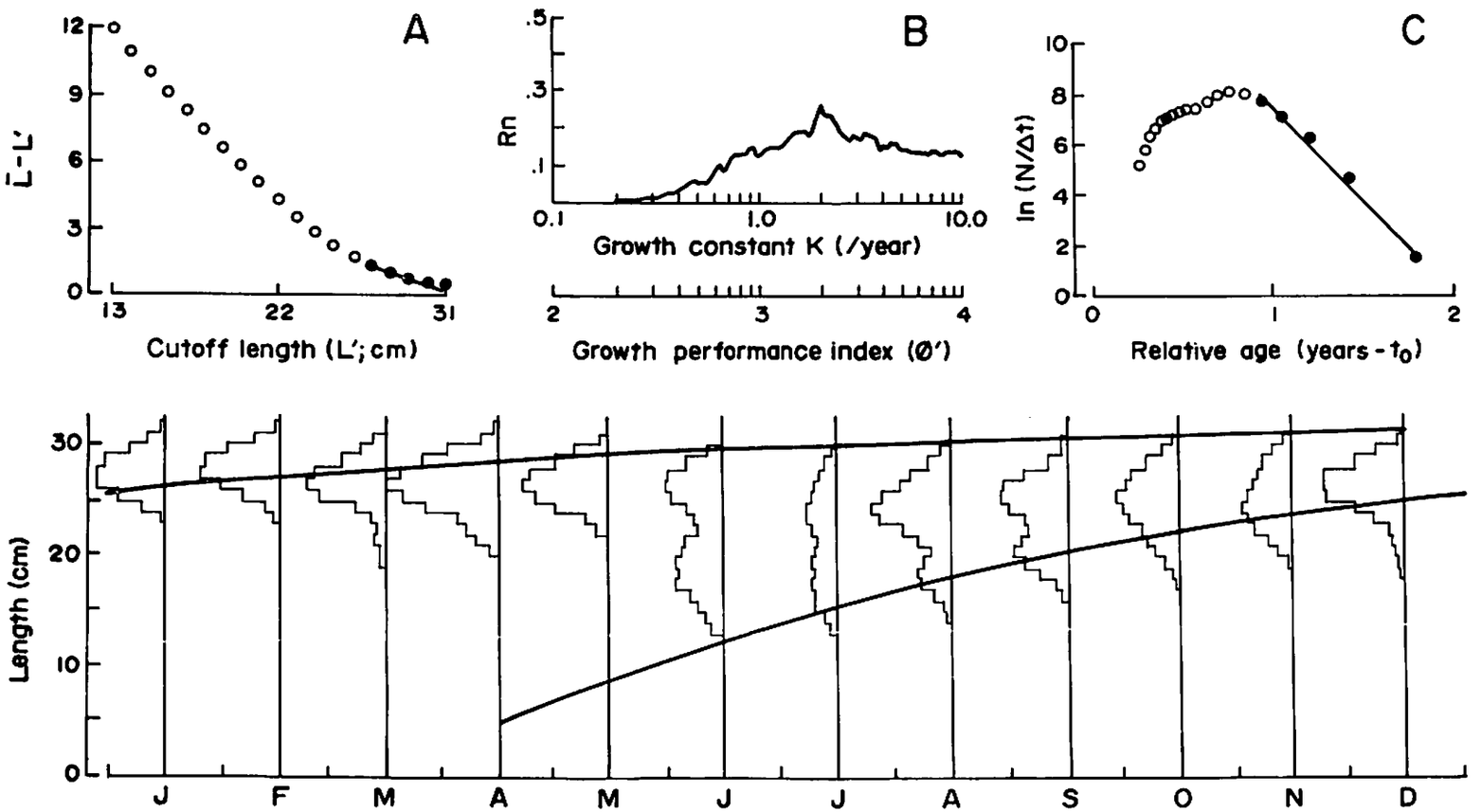
The time series of length frequencies does not exhibit clear modal progression to infer growth. The L_{max} result of 23.86 to 27.3 cm (at 95% confidence interval) indicates that sufficient data, in terms of the size ranges collected, is available allowing the use of the Powell-Wetherall's Plot which estimates L_{∞} to be about 25 cm.

Plate 2.1.3

Family : Scombridae
Species name : *Rastrelliger kanagurta* (Cuvier 1816)



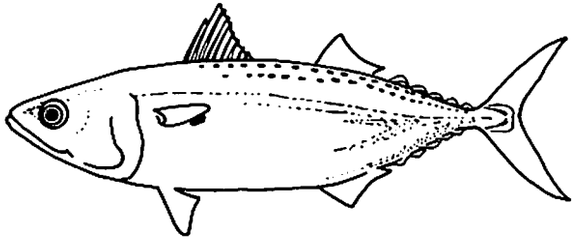
Area : Leyte Gulf
Year : 1986-1987



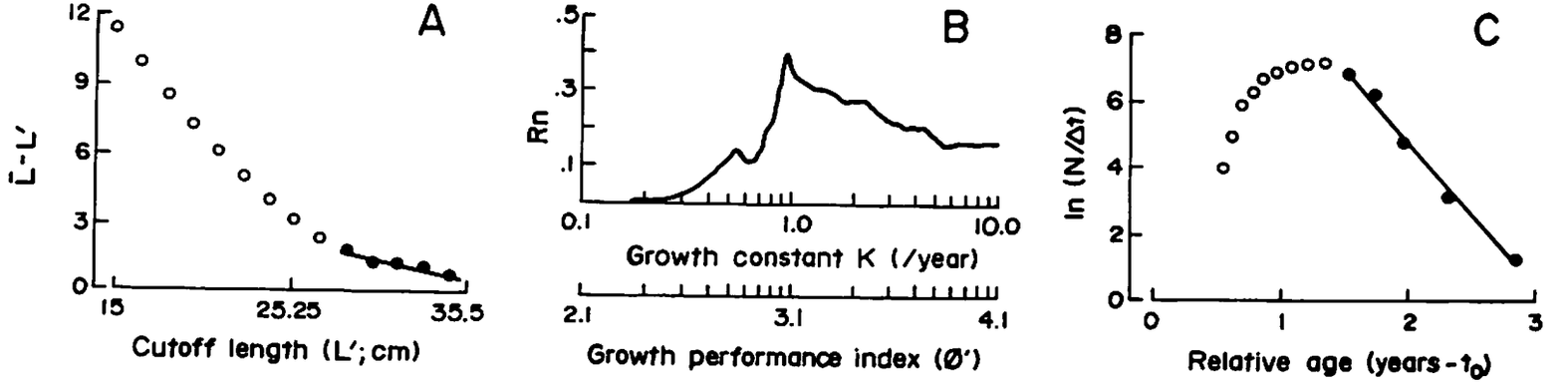
The Powell-Wetherall's Plot estimates the L_∞ to be about 31.9 cm. Using the value of L_{max} = 32.4, the results of the ELEFAN I K-scan routines estimate the K to be about 2 year^{-1}. The results of the Shepherd's approach also confirm the findings (plot not shown here). The total mortality (Z) was estimated to be about 7.4 year^{-1} using the length-converted catch curve.

Plate 2.1.4

Family : Scombridae
Species name : *Rastrelliger kanagurta* (Cuvier 1816)



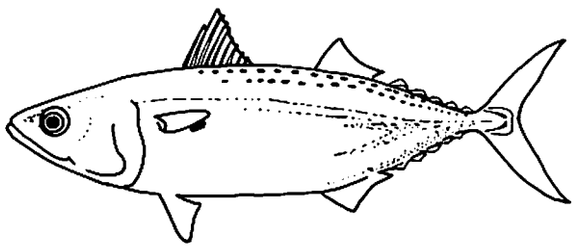
Area : Samar Sea
Year : 1983-1986



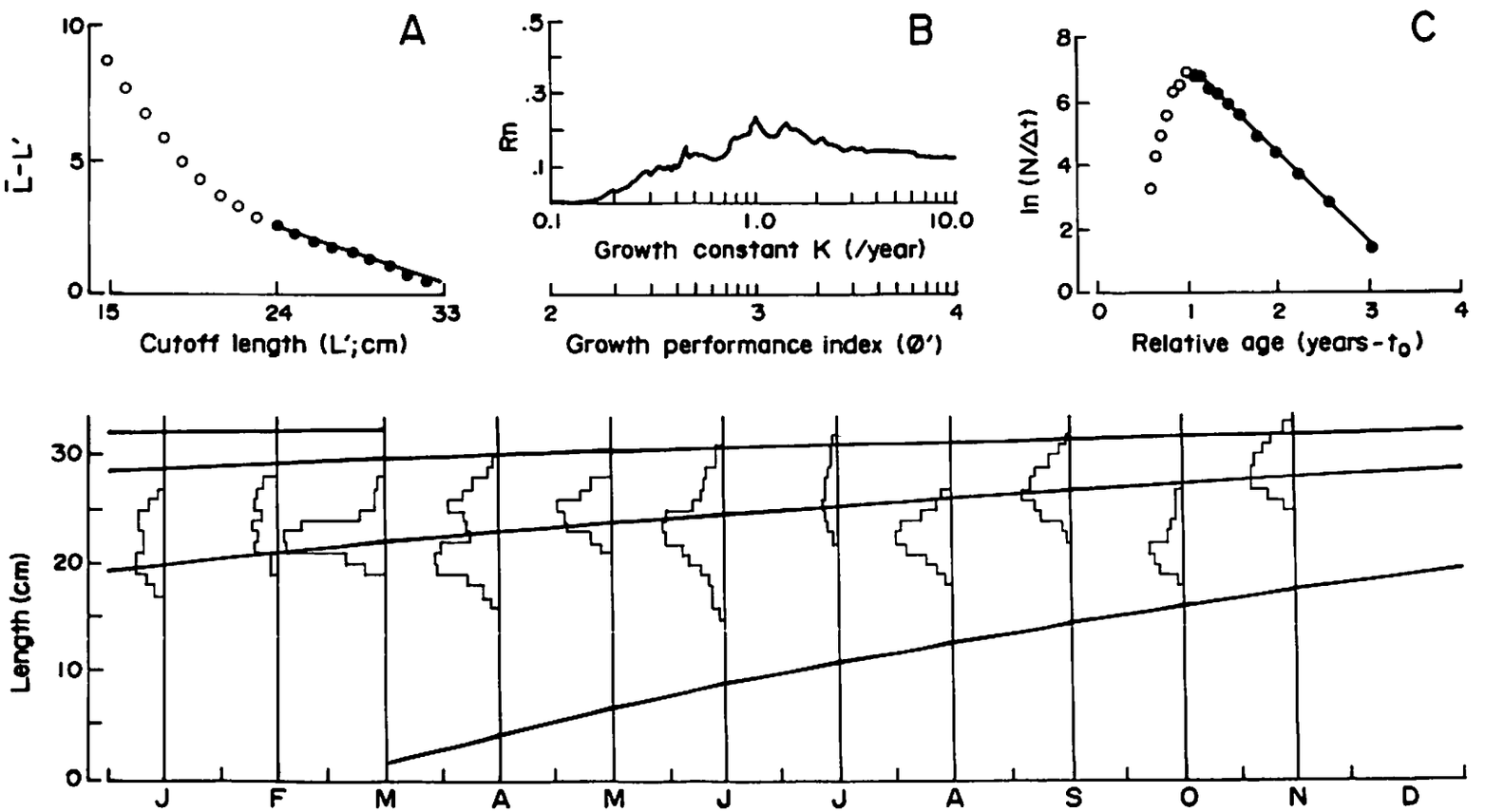
The Powell-Wetherall's Plot estimates the L_∞ to be about 37.4 cm. The results of the ELEFAN I K-scan routines clearly identify K to be about 1 year^{-1}. The results of the Shepherd's approach also confirm the findings (plot not shown here). The total mortality (Z) was estimated to be about 4.3 year^{-1} using the length-converted catch curve.

Plate 2.1.5

Family : Scombridae
Species name : *Rastrelliger kanagurta* (Cuvier 1816)



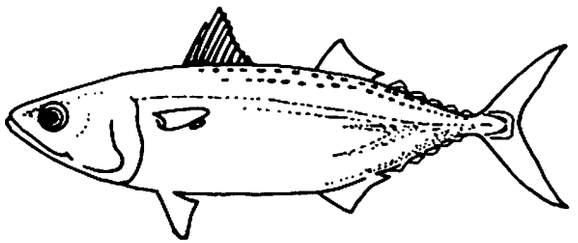
Area : Guimaras Strait
Year : 1984-1986



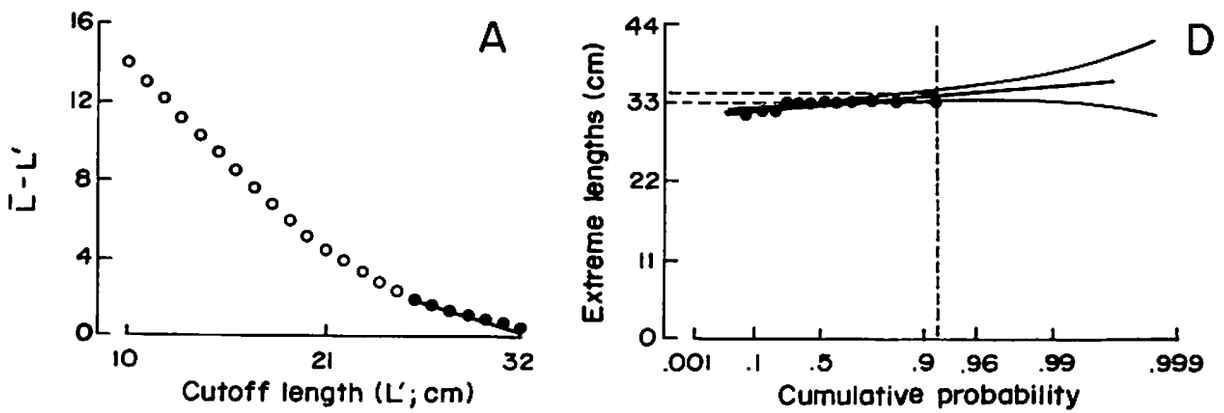
The Powell-Wetherall's Plot estimates the L_∞ to be about 34 cm. The results of the ELEFAN I K-scan routines clearly identify K to be about 1 year^{-1} with a wide standard deviation. The results of the Shepherd's approach also confirm the findings (plot not shown here). The total mortality (Z) was estimated to be about 2.83 year^{-1} using the length-converted catch curve.

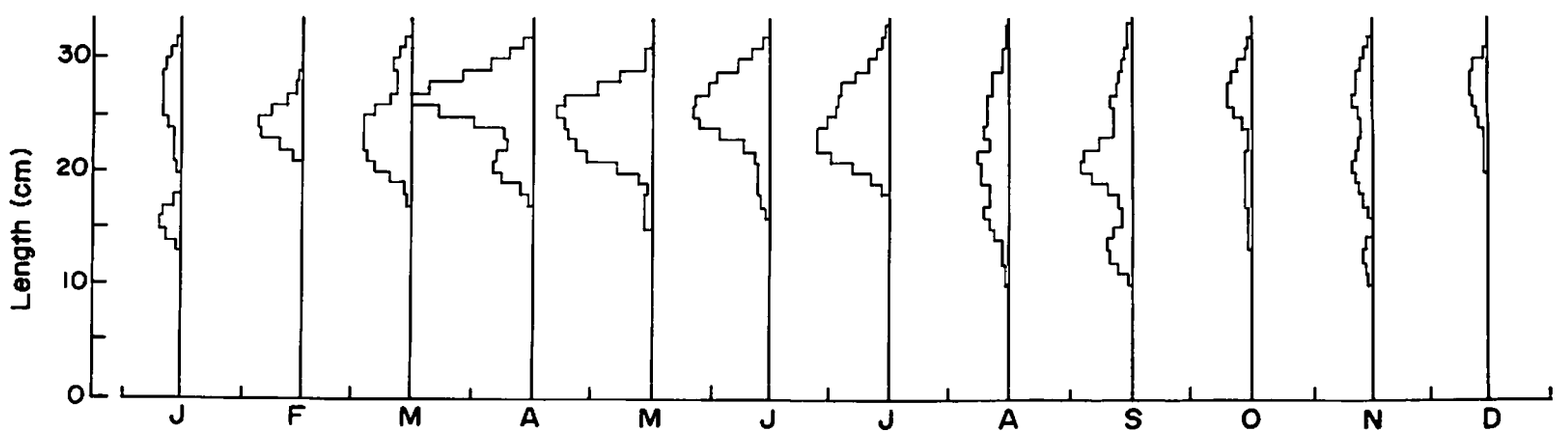
Plate 2.1.6

Family : Scombridae
Species name : *Rastrelliger kanagurta* (Cuvier 1816)



Area : Visayan Sea
Year : 1983-1988

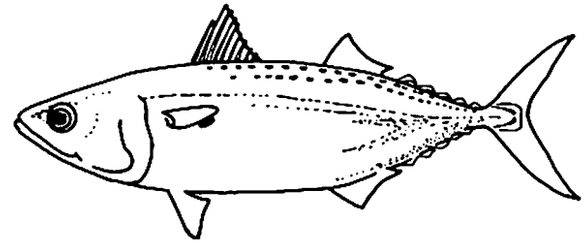




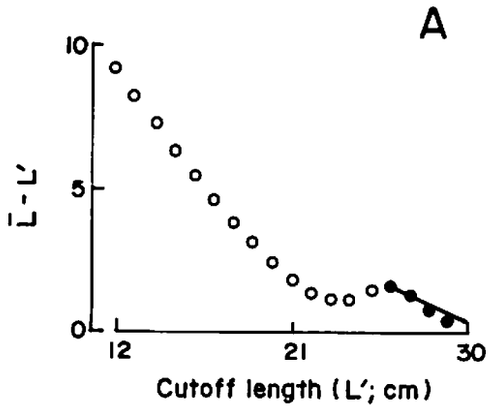
The time series of length frequencies does not exhibit clear modal progression to infer growth. The L_{max} result of 33.26 to 34.53 cm (at 95% confidence interval) indicates that sufficient data, in terms of the size ranges collected, is available allowing the use of the Powell-Wetherall's Plot which estimates L_{∞} to be about 33 cm.

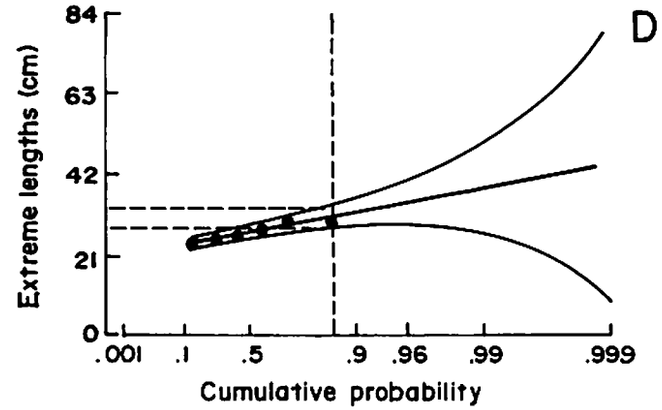
Plate 2.1.7

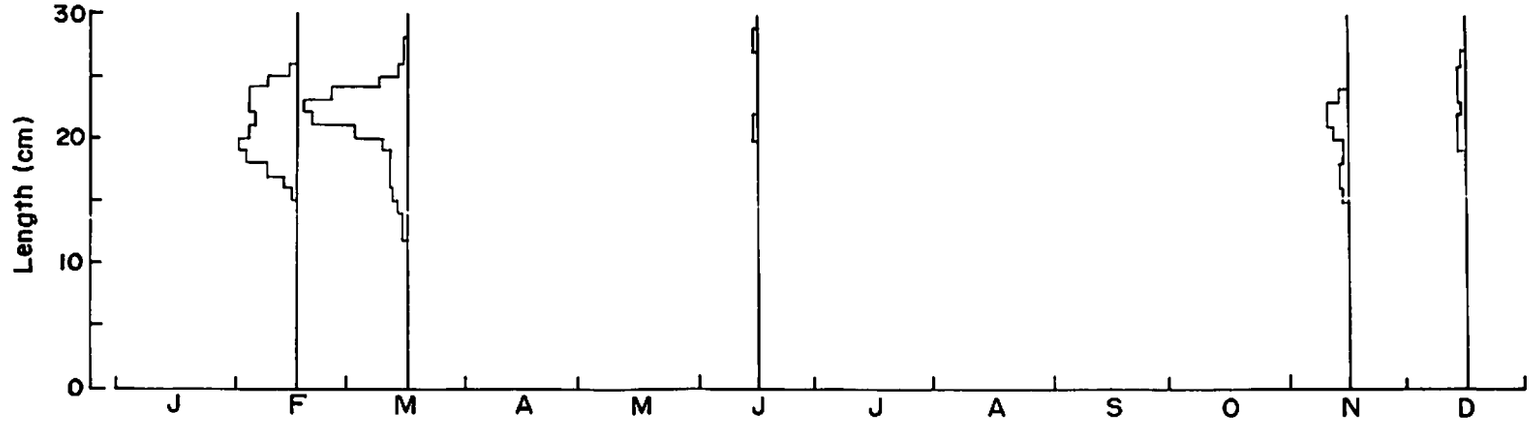
Family : Scombridae
Species name : *Rastrelliger kanagurta* (Cuvier 1816)



Area : Camotes Sea
Year : 1987



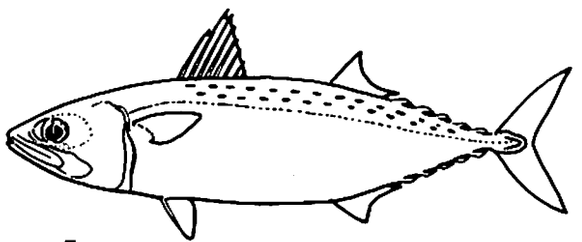




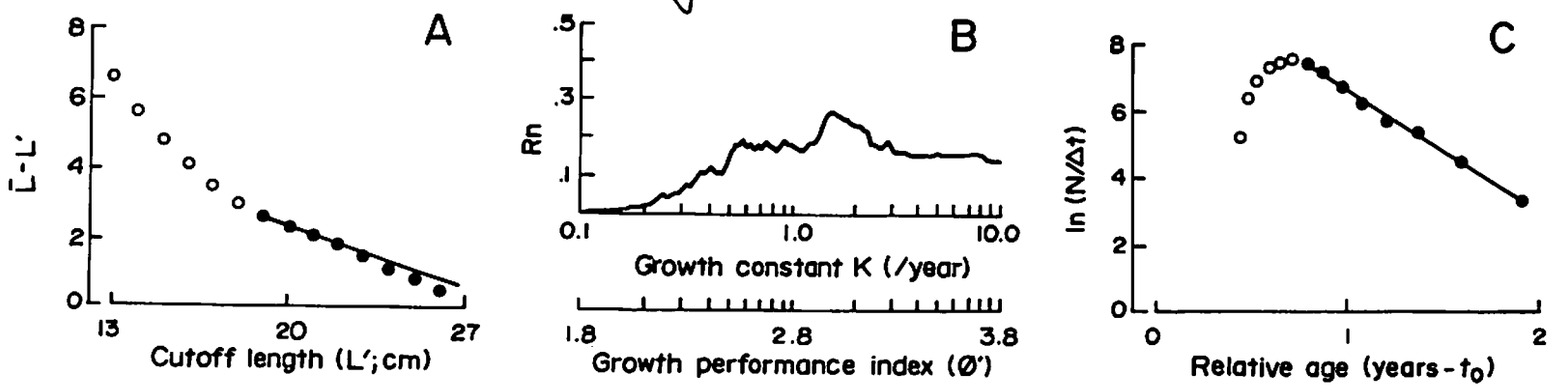
There is insufficient data to approximate the growth parameters. However, the L_{max} estimate of 27.81 to 33.4 cm indicates that the range at which the data has been collected were well-covered and from the Powell-Wetherall's Plot, the L_{∞} was approximated to be about 30.3 cm.

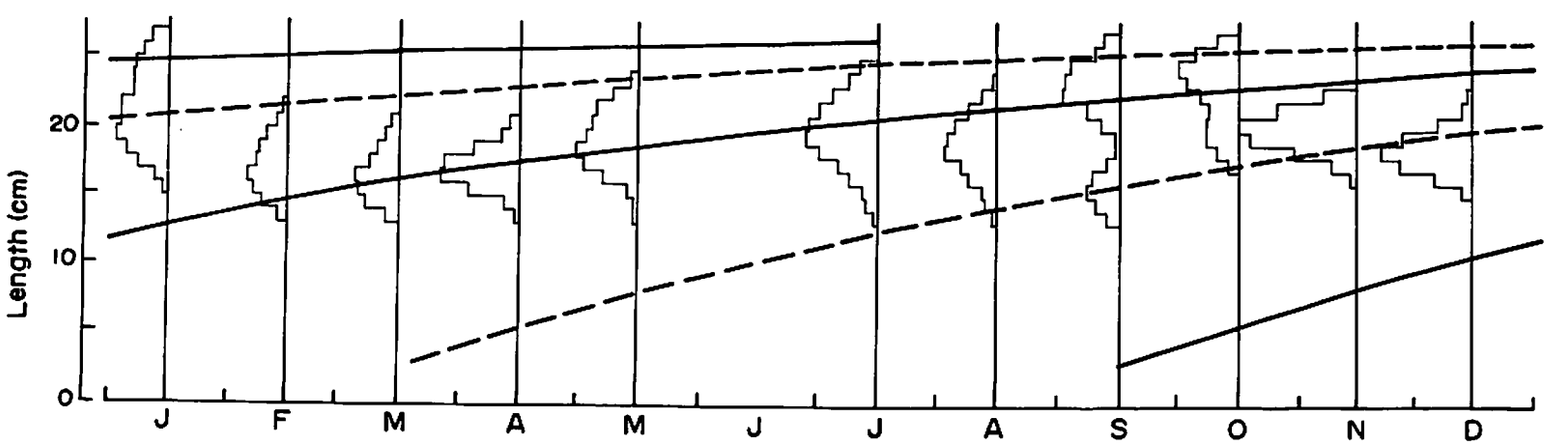
Plate 2.2.1

Family : Scombridae
Species name : *Rastrelliger faughni* (Matsui 1967)



Area : Visayan Sea
Year : 1983-1987

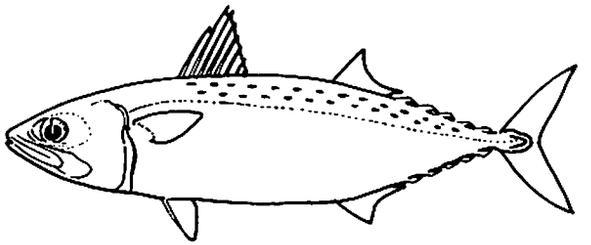




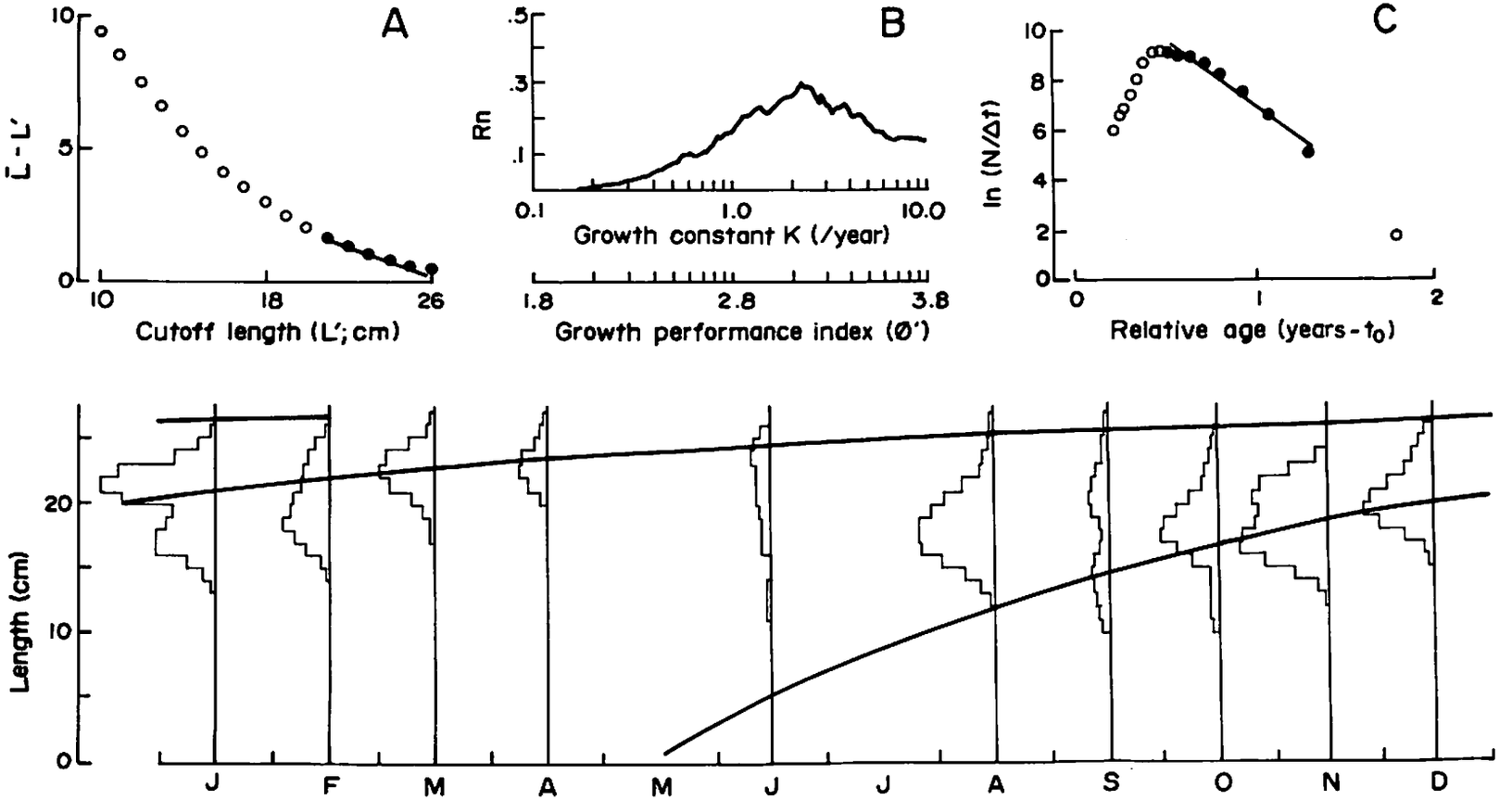
The Powell-Wetherall's Plot estimates the L_∞ to be about 28.1 cm. The results of the ELEFAN I K-scan routines clearly identify K to be about 1.5 year^{-1} with a wide standard deviation. The results of the Shepherd's approach also confirm the findings (plot not shown here). The total mortality (Z) was estimated to be about 3.6 year^{-1} using the length-converted catch curve. The recruitment pattern analysis (plot not shown) also reveals two pulses per year.

Plate 2.2.2

Family : Scombridae
Species name : *Rastrelliger faughni* (Matsui 1967)



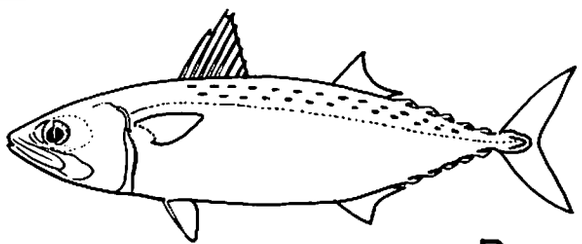
Area : Camotes Sea
Year : 1987



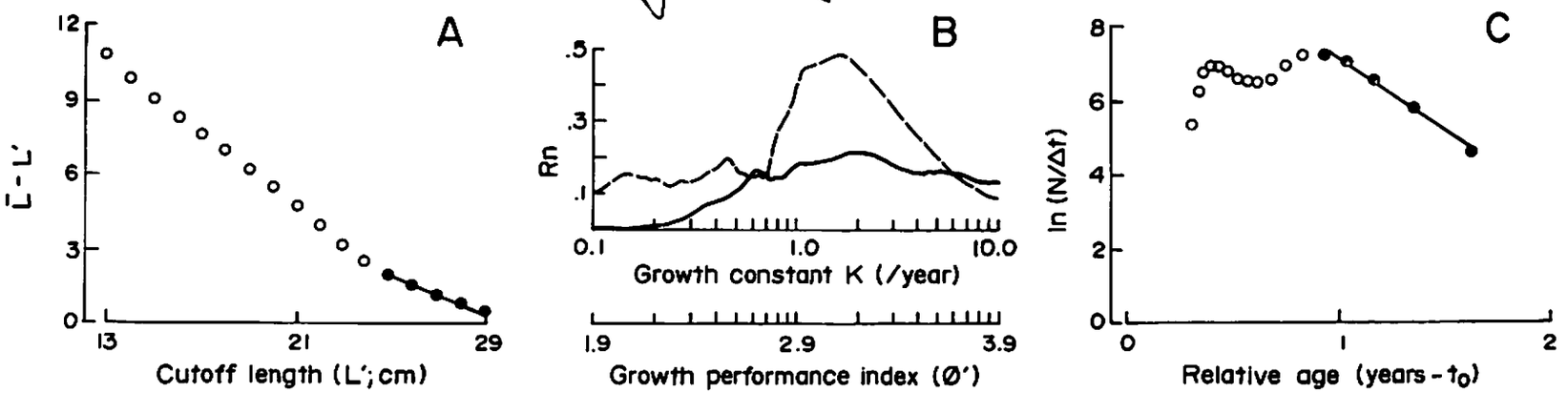
The Powell-Wetherall's Plot estimates the L_∞ to be about 27 cm. The results of the ELEFAN I K-scan routines clearly identify K to be about 2.2 year^{-1}. The results of the Shepherd's approach also confirm the findings (plot not shown here). The total mortality (Z) was estimated to be about 5.2 year^{-1} using the length-converted catch curve.

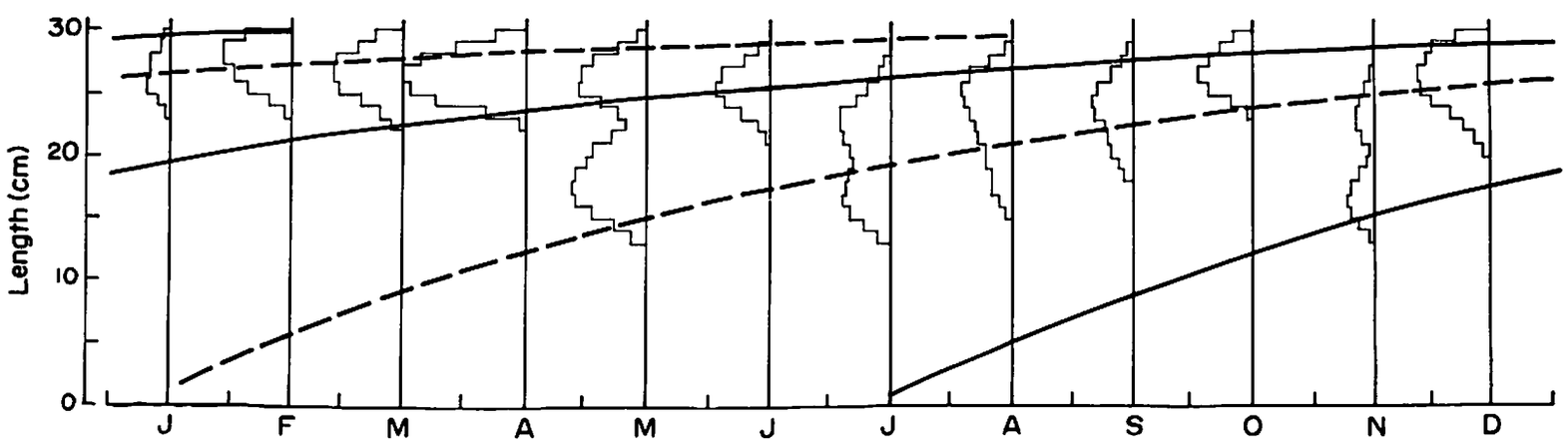
Plate 2.2.3

Family : Scombridae
Species name : *Rastrelliger faughni* (Matsui 1967)



Area : Leyte Gulf
Year : 1986-1987

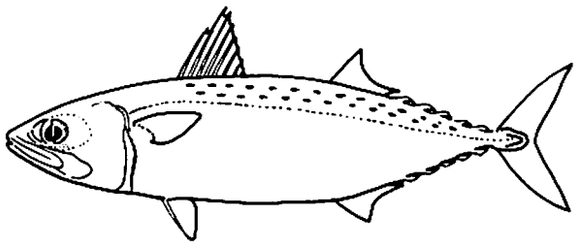




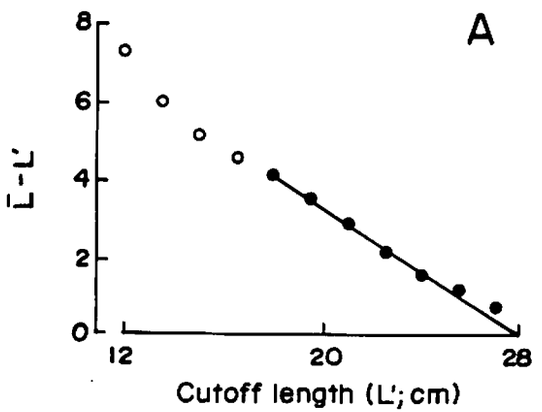
The Powell-Wetherall's Plot estimates the L_∞ to be about 30 cm from the data collected. The results of the ELEFAN I K-scan analysis barely identified the K constant. However, the Shepherd's method K-scan routines confirm the K to be about 2 year^{-1}. The total mortality (Z) was estimated to be about 3.8 year^{-1} using the length-converted catch curve. The recruitment pattern analysis indicates two pulses per year (plot not shown).

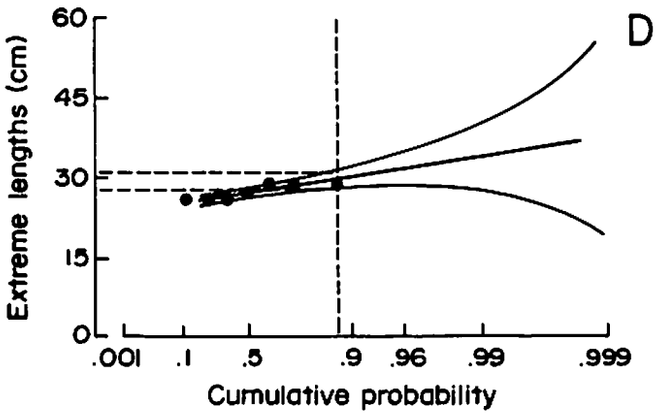
Plate 2.2.4

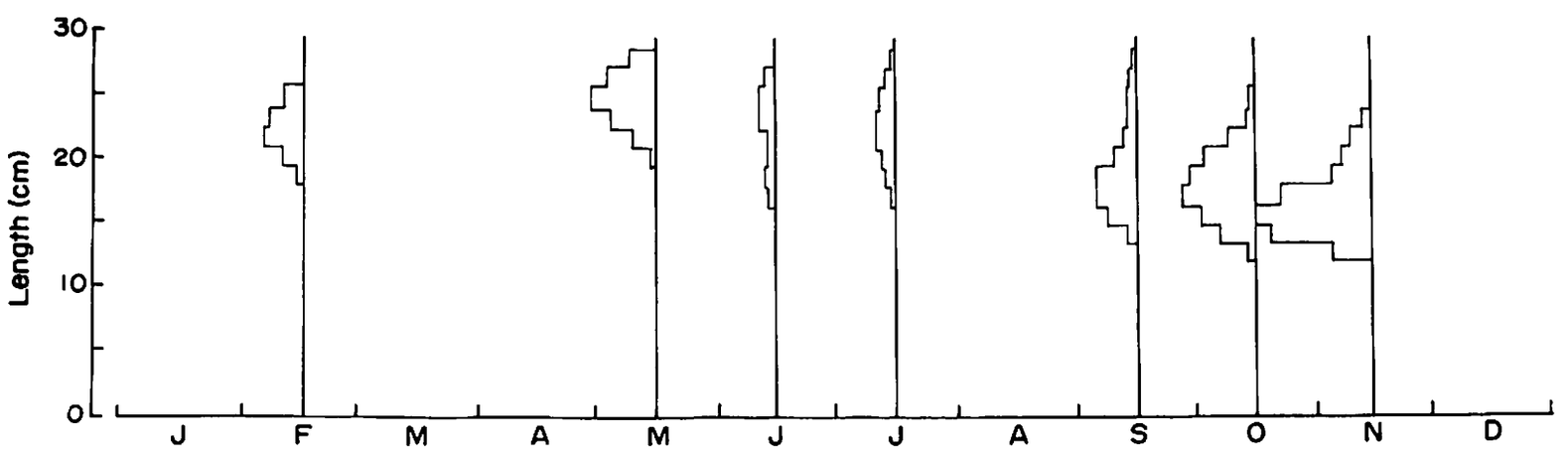
Family : Scombridae
Species name : *Rastrelliger faughni* (Matsui 1967)



Area : Tayabas Bay
Year : 1987



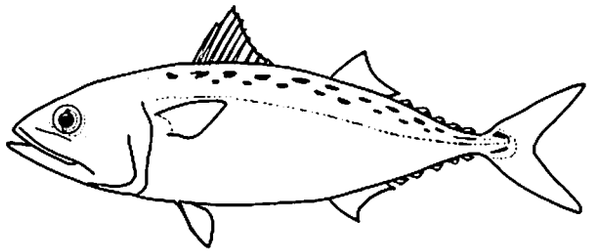




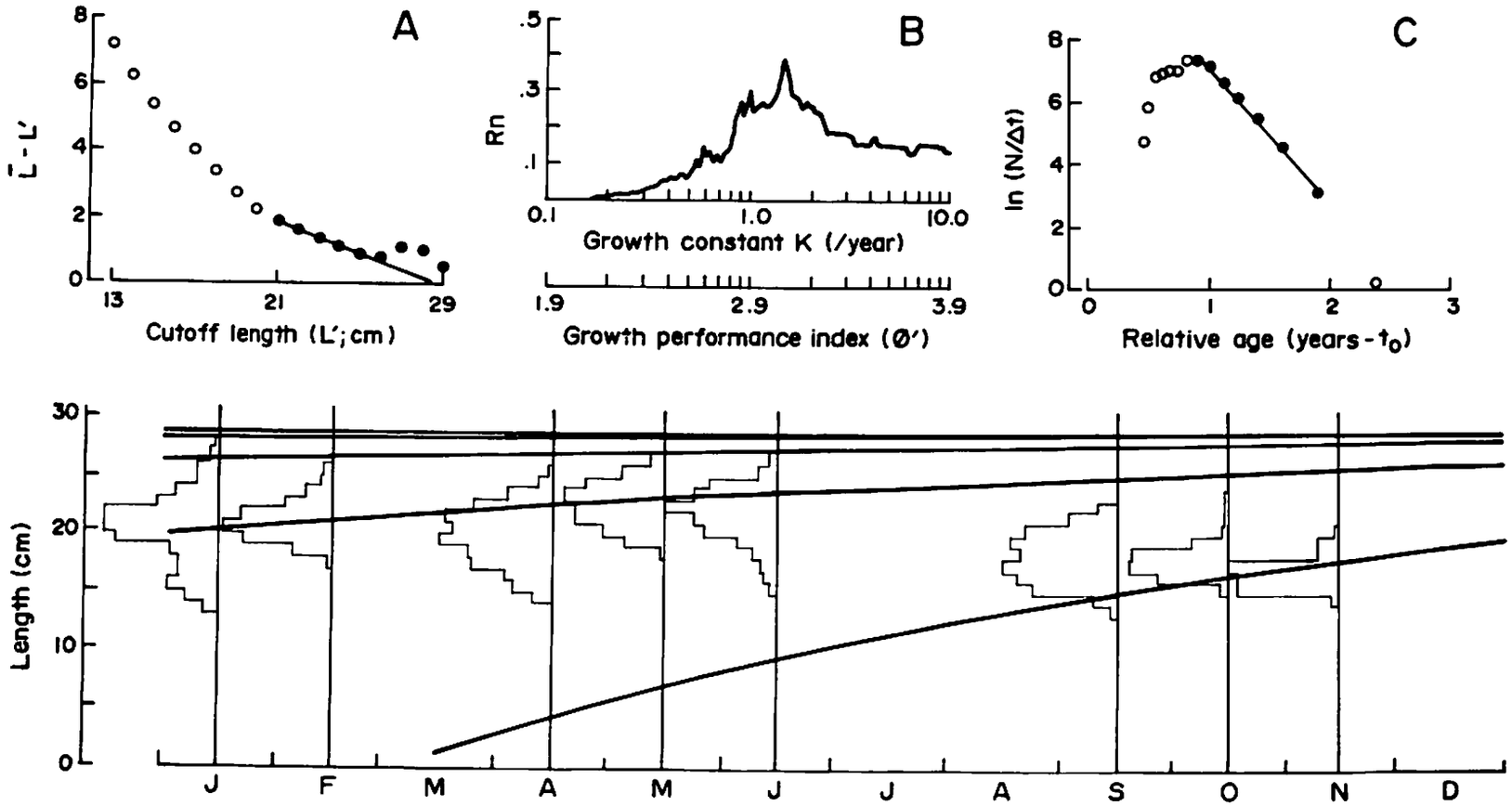
There is insufficient length-frequency data to infer growth. However, the L_{max} estimate of 27.62 to 30.8 cm indicates that the range at which the data has been collected were well-covered and from the Powell-Wetherall's Plot, the L_{∞} was approximated to be about 28.1 cm.

Plate 2.3.1

Family : Scombridae
Species name : *Rastrelliger brachysoma* (Bleeker 1851)



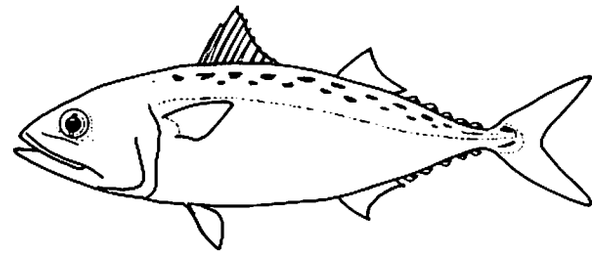
Area : Guimaras Strait
Year : 1984-1986



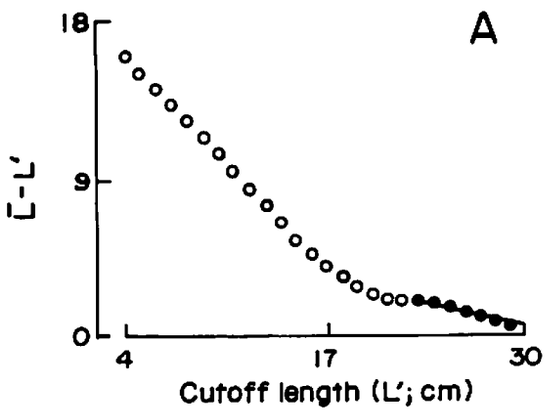
The Powell-Wetherall's Plot estimates the L_∞ to be about 28.5 cm. The results of the ELEFAN I K-scan routines clearly identify K to be about 1.4 year^{-1}. The results of the Shepherd's approach also confirm the findings (plot not shown here). The total mortality (Z) was estimated to be about 4.3 year^{-1} using the length-converted catch curve.

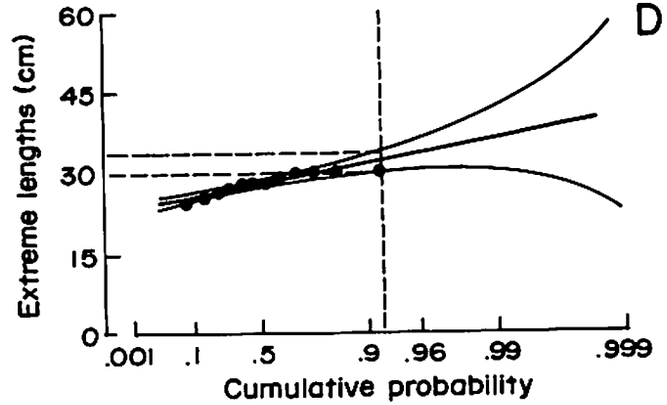
Plate 2.3.2

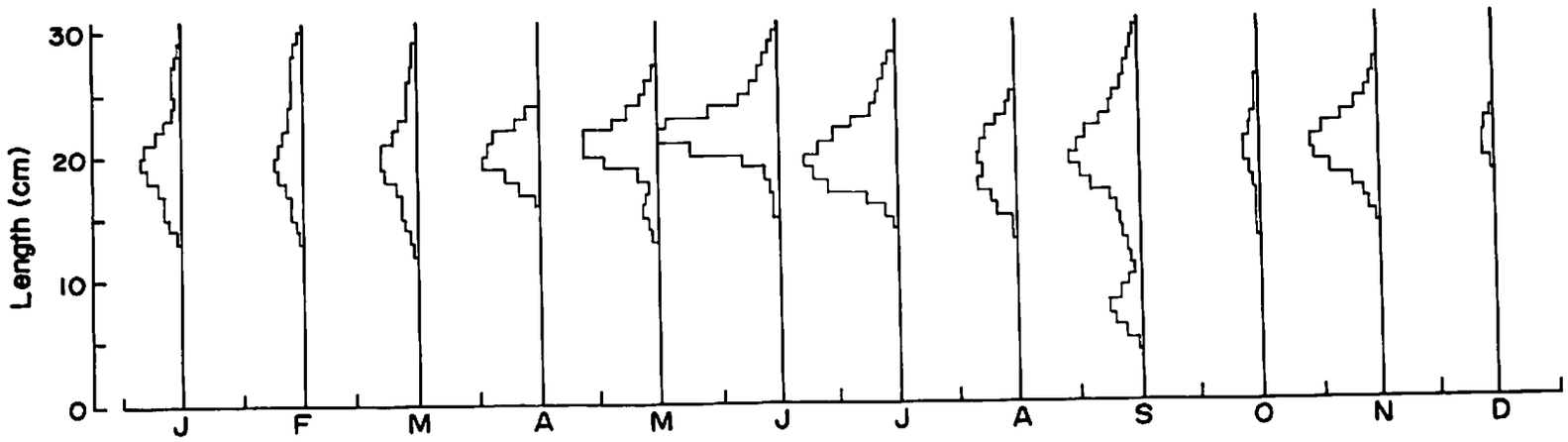
Family : Scombridae
Species name : *Rastrelliger brachysoma* (Bleeker 1851)



Area : Visayan Sea
Year : 1983-1988



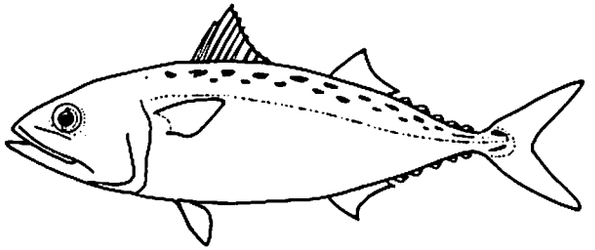




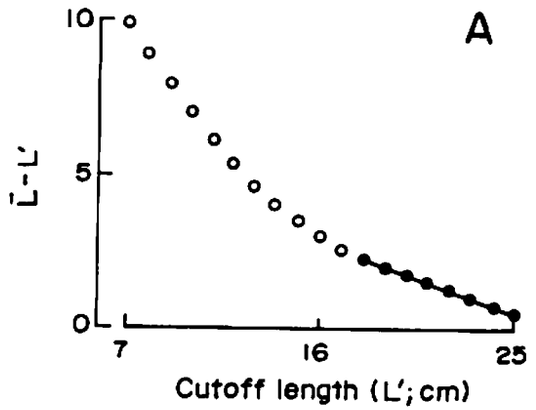
The time series of length frequencies does not exhibit clear modal progression to infer growth. The L_{max} result of 29.8 to 33.83 cm (at 95% confidence interval) indicates that sufficient data, in terms of the size ranges collected, is available allowing the use of the Powell-Wetherall's Plot which estimates L_{∞} to be about 32 cm.

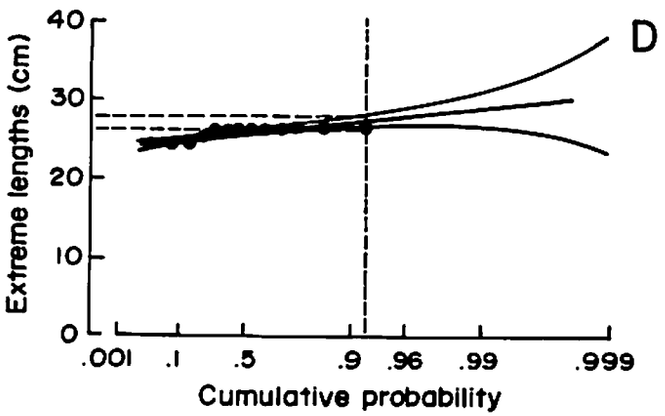
Plate 2.3.3

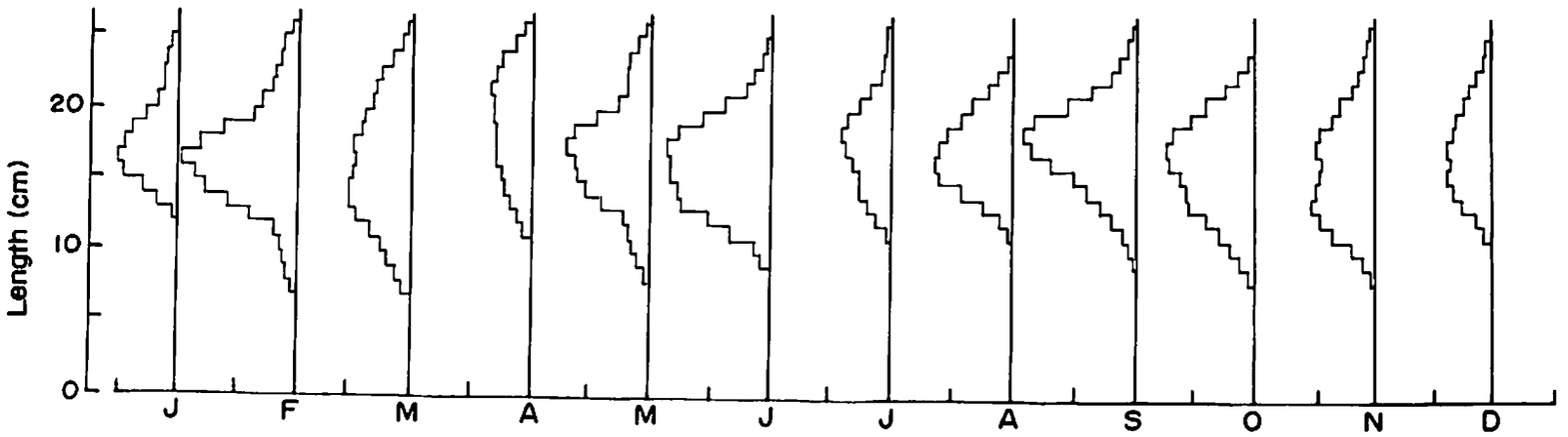
Family : Scombridae
Species name : *Rastrelliger brachysoma* (Bleeker 1851)



Area : Leyte Gulf
Year : 1983-1987



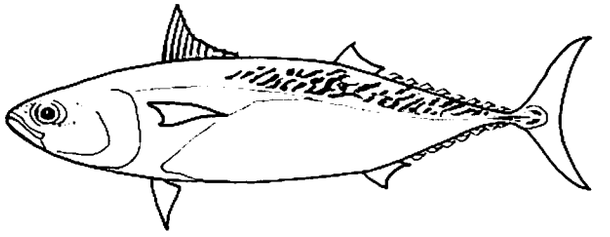




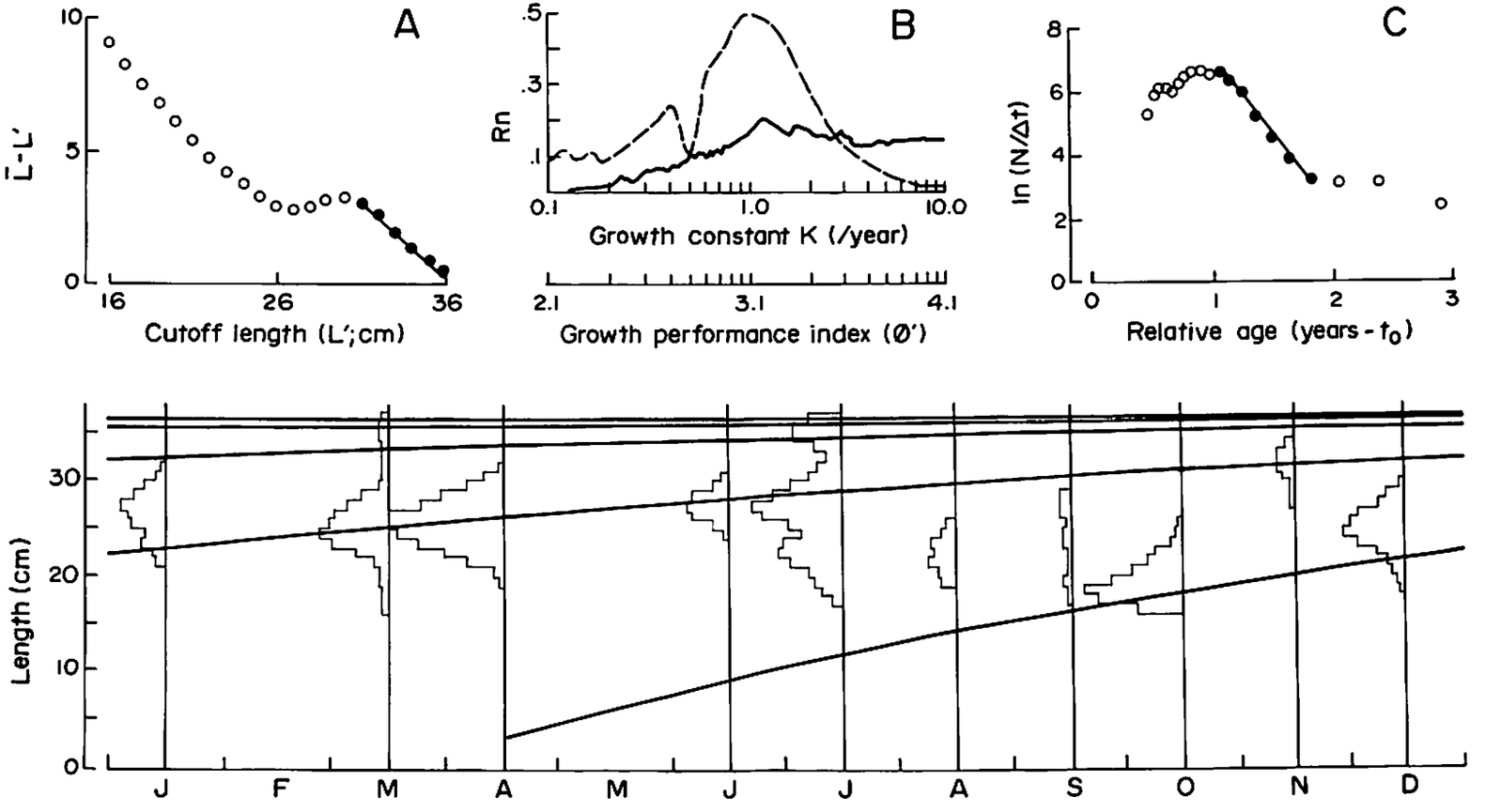
The time series of length frequencies does not exhibit clear modal progression to infer growth. The L_{max} result of 26.31 to 27.85 cm (at 95% confidence interval) indicates that sufficient data, in terms of the size ranges collected, is available allowing the use of the Powell-Wetherall's Plot which estimates L_{∞} to be about 27.3 cm.

Plate 2.4.1

Family : Scombridae
Species name : *Auxis thazard* (Lacepede 1800)



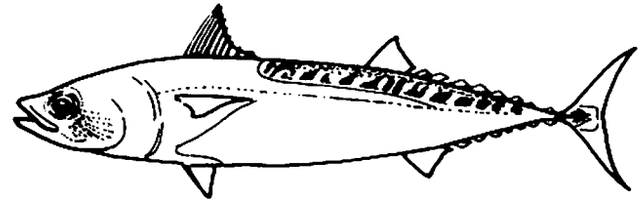
Area : Camotes Sea
Year : 1983-1987



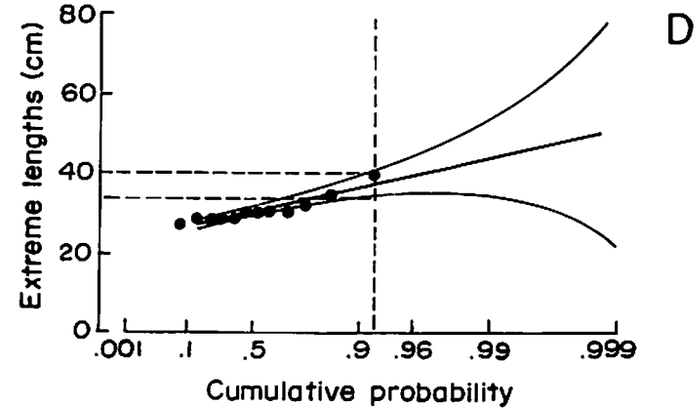
The Powell-Wetherall's Plot estimates the L_∞ to be about 36.6 cm. The results of the ELEFAN I K-scan analysis barely identified the K constant. However, the Shepherd's method K-scan routines confirm the K to be about 1.2 year^{-1}. The total mortality (Z) was estimated to be about 4.8 year^{-1} using the length-converted catch curve. Although two pulses were identified by the recruitment pattern analysis (plot not shown), the secondary cohort was not well-defined.

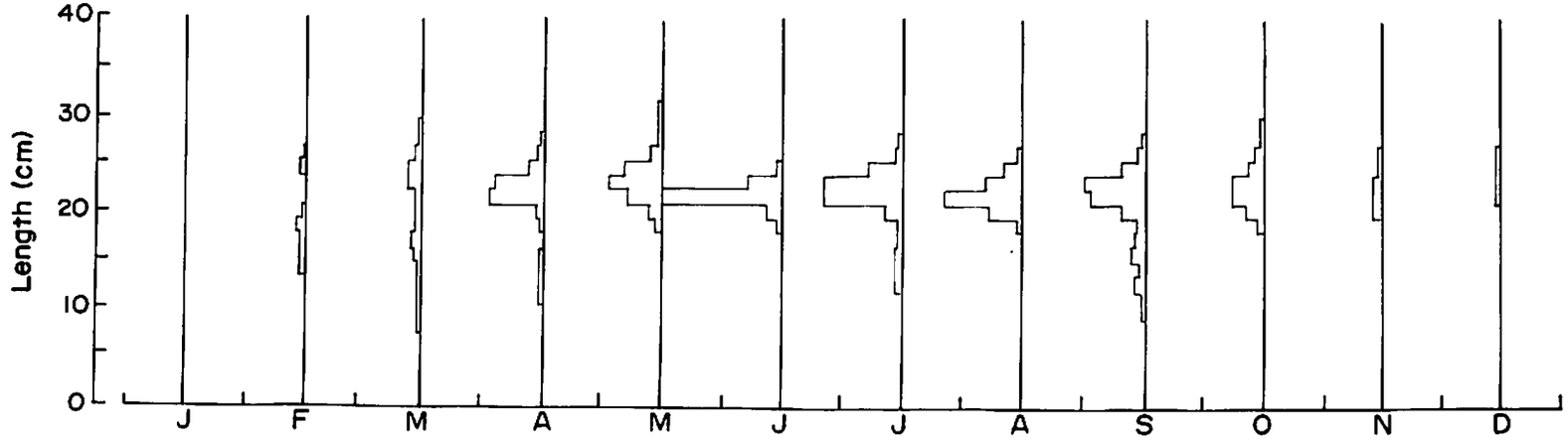
Plate 2.5.1

Family : Scombridae
Species name : *Auxis rochei* (Risso 1810)



Area : Camotes Sea
Year : 1983-1987

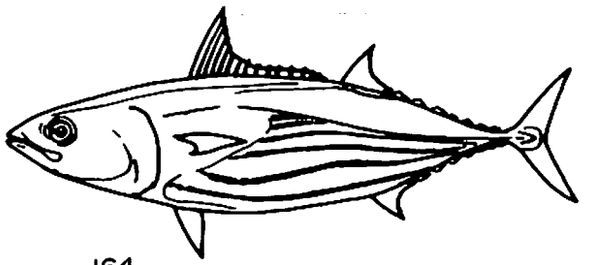




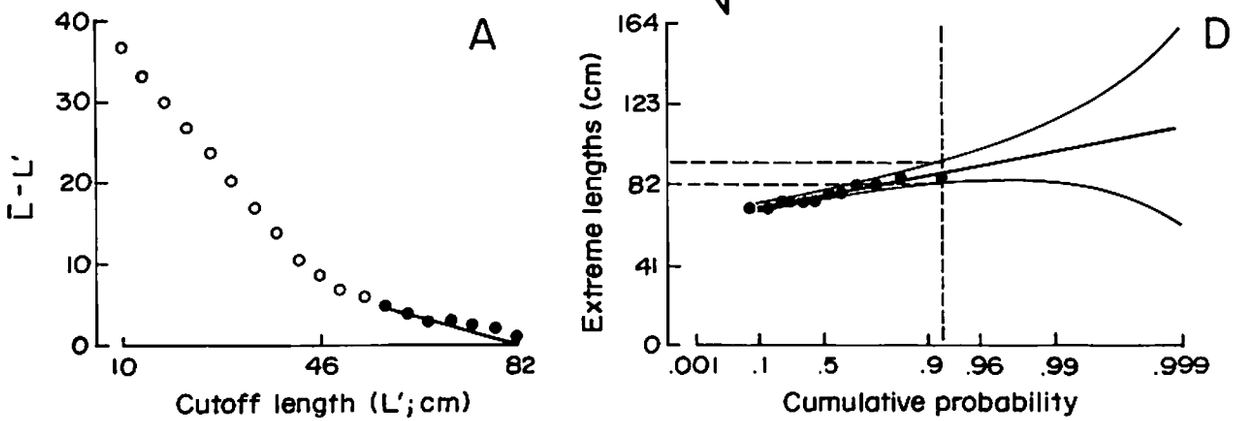
The time series of length frequencies does not exhibit clear modal progression to infer growth and neither does the data have sufficient data for use with the Powell-Wetherall's Plot. However L_{max} result was 33.5 to 39.89 cm (at 95% confidence interval) and most likely, the L_{∞} is around that range.

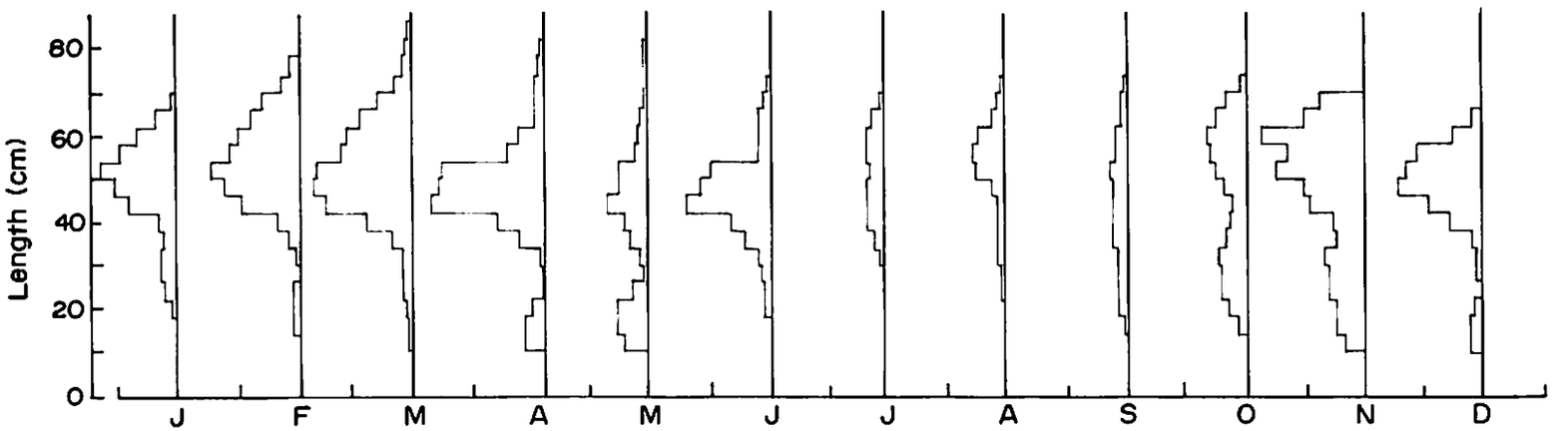
Plate 2.6.1

Family : Scombridae
Species name : *Katsuwonus pelamis* (Linnaeus 1758)



Area : Tayabas Bay/Bohol Sea/Illana Bay
Year : 1983-1988

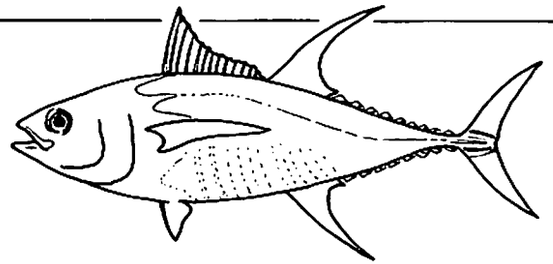




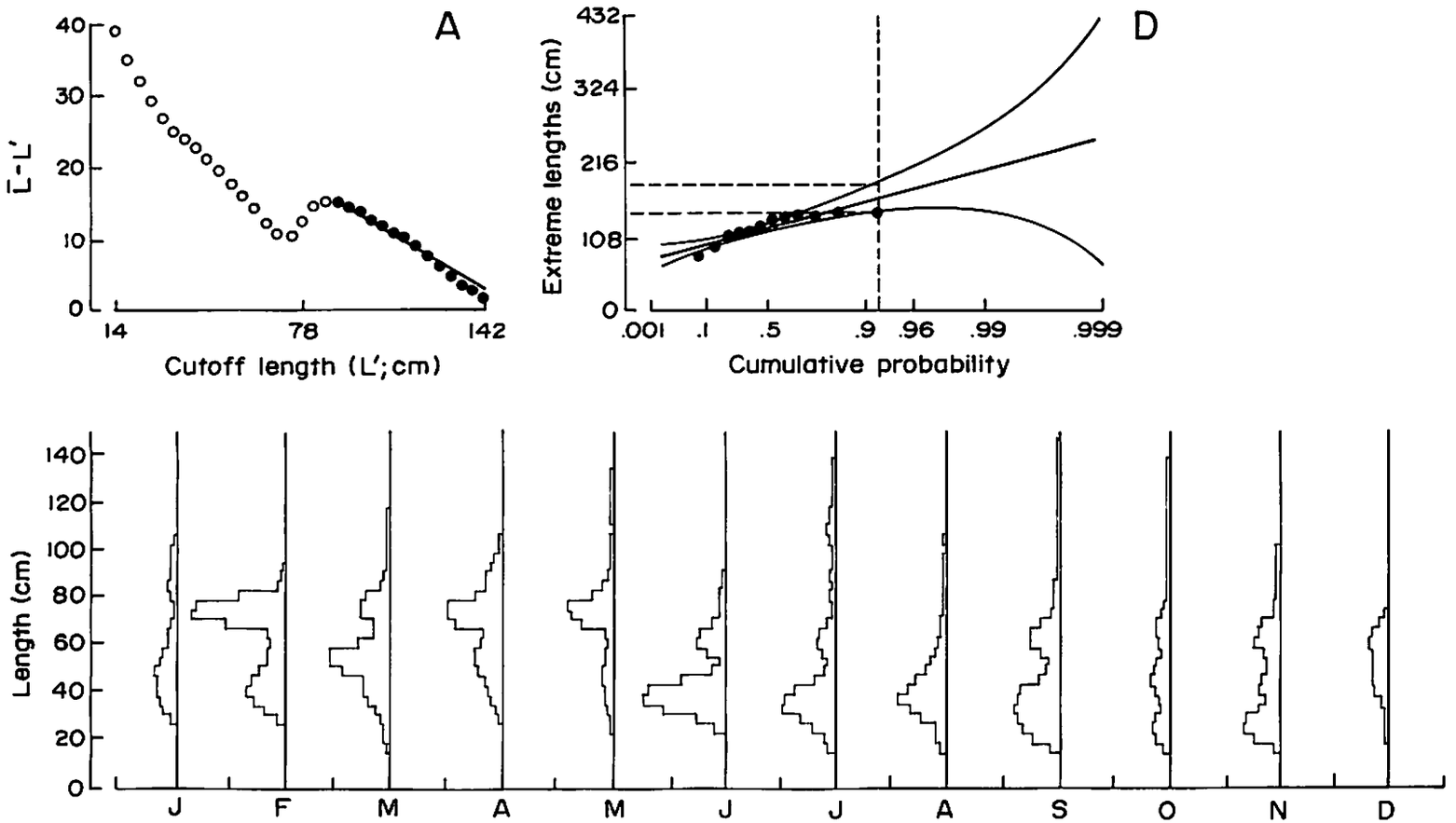
The time series of length frequencies does not exhibit clear modal progression to infer growth. The L_{max} result of 82.46 to 93.4 cm (at 95% confidence interval) indicates that sufficient data, in terms of the size ranges collected, is available allowing the use of the Powell-Wetherall's Plot which estimates L_{∞} to be about 89 cm.

Plate 2.7.1

Family : Scombridae
Species name : *Thunnus albacares* (Bonnaterre 1788)



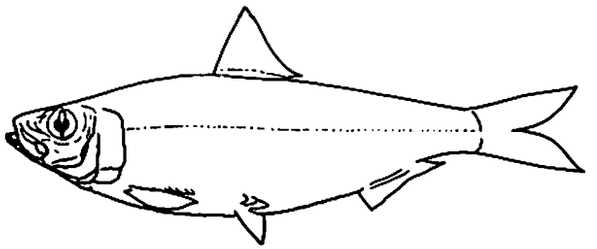
Area : Tayabas Bay/Bohol Sea/Illana Bay/Cuyo-East Pass
Year : 1983-1988



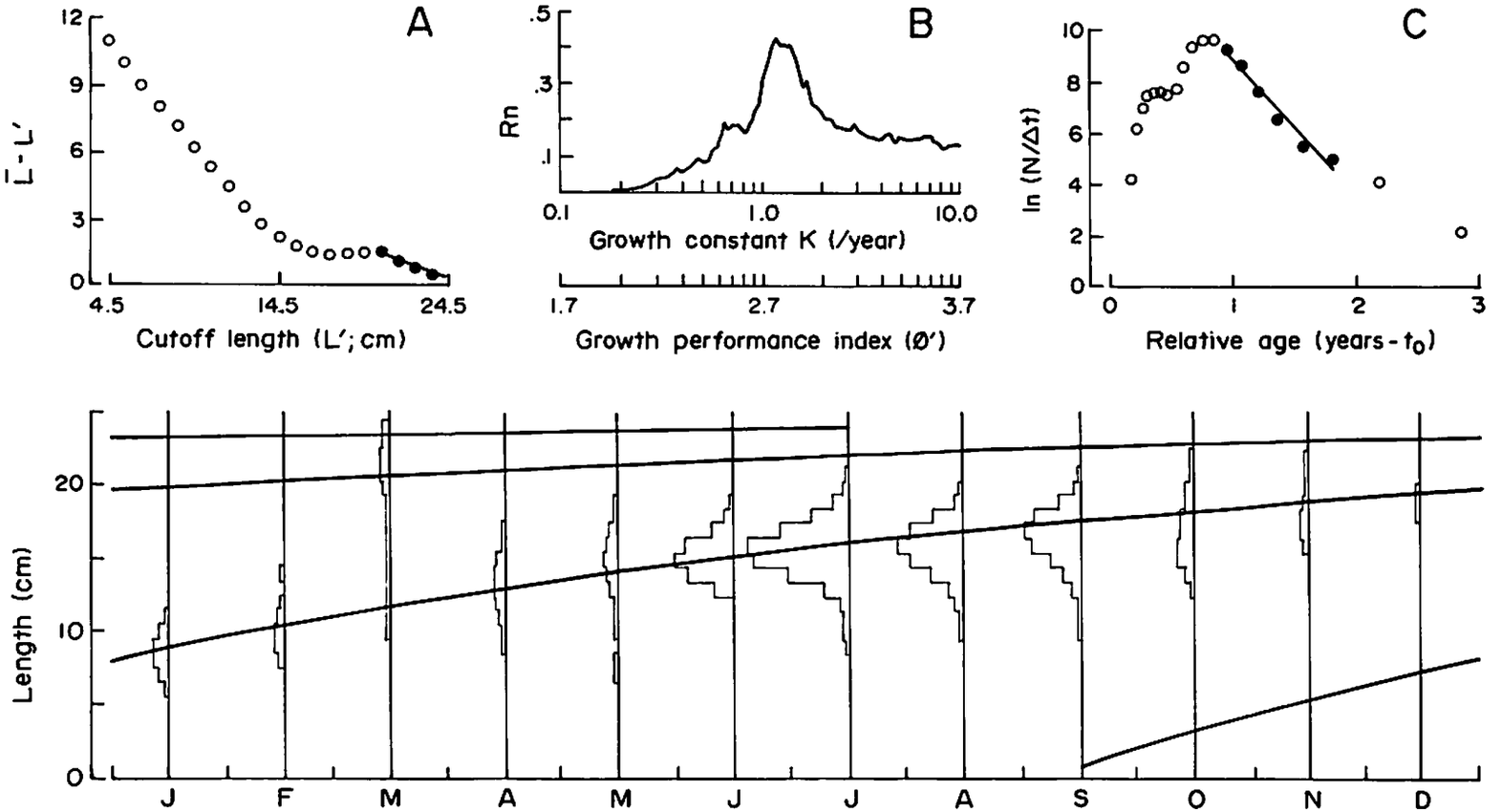
The time series of length frequencies does not exhibit clear modal progression to infer growth. The L_{max} result of 143.82 to 183.25 cm (at 95% confidence interval) indicates that sufficient data, in terms of the size ranges collected, is available allowing the use of the Powell-Wetherall's Plot which estimates L_{∞} to be about 157.3 cm.

Plate 3.1.1

Family : Clupeidae
Species name : *Sardinella fimbriata* (Valenciennes 1847)



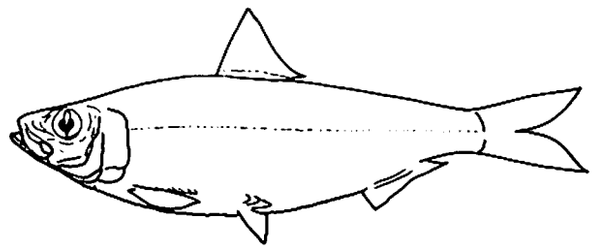
Area : Tayabas Bay
Year : 1987



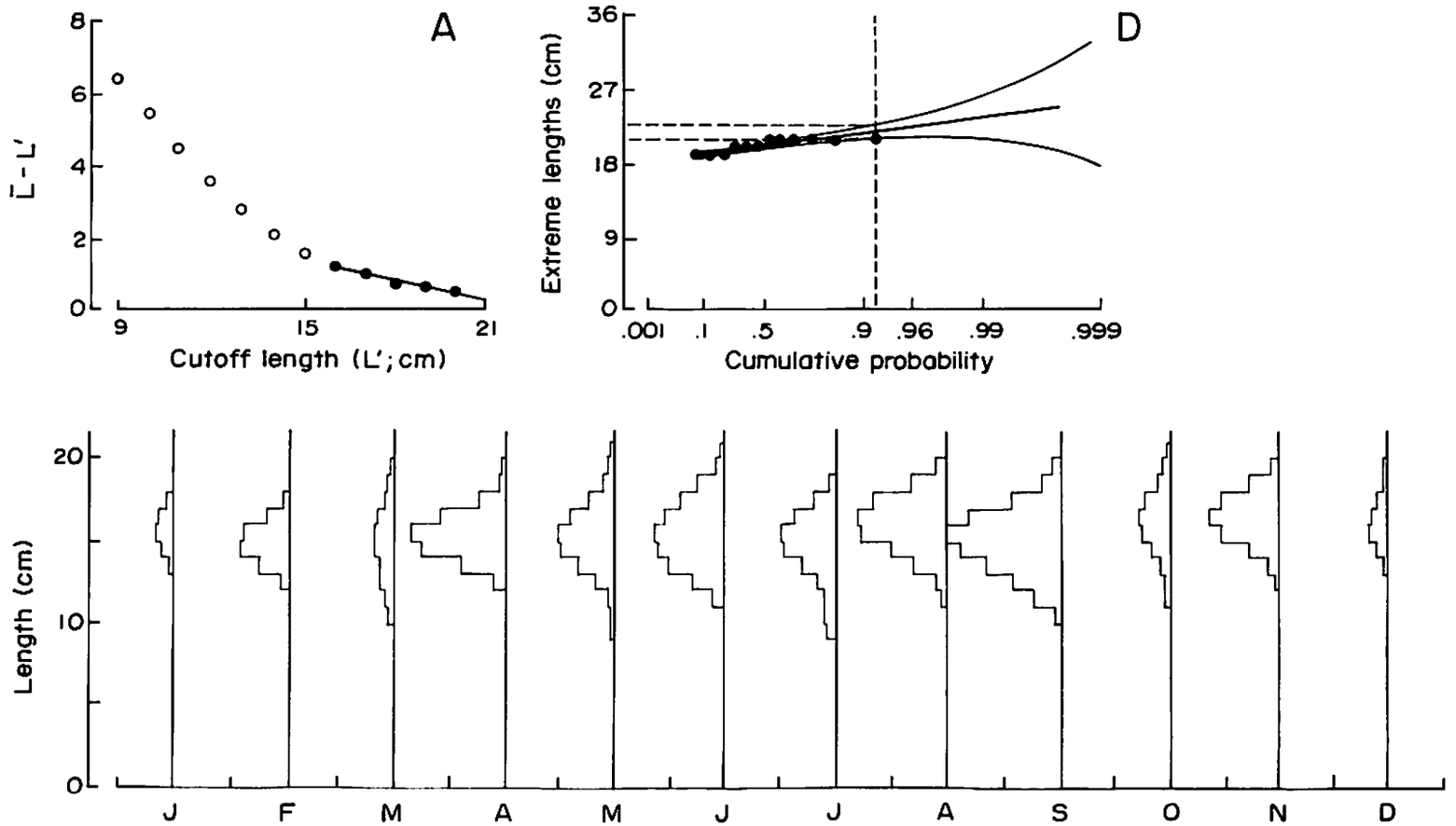
The Powell-Wetherall's Plot estimates the L_∞ to be about 24.8 cm. The results of the ELEFAN I K-scan routines clearly identify K to be about 1.2 year^{-1}. The results of the Shepherd's approach also confirm the findings (plot not shown here). The total mortality (Z) was estimated to be about 5.3 year^{-1} using the length-converted catch curve.

Plate 3.1.2

Family : Clupeidae
Species name : *Sardinella fimbriata* (Valenciennes 1847)



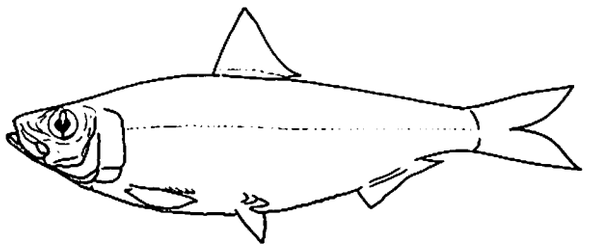
Area : Visayan Sea
Year : 1986-1988



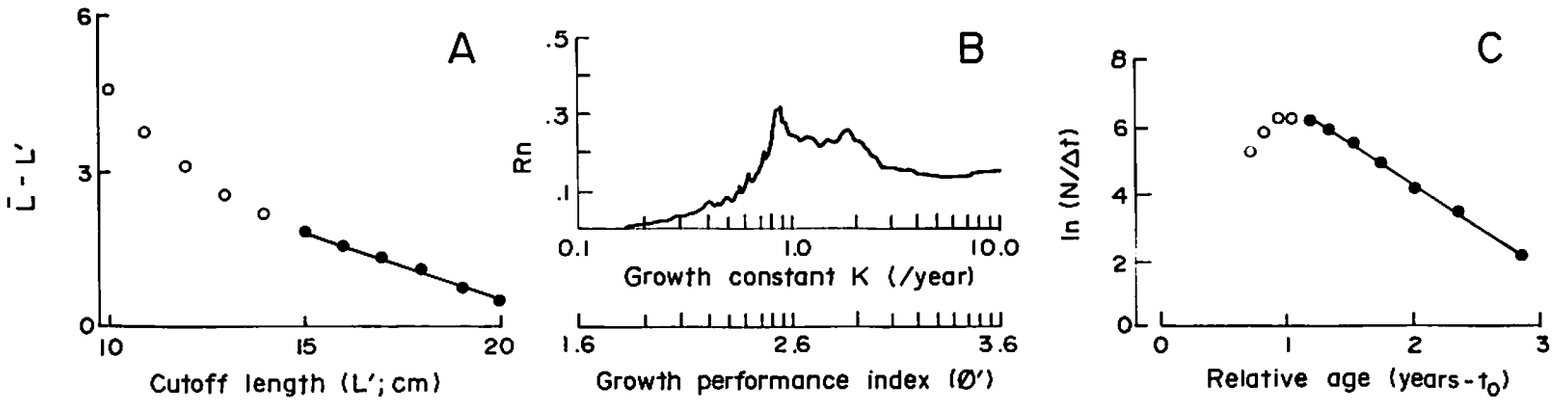
The time series of length frequencies does not exhibit clear modal progression to infer growth. The L_{max} result of 21.04 to 22.73 cm (at 95% confidence interval) indicates that sufficient data, in terms of the size ranges collected, is available allowing the use of the Powell-Wetherall's Plot which estimates L_{∞} to be about 21.6 cm.

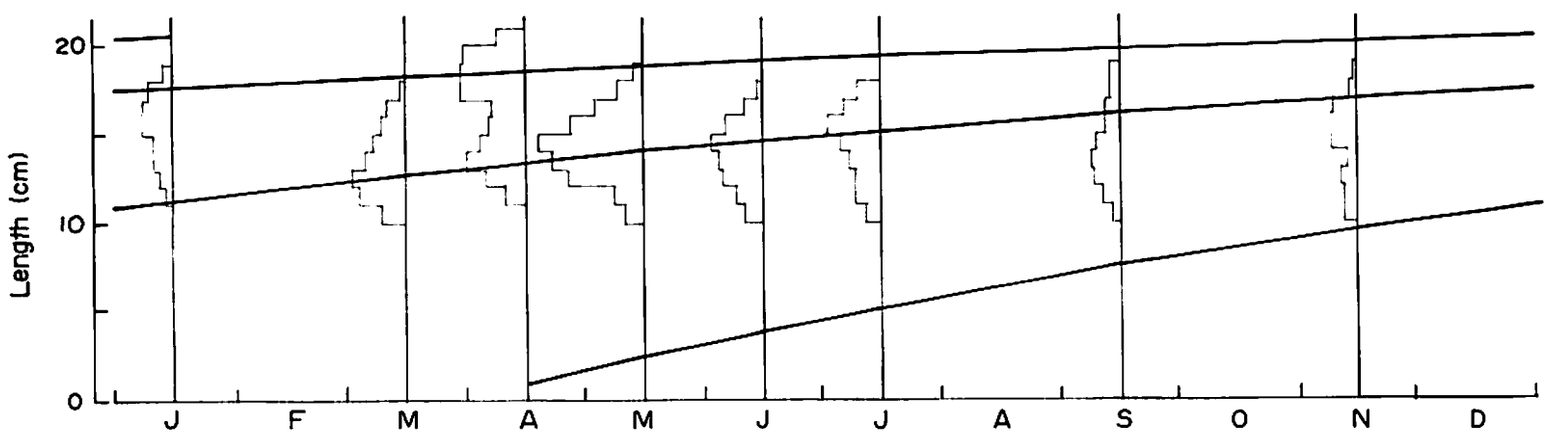
Plate 3.1.3

Family : Clupeidae
Species name : *Sardinella fimbriata* (Valenciennes 1847)



Area : Guimaras Strait
Year : 1984-1986

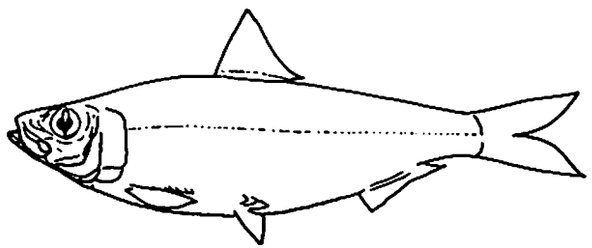




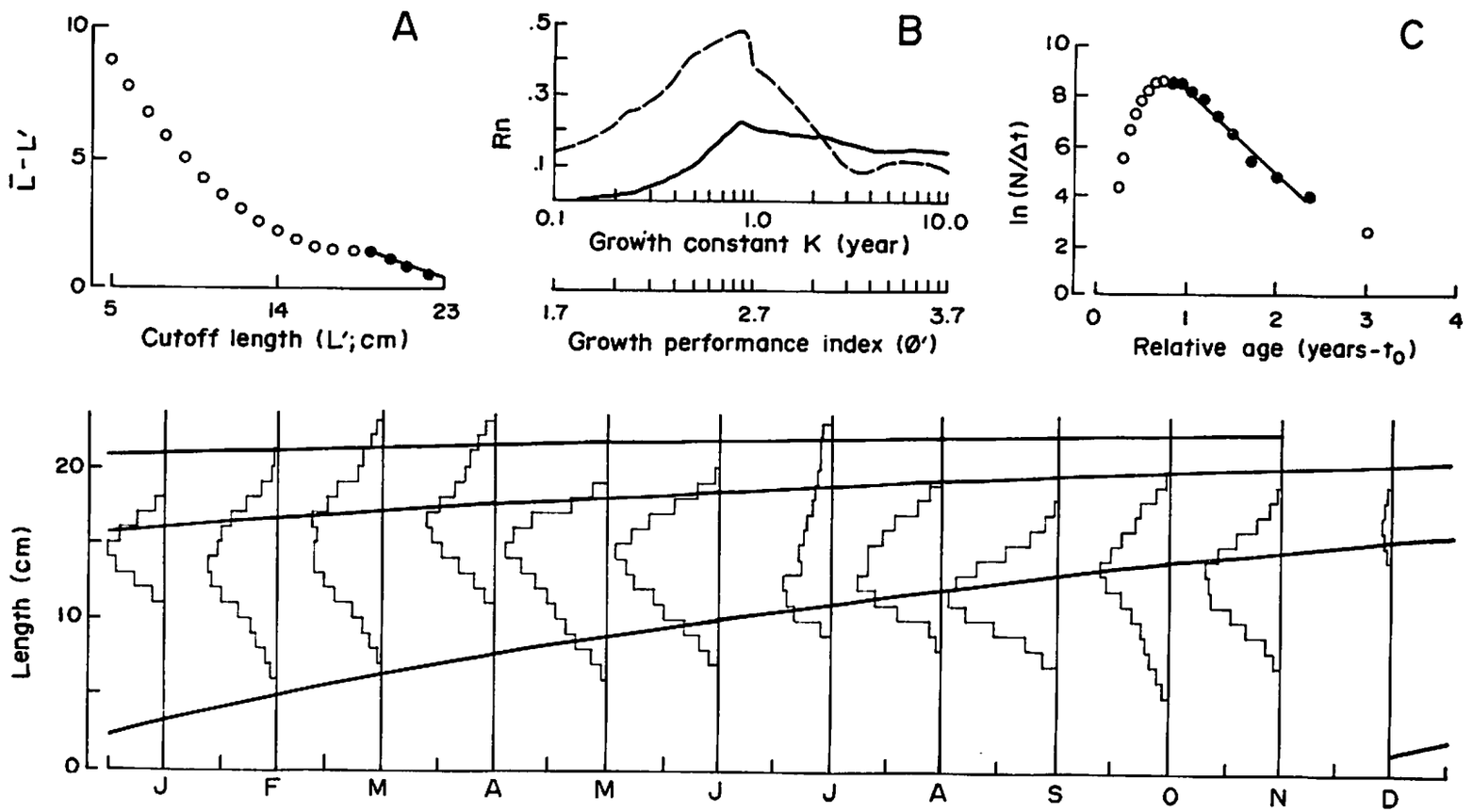
The Powell-Wetherall's Plot estimates the L_∞ to be about 22.3 cm. The results of the ELEFAN I K-scan routines clearly identify K to be about 0.9 year^{-1}. The results of the Shepherd's approach also confirm the findings (plot not shown here). The total mortality (Z) was estimated to be about 2.5 year^{-1} using the length-converted catch curve.

Plate 3.1.4

Family : Clupeidae
Species name : *Sardinella fimbriata* (Valenciennes 1847)



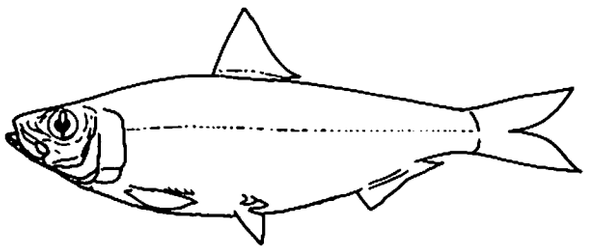
Area : Leyte Gulf
Year : 1983-1986



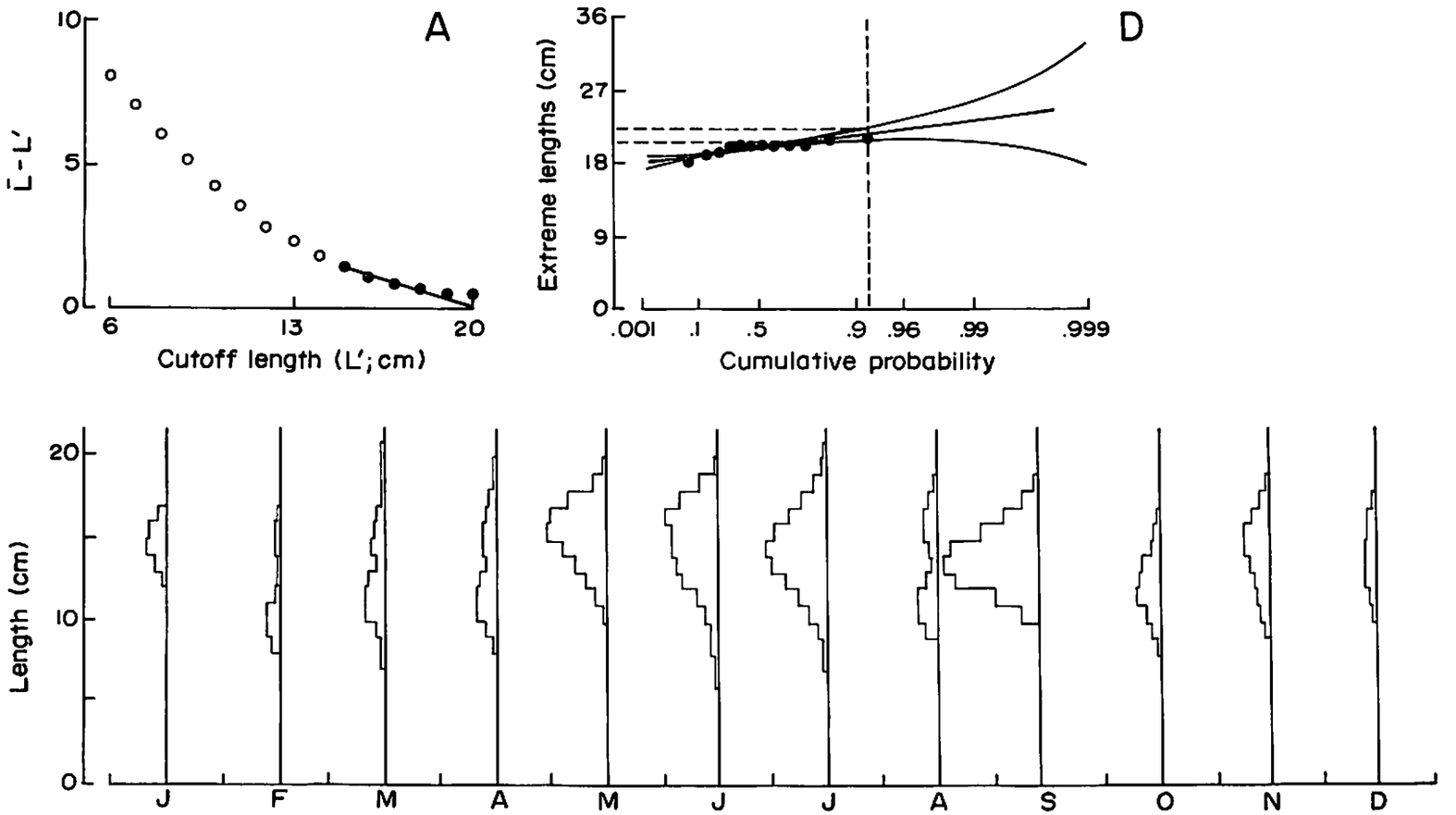
The Powell-Wetherall's Plot estimates the L_∞ to be about 23.7 cm. The results of the ELEFAN I K-scan analysis barely identified the K constant. However, the Shepherd's method K-scan routines confirm the K to be about 1 year^{-1}. The total mortality (Z) was estimated to be about 3.29 year^{-1} using the length-converted catch curve.

Plate 3.1.5

Family : Clupeidae
Species name : *Sardinella fimbriata* (Valenciennes 1847)



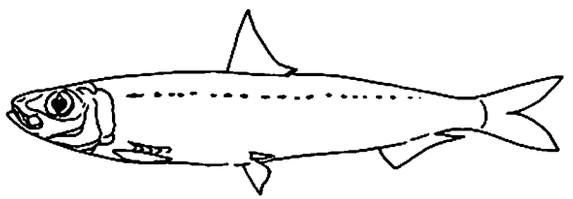
Area : South Sulu Sea
Year : 1983-1988



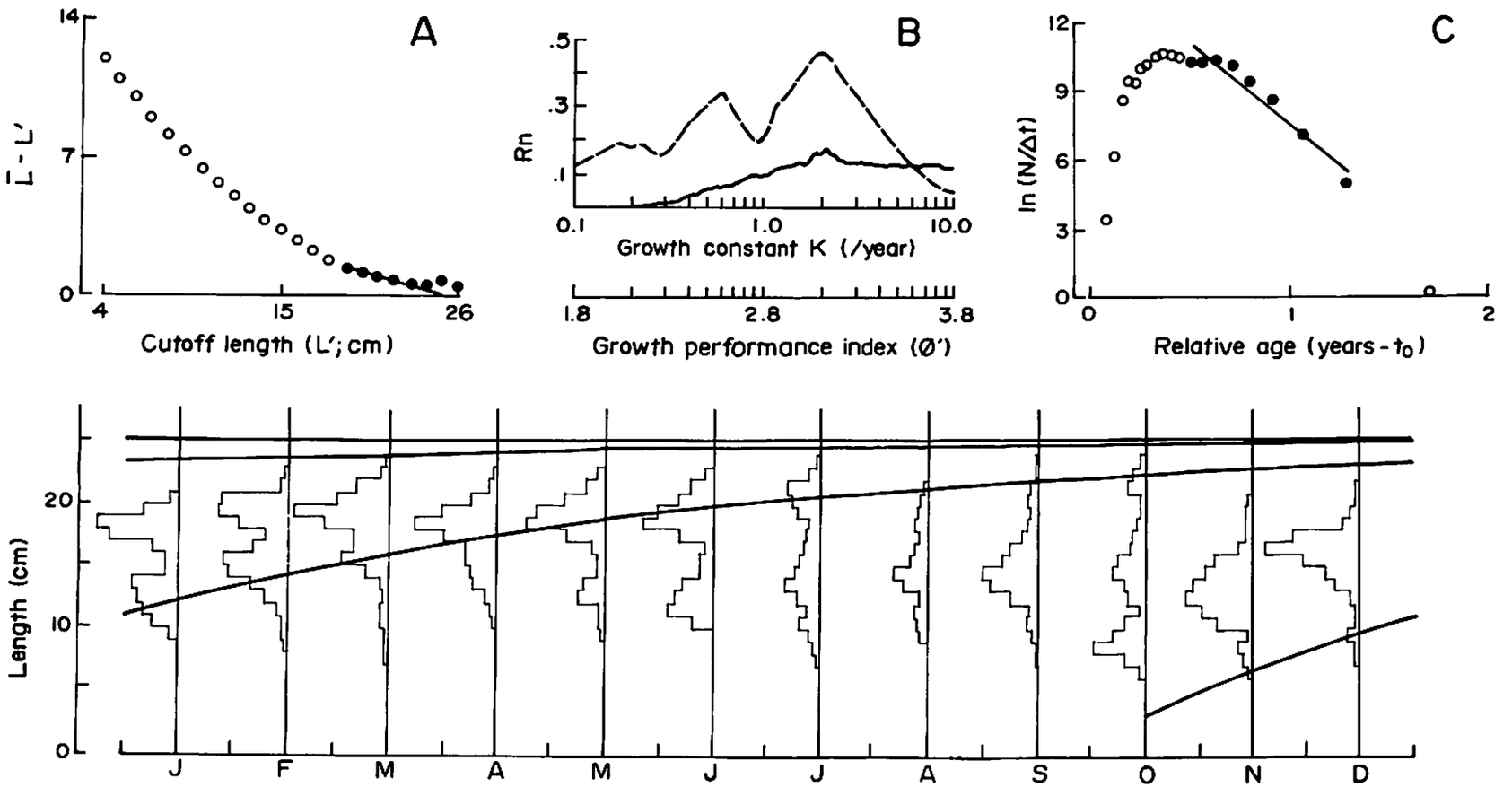
The time series of length frequencies does not exhibit clear modal progression to infer growth. The L_{max} result of 20.6 to 22.22 cm (at 95% confidence interval) indicates that sufficient data, in terms of the size ranges collected, is available allowing the use of the Powell-Wetherall's Plot which estimates L_{∞} to be about 20.1 cm.

Plate 3.2.1

Family : Clupeidae
Species name : *Amblygaster sirm* (Walbaum 1792)



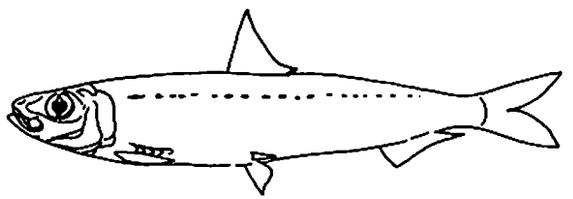
Area : South Sulu Sea
Year : 1983-1988



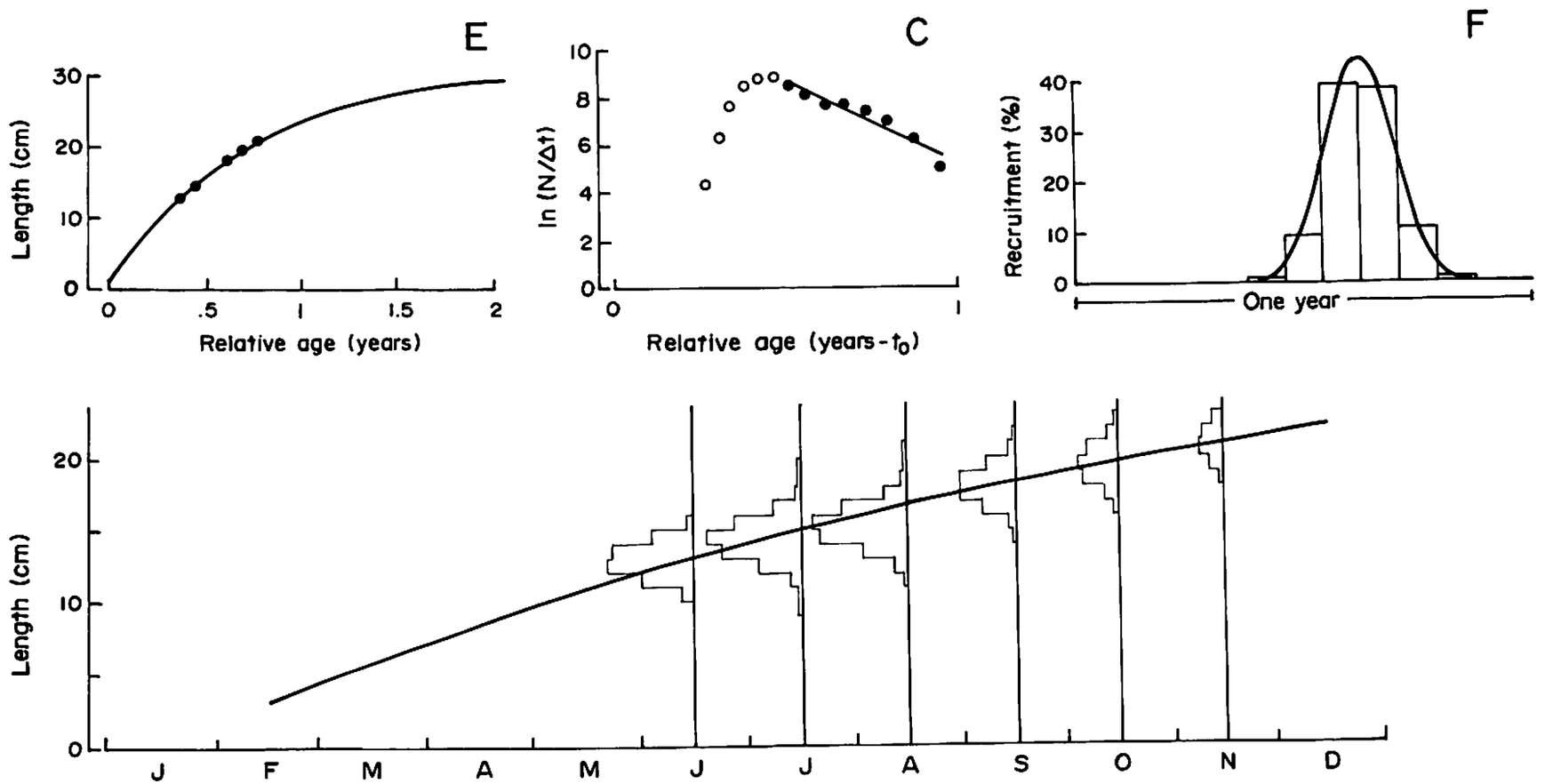
The Powell-Wetherall's Plot estimates the L_∞ to be about 25.2 cm. The results of the ELEFAN I K-scan analysis barely identified the K constant. However, the Shepherd's method K-scan routines confirm the K to be about 2.1 year^{-1}. The total mortality (Z) using the estimated parameters was estimated to be about 7 year^{-1} using the length-converted catch curve. The recruitment pattern analysis indicates only one pulse per year (plot not shown).

Plate 3.2.2

Family : Clupeidae
Species name : *Amblygaster sirm* (Walbaum 1792)



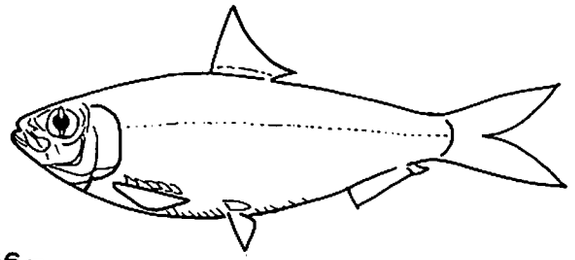
Area : Camotes Sea
Year : 1987



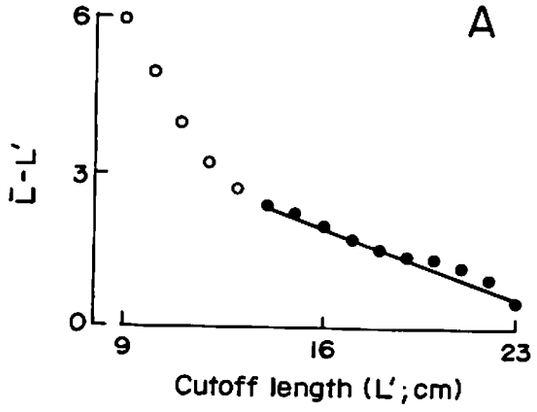
The clear progression of modes exhibited by the length frequencies allows the use of the Modal Progression Analysis (MPA) technique to identify the growth parameters. Non-linear fit of relative age data derived from the MPA procedure defines the L_∞ to be about 31 cm and the K to be about 1.35 year^{-1}. The total mortality was computed to be about 6.9 year^{-1} using the length-converted catch curve.

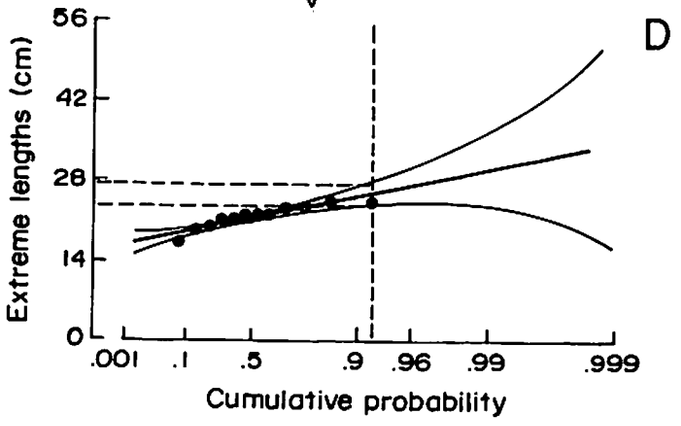
Plate 3.3.1

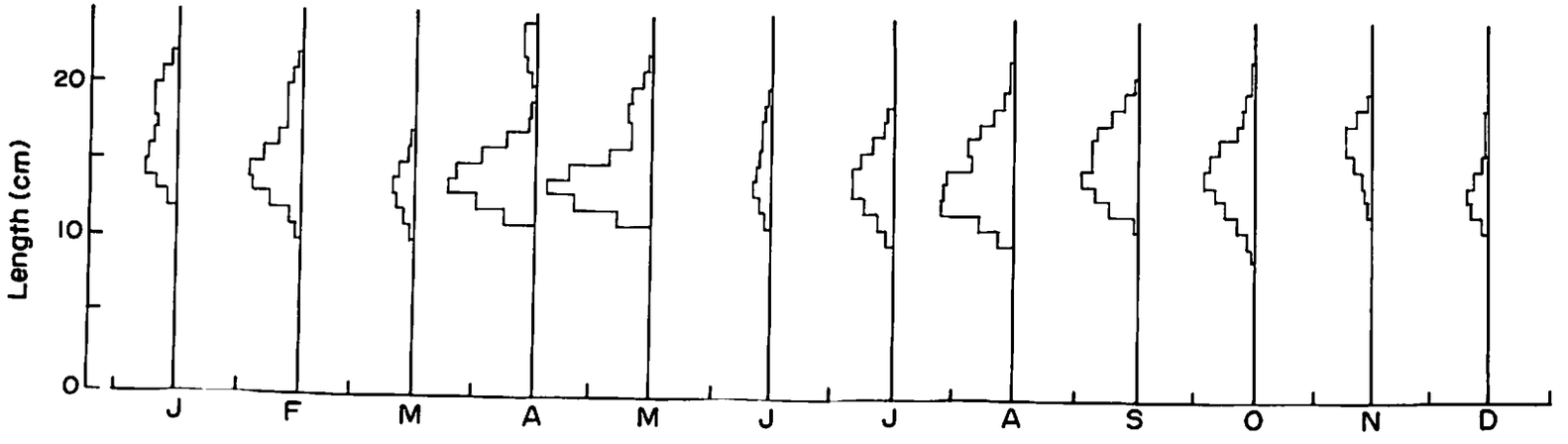
Family : Clupeidae
Species name : *Sardinella albella* (Valenciennes 1847)



Area : Visayan Sea
Year : 1983-1986



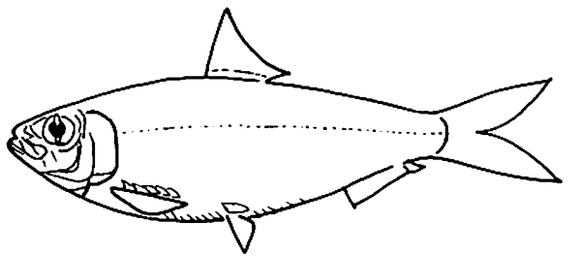




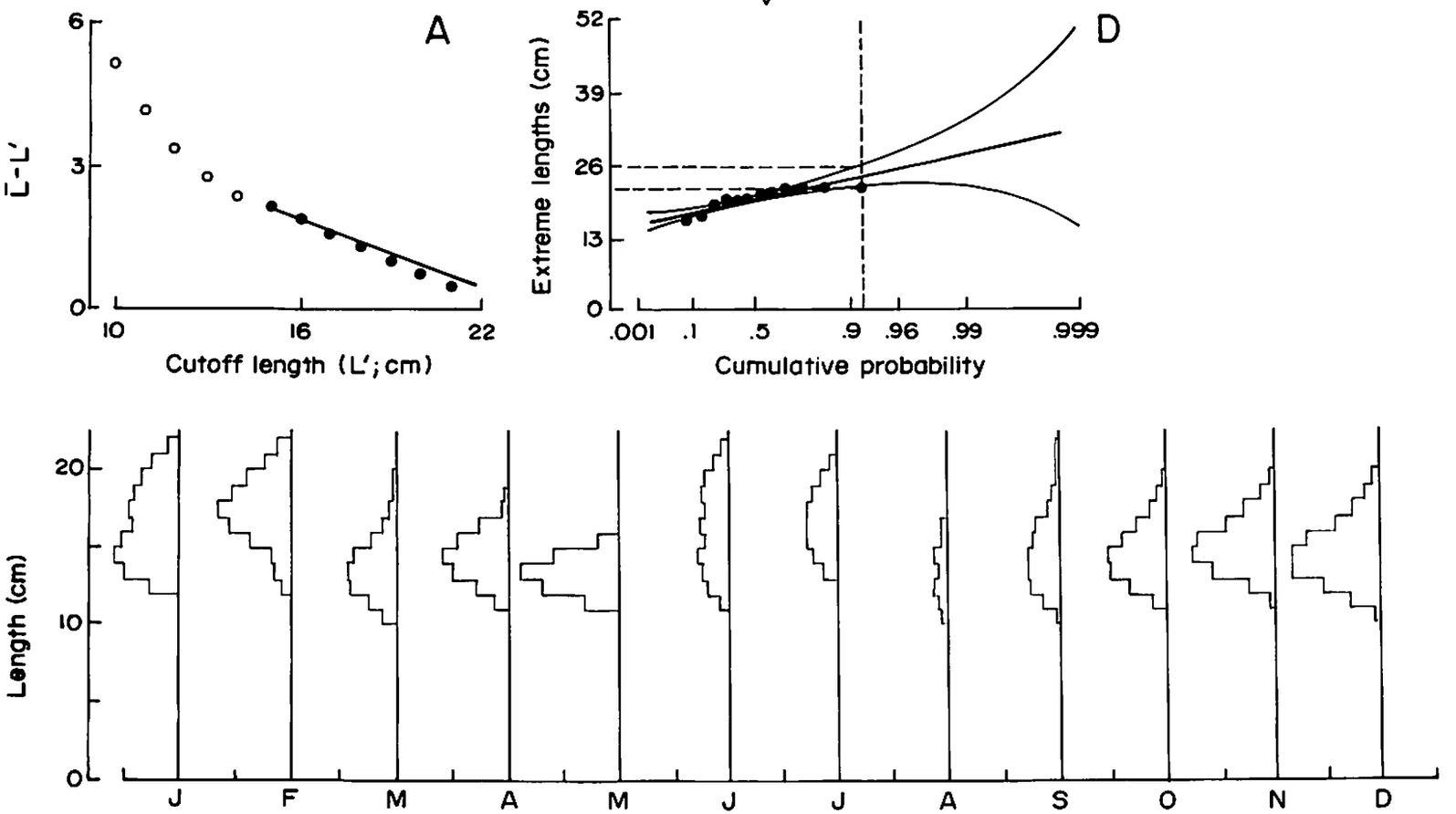
The time series of length frequencies does not exhibit clear modal progression to infer growth. The L_{max} result of 23.39 to 27.41 cm (at 95% confidence interval) indicates that sufficient data, in terms of the size ranges collected, is available allowing the use of the Powell-Wetherall's Plot which estimates L_{∞} to be about 26.4 cm.

Plate 3.3.2

Family : Clupeidae
Species name : *Sardinella albella* (Valenciennes 1847)



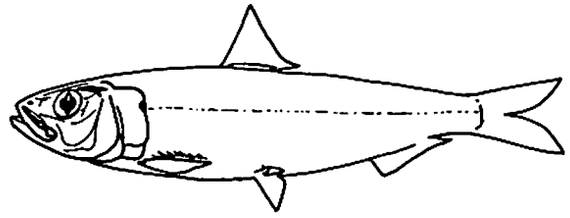
Area : Guimaras Strait/Samar Sea
Year : 1983-1986



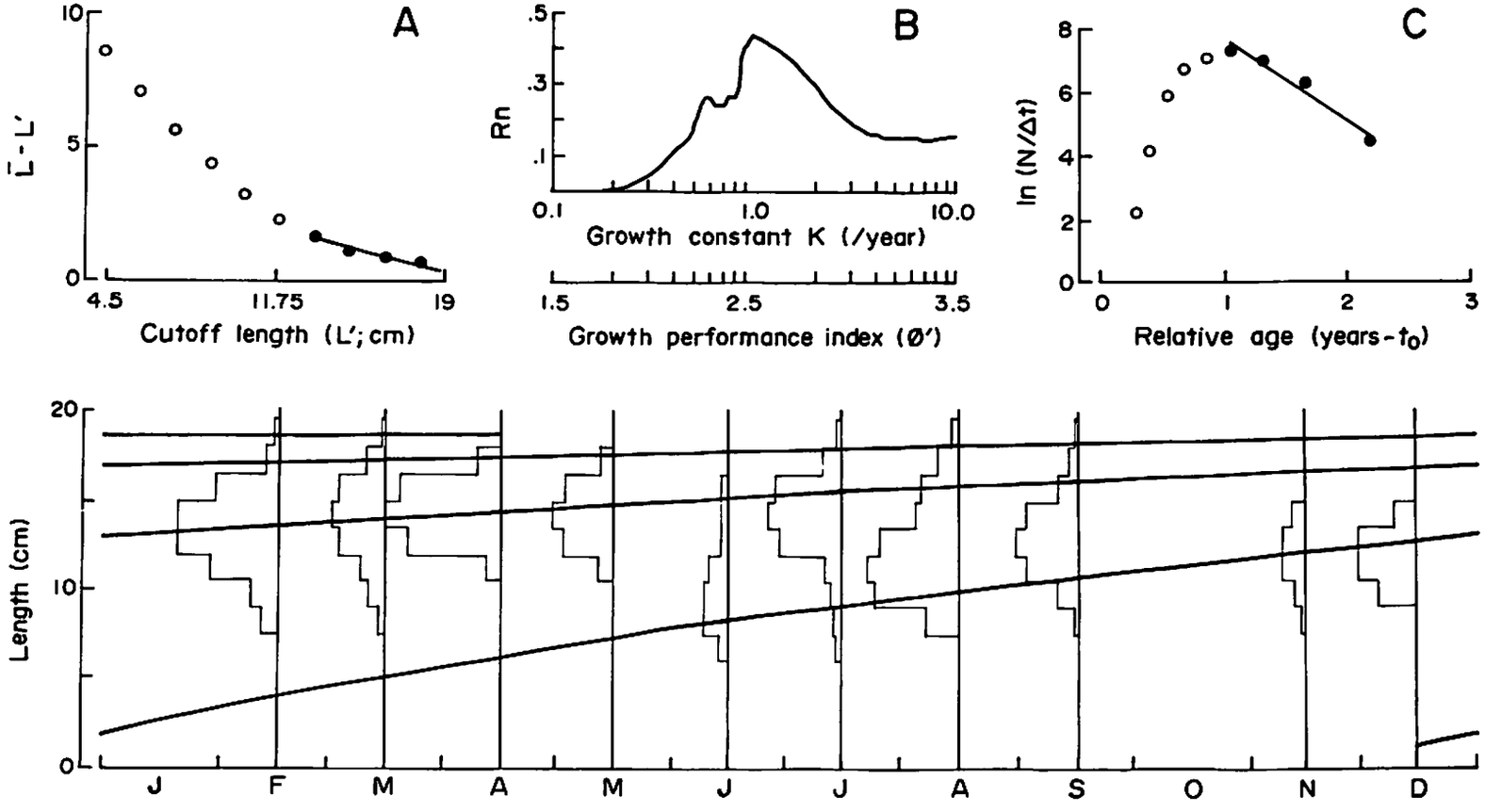
The time series of length frequencies does not exhibit clear modal progression to infer growth. The L_{max} result of 21.99 to 25.87 cm (at 95% confidence interval) indicates that sufficient data, in terms of the size ranges collected, is available allowing the use of the Powell-Wetherall's Plot which estimates L_{∞} to be about 23 cm.

Plate 3.4.1

Family : Clupeidae
Species name : *Sardinella longiceps* (Valenciennes 1847)



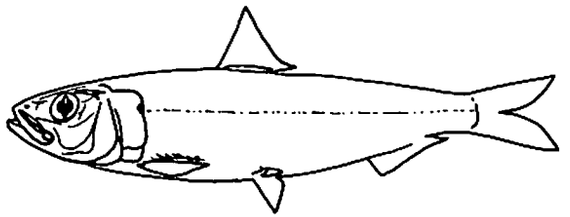
Area : South Sulu Sea
Year : 1987



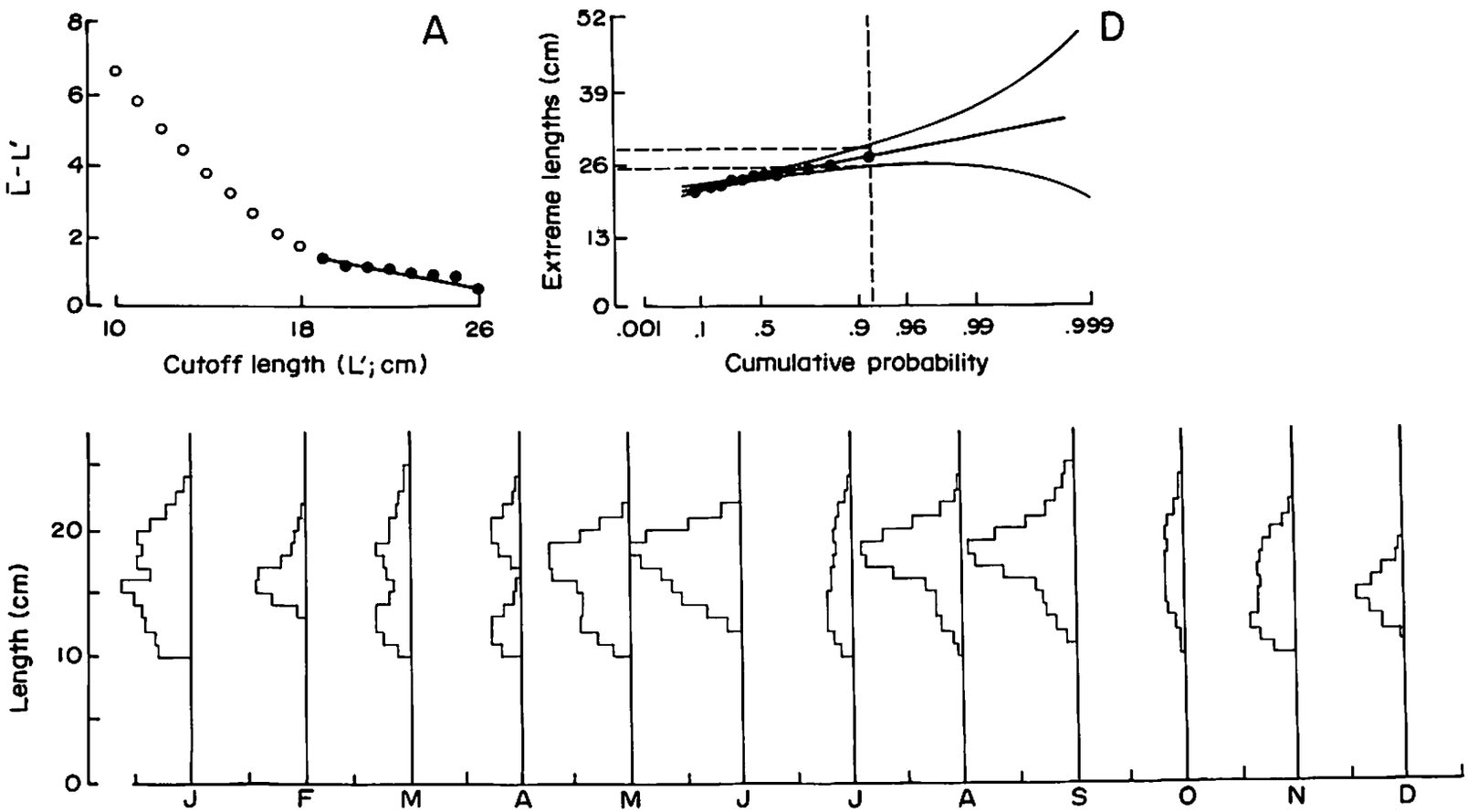
The Powell-Wetherall's Plot estimates the L_∞ to be about 19.4 cm. The results of the ELEFAN I K-scan routines clearly identify K to be about 1 year^{-1}. The results of the Shepherd's approach also confirm the findings (plot not shown here). The total mortality (Z) was estimated to be about 2.5 year^{-1} using the length-converted catch curve.

Plate 3.4.2

Family : Clupeidae
Species name : *Sardinella longiceps* (Valenciennes 1847)



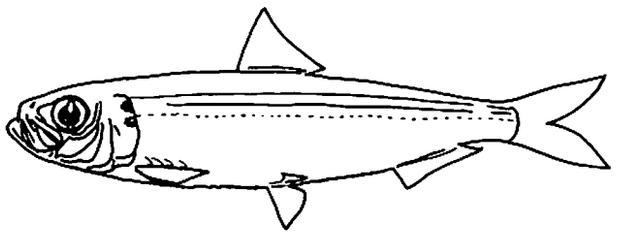
Area : Visayan Sea
Year : 1983-1987



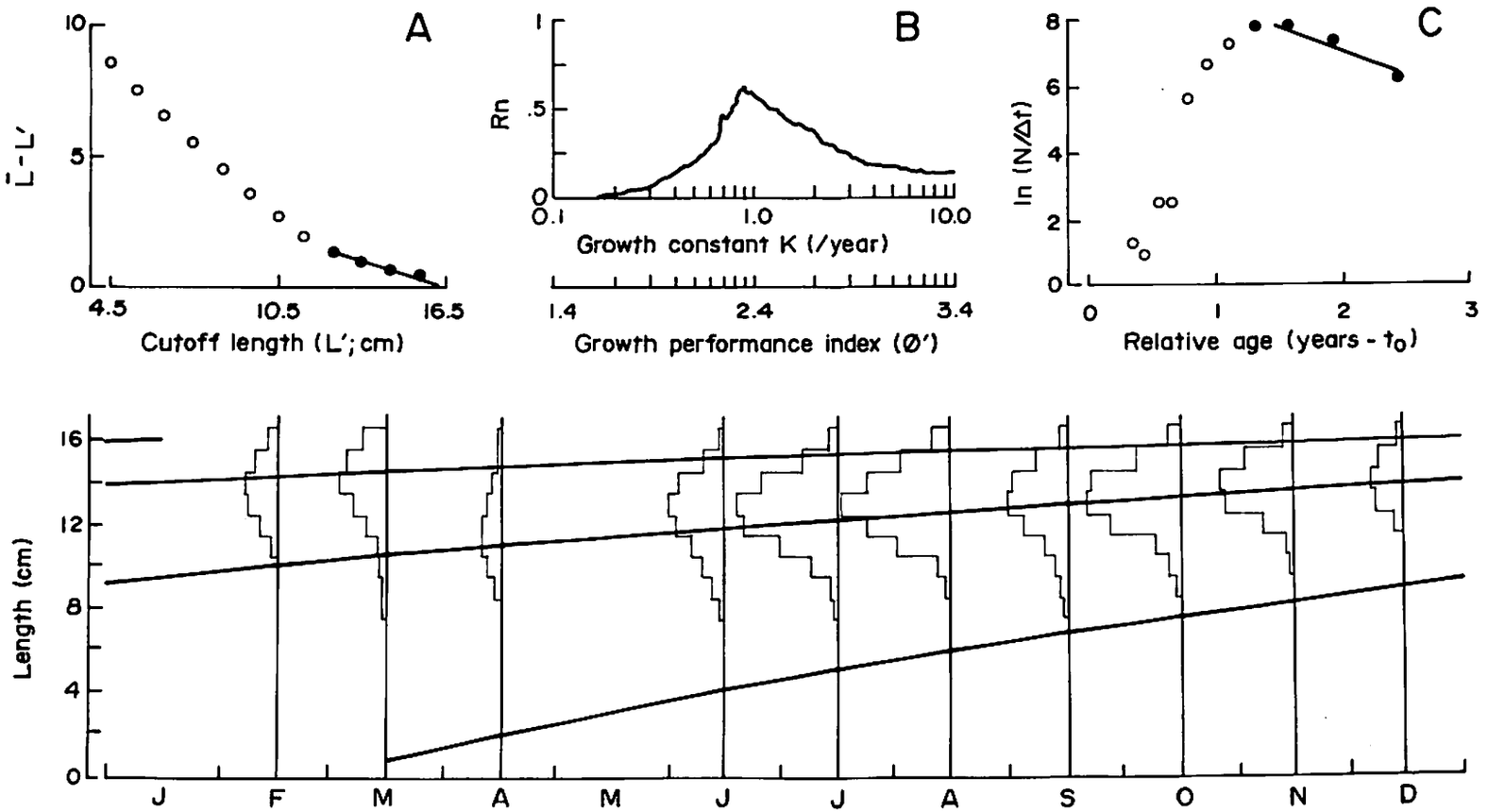
The time series of length frequencies does not exhibit clear modal progression to infer growth. The L_{max} result of 25.43 to 28.84 cm (at 95% confidence interval) indicates that sufficient data, in terms of the size ranges collected, is available allowing the use of the Powell-Wetherall's Plot which estimates L_{∞} to be about 30.4 cm.

Plate 3.5.1

Family : Clupeidae
Species name : *Herklotsichthys quadrimaculatus* (Rüppell 1837)



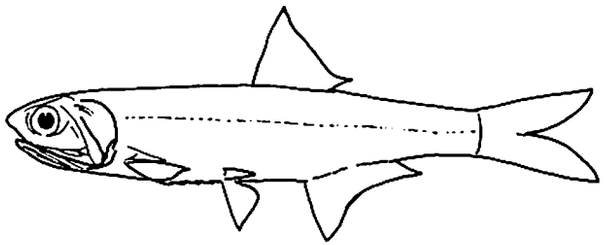
Area : Camotes Sea
Year : 1987



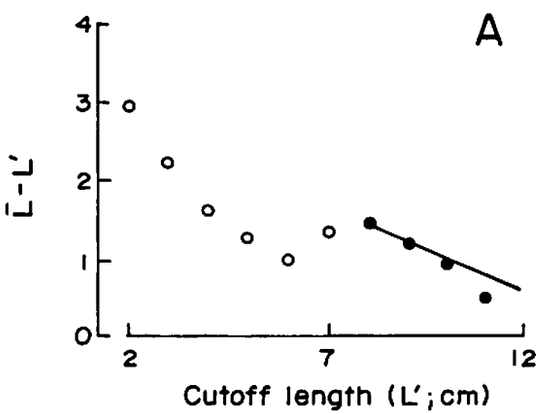
The Powell-Wetherall's Plot estimates the L_∞ to be about 16.5 cm. The results of the ELEFAN I K-scan routines clearly identify K to be about 0.98 year^{-1}. The results of the Shepherd's approach also confirm the findings (plot not shown here). The total mortality (Z) was estimated to be about 1.38 year^{-1} using the length-converted catch curve.

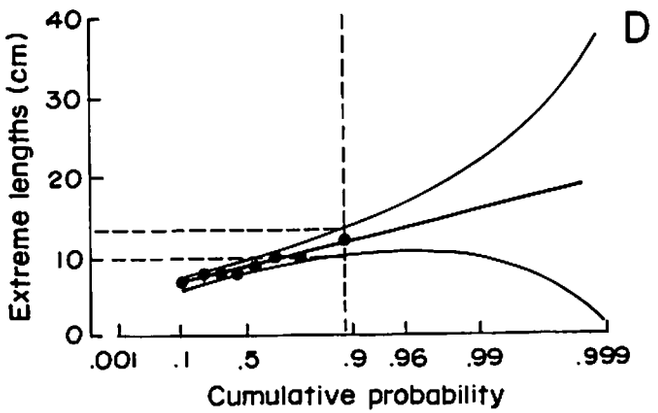
Plate 4.1.1

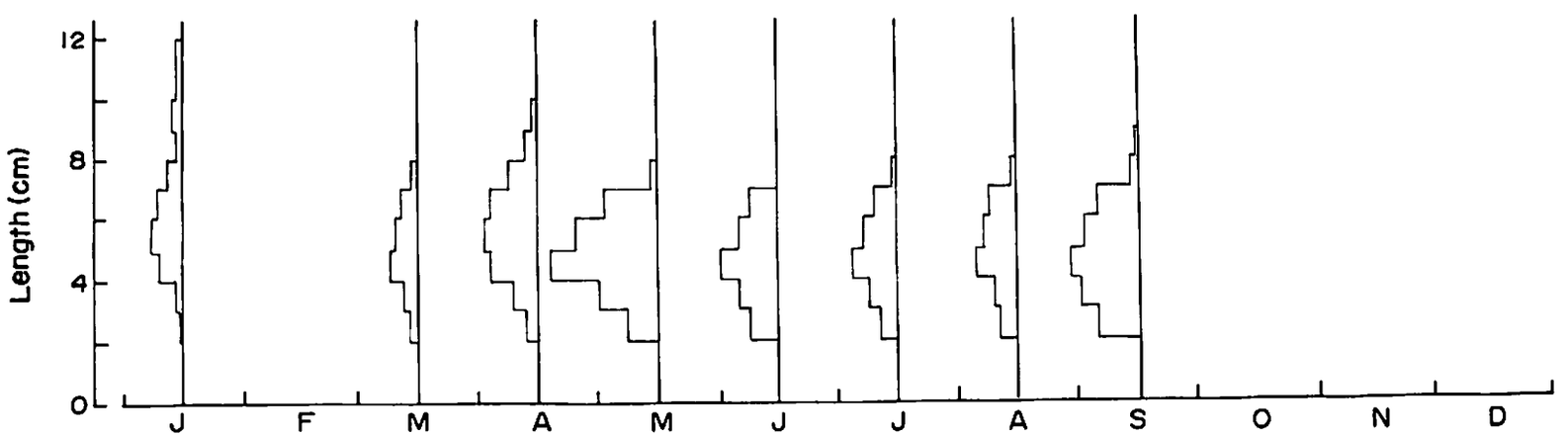
Family : Engraulidae
Species name : *Stolephorus commersonii* (Lacepede 1803)



Area : Illana Bay
Year : 1983



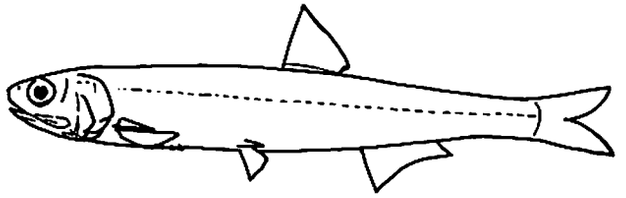




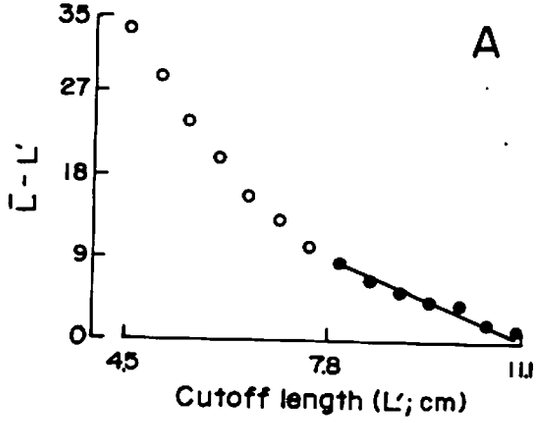
The time series of length frequencies does not exhibit clear modal progression to infer growth. The L_{max} result of 9.88 to 13.2 cm (at 95% confidence interval) indicates that sufficient data, in terms of the size ranges collected, is available allowing the use of the Powell-Wetherall's Plot which estimates L_{∞} to be about 13.3 cm.

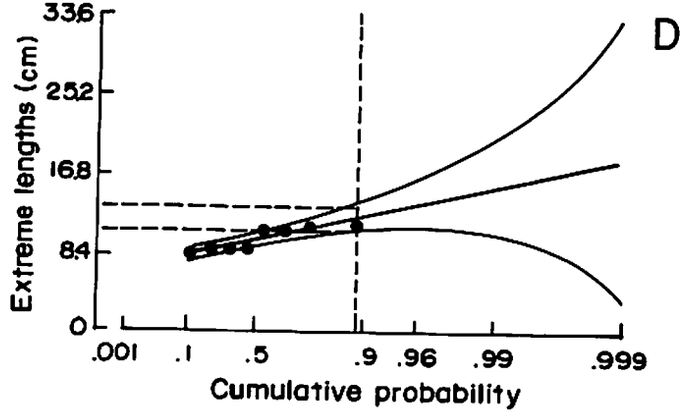
Plate 4.2.1

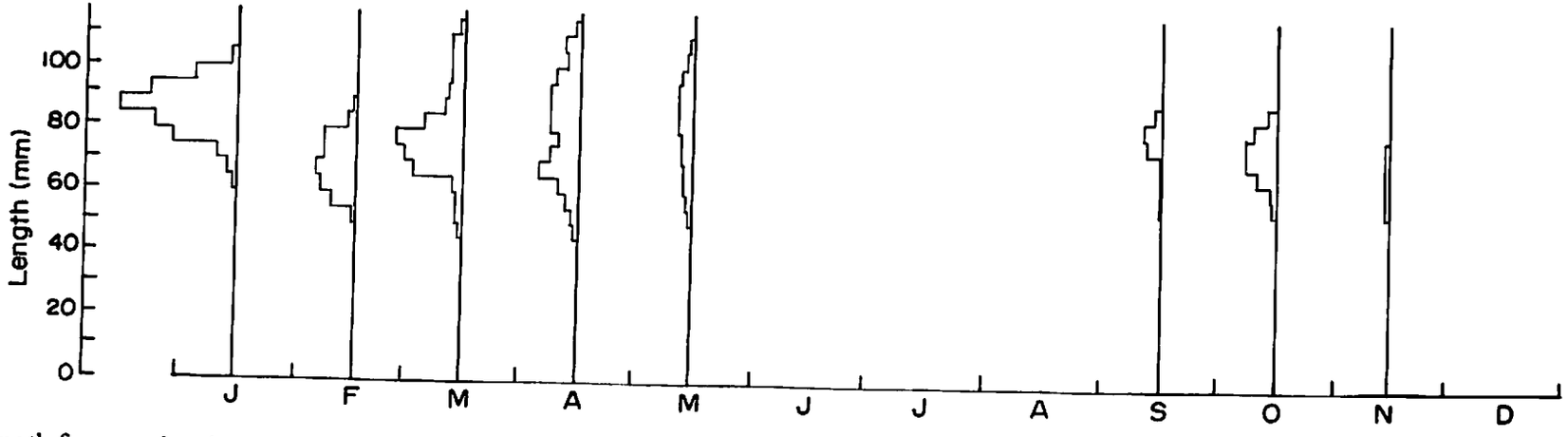
Family : Engraulidae
Species name : *Stolephorus punctifer* (Fowler 1938)



Area : Tayabas Bay
Year : 1987



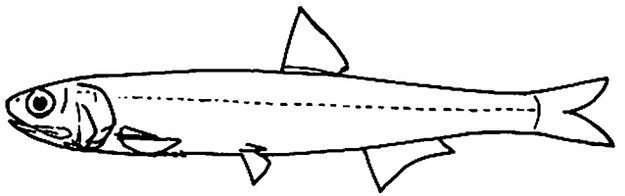




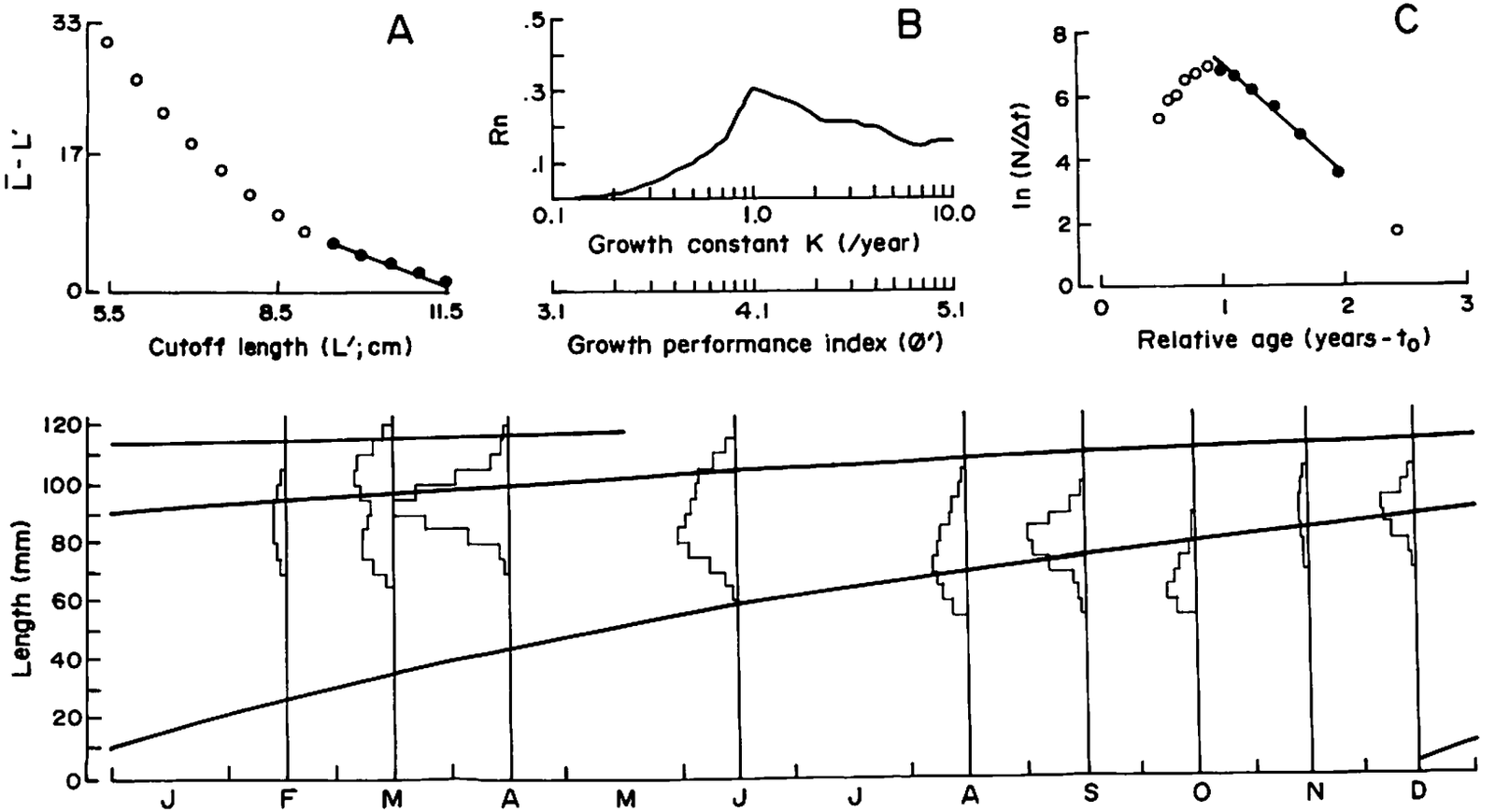
The time series of length frequencies does not exhibit clear modal progression to infer growth. The L_{max} result of 10.8 to 13.4 cm (at 95% confidence interval) indicates that sufficient data, in terms of the size ranges collected, is available allowing the use of the Powell-Wetherall's Plot which estimates L_{∞} to be about 11.6 cm.

Plate 4.2.2

Family : Engraulidae
Species name : *Stolephorus punctifer* (Fowler 1938)



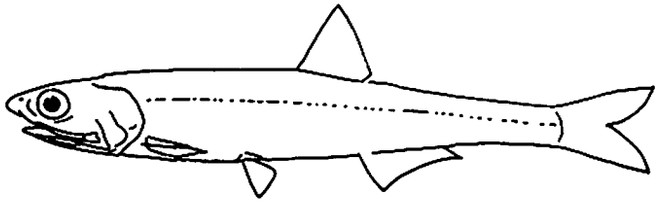
Area : South Sulu Sea
Year : 1987



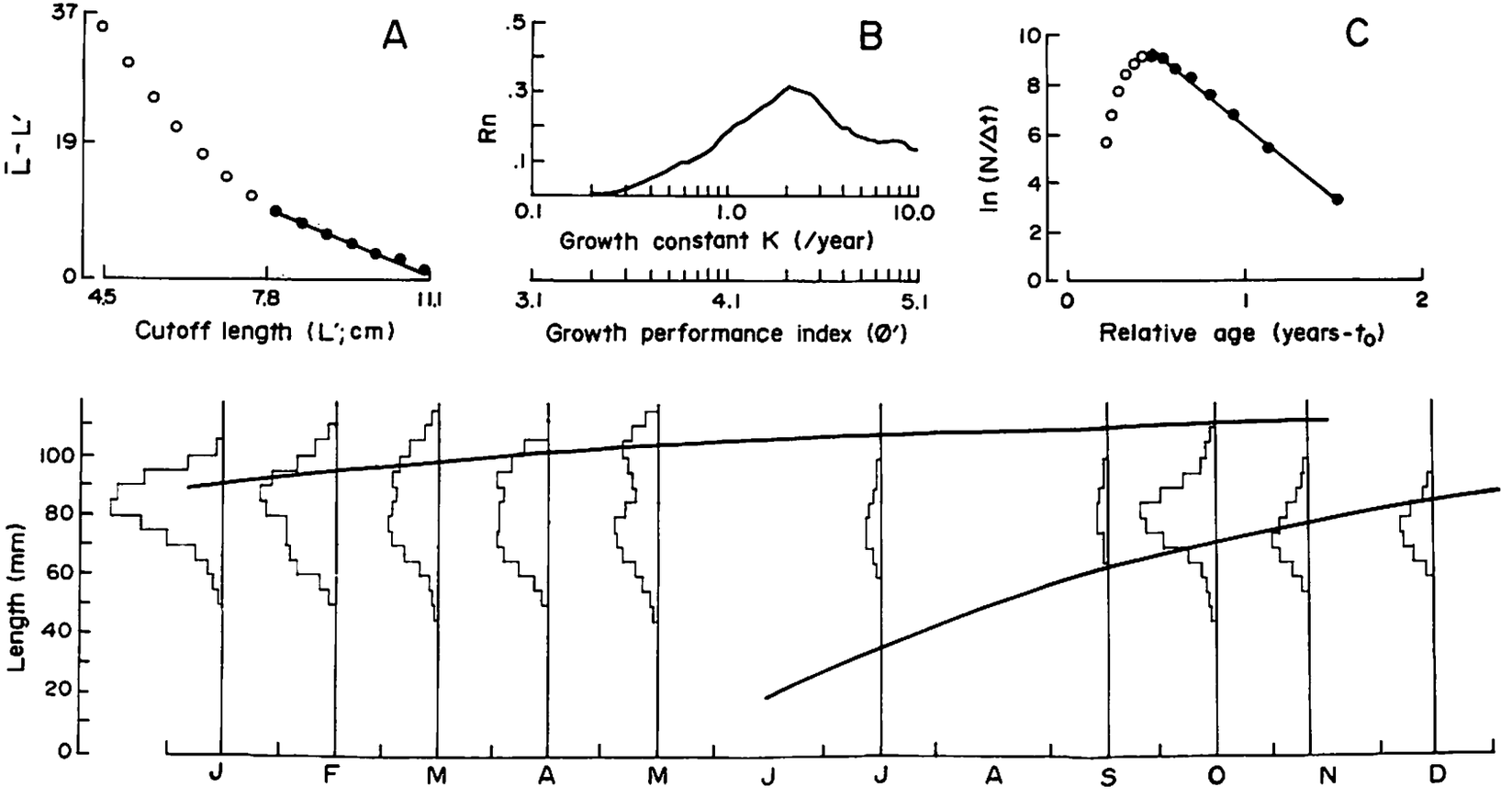
The Powell-Wetherall's Plot estimates the L_∞ to be about 12.4 cm. The results of the ELEFAN I K-scan routines clearly identify K to be about 1.2 year^{-1}. The results of the Shepherd's approach also confirm the findings (plot not shown here). The total mortality (Z) was estimated to be about 3.5 year^{-1} using the length-converted catch curve.

Plate 4.3.1

Family : Engraulidae
Species name : *Stolephorus heterolobus* (Rüppell 1837)



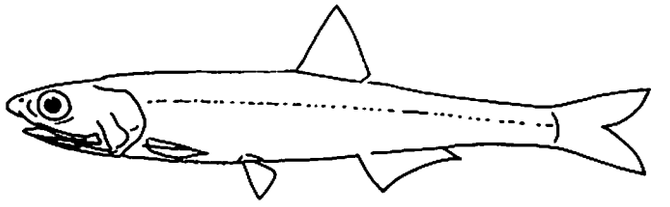
Area : Tayabas Bay
Year : 1987



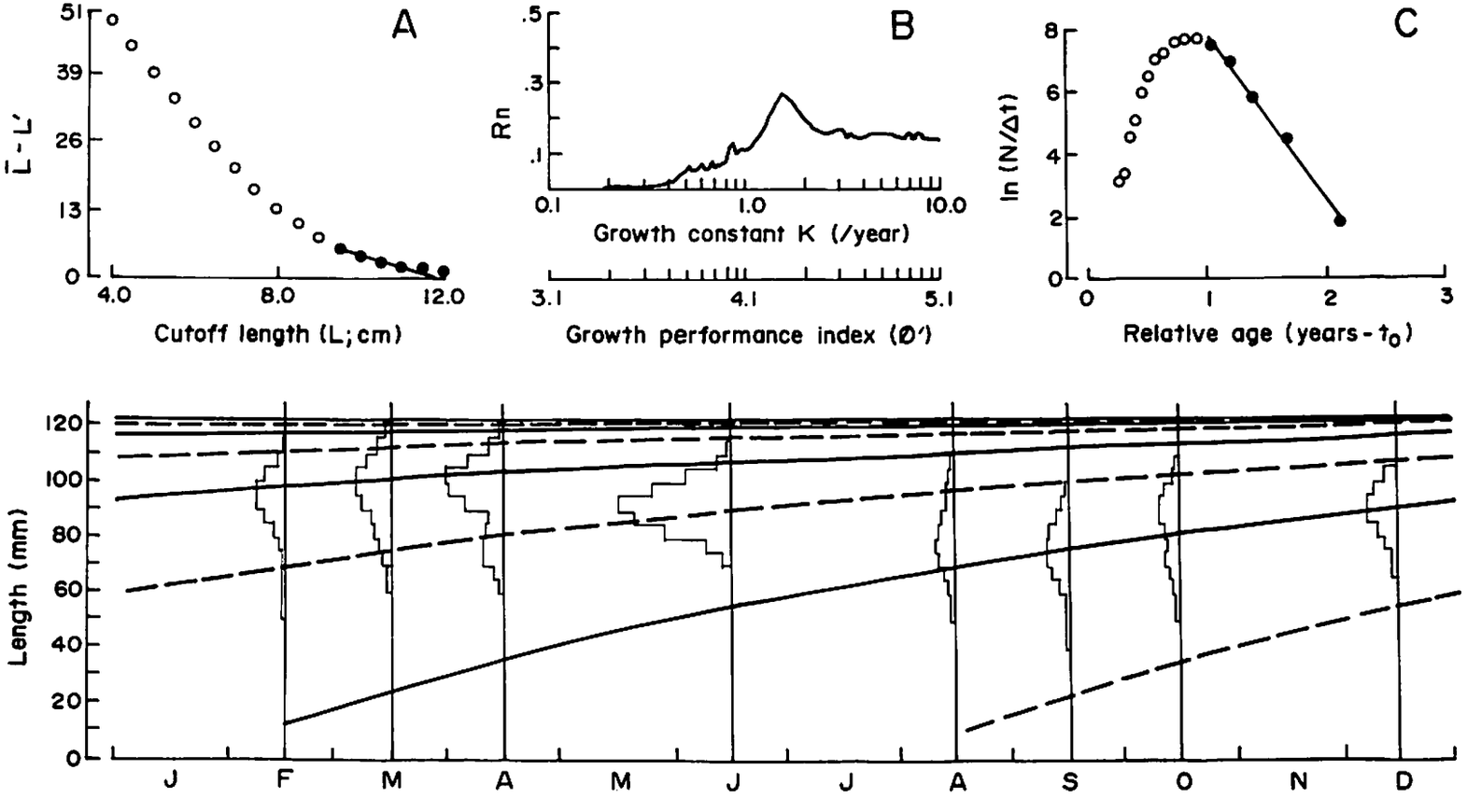
The Powell-Wetherall's Plot estimates the L_∞ to be about 11.6 cm. The results of the ELEFAN I K-scan routines clearly identify K to be about 2.3 year^{-1}. The results of the Shepherd's approach also confirm the findings (plot not shown here). The total mortality (Z) was estimated to be about 5.8 year^{-1} using the length-converted catch curve. The recruitment pattern analysis (plot not shown) also reveals two pulses per year.

Plate 4.3.2

Family : Engraulidae
Species name : *Stolephorus heterolobus* (Rüppell 1837)



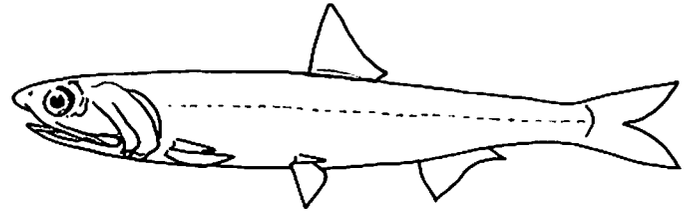
Area : South Sulu Sea
Year : 1987



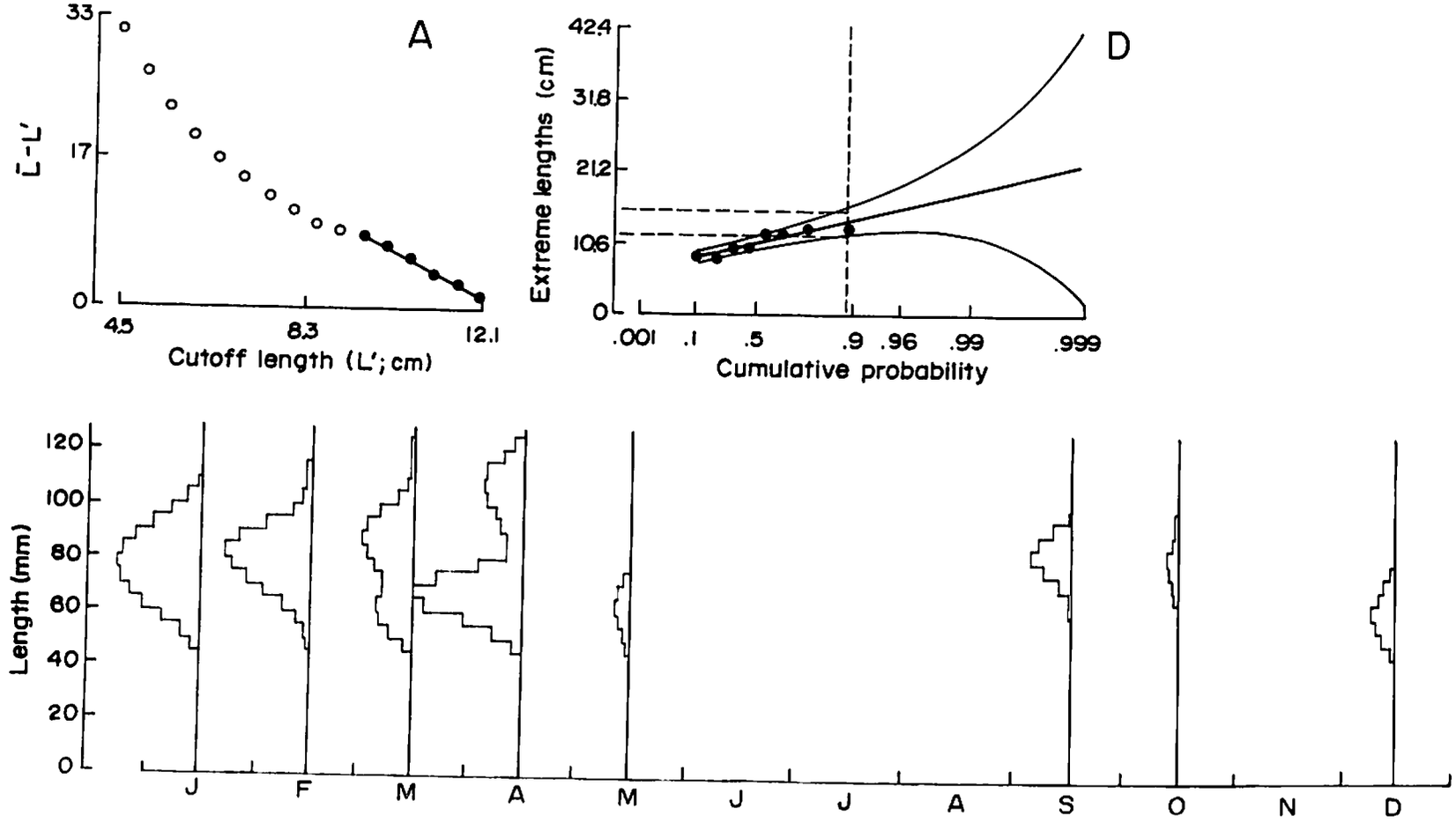
The Powell-Wetherall's Plot estimates the L_∞ to be about 12.3 cm. The results of the ELEFAN I K-scan routines clearly identify K to be about 1.5 year^{-1}. The results of the Shepherd's approach also confirm the findings (plot not shown here). The total mortality (Z) was estimated to be about 5.3 year^{-1} using the length-converted catch curve. The recruitment pattern analysis (plot not shown) also reveals two pulses per year.

Plate 4.4.1

Family : Engraulidae
Species name : *Engraulis japonicus* (Temminck & Schlegel 1846)



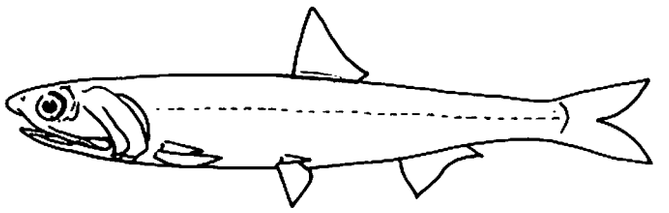
Area : Tayabas Bay
Year : 1987



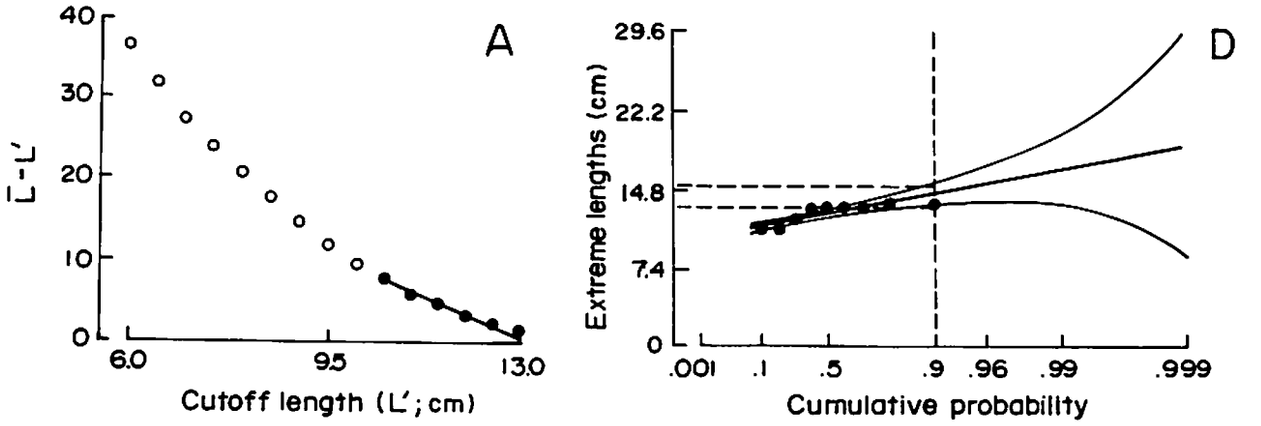
The time series of length frequencies does not exhibit clear modal progression to infer growth. The L_{max} result of 11.7 to 15.2 cm (at 95% confidence interval) indicates that sufficient data, in terms of the size ranges collected, is available allowing the use of the Powell-Wetherall's Plot which estimates L_{∞} to be about 12.9 cm.

Plate 4.4.2

Family : Engraulidae
Species name : *Engraulis japonicus* (Temminck & Schlegel 1846)



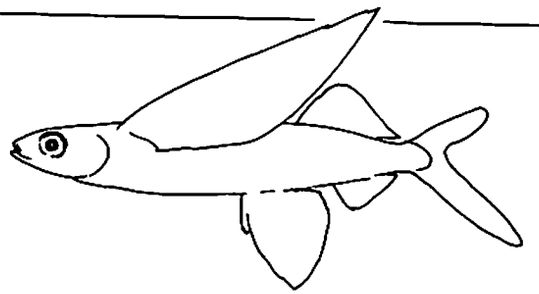
Area : South Sulu Sea
Year : 1987



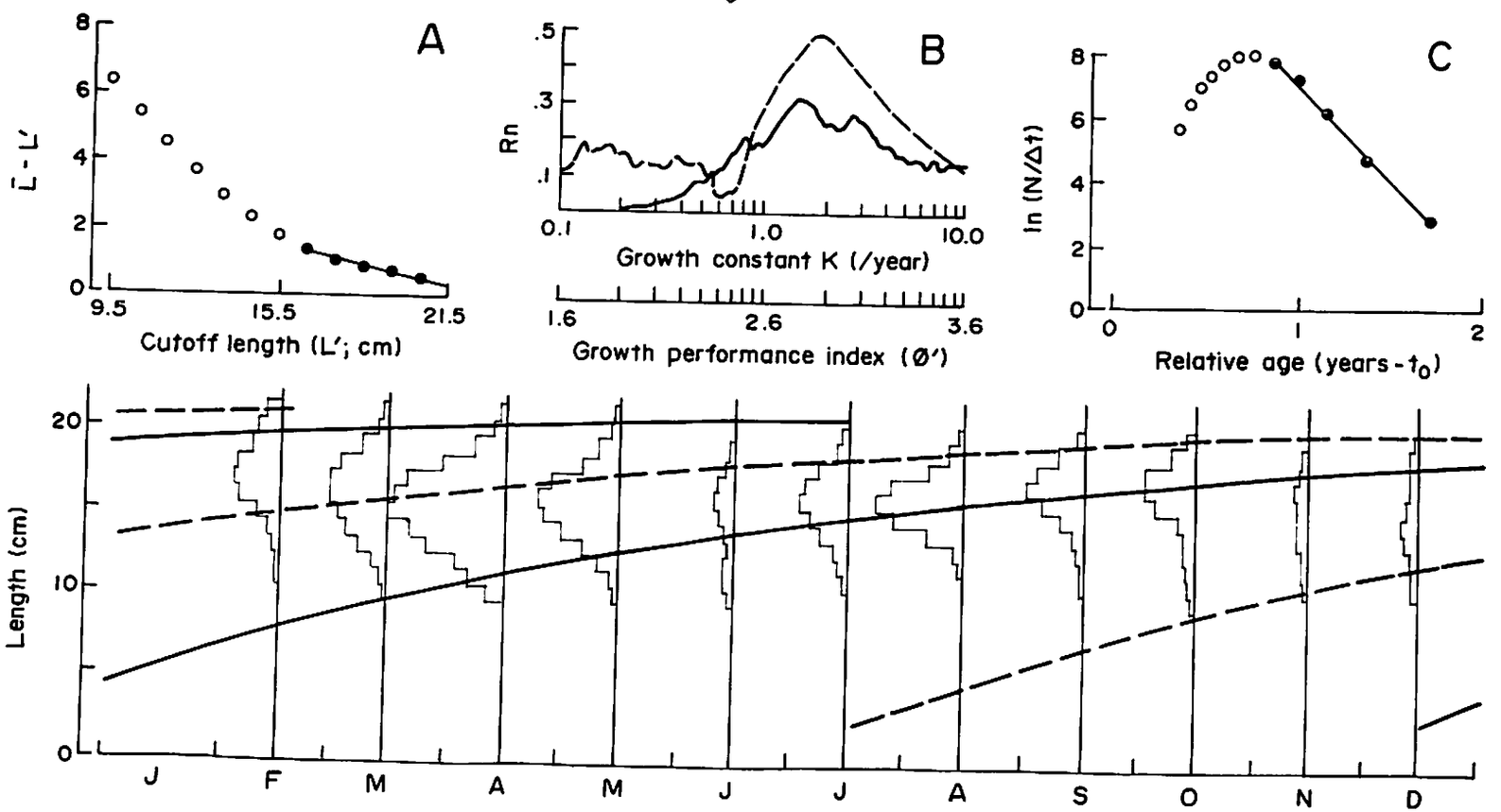
There is insufficient length-frequency data to infer growth. However, the L_{max} estimate of 13.2 to 15.2 cm indicates that the range at which the data has been collected were well-covered and from the Powell-Wetherall's Plot, the L_{∞} was approximated to be about 13.4 cm.

Plate 5.1.1

Family : Exocoetidae
Species name : *Cheilopogon nigricans* (Bennet 1840)



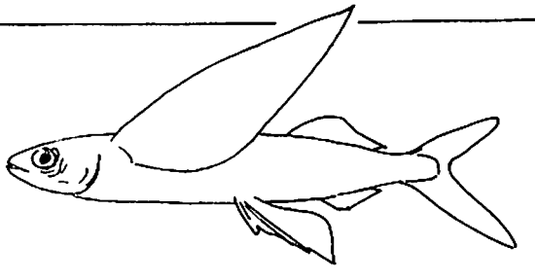
Area : Camotes Sea
Year : 1987



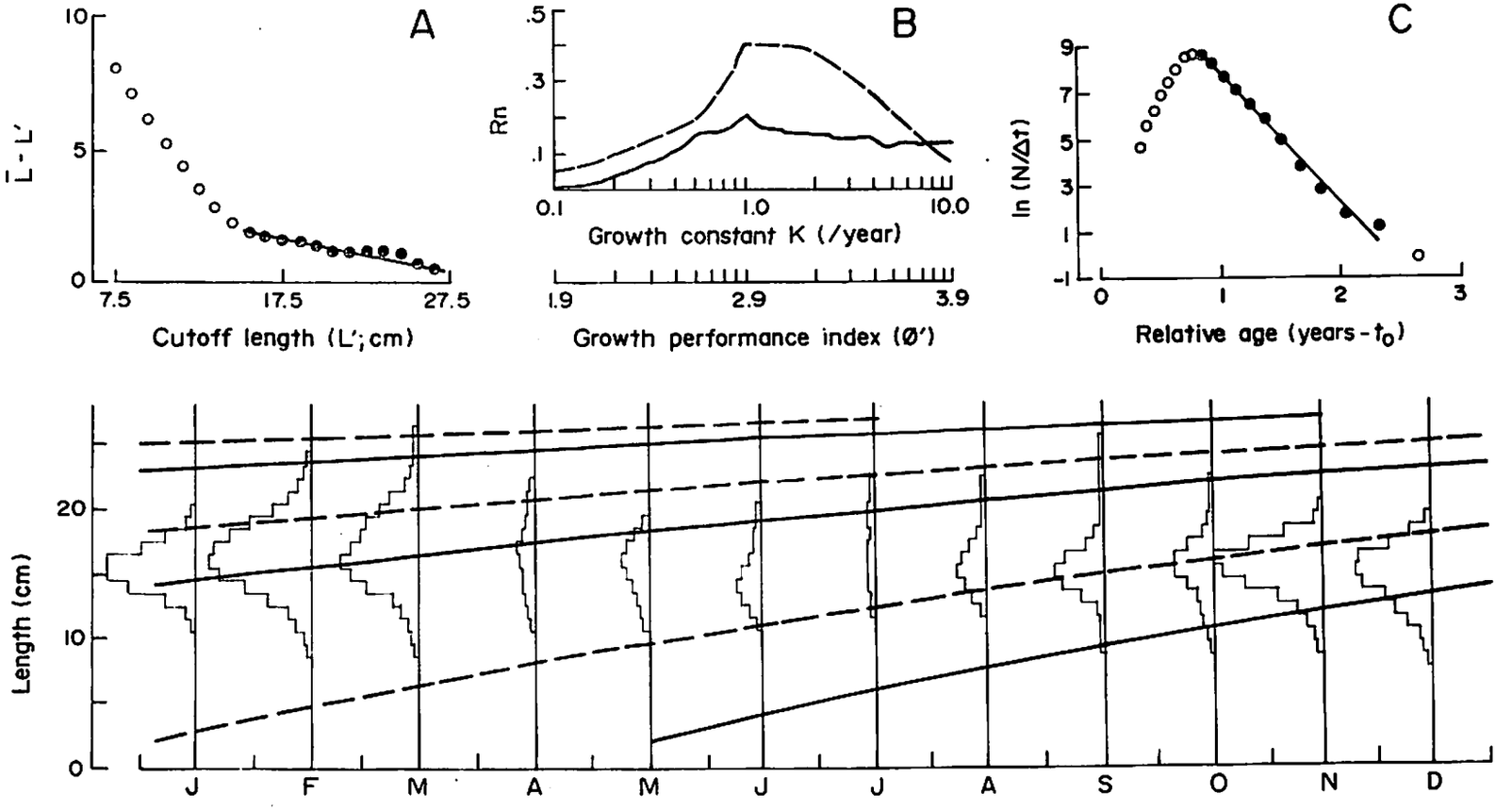
The Powell-Wetherall's Plot estimates the L_∞ to be about 22.2 cm. The results of both the ELEFAN I and Shepherd's method K-scan analysis identified the K constant to be about 1.7 year^{-1}. The total mortality (Z) was estimated to be about 6 year^{-1} using the length-converted catch curve. The recruitment pattern analysis (plot not shown) clearly exhibits two pulses per year.

Plate 5.2.1

Family : Exocoetidae
Species name : *Cheilopogon atrisignis* (Jenkins 1903)



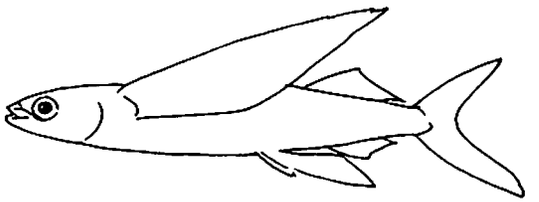
Area : Camotes Sea
Year : 1987



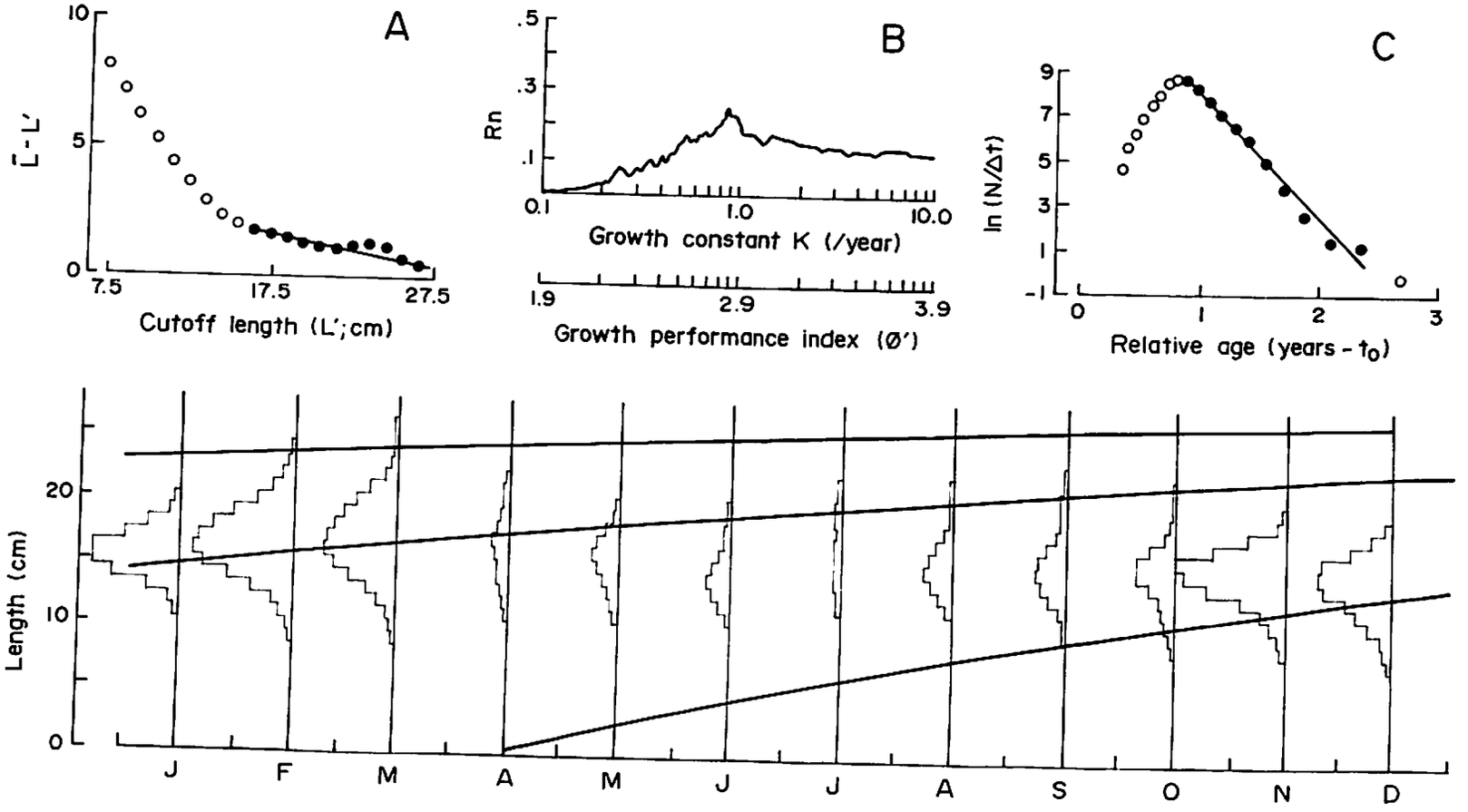
The Powell-Wetherall's Plot estimates the L_∞ to be about 30 cm. The results of the ELEFAN I K-scan analysis barely identified the K constant. However, the Shepherd's method K-scan routines confirm the K to be about 0.9 year^{-1}. The total mortality (Z) using the estimated parameters was estimated to be about 5.5 year^{-1} using the length-converted catch curve. The recruitment pattern analysis indicates only one pulse per year (plot not shown).

Plate 5.3.1

Family : Exocoetidae
Species name : *Cheilopogon cyanopterus* (Valenciennes 1847)



Area : Camotes Sea
Year : 1987

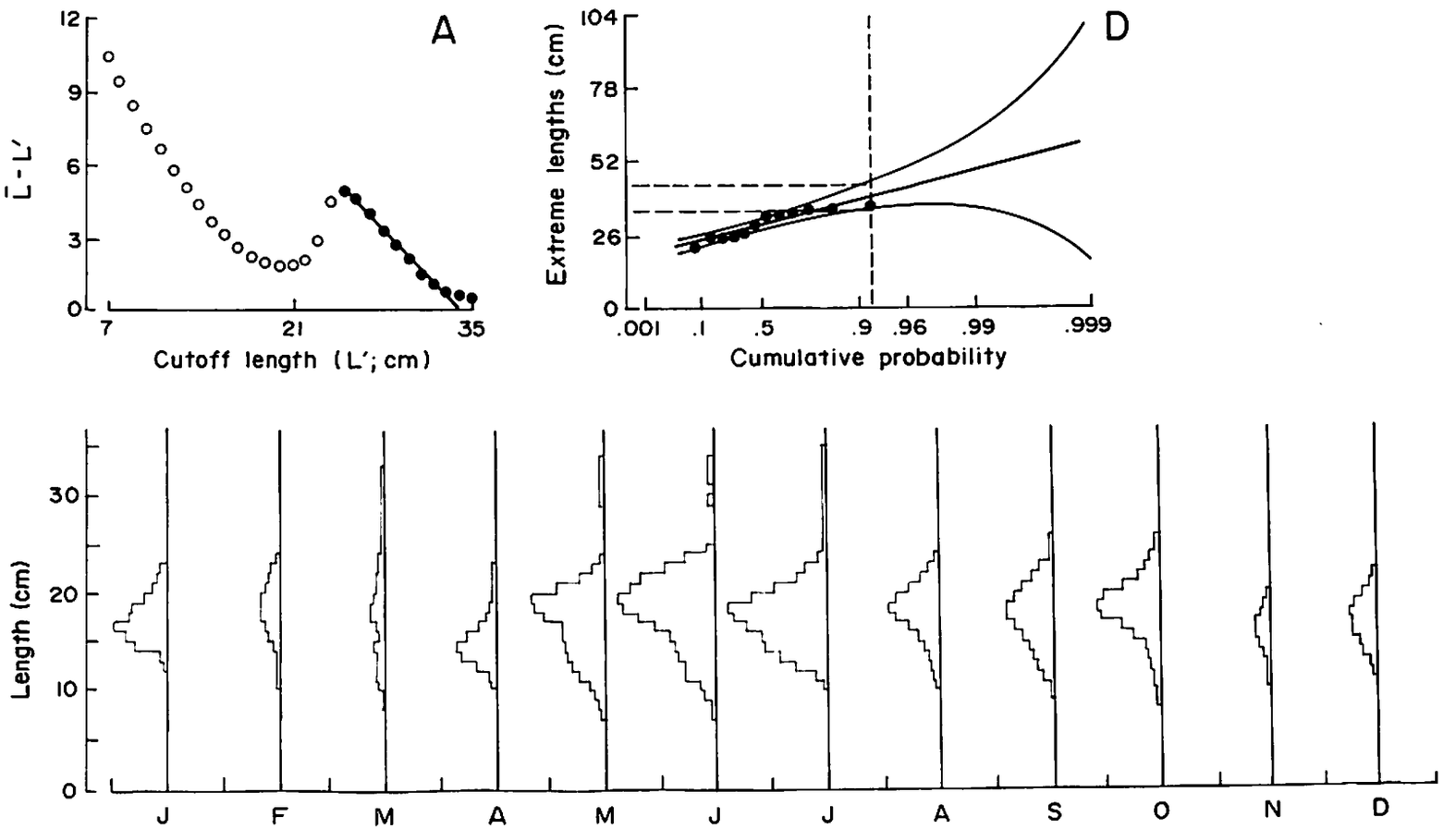


The Powell-Wetherall's Plot estimates the L_∞ to be about 30 cm. The results of the ELEFAN I K-scan routines clearly identify K to be about 0.9 year^{-1}. The results of the Shepherd's approach also confirm the findings (plot not shown here). The total mortality (Z) was estimated to be about 5.5 year^{-1} using the length-converted catch curve.

Plate 5.4.1

Family : Exocoetidae
Species name : *Cypselurus negripinnis* (Cuvier & Valenciennes)

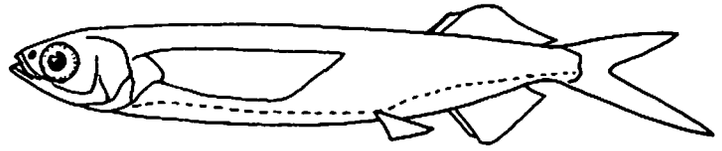
Area : Bohol Sea
Year : 1987-1988



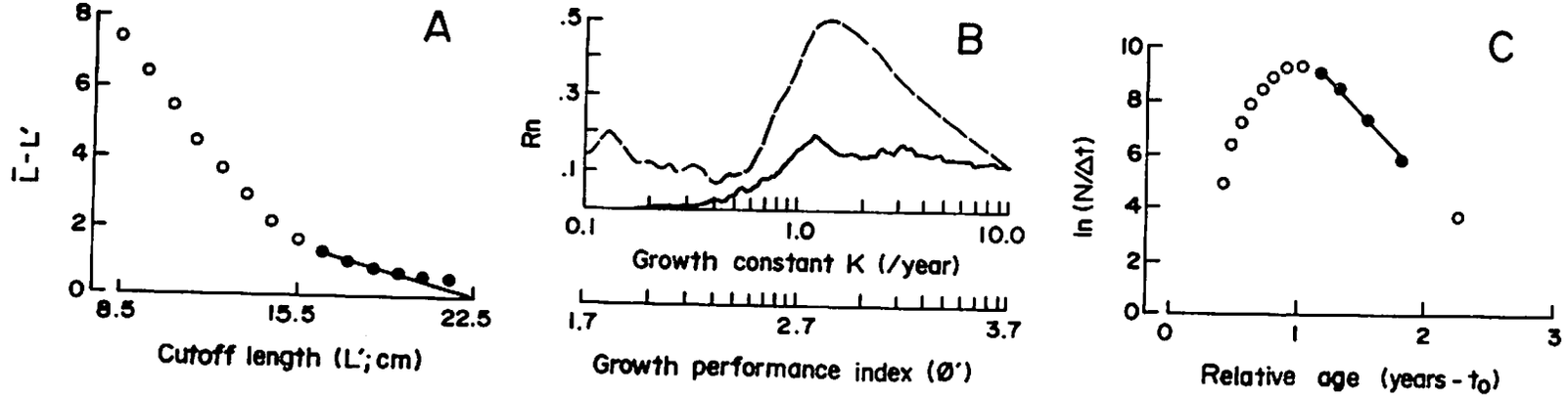
The Powell-Wetherall's Plot estimates the L_∞ to be about 34 cm. The time series of length frequencies does not exhibit clear modal progression to infer growth. The L_{max} result of 34.52 to 43.62 cm (at 95% confidence interval) indicates that sufficient data, in terms of the size ranges collected, is available allowing the use of the Powell-Wetherall's Plot which estimates L_∞ to be about 24 cm.

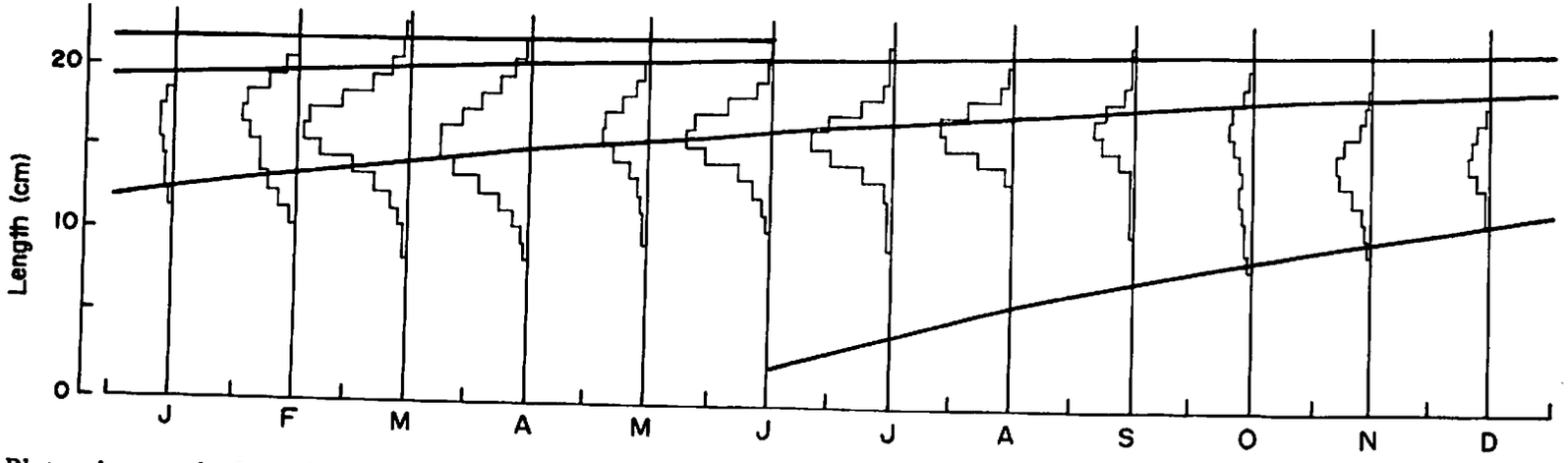
Plate 5.5.1

Family : Exocoetidae
Species name : *Oxyporhamphus convexus* (Weber & de Beaufort 1922)



Area : Camotes Sea
Year : 1984-1987

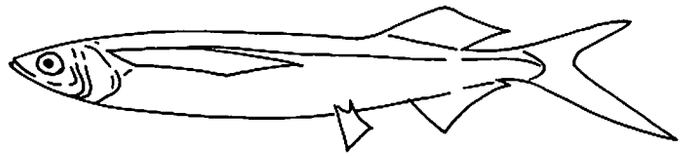




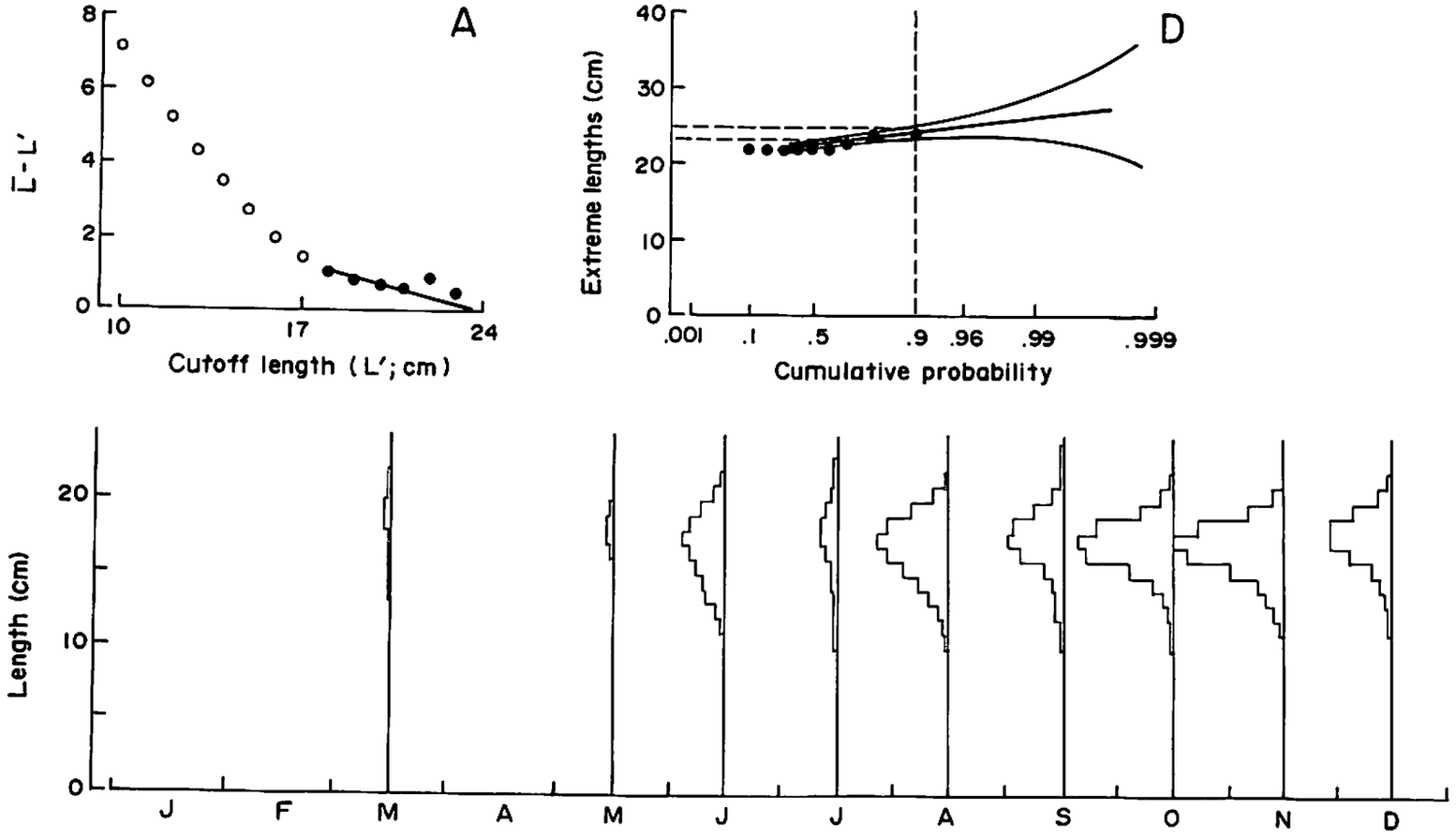
The Powell-Wetherall's Plot estimates the L_∞ to be about 22.5 cm. The results of the ELEFAN I K-scan analysis barely identified the K constant. However, the Shepherd's method K-scan routines confirm the K to be about 1.2 $year^{-1}$. The total mortality (Z) using the estimated parameters was estimated to be about 5 $year^{-1}$ using the length-converted catch curve.

Plate 5.5.2

Family : Exocoetidae
Species name : *Oxyporhamphus micropterus* (Valenciennes 1847)



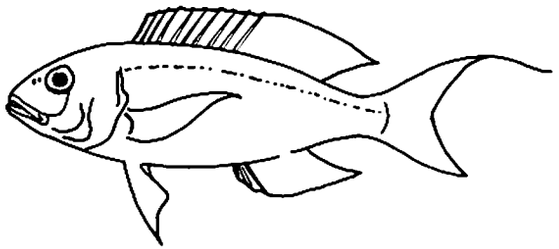
Area : Bohol Sea
Year : 1985 & 1987



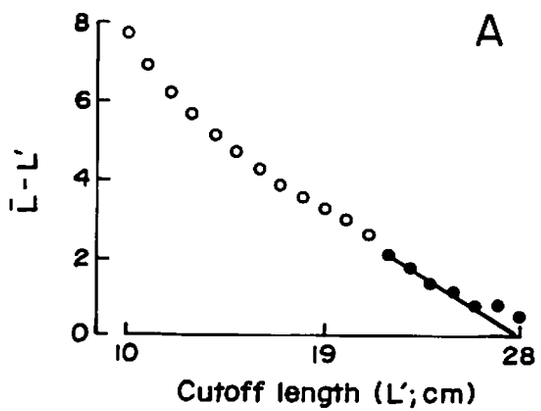
The time series of length frequencies does not exhibit clear modal progression to infer growth. The L_{max} result of 23.14 to 24.93 cm (at 95% confidence interval) indicates that sufficient data, in terms of the size ranges collected, is available allowing the use of the Powell-Wetherall's Plot which estimates L_{∞} to be about 24 cm.

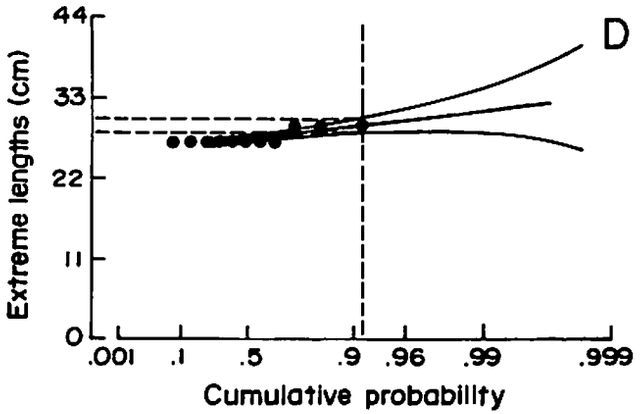
Plate 6.1.1

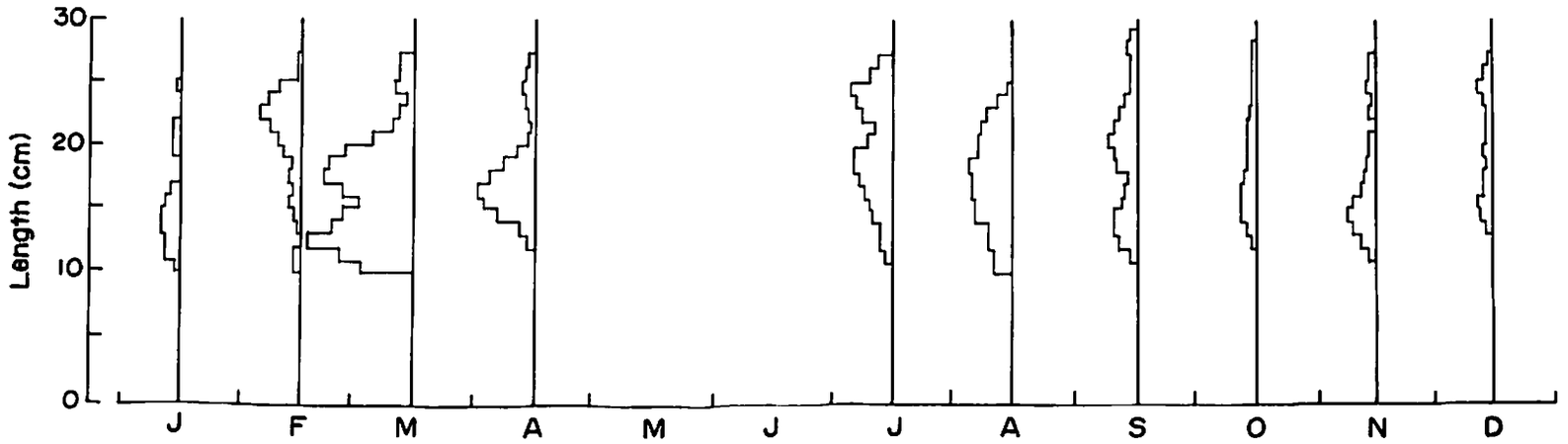
Family : Nemipteridae
Species name : *Nemipterus japonicus* (Bloch 1791)



Area : Tayabas Bay
Year : 1987-1988



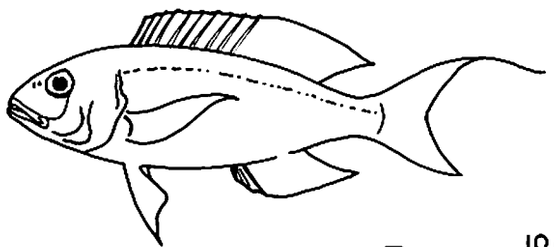




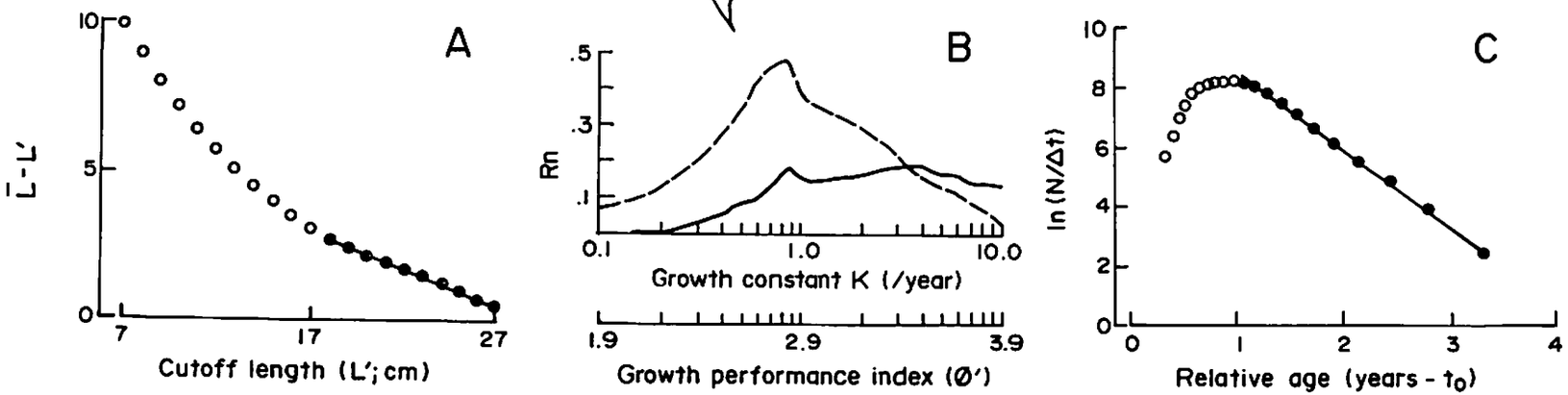
The time series of length frequencies does not exhibit clear modal progression to vividly infer growth. The L_{max} result of 28.33 to 30.17 cm (at 95% confidence interval) indicates that sufficient data, in terms of the size ranges collected, is available allowing the use of the Powell-Wetherall's Plot which estimates L_{∞} to be about 28.3 cm.

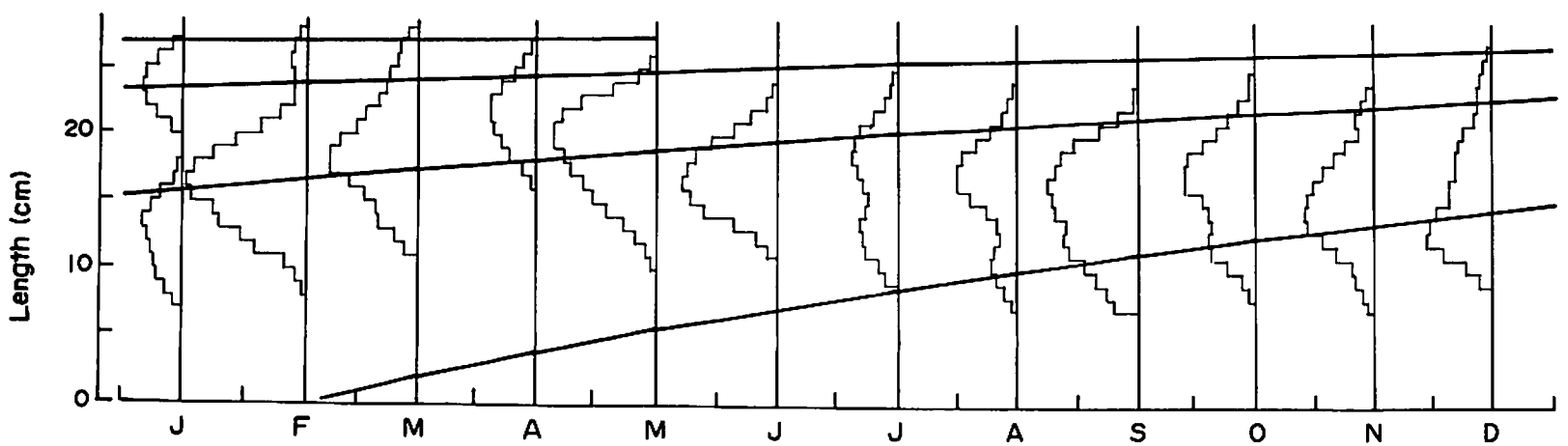
Plate 6.1.2

Family : Nemipteridae
Species name : *Nemipterus japonicus* (Bloch 1791)



Area : Leyte Gulf
Year : 1984-1987



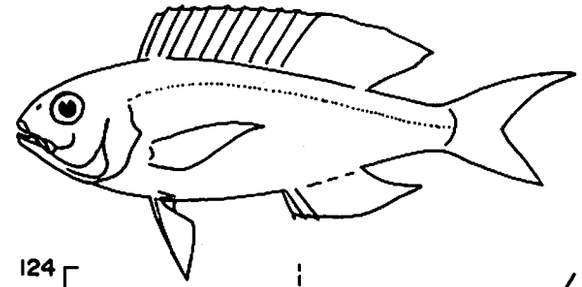


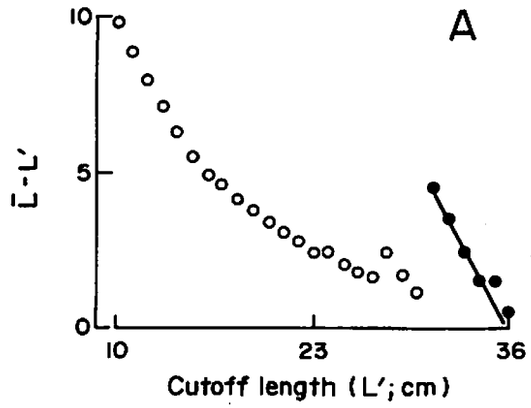
The Powell-Wetherall's Plot estimates the L_∞ to be about 29.3 cm. The results of the ELEFAN I K-scan analysis barely identified the K constant. However, the Shepherd's method K-scan routines confirm the K to be about 0.84 year^{-1}. The total mortality (Z) using the estimated parameters was estimated to be about 2.6 year^{-1} using the length-converted catch curve. The recruitment pattern analysis indicates two pulses per year (plot not shown). However, the secondary cohort is not well-defined.

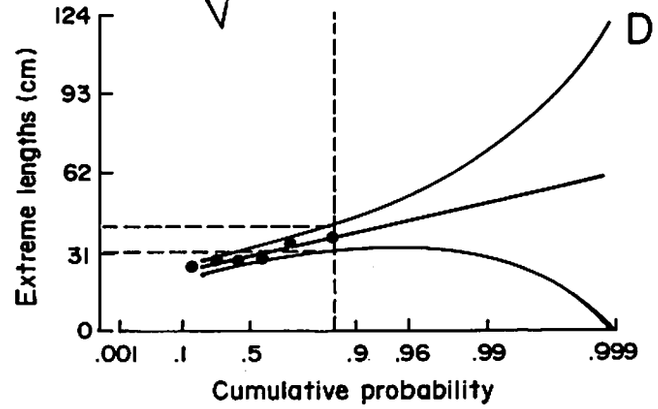
Plate 6.2.1

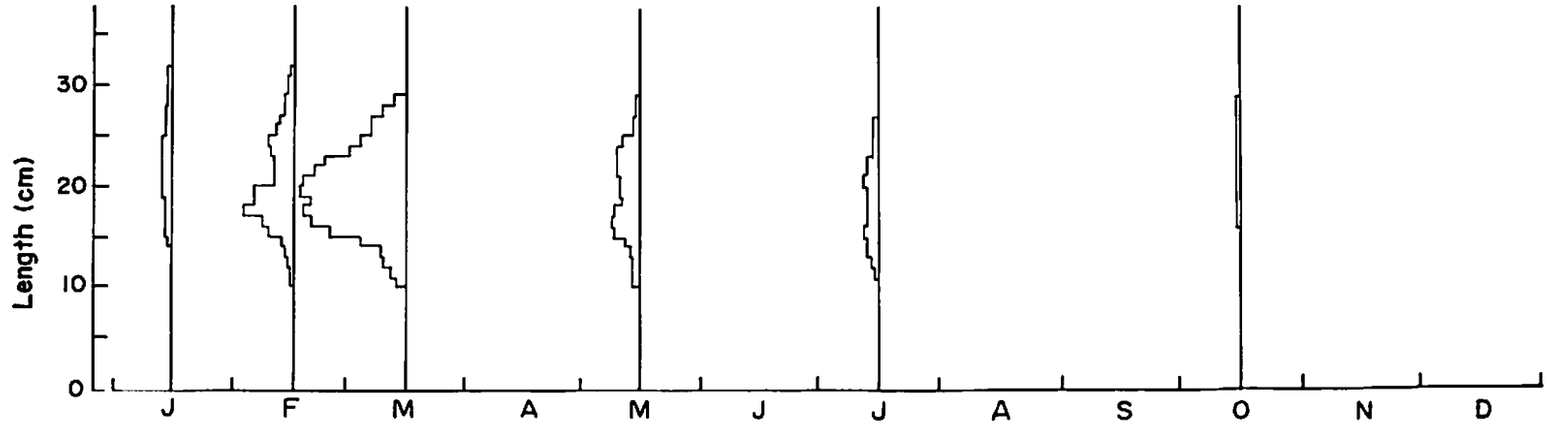
Family : Nemipteridae
Species name : *Nemipterus marginatus* (Valenciennes 1830)

Area : Tayabas Bay
Year : 1987







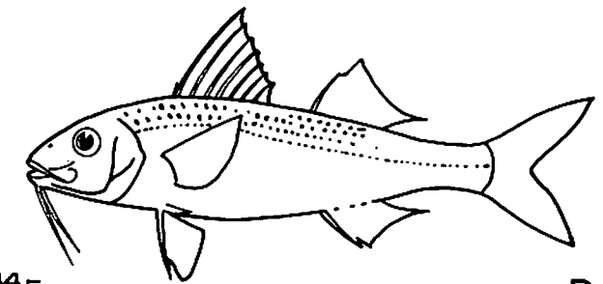


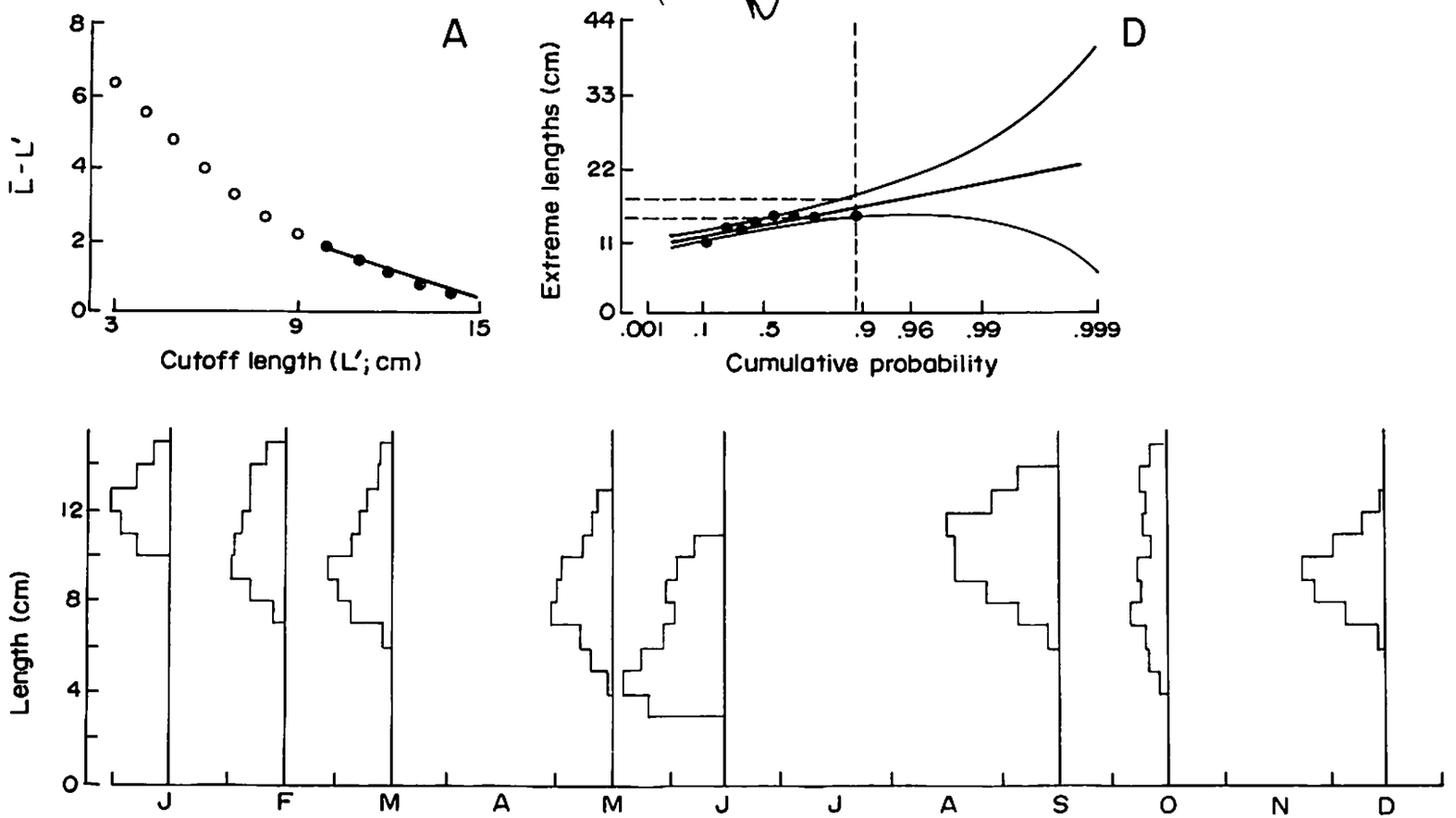
The time series of length frequencies does not exhibit clear modal progression to infer growth. The L_{max} result of 31.61 to 41.24 cm (at 95% confidence interval) indicates that sufficient data, in terms of the size ranges collected, is available allowing the use of the Powell-Wetherall's Plot which estimates L_{∞} to be about 36.3 cm.

Plate 7.1.1

Family : Mullidae
Species name : *Upeneus sulphureus* (Cuvier 1829)

Area : Leyte Gulf
Year : 1984-1986

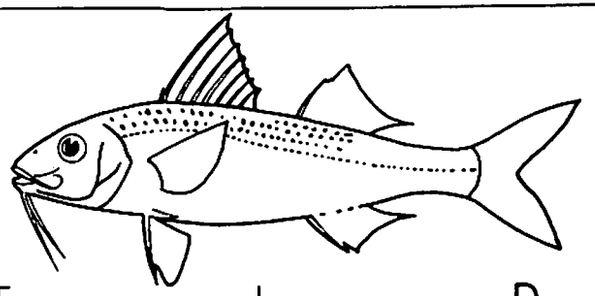




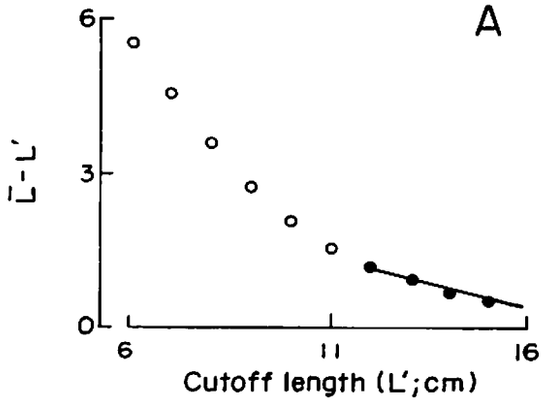
The time series of length frequencies does not exhibit clear modal progression to infer growth. The L_{max} result of 14.67 to 17.69 cm (at 95% confidence interval) indicates that sufficient data, in terms of the size ranges collected, is available allowing the use of the Powell-Wetherall's Plot which estimates L_{∞} to be about 15.3 cm.

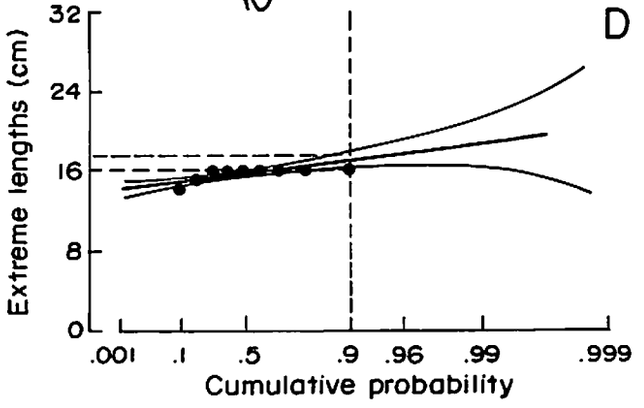
Plate 7.1.2

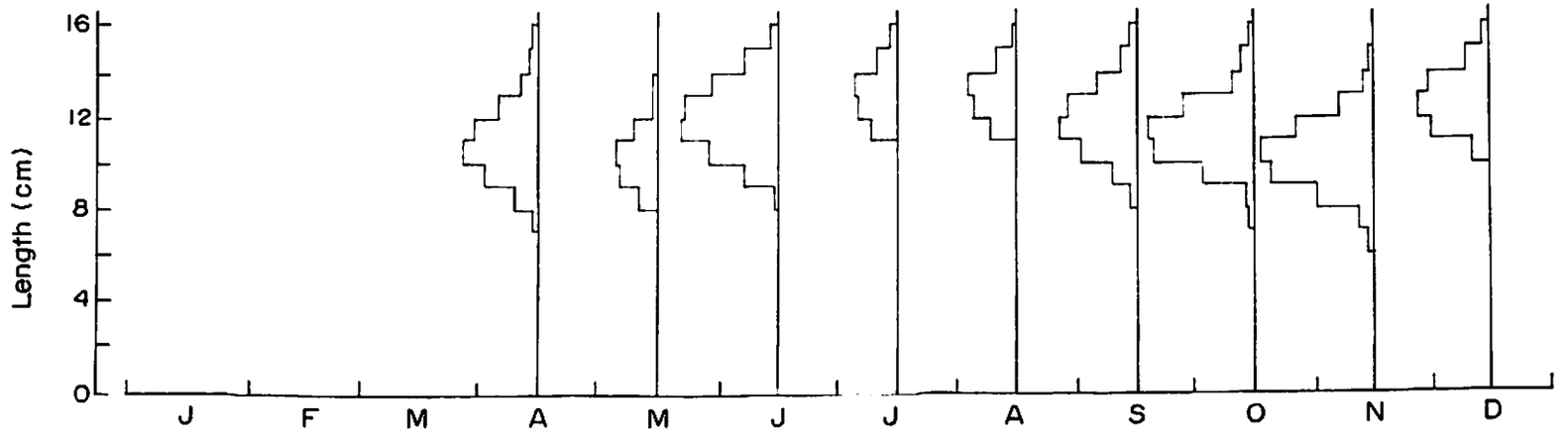
Family : Mullidae
Species name : *Upeneus sulphureus* (Cuvier 1829)



Area : Visayan Sea
Year : 1987



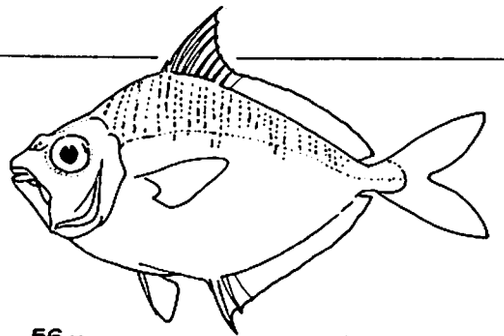




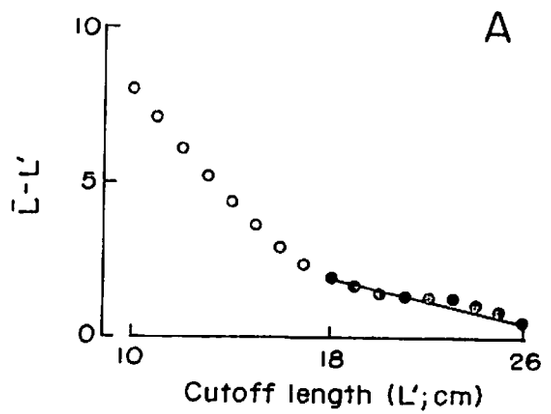
The time series of length frequencies does not exhibit clear modal progression to infer growth. The L_{max} result of 16.13 to 17.57 cm (at 95% confidence interval) indicates that sufficient data, in terms of the size ranges collected, is available allowing the use of the Powell-Wetherall's Plot which estimates L_{∞} to be about 16.6 cm.

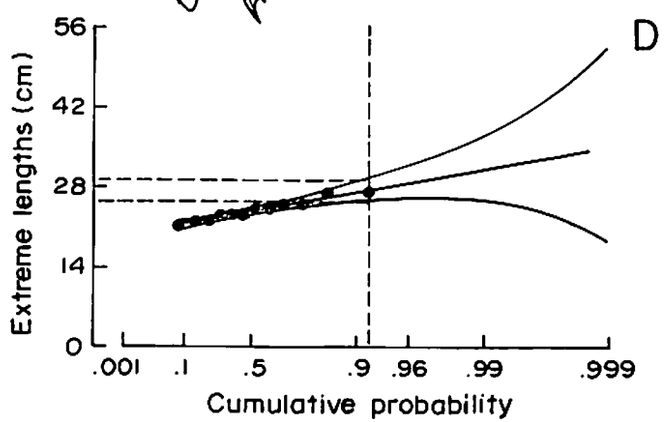
Plate 8.1.1

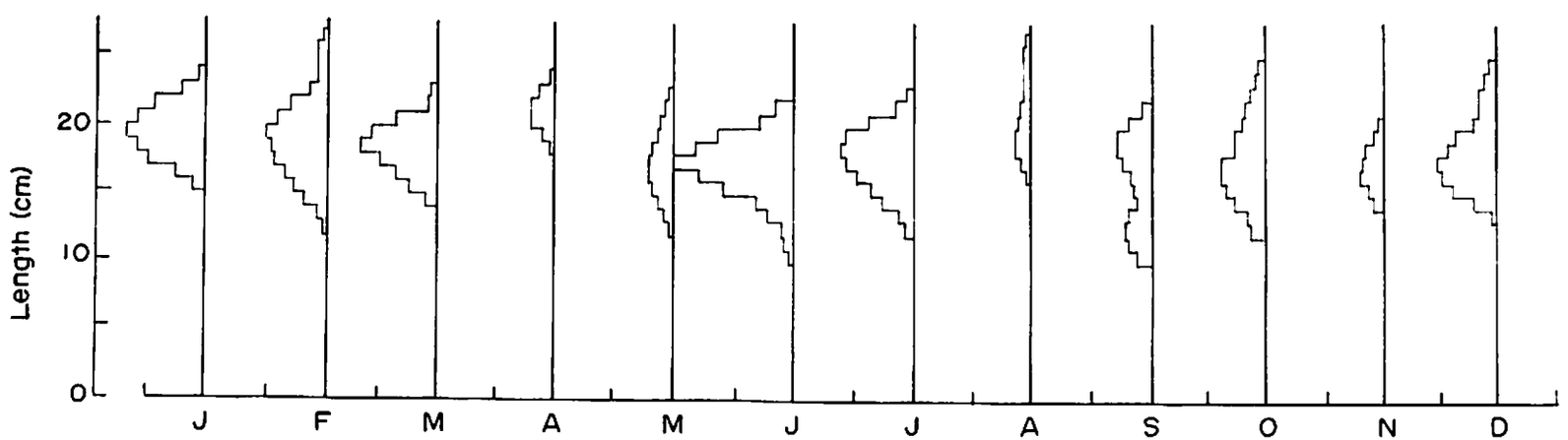
Family : Leognathidae
Species name : *Leiognathus equulus* (Forsskal 1775)



Area : Leyte Gulf
Year : 1985-1987



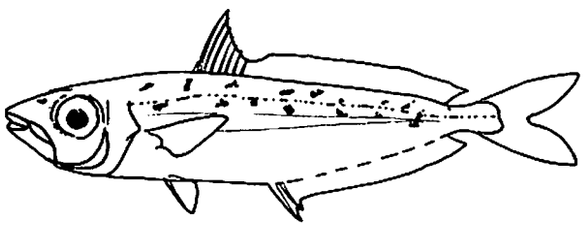




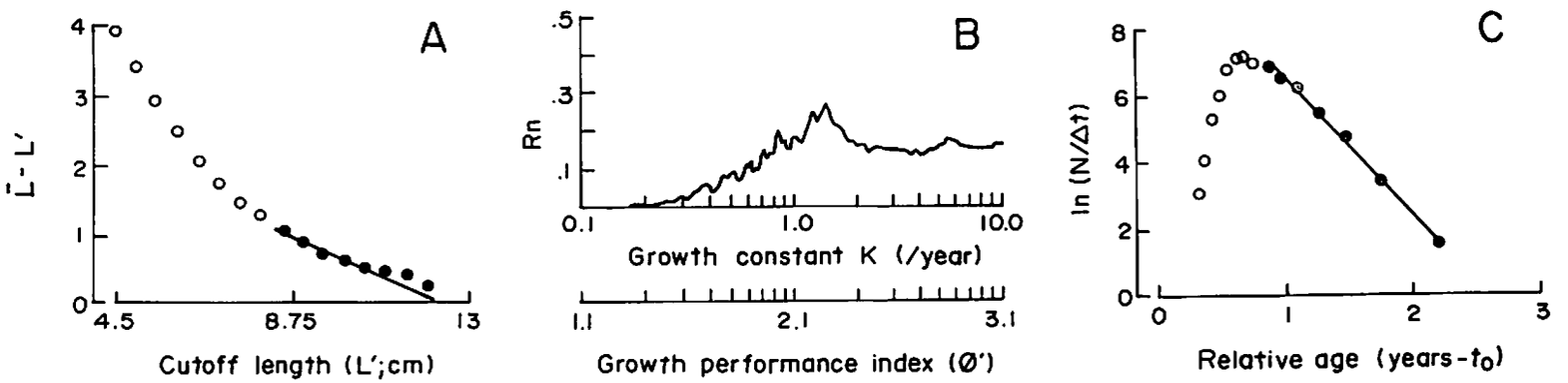
The time series of length frequencies does not exhibit clear modal progression to infer growth. The L_{max} result of 25.57 to 29.27 cm (at 95% confidence interval) indicates that sufficient data, in terms of the size ranges collected, is available allowing the use of the Powell-Wetherall's Plot which estimates L_{∞} to be about 29 cm.

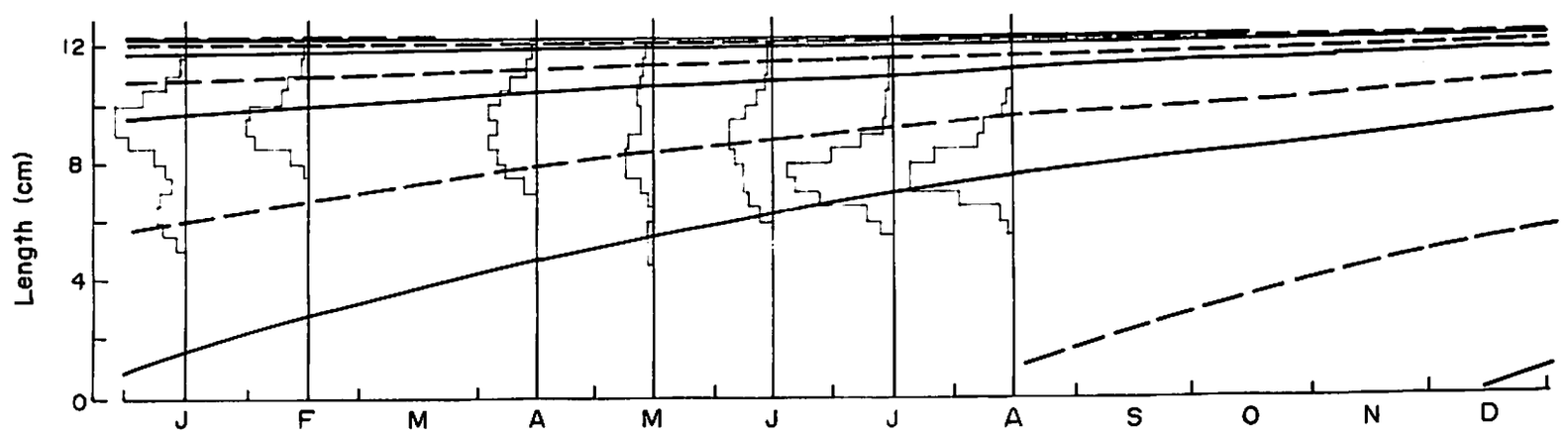
Plate 8.2.1

Family : Leognathidae
Species name : *Leiognathus elongatus* (Gunther 1874)



Area : Guimaras Strait
Year : 1986

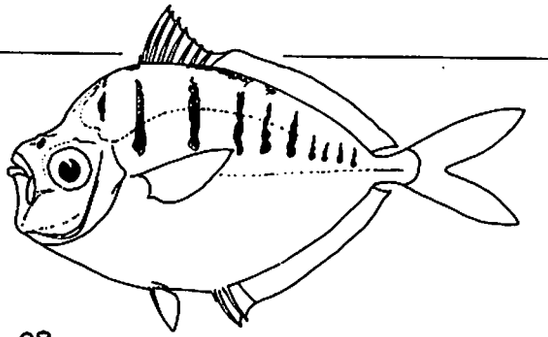




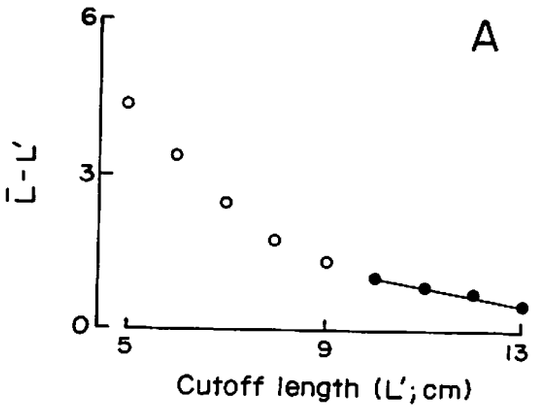
The Powell-Wetherall's Plot estimates the L_∞ to be about 12.3 cm. The results of the ELEFAN I K-scan routines clearly identify K to be about 1.4 year^{-1}. The results of the Shepherd's approach also confirm the findings (plot not shown here). The total mortality (Z) was estimated to be about 4 year^{-1} using the length-converted catch curve. The recruitment pattern analysis (plot not shown) also reveals two pulses per year.

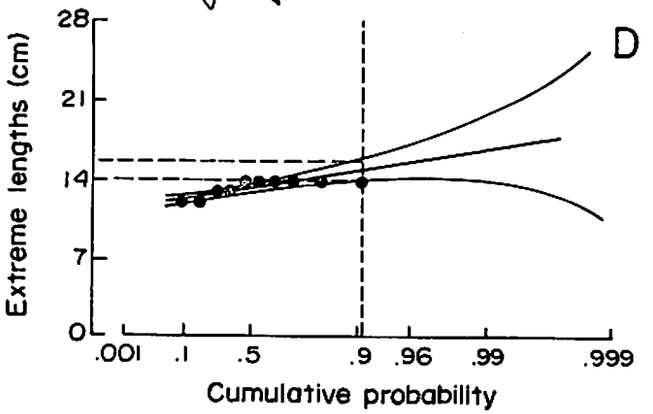
Plate 8.3.1

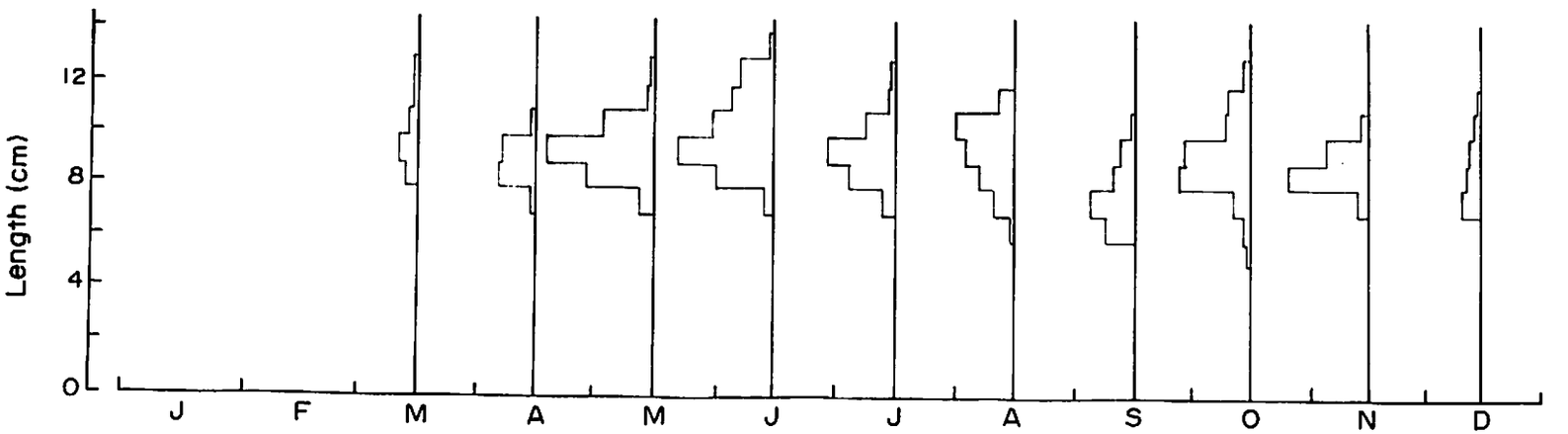
Family : Leognathidae
Species name : *Secutor ruconius* (Hamilton 1822)



Area : Visayan Sea
Year : 1987



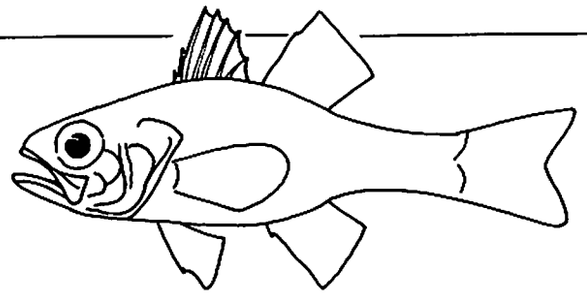




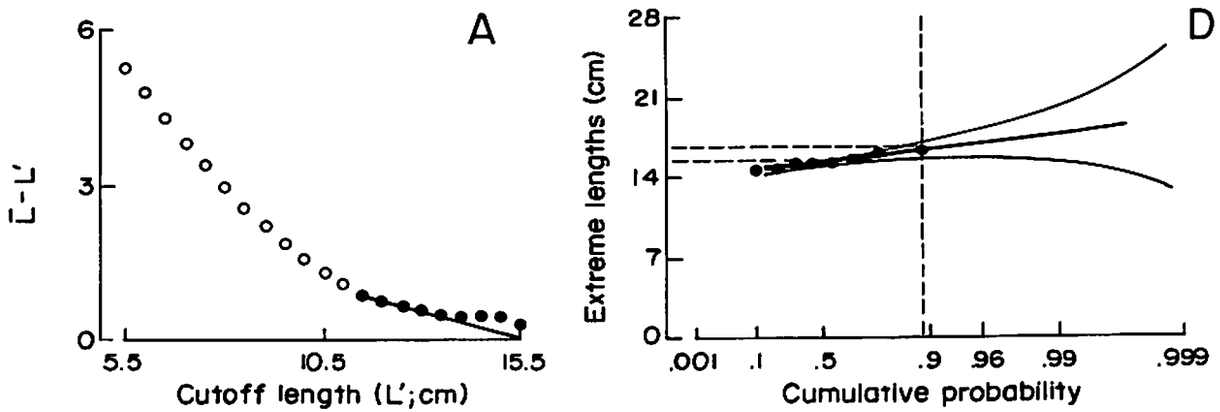
The time series of length frequencies does not exhibit clear modal progression to infer growth. The L_{max} result of 14.04 to 15.72 cm (at 95% confidence interval) indicates that sufficient data, in terms of the size ranges collected, is available allowing the use of the Powell-Wetherall's Plot which estimates L_{∞} to be about 16.4 cm.

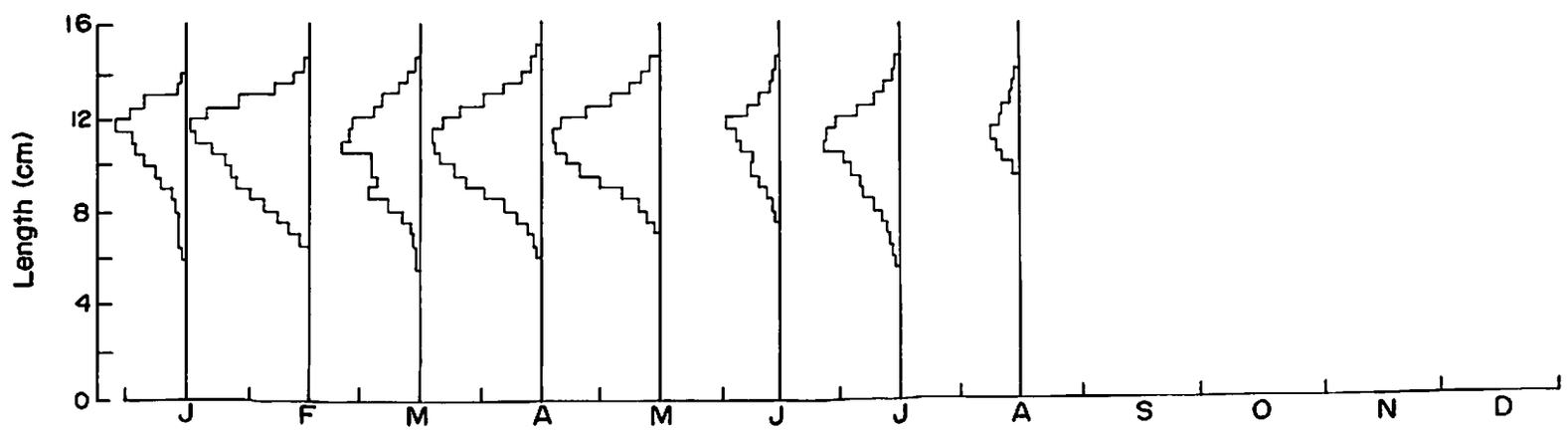
Plate 9.1.1

Family : Apogonidae
Species name : *Apogon quadrifasciatus* (Cuvier 1828)



Area : Guimaras Strait
Year : 1987

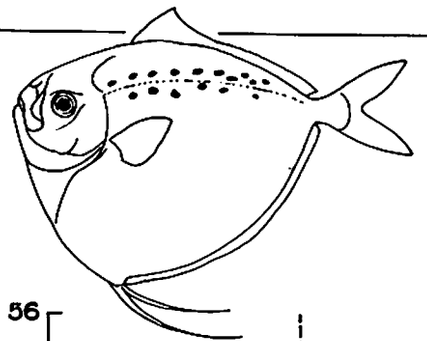




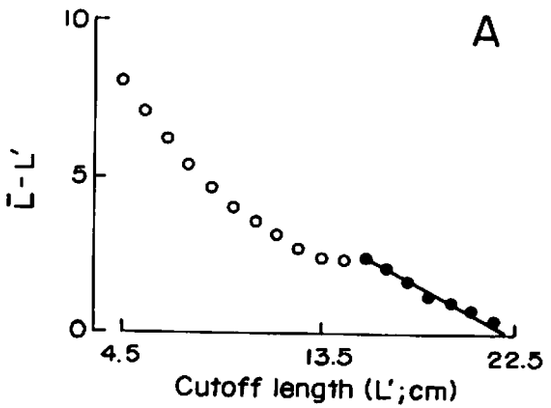
The time series of length frequencies does not exhibit clear modal progression to infer growth. The L_{max} result of 15.51 to 16.74 cm (at 95% confidence interval) indicates that sufficient data, in terms of the size ranges collected, is available allowing the use of the Powell-Wetherall's Plot which estimates L_{∞} to be about 15.5 cm.

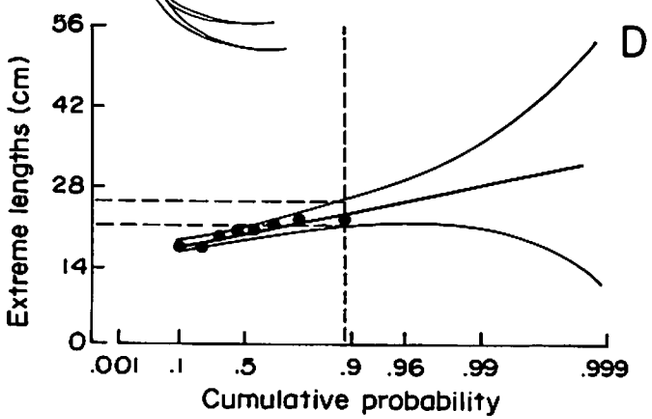
Plate 10.1.1

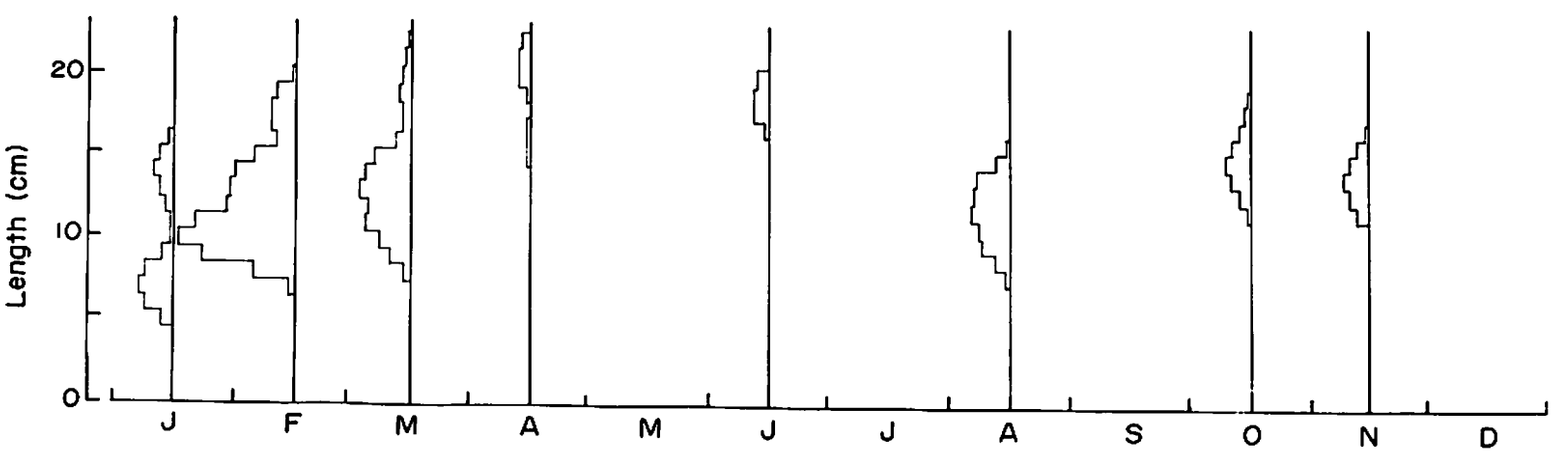
Family : Menidae
Species name : *Mene maculata* (Bloch & Schneider 1801)



Area : Camotes Sea
Year : 1987



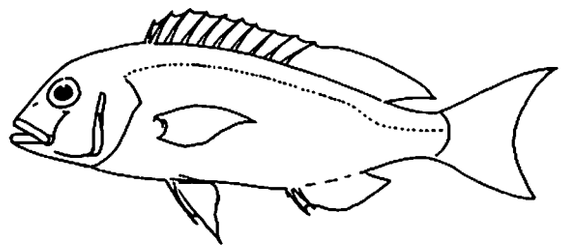




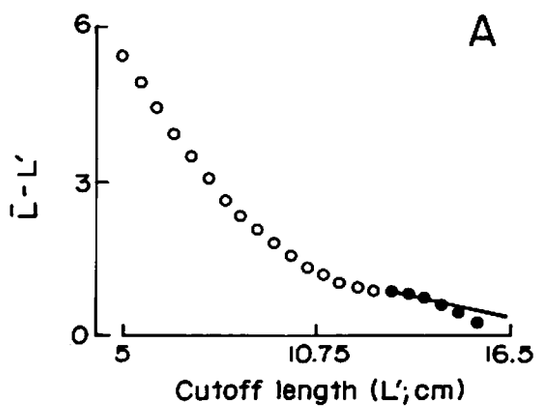
The time series of length frequencies does not exhibit clear modal progression to infer growth. The L_{max} result of 21.33 to 25.44 cm (at 95% confidence interval) indicates that sufficient data, in terms of the size ranges collected, is available allowing the use of the Powell-Wetherall's Plot which estimates L_{∞} to be about 22.3 cm.

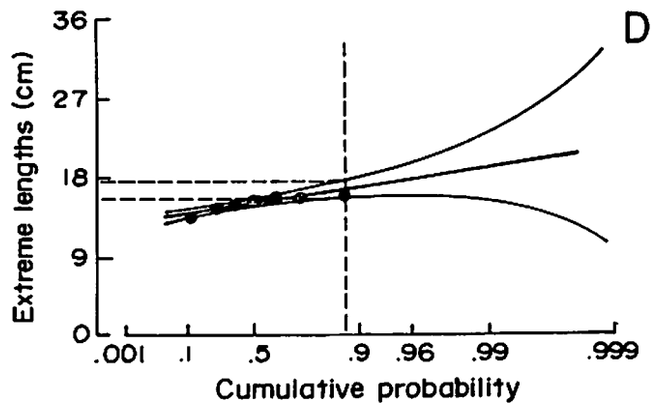
Plate 11.1.1

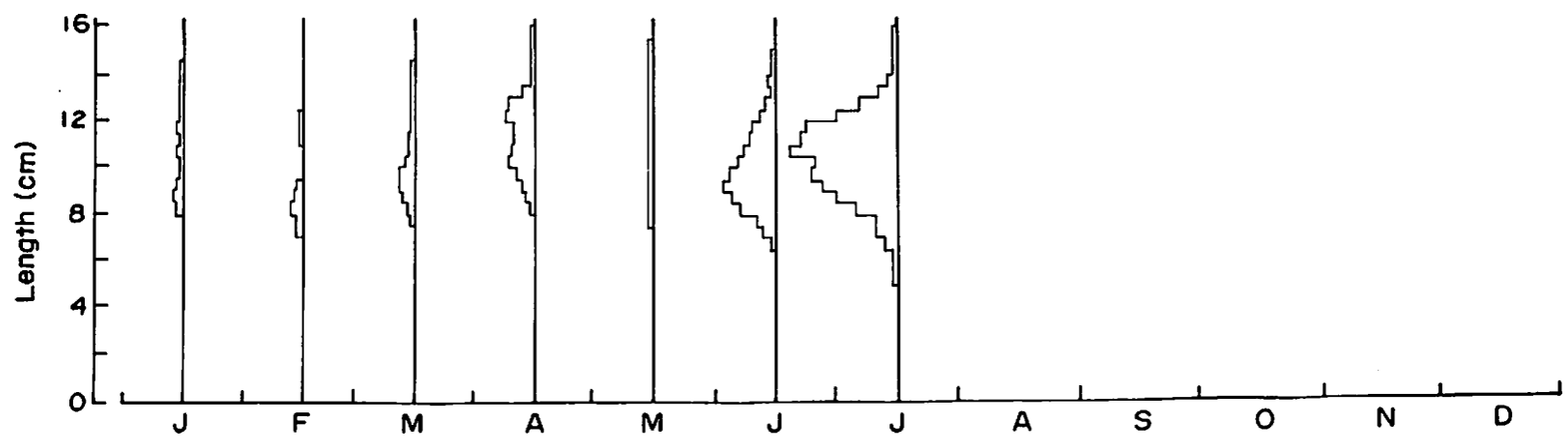
Family : Pomadasyidae
Species name : *Scolopsis taeniopterus* (Kuhl & Van Hasselt 1830)



Area : Guimaras Strait
Year : 1986



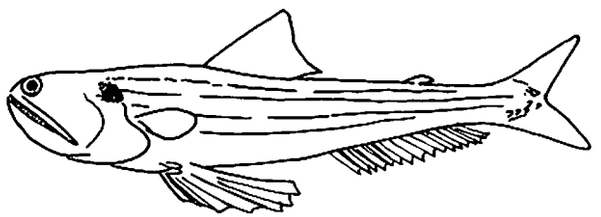




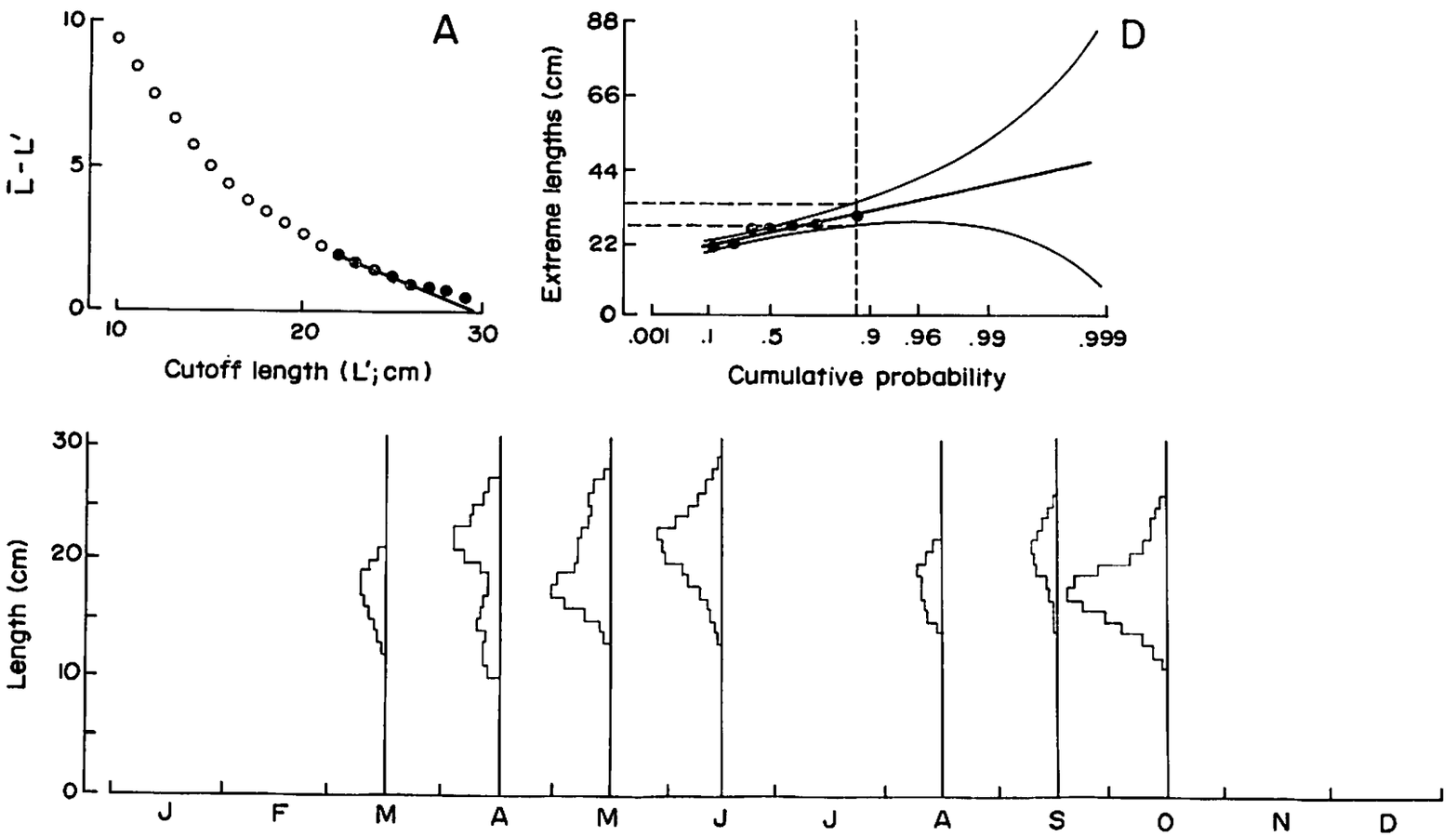
There is insufficient length-frequency data to infer growth. However, the L_{max} estimate of 15.61 to 17.62 cm indicates that the range at which the data has been collected were well-covered and from the Powell-Wetherall's Plot, the L_{∞} was approximated to be about 17.9 cm.

Plate 12.1.1

Family : Synodontidae
Species name : *Trachinocephalus myops* (Forster 1801)



Area : Visayan Sea
Year : 1986-1987



The time series of length frequencies does not exhibit clear modal progression to infer growth. The L_{max} result of 27.04 to 33.82 cm (at 95% confidence interval) indicates that sufficient data, in terms of the size ranges collected, is available allowing the use of the Powell-Wetherall's Plot which estimates L_{∞} to be about 30 cm.

Appendix B: Length Frequency Data*

Table 1.1.1. Pooled length frequency data for *Decapterus macrosoma* (Bleeker, 1851) collected in Leyte Gulf from 1983 to 1988.

ML\DATE	15/01	15/02	15/03	15/04	15/05	15/06	15/07	15/08	15/09	15/10	15/11	15/12
7.50					5					3		
8.50			16		22					5	4	
9.50		27	20		17			5		14	6	
10.50		49	30	10	36	27	5	16	6	28	8	5
11.50	5	57	45	2	23	29	4	17	31	35	25	6
12.50	9	76	56	35	44	72	16	52	76	71	45	23
13.50	32	82	86	46	66	66	9	110	133	124	86	33
14.50	85	85	65	71	92	150	23	86	127	140	127	56
15.50	74	133	149	68	129	190	60	177	144	159	160	73
16.50	92	126	150	111	149	195	103	197	176	193	165	147
17.50	189	198	211	167	187	286	137	187	187	185	181	187
18.50	162	178	184	160	242	284	162	142	157	231	201	206
19.50	217	169	185	171	297	253	149	165	193	214	167	179
20.50	180	165	205	154	282	200	121	112	166	142	112	162
21.50	114	103	118	119	229	91	54	40	124	111	53	111
22.50	59	42	89	87	130	7	22	44	35	37	32	56
23.50	38	42	66	58	107		5	4	6	13	28	26
24.50	13	25	33	29	17			2		7	3	27
25.50		12	19		11							
26.50			4									
SUM	**1269**	**1569**	**1731**	**1288**	**2085**	**1850**	**870**	**1356**	**1561**	**1712**	**1403**	**1297**

Table 1.1.2. Pooled length frequency data of *Decapterus macrosoma* (Bleeker, 1851) collected in Visayan Sea from 1984 to 1988.

ML\DATE	15/01	15/02	15/03	15/04	15/05	15/06	15/07	15/08	15/09	15/10	15/11	15/12
4.50									2			
5.50									11			
6.50									27			
7.50									34			
8.50									9			
9.50									19			
10.50			3						1			
11.50			15	1			1		17	1		
12.50	5	1	21	11					48			
13.50	24	68	45	19		10	4	56	96	4	4	6
14.50	51	99	31	12		120	58	20	101	17	16	12
15.50	64	158	40	5	3	131	80	69	93	30	30	63
16.50	105	186	122	79	18	135	109	131	112	133	76	33
17.50	55	120	71	167	52	122	158	108	79	83	61	202
18.50	61	478	139	171	117	160	134	70	66	216	80	256
19.50	99	60	131	237	129	129	89	75	78	101	152	103
20.50	48	30	86	149	110	42	140	74	95	250	47	218
21.50	27	20	45	114	69	24	61	58	41	99	64	132
22.50	17	29	25	4	33	14	59	27	12	59	32	46
23.50	7	16	12	3	25	7	11	3	3	20	15	31
24.50	37	6	4	7	14	7	3	3	2	7	4	15
25.50	22				6	4					4	4
26.50	14				4	3						8
27.50	14				7							2
28.50					2							
SUM	**650**	**1271**	**790**	**979**	**589**	**908**	**907**	**694**	**946**	**1020**	**585**	**1131**

* Original data are available from the authors upon request.

Table 1.1.3. Pooled length frequency data of *Decapterus macrosoma* (Bleeker, 1851) collected in Guimaras Strait from 1984 to 1986.

ML\DATE	15/01	15/02	15/03	15/04	15/05	15/06	15/08	15/09	15/11	15/12
7.50		6								
8.50		4								
9.50		30								
10.50		10								
11.50		12	3							
12.50	3	16					2			
13.50	20	54	20				11	4	5	
14.50	15	56	24		2	8	15	10	16	
15.50	16	42	10	5	10	17	24	73	17	5
16.50	35	12	3	18	32	19	22	18	6	4
17.50	12	3	21	58	13	32	1	10	5	5
18.50	16		48	99	3	30	5	13	8	25
19.50	31		26	48		49	2	5	12	20
20.50	12		18	31		12	2	2	6	27
21.50	8		16	20		5	3	1	4	30
22.50	8		10	19		1	1		3	13
23.50			4	4	3		1			4
24.50	12			7	12					
25.50	3			9	6					
26.50				3	8					
27.50					7					
28.50					5					
29.50					5					
SUM	191	245	203	321	106	173	89	136	82	133

Table 1.1.4. Pooled length frequency data of *Decapterus macrosoma* (Bleeker, 1851) collected in Samar Sea from 1985 to 1987.

ML\DATE	15/01	15/02	15/03	15/06	15/07	15/08	15/10	15/11
12.50			8					2
13.50		2	28	41				8
14.50	18		9	16	17			36
15.50	24	10	17	28	31			12
16.50	51	7	40	9	34	8	19	10
17.50	60	10	15	17	24	5	11	28
18.50	25	32	4	11	21	10	22	23
19.50	13	23	1	25	8	6	21	10

Continued

Table 1.1.4 (continued).

ML\DATE	15/01	15/02	15/03	15/06	15/07	15/08	15/10	15/11
20.50	5	7		2	28	16	29	10
21.50	2				6	14	9	4
22.50	2				2	5	1	
23.50					2	4		
24.50						1	1	
25.50								
26.50						2		
SUM	200	91	122	149	173	71	113	143

Table 1.1.5. Pooled length frequency data of *Decapterus macrosoma* (Bleeker, 1851) collected in Camotes Sea from 1985 to 1987.

ML\DATE	15/01	15/02	15/03	15/04	15/05	15/06	15/07	15/08	15/09	15/10
4.50		2								
5.50		13								
6.50		11								
7.50		13				1				
8.50		8		1		4				
9.50	3	26		5		17	2		4	
10.50	14	23	5	20		47	8		3	
11.50	22	32	12	32	8	126	15		4	2
12.50	10	52	30	99	13	234	26		6	16
13.50	24	223	68	128	10	183	38		8	24
14.50	25	346	122	74	12	168	55		11	31
15.50	8	95	156	71	53	69	77	2	31	64
16.50		40	189	64	40	47	89	23	52	49
17.50		35	182	62	27	60	103	25	20	32
18.50		24	115	99	22	74	64	50	25	25
19.50	1	45	170	108	16	56	56	86	7	15
20.50	3	103	217	84	11	30	31	42	14	14
21.50	8	27	172	75	3	23	24	68		20
22.50	20	9	84	59	1	10	10	82		20
23.50	91	6	40	3		1	4	37		1
24.50	74	6	34	2				11		
25.50	19		16					2		
26.50	5		3							
27.50	1									
28.50						1				
SUM	328	1139	1615	986	216	1151	602	428	185	313

Table 1.1.6. Pooled length frequency data of *Decapterus macrosoma* (Bleeker, 1851) collected in Davao Gulf from 1983 to 1986.

ML\DATE	15/02	15/03	15/04	15/05	15/06	15/07	15/08	15/09	15/10	15/11	15/12
7.50			1								
8.50	4					2	2				
9.50	17					31	8				
10.50	34	3	6	3	1	34	19	5	2	2	
11.50	34		8	6	1	51	34	2	3	9	4
12.50	45	1	21	19	4	46	50	2	1	23	4
13.50	38	6	29	48		29	65	4	7	24	13
14.50	88	25	23	62	13	7	119	12	16	3	15
15.50	61	84	38	36	40	17	100	22	26	52	49
16.50	27	84	18	35	37	17	29	64	60	24	29
17.50	10	63	14	33	43	16	25	36	57	6	16
18.50	3	29	19	28	34	25	18	25	33	12	4
19.50	5	20	24	57	16	18	6	22	19	6	
20.50	3	34	6	24	33	24	5	11	7	6	1
21.50	1	22	1	4	29	18	4	5	11		
22.50		8			27	2	3	3	5		2
23.50		8		2	15	1	2	4	9		
24.50		6		2	32	1	6	6	4		
25.50		5		3	21		2	10	3		
26.50				2	3			1			
27.50				7	2						
28.50				1							
29.50				1							
30.50				1							
SUM	370	398	208	374	351	339	497	234	263	167	137

Table 1.1.7. Pooled length frequency data of *Decapterus macrosoma* (Bleeker, 1851) collected in South Sulu Sea from 1983 to 1988.

ML\DATE	15/01	15/02	15/03	15/04	15/05	15/06	15/07	15/08	15/09	15/10	15/11	15/12
5.50		1										
6.50		7	3							2		
7.50		9	5							13		
8.50		5	23	1	1				2	19		1
9.50	2	4	30	8	1	4		33	8	28	2	12
10.50	8	11	16	76	25	4		152	36	26	2	36
11.50	21	21	24	245	19	17	17	173	41	18	1	34
12.50	31	61	64	331	32	7	9	87	86	13	1	12
13.50	50	48	127	428	112	33	13	55	143	4	4	3
14.50	112	47	168	511	245	28	34	80	168	13	7	5

Continued

Table 1.1.7 (continued).

ML\DATE	15/01	15/02	15/03	15/04	15/05	15/06	15/07	15/08	15/09	15/10	15/11	15/12
15.50	177	96	300	415	338	59	35	38	109	13	9	21
16.50	130	161	244	406	565	276	29	30	73	19	25	46
17.50	38	93	152	327	544	349	26	28	41	18	23	43
18.50	4	11	144	262	236	171	45	10	21	8	6	19
19.50		5	83	100	87	61	65	27	22	3	1	6
20.50		1	37	22	19	17	80	65	25			1
21.50			9	4	3	2	53	61	15	1		
22.50			3	2		2	21	20	3	1		
23.50						1	3	2	1			
24.50							1	1				
25.50							1	1				
SUM	573	581	1432	3138	2227	1031	432	863	794	199	81	239

Table 1.1.8. Pooled length frequency data of *Decapterus macrosoma* (Bleeker, 1851) collected in Moro Gulf and Illana Bay from 1983 to 1988.

ML\DATE	15/01	15/02	15/03	15/04	15/05	15/06	15/07	15/08	15/09	15/10	15/11	15/12
4.50	5											
5.50	1											
6.50	17											
7.50	36		4								9	
8.50	44	10	8		8					6	23	
9.50	29	27	7		30	2				36	27	
10.50	39	17	13	17	63	9	5		1	40	75	7
11.50	35	22	13	56	74	30	13			18	213	170
12.50	38	14	5	18	120	54	12			25	292	180
13.50	37	9	4	122	68	29	24	1	16	61	149	68
14.50	32	11	7	251	33	22	26	2	48	55	14	74
15.50	16	1	1	113	9	37	21	1	23	35	10	85
16.50	1	2		57	1	78	67	11		22	4	48
17.50	1	2		43		145	35	124		18	8	88
18.50		3		7		66	19	123		15	48	123
19.50		5		6		27	4	15		15	26	84
20.50				11		12	1	3		1	10	33
21.50				2		1	1				6	4
SUM	331	123	62	703	406	512	228	280	88	347	914	964

Table 1.2.1. Pooled length frequency data of *Decapterus kurroides* (Bleeker, 1855) collected in Visayan Sea from 1983 to 1988.

ML/DATE	15/01	15/02	15/03	15/04	15/05	15/06	15/07	15/08	15/09	15/10	15/11	15/12
11.50										38		
12.50			3		4				1	28		
13.50		24	31	12	7			17	4	31		6
14.50	1	58	92	37	77		2	7	7	24	9	11
15.50	2	62	117	54	121		35	15	19	28	12	37
16.50	7	35	136	53	165	6	96	24	21	32	26	15
17.50	17	55	169	85	234	25	112	79	39	42	59	41
18.50	34	67	147	61	177	23	139	42	84	85	91	64
19.50	25	58	78	65	77	9	33	48	36	111	68	29
20.50	13	26	62	54	51	9	22	26	52	47	40	52
21.50	4	45	20	12	14	11	119	31	69	129	53	48
22.50	1	38	5	10	11	11	83	7	38	98	52	23
23.50	1	12		5	4	5	32	9	4	85	10	17
24.50		5	10	1	4		20	5		61		6
25.50		8	17	1	2		10			30		6
26.50		2	21		5			4		12		2
27.50			4		2					3		1
28.50			8									1
SUM	105	495	920	450	955	99	703	314	374	884	420	359

Table 1.2.2. Pooled length frequency data of *Decapterus kurroides* (Bleeker, 1855) collected in Samar Sea from 1983 to 1986.

ML\DATE	15/01	15/02	15/04	15/05	15/08	15/10
11.50		18				
12.50		4				
13.50		20				
14.50			18			
15.50			17			
16.50			12	8		12
17.50	1	1	7	25		6
18.50	12	4	15	20	7	23
19.50	9	4	9	34	7	18
20.50	6	4	10		4	34
21.50	3	1				16
22.50						8
23.50						3
24.50						1
25.50						1
26.50						1
27.50	3					
28.50	3					
29.50	2					
SUM	39	56	88	87	18	123

Table 1.2.3. Pooled length frequency data of *Decapterus kurroides* (Bleeker, 1855) collected in Davao Gulf from 1983 to 1988.

ML\DATE	15/01	15/02	15/03	15/04	15/05	15/06	15/07	15/08	15/09	15/10	15/11	15/12
4.50				1								
5.50										1		
6.50												
7.50		1										
8.50		2	3	2	1	5	5	14		4	2	1
9.50	8	22	13	30	18	16	35	57	9	18	5	4
10.50	9	73	23	82	37	89	62	112	34	55	20	25
11.50	19	110	64	118	64	157	78	146	87	120	17	55
12.50	25	147	95	161	96	193	55	171	112	160	59	97
13.50	25	229	176	229	146	166	60	212	78	126	60	78
14.50	36	187	170	169	148	132	57	238	87	158	55	67
15.50	53	188	242	186	164	112	81	185	100	123	77	21
16.50	60	67	180	125	124	179	43	92	74	119	92	18
17.50	73	48	131	92	66	169	48	33	43	94	73	14
18.50	37	35	80	72	24	106	19	14	48	75	53	10
19.50	15	23	50	26	15	40	14	3	52	29	30	7
20.50	5	14	23	7	9	7	8	2	25	7	14	4
21.50		6	39	1	11	8	5		4	3	9	1
22.50		2	8	1	1	1			1	2		
23.50		2	4		1							
24.50		1				1		1				
SUM	365	1157	1301	1302	925	1381	570	1280	754	1094	566	402

Table 1.3.1. Pooled length frequency data of *Decapterus russelli* (Rüppel, 1830) collected in Visayan Sea from 1984 to 1987.

ML\DATE	15/01	15/02	15/03	15/04	15/05	15/07	15/08	15/09	15/10	15/11	15/12
9.50			1								
10.50			10			1	3				
11.50			18			3	5		9		
12.50			50			6	14	2	28		
13.50	6	6	53			7	26	31	26		
14.50	3	8	25			7	52	22	7		
15.50	33	11	25			9	21	26	4		2
16.50	87	11	31			14	23	35	6	3	
17.50	72	11	36		4	22	11	18	7	8	5
18.50	70	11	30		2	9	26	26	6	20	6
19.50	30	16	13		12	2	16	19	2	21	14
20.50	18	16	3	9	13		36	10		12	22
21.50	11	9		13	12		7	13		20	10
22.50	8	6		15	38	7		10		18	
23.50	7			26	45	8				11	
24.50				22	39	4				2	2
25.50				41	48		1			5	
26.50				17	11	1	17		25		2
27.50				49	5		14		35		
28.50				12			12		18	1	19
29.50				3					30		34
30.50									19	7	17
31.50									10	2	16
32.50									4	2	1
33.50									19	2	14
34.50										2	4
SUM	**345**	**105**	**295**	**207**	**229**	**100**	**284**	**212**	**255**	**136**	**168**

Table 1.3.2. Pooled length frequency data of *Decapterus russelli* (Rüppel, 1830) collected in Camotes Sea from 1985 to 1988.

ML\DATE	15/01	15/02	15/03	15/04	15/05	15/06	15/09	15/10	15/11	15/12
6.50			1							
7.50			12	1		1				
8.50		6	35	12		3				
9.50	2	17	58	41		7	4	1		
10.50	22	37	106	70		24	11	3		3
11.50	44	61	167	88		35	48	4	4	19
12.50	54	72	194	140	1	36	70	14	13	56
13.50	49	57	170	170	8	31	77	35	25	68
14.50	22	50	162	156	29	19	68	67	41	52
15.50	5	49	132	138	44	19	45	134	43	38
16.50	4	45	123	82	67	23	26	165	32	23
17.50	11	56	141	70	98	43	10	118	31	14
18.50	31	27	197	67	93	75	6	71	18	14
19.50	47	32	175	30	62	85	3	29	23	12
20.50	32	23	84	25	39	74		13	11	7
21.50	11	9	93	56	25	47		14	3	8
22.50	6	12	56	51	8	22		12	2	5
23.50	3	15	19	17	1	8		3		
24.50		18	15	15		1				
25.50	1	17	14	17						
26.50	1	14	6	10				2		
27.50		9	3	6				1		
28.50		3	1	3						
29.50		1	2	1						
30.50			3	2						
31.50			1	2						
SUM	**345**	**630**	**1970**	**1270**	**475**	**553**	**368**	**686**	**246**	**319**

Table 1.4.1. Length frequency data of *Decapterus macarellus* (Cuvier, 1833) collected in Pujada Bay in 1986.

ML\DATE	15/01	15/05	15/06	15/09	15/10	15/11
14.50				2		
15.50	1	1		2		
16.50		1	12	2	6	4
17.50	2	2	21	10	20	16
18.50	3	5	29	9	25	19
19.50	1	3	25	7	25	18
20.50	3	1	35	12	29	20
21.50	3	2	20	17	14	13
22.50	5	1	14	15	13	3
23.50	1		1	5		3
SUM	19	16	157	81	132	96

Table 1.4.2. Length frequency data of *Decapterus macarellus* (Cuvier, 1833) collected in Davao Gulf in 1986.

ML\DATE	15/02	15/03	15/04	15/05	15/06	15/09	15/10	15/11	15/12
8.50							1		
9.50			2	1			2		
10.50			10	5			3		
11.50			6	13	2		4		
12.50	1		4	20	1		13		2
13.50		2	7	18	9	1	40		1
14.50		4	7	39	15		33		2
15.50		7	5	37	22	5	9	3	1
16.50	1	7	11	44	42	8	9	16	
17.50		5	10	35	56	15	4	33	7
18.50		11	9	42	43	18	6	31	8
19.50		10	7	61	72	16	5	43	7
20.50		9	4	35	65	19	6	39	3
21.50		7	11	38	108	49	12	10	
22.50	1	4	4	18	93	39	20	3	1
23.50	2	11		10	60	41	31	1	7
24.50	4	4	2	6	21	32	34	3	22
25.50	8			2	13	30	31	2	4
26.50	8	2		3	9	15	15		
27.50				5	1	6	13		
28.50	1			8		3	6		
29.50							3		
30.50				3	1				1
31.50				4					
SUM	26	83	99	447	633	297	300	184	66

Table 1.5.1. Length frequency data of *Decapterus maruadsi* (Temminck and Schlegel, 1844) collected in Tayabas Bay in 1987.

ML\DATE	15/02	15/05	15/06	15/07	15/08	15/10	15/12
13.00			1	1			
14.00	4	5	1				
15.00	14	17	6				
16.00	3	30	9	2			
17.00		17	12	9			
18.00		1	8	52			1
19.00			13	61	7	18	1
20.00			1	15	36	27	2
21.00				6	9	12	9
22.00				1		3	2
23.00						1	3
24.00						2	
25.00						2	
26.00						1	
SUM	21	70	51	147	52	66	18

Table 1.5.2. Pooled length frequency data of *Decapterus maruadsi* (Temminck and Schlegel, 1844) collected in South Sulu Sea from 1984 to 1986.

ML\DATE	15/04	15/05	15/06	15/10	15/11	15/12
8.50					2	
9.50					35	
10.50					84	1
11.50			1	2	137	1
12.50	4		1	1	87	3
13.50	12		12	2	41	10
14.50	6	1		15	15	7
15.50	13	2		7	6	3
16.50	17	21		2	16	12
17.50	9	32		2	11	26
18.50	1	20			1	25
19.50		11				30
20.50		5				18
21.50						14
22.50						8
23.50						2
SUM	62	92	14	31	435	160

Table 1.5.3. Pooled length frequency data of *Decapterus maruadsi* (Temminck and Schlegel, 1844) collected in Camotes Sea from 1987 to 1988.

ML\DATE	15/01	15/02	15/03	15/04	15/06	15/07	15/08	15/09	15/10	15/11
8.00	1					6			12	
9.00	15				50	34	2	2	30	2
10.00	30				32	98	2	4	6	8
11.00			4	2	6	78	28	114	18	22
12.00		2	26	4	4	36	26	56	80	86
13.00		8		20		20	38	46	150	84
14.00		22	2	88		24	4	26	6	114
15.00		13	44	30		58	32	40	2	138
16.00	1	15	43	14		22	56	60	6	190
17.00	10	10	52	14		2	12	4	28	56
18.00	55	4	50						14	4
19.00	66	14	80				2		2	
20.00	26	8	25							
21.00	11	1	34							
22.00	4		2							
23.00	1		2							
24.00		2	1							
25.00		6								
26.00		6								
27.00		5								
28.00										
29.00		1								
SUM	220	117	365	172	92	378	202	352	354	704

Table 1.6.1. Length frequency data of *Selar crumenophthalmus* (Bloch, 1793) collected in Illana Bay in 1988.

ML\DATE	15/02	15/03	15/05	15/06	15/07	15/09	15/10	15/11
6.50	1							
7.50	10							
8.50	14							
9.50						1		
10.50	6	6	5			8	2	9
11.50	18	8	6	5	2	26	30	21
12.50	31	8	16	22	11	5	33	57
13.50	17		5	24	30		12	20
14.50	26		6	25	34		3	14
15.50	16		4	11	26			13
16.50	3				11			
17.50					1			
SUM	142	22	42	87	115	40	80	134

Table 1.6.2. Length-frequency data of *Selar crumenophthalmus* (Bloch, 1793) collected in Pujada Bay in 1986.

ML\DATE	15/01	15/02	15/03	15/05	15/06	15/09	15/10	15/11
15.50	5	4		1		1		
16.50	6	9	5	7	3	10	11	4
17.50	20	20	9	15	6	22	23	17
18.50	21	24	8	9	7	15	33	20
19.50	18	15	6	12	15	19	27	14
20.50	21	15	8	11	10	20	18	16
21.50	13	9		5	6	16	9	10
22.50	7			1	3	8	5	7
SUM	111	96	36	61	50	111	126	88

Table 1.6.3. Pooled length frequency data of *Selar crumenophthalmus* (Bloch, 1793) collected in Davao Gulf from 1983 to 1987.

ML\DATE	15/01	15/02	15/03	15/04	15/05	15/06	15/07	15/08	15/09	15/10	15/11	15/12
6.50	1				1		2	2		3	1	2
7.50		2	3	6			3	6	1	1		1
8.50	5	1	6	30	8	4	9	34	2	2		2
9.50	15	6	3	35	15	11	5	28	1	12	7	3
10.50	24	7	2	39	9	19	12	13	10	28	4	25
11.50	43	7	5	40	23	27	19	35	10	27	10	21
12.50	29	18	14	88	34	68	36	67	28	49	16	57
13.50	39	27	45	109	44	97	101	70	16	50	22	63
14.50	85	48	67	123	91	166	136	87	54	102	51	71
15.50	51	63	148	181	136	226	124	178	75	185	103	49
16.50	34	100	111	119	128	382	69	191	115	174	163	79
17.50	50	105	168	88	152	396	78	282	163	154	202	97
18.50	82	119	240	144	169	342	65	317	192	125	186	131
19.50	70	152	174	151	56	293	79	222	202	141	162	143
20.50	67	171	257	235	37	126	80	153	133	186	243	50
21.50	108	105	317	181	75	54	55	35	153	131	189	23
22.50	49	45	120	150	92	92	15	22	60	88	112	46
23.50	34	18	38	60	56	64	2	5	11	14	24	28
24.50	3	1	9	11	9	32		13	5	9	4	7
25.50	1		3	3	2	17		3	2	1	4	
26.50								4	1		1	
27.50			1					1	2			
SUM	790	995	1731	1793	1137	2416	890	1768	1236	1482	1504	898

Table 1.6.4. Pooled length-frequency data of *Selar crumenophthalmus* (Bloch, 1793) collected in South Sulu Sea in 1987.

ML\DATE	15/02	15/03	15/04	15/05	15/06	15/07	15/08	15/09	15/10	15/11
10.00										
11.00									4	
12.00					2	1	2	3	25	
13.00	2		4		36	19	5	10	29	5
14.00	5		7		70	77	59	25	19	32
15.00	26	4	6		12	36	131	10	41	38
16.00	59	4	3			39	187	32	26	42
17.00	33	10	3			8	206	113	11	6
18.00	13	70	4				30	60	51	1
19.00	2	87	14	1			2	3	38	
20.00		20	33	8					1	
21.00	1	6	46	50						
22.00		1	18	20						
23.00			1	6			1			
24.00			1	3						
SUM	141	202	140	88	120	180	623	256	245	124

Table 1.6.5. Length-frequency data of *Selar crumenophthalmus* (Bloch, 1793) collected in Leyte Gulf from 1985 to 1987.

ML\DATE	15/01	15/02	15/03	15/04	15/05	15/06	15/07	15/08	15/09	15/10	15/11	15/12
8.50					15					4		
9.50					18					17		7
10.50					29	7				35	4	13
11.50		2			28	26	1			22	6	10
12.50		14			18	24	4	7		30	21	8
13.50	9	25	23		18	27	17	3		27	32	8
14.50	20	34	26		11	51	17	9	2	27	21	14
15.50	30	42	46		8	74	18	27	8	32	25	12
16.50	29	27	36		4	61	15	22	19	35	15	13
17.50	35	34	48		12	73	23	27	23	25	9	19
18.50	37	30	40	5	38	74	22	14	30	15	15	17
19.50	35	23	35	28	67	49	8	11	12	16	14	21
20.50	34	20	19	27	55	14	12	8	10	6	14	19
21.50	36	19	31	37	49	2		5	4	6	7	30
22.50	4	3	23	21	38			4	2	5	5	25
23.50	5	4	23	17	12			2	2			
24.50		7	9	13	11			3				
25.50				4								
SUM	274	284	359	152	431	482	137	142	112	302	188	216

Table 1.6.6. Pooled length-frequency data of *Selar crumenophthalmus* (Bloch, 1793) collected in Camotes Sea from 1983 to 1987.

ML\DATE	15/01	15/02	15/03	15/04	15/05	15/06	15/07	15/08	15/09	15/10	15/11	15/12
6.50		1				3						
7.50		1		2		3	3					1
8.50		5		2		17	20		31	11	6	1
9.50		7				22	31		44	20	18	2
10.50		1	1	10		33	38	18	4	40	35	4
11.50			1	12		37	86	76	1	79	80	11
12.50			3	20		35	162	69	5	147	104	34
13.50	1		30	16		14	227	118	16	243	107	93
14.50	2	5	30	6	2	8	102	206	16	352	141	161
15.50	5	35	12	17	14	10	118	164	42	266	183	96
16.50	33	56	3	20	29	15	125	210	121	137	297	218
17.50	55	21	11	9	91	10	48	239	159	159	277	253
18.50	45	64	26	7	117	23	65	222	200	221	177	100
19.50	56	98	45	13	82	30	141	117	215	243	99	55
20.50	72	101	84	68	27	54	124	59	117	206	110	51
21.50	61	102	133	70	20	19	97	45	91	73	56	57
22.50	20	82	97	127	47	21	31	30	61	22	9	12
23.50	10	28	30	84	46	32	20	14	47	23	3	2
24.50	3	19	12	36	25	23	13	16	51	25	1	
25.50		11	8	12	1	13		4	15	17		
26.50		11	2	1					3	5		1
27.50		1							2	2		
SUM	363	649	528	532	501	422	1451	1607	1241	2291	1703	1152

Table 1.7.1. Length-frequency data of *Atule mate* (Cuvier, 1833) collected in Leyte Gulf in 1987.

ML\DATE	15/02	15/03	15/04	15/05	15/06	15/07	15/08	15/09	15/10	15/11	15/12
20.50					4		1	4	4	3	
21.50			4	4	8	2	2	5	18	2	
22.50			6	5	3	4	4	10	13	1	2
23.50			9	11	17	12	6	7	12	2	8
24.50	4	2	7	12	8	19	7	13	17	2	4
25.50	8	4	5	19	4	23	3	21	8	5	9
26.50	16	3		16	16	14	6	11	5	5	13
27.50	10	4		11	11	8		10	7	8	13
28.50	12			7		3		5		3	1
29.50	3							4			2
SUM	53	13	31	85	71	85	29	90	84	31	52

Table 2.1.1. Length-frequency data of *Rastrelliger kanagurta* (Cuvier, 1816) collected in South Sulu Sea in 1987.

ML DATE	15/01	15/02	15/03	15/04	15/06	15/07	15/08	15/09	15/10	15/11
9.00									3	
10.00									4	
11.00									1	
12.00								1		
13.00								1		1
14.00	1	2						8	1	1
15.00	9	8	2				1	4	8	6
16.00	30	1	11			4	1		4	17
17.00	27	4	20		9	6	13	1	6	12
18.00	36	7	14		5	4	28	1	17	11
19.00	23	2	12	1	4		15	2	14	17
20.00	7	4	16		2		9		3	13
21.00	4	8	35	2						2
22.00	7	4	39	12						
23.00			12	21						
24.00				5						
SUM	144	40	161	41	20	14	67	18	61	80

Table 2.1.2. Pooled length-frequency data of *Rastrelliger kanagurta* (Cuvier, 1816) collected in Illana Bay from 1983 to 1984.

ML DATE	15/01	15/02	15/03	15/04	15/05	15/06	15/07	15/08	15/09	15/10	15/11	15/12
7.50							3				1	
8.50							11			2	8	6
9.50			5	4			3			3	19	1
10.50			5	46		1	2			5	73	7
11.50			11	57		4	2	7	8	13	78	18
12.50	8		21	16	4	11	13	23	34	32	61	67
13.50	19	2	33	29	16	78	31	51	170	20	64	86
14.50	12	8	15	52	35	124	102	57	221	16	40	73
15.50	9	28	5	61	62	204	173	48	134	45	30	50
16.50	7	13	3	13	82	118	144	42	89	34	28	38
17.50	2				126	57	68	31	20	8	26	36
18.50	1	5			51	28	66	11	7	2	11	9
19.50	0	8			12	4	13	6	13		2	2
20.50	3	7	7		8	1	17	3	7			3
21.50	17	19	4				18		4			
22.50	17	6	13									
23.50	1		16									
SUM	96	96	138	278	396	630	666	279	707	180	441	396

Table 2.1.3. Pooled length-frequency data of *Rastrelliger kanagurta* (Cuvier, 1816) collected in Leyte Gulf from 1986 to 1987.

ML DATE	15/01	15/02	15/03	15/04	15/05	15/06	15/07	15/08	15/09	15/10	15/11	15/12
13.50						5						
14.50						5	4					
15.50						7	5	2				
16.50						12	13	2				
17.50						14	5	12	3			
18.50						18	8	14	7	1		
19.50						10	10	4	14	5		3
20.50			3			16	6	8	20	9	3	4
21.50			2	7		13	5	7	16	13	10	3
22.50			5	14		9	8	15	7	12	11	5
23.50				10	10	2	12	26	16	15	17	7
24.50	3	4	7	13	13	16	10	30	18	28	17	21
25.50	19	8	23	48	36	17	8	21	22	19	17	26
26.50	22	25	44	35	35	18	7	17	25	24	11	40
27.50	24	26	20	29	26	21	7	12	13	17	12	26
28.50	20	29	16	34	29	13	2	9	2	12	10	24
29.50	13	19	9	12	5	1			3	5	8	6
30.50	2	3		2								
31.50	2											
SUM	105	114	129	204	154	197	110	179	166	160	116	165

Table 2.1.4. Pooled length-frequency data of *Rastrelliger kanagurta* (Cuvier, 1816) collected in Samar Sea from 1983 to 1986.

ML DATE	15/01	15/02	15/03	15/04	15/05	15/07	15/10	15/11
16.50		1	1					
17.50		9						
18.50		7	3					2
19.50		4	5			6		2
20.50	5	8	6			24		6
21.50	5	3	2			25		5
22.50	10	12	7			33		1
23.50	6	6	17			38		3
24.50	4	7	28	3		17		6
25.50	11	4	28	5	3	33	49	7
26.50	17	15	16	2	5	14	12	16
27.50	11	12	25	4	9	10	7	17
28.50	14	23	47	18	36	9	25	35
29.50	12	12	34	17	30	5	16	29
30.50	2	1	3	20	10		21	13
31.50				9			10	
32.50		2		3	1		5	
33.50		4		2				
34.50								
35.50		2						
SUM	97	132	222	83	94	214	145	142

Table 2.1.5. Pooled length-frequency data of *Rastrelliger kanagurta* (Cuvier, 1816) collected in Guimaras Strait from 1984 to 1986.

ML DATE	15/01	15/02	15/03	15/04	15/05	15/06	15/07	15/08	15/09	15/10	15/11
15.50						2					
16.50	1					1					
17.50				3		6					
18.50	5			7		2					
19.50	8			12		3		4		2	
20.50	7	3	13	25		12		5		16	
21.50	5		17	10		11		8		3	
22.50	2	12	52	8	7	7		21		7	
23.50	7	2	16	2	8	26	1	13	2	1	
24.50	9	3		14	20	13	4	4	1		
25.50	2	4	2	10	10	5	2	5	15	3	
26.50		9	2	13	15	5	5		7		7
27.50				3		7	2		11		11
28.50				2		2	1		8		13
29.50						3	2		3		8
30.50							1		2		9
31.50						1					5
32.50											2
SUM	46	33	102	109	60	106	18	60	49	32	55

Table 2.1.6. Pooled length-frequency data of *Rastrelliger kanagurta* (Cuvier, 1816) collected in Visayan Sea from 1983 to 1988.

ML DATE	15/01	15/02	15/03	15/04	15/05	15/06	15/07	15/08	15/09	15/10	15/11	15/12
10.50											1	
11.50								6	9		10	
12.50								9	30		16	
13.50								6	32		6	
14.50	18							8	18	4		
15.50	46							40	8			
16.50	24				21	7		28	8	6	5	
17.50						11		29	12	6	9	
18.50	4		6	3	4	20		17	17	7	16	
19.50	1	1	13	42	13	14	13	36	52	4	35	3
20.50	5	1	63	81	31	20	52	62	89	9	24	1
21.50	10	1	78	27	104	11	102	15	62	5	25	9
22.50	10	26	59	33	158	34	107	42	31	6	21	6
23.50	6	60	80	40	83	57	128	24	24		14	1
24.50	12	81	73	36	146	117	93	31	9	4	13	3
25.50	33	35	59	154	167	121	56	39	28	32	21	42
26.50	22	10	21	196	124	85	98	16	22	34	23	5
27.50	23	7	6	137	108	100	75	39	19	32	34	20
28.50	28	2	27	79	12	68	40	8	14	39	17	53
29.50	25	1	22	66	17	45	29	20	7	19	14	13
30.50	6		17	20		20	21		8	5	13	
31.50	9			6	1	5	1	6			3	1
32.50				3	1	3	1		2		1	
SUM	282	225	524	923	990	738	816	481	501	212	321	157

Table 2.1.7. Length-frequency data of *Rastrelliger kanagurta* (Cuvier, 1816) collected in Camotes Sea in 1987.

ML\DATE	15/02	15/03	15/06	15/11	15/12
12.50		1			
13.50					
14.50		1			
15.50	1	15		1	
16.50	7	19		9	
17.50	18	12	1	5	
18.50	48	17	2	2	2
19.50	64	15	2	1	4
20.50	41	36	2	2	9
21.50	20	106	5	33	3
22.50	47	151	1	19	6
23.50	62	63		1	5
24.50	15	17			8
25.50		1			10
26.50		1			1
27.50			4		1
28.50			4		1
29.50			2		
SUM	323	455	23	73	50

Table 2.2.1. Pooled length-frequency data of *Rastrelliger faughni* (Matsui, 1967) collected in Visayan Sea from 1983 to 1987.

ML\DATE	15/01	15/02	15/03	15/04	15/05	15/07	15/08	15/09	15/10	15/11	15/12
13.50			2					1			
14.50		6	6	1	1	1	2	6			
15.50	1	14	18	10	2	7	6	10			
16.50	2	7	10	29	3	1	3	7			7
17.50	7	9	8	23	25	13	14	1		4	26
18.50	13	8	6	7	19	16	12		6	17	35
19.50	12	5	2	5	11	17	16		12	30	24
20.50	16	2			15	23	11	1	9	39	5
21.50	7				15	13	7	10	7	26	1
22.50	12				5	8	3	11	8		1
23.50	9					13		21	17		
24.50	7							8	20		
25.50	9							7	15		
26.50	3							2	1		
SUM	98	51	52	75	96	112	74	85	95	116	99

Table 2.2.2. Pooled length-frequency data of *Rastrelliger faughni* (Matsui, 1967) collected in Camotes Sea in 1987.

ML\DATE	15/01	15/02	15/03	15/04	15/06	15/08	15/09	15/10	15/11	15/12
10.00					1		1	6		
11.00					3		13	12		
12.00	1				8		11	15		
13.00	2				2	5	15		10	
14.00	14					42	21	9	27	2
15.00	25	6			1	64	18	19	96	6
16.00	63	22			5	93	4	78	120	3
17.00	133	60			23	118	2	75	126	25
18.00	26	46	2	1	7	78	4	88	85	96
19.00	18	69	5		7	89	21	66	74	122
20.00	122	36	25	1	30	71	25	25	117	104
21.00	211	32	54	14	16	25	19	28	108	65
22.00	91	35	107	53	8	17	8	7	40	36
23.00	52	34	71	25	30	11	7	13	2	24
24.00	11	11	14	9	31	7	2	8	3	30
25.00		1	3	3	5	4	1	1	1	6
26.00				2		1				
SUM	769	352	281	108	177	625	172	450	809	519

Table 2.2.3. Pooled length-frequency data of *Rastrelliger faughni* (Matsui, 1967) collected in Leyte Gulf from 1986 to 1987.

ML\DATE	15/01	15/02	15/03	15/04	15/05	15/06	15/07	15/08	15/09	15/10	15/11	15/12
13.50					4							
14.50					6		7				3	
15.50					14		11				6	
16.50					21		12	4			6	
17.50					20		14	4			6	
18.50					16		9	5			4	
19.50					19		8	5	5			
20.50					10		11	7	4			
21.50					12		10	6	5		2	4
22.50					3	3	16	10	7		5	7
23.50			7	4		5	12	8	7		4	8
24.50	3	4	8	23	18	12	10	11	12	2	3	15
25.50	5	11	15	33	17	15	4	13	8	13	2	23
26.50	8	13	24	22	18	10	3	11	4	15	1	15
27.50	2	14	12	27	15	8		4	2	11		18
28.50	5	18	13	20	7					6		17
29.50		12	7							5		10
SUM	23	72	86	129	200	53	127	88	54	52	42	117

Table 2.2.4. Length-frequency data of *Rastrelliger faughni* (Matsui, 1967) collected in Tayabas Bay in 1987.

ML\DATE	15/02	15/05	15/06	15/07	15/09	15/10	15/11
13.00							3
14.00						5	32
15.00					2	16	46
16.00					7	25	22
17.00			1		14	8	5
18.00			4		6	12	7
19.00			3	2	8	26	3
20.00	6			4	2	6	10
21.00	5			2	1	5	3
22.00	15	3		3	1	1	3
23.00	9	15	5	6			
24.00		13	8	5	4		
25.00		14		1			
26.00		13			1		
27.50		2					
SUM	35	60	21	23	46	104	134

Table 2.3.1. Pooled length-frequency data of *Rastrelliger brachysoma* (Bleeker, 1851) collected in Guimaras Strait from 1984 to 1986.

ML\DATE	15/01	15/02	15/04	15/05	15/06	15/09	15/10	15/11
13.50						1		
14.50	14					2		
15.50	17		6		1	11		2
16.50	18		7		6	40	3	24
17.50	4		3		3	12	23	
18.50	16	4	17		4	21	11	4
19.50	26	37	8	1	11	29	2	1
20.50	53	55	13	23	15	19		
21.50	28	28	12	12	29	11		
22.50	26	17	11	20	19		1	
23.50	3	4	3	22	37			
24.50	13	7	1	18	7			
25.50	6			8	7			
26.50	3							
27.50								
28.50								
29.50	1							
SUM	228	152	81	104	139	146	40	31

Table 2.3.2. Pooled length-frequency data of *Rastrelliger brachysoma* (Bleeker, 1851) collected in Visayan Sea from 1983 to 1988.

ML\DATE	15/01	15/02	15/03	15/04	15/05	15/06	15/07	15/08	15/09	15/10	15/11	15/12
4.50									2			
5.50									7			
6.50									33			
7.50									44			
8.50									19			
9.50												
10.50									10			
11.50									8			
12.50									10			
13.50	2		3						20		1	
14.50	16	9	9		16			11	25	6	4	
15.50	24	14	19		20	7	6	3	17	3	6	
16.50	16	10	16		20	14	36	50	27	3	19	
17.50	17	10	14	8	2	6	68	32	42	3	25	
18.50	45	33	40	53	4	9	161	52	83	7	47	8
19.50	53	38	56	51	65	35	103	28	70	18	88	11
20.50	40	25	22	79	142	87	103	53	81	22	88	29
21.50	31	26	40	40	92	187	101	43	51	10	56	6
22.50	16	15	15	32	60	135	45	10	41	2	45	4
23.50	11	9	5	1	23	58	23	15	35	2	24	
24.50	8	21	8		33	43	26	3	17	1	7	
25.50	6	7	10		13	33	24		25	1	6	
26.50	15	12	5		1	21	13		8		3	
27.50	8	16	1			17			10			
28.50	2	9				16			3			
29.50	6	4							1			
SUM	316	258	263	264	491	668	709	300	689	78	419	58

Table 2.3.3. Pooled length-frequency data of *Rastrelliger brachysoma* (Bleeker, 1851) collected in Leyte Gulf from 1983 to 1987.

ML\DATE	15/01	15/02	15/03	15/04	15/05	15/06	15/07	15/08	15/09	15/10	15/11	15/12
7.50		5	8									
8.50		15	13								4	
9.50		19	27		4					22	12	
10.50		15	43		40	34			3	38	28	
11.50		23	42		21	20		2	13	33	47	
12.50	9	43	71	24	21	92	10	11	16	67	85	23
13.50	6	108	102	29	69	117	40	27	48	93	81	38
14.50	57	110	83	24	110	128	43	68	54	107	78	65
15.50	64	135	66	50	90	98	37	93	73	86	56	56
16.50	78	152	83	39	108	146	50	104	99	114	74	60
17.50	75	158	64	42	124	135	65	84	129	149	73	54
18.50	48	63	79	54	125	109	70	77	153	98	68	67
19.50	47	53	48	33	70	101	64	75	127	97	63	36
20.50	19	45	56	58	31	46	43	38	82	61	30	44
21.50	12	31	44	47	25	26	23	29	38	40	30	31
22.50	21	20	36	49	34	12	10	14	27	15	18	9
23.50	18	32	25	35	37	16	2		10		5	14
24.50	5	12	5	25	7		4		5		10	4
25.50	4	5			6				5		5	
SUM	463	1044	895	509	922	1080	461	622	882	1020	767	501

Table 2.4.1. Pooled length-frequency data of *Auxis thazard* (Lacepede, 1800) collected in Camotes Sea from 1983 to 1987.

ML\DATE	15/01	15/03	15/04	15/06	15/07	15/08	15/09	15/10	15/11	15/12
16.50								3		
17.50		1						22		
18.50					4		1	22		
19.50		1			6			11		2
20.50	1	2	1		5	6	1	7		2
21.50			2		7	2		10		2
22.50	3	3	14		16	5		2		5
23.50	3	12	13		12	3	1	2		9
24.50	5	12	15		5	4	1	1		12
25.50	2	9	24	2	5					14
26.50	9	7	18	5	20					5
27.50	7	9	14	11	19		3			7
28.50	6	3	8	4	11				1	2
29.50	2		8	3	8				1	
30.50	2		1		9					
31.50		1			1				4	
32.50					3				4	
33.50					3					
34.50		1			9					
35.50		2			14					
SUM	40	63	118	25	160	20	7	80	10	60

Table 2.5.1. Pooled length-frequency data of *Auxis rochei* (Risso, 1810) collected in Camotes Sea from 1983 to 1987.

ML\DATE	15/01	15/02	15/03	15/04	15/05	15/06	15/07	15/08	15/09	15/10	15/11	15/12
8.50			4									
9.50			4	1								
10.50		1	13	4					4			
11.50		2	8	6					25			
12.50		3	9	10			26		55			
13.50		18	15	13			44		50			
14.50		31	9	14			15		16			
15.50		34	13	15			43		57			
16.50		35	41	4			22		65			
17.50	1	24	43	3	1	3	1		23	1		
18.50	13	53	22	1	15	6	4	2	10	8	1	
19.50	3	42	16	14	67	65	33	43	50	55	20	3
20.50	3	12	14	37	93	101	156	288	187	140	80	2
21.50		1	14	307	250	962	512	600	287	193	68	20
22.50	7	2	67	379	220	390	699	302	400	256	58	50
23.50	5	3	73	253	479	139	498	185	355	200	50	26
24.50	1	36	65	89	345	30	314	144	164	108	14	25
25.50	5	36	38	55	102	4	77	39	83	70	11	17
26.50	2	2	21	22	52	1	5	9	10	32	13	19
27.50		1	14	7	7	2	1	1	4	4	11	11
28.50			2		10	1				11	8	9
29.50				1	5					7	10	3
30.50					8					1	5	
31.50					7						6	
32.50					1						4	
33.50					1							
34.50												
35.50												
36.50												
37.50											2	
SUM	40	336	505	1235	1663	1704	2450	1613	1845	1086	361	185

Table 2.6.1. Pooled length-frequency data of *Katsuwonus pelamis* (Linnaeus, 1758) collected in Illana Bay, Tayabas Bay and Bohol Sea from 1983, 1984, 1987 and 1988.

ML\DATE	15/01	15/02	15/03	15/04	15/05	15/06	15/07	15/08	15/09	15/10	15/11	15/12
12.00				24	9						16	14
16.00		3	1	31	71					3	56	26
20.00		16			43				8	20	31	
24.00	10	1	11			21			12	27	12	
28.00	30		9		6	1		1	1	30	80	
32.00	3				1	5	2	5	9	23	40	10
36.00	9	8	10	11	13	28	10	3	13	29	15	
40.00	24	25	47	63	53	49	16	6	13	10	46	19
44.00	20	34	91	72	19	44	30	1	10	10	45	87
48.00	102	116	156	210	79	163	16	6	18	20	106	77
52.00	72	82	83	38	13	10	16	27	8	34	66	125
56.00	57	72	87	63	16	5	20	45	17	37	145	64
60.00	47	59	70	8	7	20	24	19	4	43	58	32
64.00	14	56	63	7	5	13	14	7	7	36	160	4
68.00	2	31	31	14	2	6		3	2	18	1	
72.00		21	15	8		5				2		
76.00		2	4	5	1							
80.00			4									
84.00			1	1								
SUM	390	526	683	555	338	370	148	123	122	342	877	458

Table 2.7.1. Pooled length-frequency data of *Thunnus albacares* (Bonnaterre, 1788) collected in Illana Bay, Tayabas Bay, Cuyo-East Pass and Bohol Sea from 1983 to 1988.

ML\DATE	15/01	15/02	15/03	15/04	15/05	15/06	15/07	15/08	15/09	15/10	15/11	15/12
16.00							8	8	2	5	2	
20.00			7				28	27	38	29	29	
24.00			13				22	29	109	52	122	19
28.00			5	1	10	62	100	6	68	14	68	
32.00	31	54	24	15	13	112	121	122	61	22	18	3
36.00	41	89	43	17	8	219	150	85	129	16	38	12
40.00	24	76	60	25	25	186	91	95	56	34	34	26
44.00	44	114	56	26	23	70	39	57	39	37	56	52
48.00	38	40	44	40	21	11	14	43	18	43	23	31
52.00	48	34	223	67	27	7	16	33	17	22	9	35
56.00	13	46	141	49	11	19	19	17	14	14	57	41
60.00	12	46	43	33	15	88	47	13	75	20	29	44
64.00	19	17	26	42	10	67	44	13	74	37	79	40
68.00	8	59	21	39	22	10	2	10	21	25	19	25
72.00	5	335	42	195	193	10	3	2	10	15	16	1
76.00	2	289	119	98	75	10	4	4	6	6	5	1
80.00	11	24	26	29	40	13	3	2	11	4	7	
84.00	23	13	7	30	26	13	13	8	5	6	8	
88.00	6	12	6	28	3	3		5	1		3	
92.00	1	7		26		6	5	3	1	5	6	
96.00	19		5	9	5	3	1	1	1	2	4	
100.00	5		1	5	9	1	4	5	4	3	5	
104.00			2	1	1	3	8	1	3	2	3	
108.00	5		3		2	6	17	2	2	1		
112.00			1	1	1	1	11	2	2	1	1	
116.00				1	5		3	1	1	1		
120.00					5	1	4	3		1		
124.00					4		3	1	2	1		
128.00				2	3		1	1	1	1		
132.00					3		1	1	3	2		
136.00					1			1	2	1		
140.00									1			
144.00					1							
SUM	355	1255	918	779	562	921	782	601	777	422	641	330

Table 3.1.1. Length-frequency data of *Sardinella fimbriata* (Valenciennes, 1847) collected in Tayabas Bay in 1987.

ML\DATE	15/01	15/02	15/03	15/04	15/05	15/06	15/07	15/08	15/09	15/10	15/11	15/12
5.00	1											
6.00	8											
7.00	46	1			11							
8.00	80	13			4							
9.00	77	52		1	3							
10.00	37	47		11	1		3	8				
11.00	25	9	4	10	15		46	35	1			
12.00	7	7	10	31	23		36	8				
13.00		5	11	47	19	32	43	60	16	2	1	
14.00		4	5	58	63	238	284	121	73	37	1	
15.00		12		29	101	400	668	286	104	77	3	
16.00				13	67	215	599	364	223	120	19	1
17.00				3	17	88	375	297	327	62	41	14
18.00			1	3	24	34	161	98	229	40	52	16
19.00			3	1	10	11	56	20	57	88	11	23
20.00			14			1	5		9	8	4	14
21.00			21							5	29	2
22.00			38							1	14	
23.00			25									
24.00			8							1		
SUM	281	150	140	207	358	1019	2276	1297	1039	441	175	70

Table 3.1.2. Pooled length-frequency data of *Sardinella fimbriata* (Valenciennes, 1847) collected in Visayan Sea from 1986 to 1988.

ML\DATE	15/01	15/02	15/03	15/04	15/05	15/06	15/07	15/08	15/09	15/10	15/11	15/12
9.50							22					
10.50					12		23					
11.50			13		3	1	16		17			
12.50			27	2	10	69	13	23	121	21	3	
13.50		41	25	51	95	104	72	38	115	13	9	
14.50	26	122	24	194	130	149	122	128	178	19	48	18
15.50	34	94	48	228	129	128	127	151	270	73	126	48
16.50	35	23	26	113	104	118	90	211	176	82	154	49
17.50	5	4	16	22	39	93	31	149	62	44	133	14
18.50			1	4	27	38		54	31	31	46	10
19.50					3	16		1		6	4	4
20.50					4							
SUM	100	284	180	614	556	716	516	755	970	289	523	143

Table 3.1.3. Pooled length-frequency data of *Sardinella fimbriata* (Valenciennes, 1847) collected in Guimaras Strait from 1984 to 1986.

ML\DATE	15/01	15/03	15/04	15/05	15/06	15/07	15/09	15/11
10.50				2	2	2	1	
11.50	1	14		11	10	8	2	7
12.50	4	14	12	8	5	7	7	1
13.50	3	6	14	38	11	4	6	2
14.50	5	5	12	24	13	12	4	3
15.50	4	8	2	18	10	12	4	12
16.50	10	1	10	14	2	15	1	2
17.50	5		9	5			4	2
18.50	1		22					
19.50			11					
20.50			6					
SUM	33	48	98	120	53	60	29	29

Table 3.1.4. Pooled length-frequency data of *Sardinella fimbriata* (Valenciennes, 1847) collected in Leyte Gulf from 1983 to 1986.

ML\DATE	15/01	15/02	15/03	15/04	15/05	15/06	15/07	15/08	15/09	15/10	15/11	15/12
5.50										5		
6.50										8		
7.50		11			7	3				9	3	
8.50		10	4		23	14			18	27	8	
9.50		22	15		37	23		3	39	18	15	
10.50		22	21		34	37	13	19	65	18	47	
11.50	3	36	25		46	54	69	70	76	49	40	
12.50	19	62	59	13	55	44	17	51	78	43	60	
13.50	41	41	50	25	69	82	25	60	52	54	51	
14.50	38	44	47	30	75	71	22	46	30	61	48	
15.50	38	37	59	53	90	67	26	52	18	17	31	9
16.50	17	39	48	47	50	49	13	28	3	34	15	5
17.50		20	56	38	33	35	14	20		28	5	6
18.50		7	21	25		8	14			3		
19.50		5	24	15			8					
20.50			9	18			7					
21.50			5	15			6					
22.50			4				7					
SUM	156	356	447	279	519	487	241	349	379	374	323	20

Table 3.1.5. Pooled length-frequency data of *Sardinella fimbriata* (Valenciennes, 1847) collected in South Sulu Sea from 1983 to 1988.

ML\DATE	15/01	15/02	15/03	15/04	15/05	15/06	15/07	15/08	15/09	15/10	15/11	15/12
6.50						1						
7.50						18						
8.50		2	1	3		5	2					
9.50		60	7	17		36	12	5		18	2	2
10.50		25	41	41	4	19	47	64	4	28	29	
11.50	1	1	73	64	23	42	76	55	116	40	39	14
12.50	7	2	15	13	51	86	96	13	219	80	27	43
13.50	25	7	17	30	87	139	158	3	342	22	48	22
14.50	56	15	23	25	105	82	196	25	225	19	68	22
15.50	52	11	41	25	168	113	143	34	148	9	69	35
16.50	2	5	9	30	211	147	95	35	97	1	52	20
17.50			1	7	77	114	73	13	28		18	7
18.50	1	1		4	17	24	27	2				1
19.50			1				1					
20.50			1									
SUM	144	129	230	259	743	826	926	249	1179	217	352	166

Table 3.2.1. Pooled length-frequency data of *Amblygaster sirm* (Walbaum, 1792) collected in South Sulu Sea from 1983 to 1988.

ML\DATE	15/01	15/02	15/03	15/04	15/05	15/06	15/07	15/08	15/09	15/10	15/11	15/12
4.50												1
5.50												
6.50						2				22	16	7
7.50		2	2			8	2	1	1	93	36	15
8.50	2	12	6		2	9	17	5	1	258	57	22
9.50	42	25	8		6	7	43	31	12	167	8	49
10.50	116	26	27	3	18	95	95	50	42	97	156	12
11.50	168	49	22	22	22	211	54	52	25	18	229	20
12.50	188	99	19	42	133	175	107	37	119	90	308	46
13.50	204	171	24	100	104	144	181	118	205	103	276	125
14.50	65	275	101	113	37	55	128	156	248	158	214	174
15.50	62	289	237	130	35	64	91	79	156	132	167	289
16.50	119	159	166	129	62	42	70	61	117	68	62	486
17.50	304	97	176	230	198	147	57	39	65	64	28	343
18.50	371	222	324	372	403	315	47	60	45	30	28	76
19.50	165	319	479	244	346	255	114	46	25	21	28	37
20.50	39	306	264	108	201	161	131	31	35	26	17	16
21.50	4	36	157	31	88	100	167	16	31	84	7	15
22.50	1	7	25	3	31	42	46	2	4	59		
23.50		2	3	2	3	7	8	2	1	15		
24.50										1		
25.50												
26.50										1		
SUM	1850	2096	2040	1529	1689	1839	1358	786	1132	1507	1637	1733

Table 3.2.2. Length-frequency data of *Amblygaster sirm* (Walbaum, 1792) collected in Camotes Sea in 1987.

ML\DATE	15/06	15/07	15/08	15/09	15/10	15/11
9.50		2				
10.50	2	3	1			
11.50	46	5	2			
12.50	161	31	5			
13.50	138	151	42			
14.50	23	189	135			
15.50	4	95	184	4		
16.50		19	76	16	1	1
17.50		2	10	110	7	
18.50		1	6	89	51	
19.50			2	14	98	10
20.50			3	1	36	43
21.50					5	37
22.50						1
SUM	374	498	466	234	198	92

Table 3.3.1. Pooled length-frequency data of *Sardinella albella* (Valenciennes, 1847) collected in Visayan Sea from 1983 to 1986.

ML\DATE	15/01	15/02	15/03	15/04	15/05	15/06	15/07	15/08	15/09	15/10	15/11	15/12
9.50												1
10.50										4		1
11.50		9	6		2	3	14	68		16		8
12.50	1	42	32	137	165	31	49	83	10	63		26
13.50	41	87	34	124	230	23	78	176	105	62	12	52
14.50	56	87	22	118	143	27	69	49	65	73	12	25
15.50	44	53	1	103	50	16	53	70	69	122	19	3
16.50	34	26		15	20	12	26	69	61	33	43	5
17.50	24	17		5	25	16	14	62	68	26	49	8
18.50	40	23			60	12		22	39	23	17	5
19.50	45	26			26	3		5	1	6	2	
20.50	25	15			14	1		6		4		
21.50	3			5	2	1						
22.50				28	1							
23.50				12								
SUM	313	385	95	547	738	145	303	610	418	432	154	134

Table 3.3.2. Pooled length-frequency data of *Sardinella albella* (Valenciennes, 1847) collected in Guimaras Strait and Samar Sea from 1983 to 1986.

ML\DATE	15/01	15/02	15/03	15/04	15/05	15/06	15/07	15/08	15/09	15/10	15/11	15/12
10.50												1
11.50			21					9	2		2	7
12.50		2	26	21	66	14		3	22	23	2	47
13.50	52	9	37	33	83	25		12	21	49	40	62
14.50	42	14	25	39	42	6	23		9	41	69	72
15.50	19	8	16	38		24	19	8	23	27	37	45
16.50	36	50	3	7		12	17		10	17	32	30
17.50	28	49		2		12	21		4	8	14	14
18.50	22	30	1			19	21		1	4	7	9
19.50	27	24				14	5					3
20.50	15	19				10			1			
21.50	6	1				1						
SUM	247	206	129	140	191	137	106	32	93	169	203	290

Table 3.4.1. Length-frequency data of *Sardinella longiceps* (Valenciennes, 1847) collected in South Sulu Sea in 1987.

ML\DATE	15/02	15/03	15/04	15/05	15/06	15/07	15/08	15/09	15/11	15/12
6.00										
7.00					3					
8.00					7	6				
9.00					7	5	3			
10.00	29	8			28	2	52	1	3	2
11.00	13	11			1	2	81	16	4	39
12.00	7	12	2	1		2	17	22	25	65
13.00	67	13	22	24		22	7	44	9	12
14.00	74	32	94	58	9	88	15	20	2	2
15.00	26	41	80	35	4	21	25	7		
16.00	4	10	2	2		15	17	4		
17.00		1				8	7			
18.00		2					2	1		
19.00	3				1			1		
SUM	223	130	200	120	60	171	226	116	43	120

Table 3.4.2. Pooled length-frequency data of *Sardinella longiceps* (Valenciennes, 1847) collected in Visayan Sea from 1983 to 1987.

ML\DATE	15/01	15/02	15/03	15/04	15/05	15/06	15/07	15/08	15/09	15/10	15/11	15/12
10.50			4	8	4		7	2			12	
11.50	77		25	32	39		18	5		1	37	1
12.50	4		37	25	44		20	12	14	1	33	6
13.50	28		25	8	52	31	30	30	27	18	34	49
14.50	80	16	26	2	34	55	18	21	24	20	20	39
15.50	23	67	3		40	61	18	12	22	7	32	40
16.50	61	35	11		68	55	16	55	45	23	28	10
17.50	14	8	47	1	105	77	16	100	103	16	24	6
18.50	54	14	10	14	51	111	12	79	92	8	28	3
19.50	48	7	28	33	67	81	12	70	67	20	20	2
20.50	27	4	17	21	14	41	20	41	31	19	7	
21.50	19		10	9		2	7	6	19		1	
22.50	12		4	2			4	4	14	2		
23.50	2		6						9			
24.50								1	2			
25.50									2			
26.50									1			
SUM	449	151	253	155	518	514	198	438	472	135	276	156

Table 3.5.1. Pooled length-frequency data of *Herklotsichthys quadrimaculatus* (Ruppel, 1837) collected in Camotes Sea in 1987.

ML\DATE	15/02	15/03	15/04	15/06	15/07	15/08	15/09	15/10	15/11	15/12
5.00				1						
6.00										
7.00										
8.00										
9.00		1	2	12	1		2			
10.00	2		16	32	21	6	13	6	4	
11.00		8	31	42	89	29	19	40	6	
12.00	14	21	20	47	132	162	40	58	11	1
13.00	43	42	15	99	186	132	93	199	98	34
14.00	50	69	9	67	113	127	87	142	152	80
15.00	31	68	3	11	24	59	17	38	28	27
16.00	1	9			3	2	1	1	5	2
SUM	141	218	96	311	569	517	272	484	304	144

Table 4.1.1. Length-frequency data of *Stolephorus commersonii* (Lacepede, 1803) collected in Illana Bay in 1983.

ML\DATE	15/01	15/03	15/04	15/05	15/06	15/07	15/08	15/09
2.50				1	30	16	20	60
3.50	8	22	28	101	54	34	25	45
4.50	14	11	45	98	31	42	19	44
5.50	51	41	63	160	85	68	71	88
6.50	29	6	52	17		1	5	8
7.50			27	2				5
8.50	18		5	1				
9.50	4							
10.50	10							
11.50	6							
SUM	140	80	220	380	200	161	140	250

Table 4.2.1. Length-frequency data of *Stolephorus punctifer* (Fowler, 1938) collected in Tayabas Bay in 1987.

ML\DATE	15/01	15/02	15/03	15/04	15/05	15/09	15/10
47.50			1	1	1		
52.50		4	5	6	2		
57.50	3	33	7	13	6	1	2
62.50	4	48	10	24	11	1	7
67.50	12	57	74	52	13		30
72.50	30	44	92	37	17	2	46
77.50	88	46	107	27	19	16	48
82.50	115	12	59	38	22	23	34
87.50	165	4	21	36	21	7	13
92.50	125		17	38	22		
97.50	58		16	31	19		
102.50	8		12	14	8		
107.50	1		14	17	2		
112.50			3	2			
SUM	609	248	438	336	163	50	180

Table 4.2.2. Length-frequency data of *Stolephorus punctifer* (Fowler, 1938) collected in South Sulu Sea in 1987.

ML\DATE	15/02	15/03	15/04	15/06	15/08	15/09	15/10	15/11	15/12
57.50					7	1	11		
62.50					7		10		
67.50		4		3	13	4	12	1	1
72.50		18		10	14	6	4	1	1
77.50	5	13	2	19	13	28	1	1	1
82.50	3	7	5	27	7	23	1	1	5
87.50	4	8	38	23	9	12		5	27
92.50	4	10	52	10	3	3		4	12
97.50	3	23	43	20	2			2	7
102.50	1	14	12	17				1	
107.50		8	5	7					
112.50			1	1					
117.50				1					
SUM	20	105	158	138	75	77	39	16	54

Table 4.3.1. Length-frequency data of *Stolephorus heterolobus* (Rüppel, 1837) collected in Tayabas Bay in 1987.

ML\DATE	15/01	15/02	15/03	15/04	15/05	15/07	15/09	15/10	15/11	15/12
47.50	2				2			1		
52.50	2	4	2	2	6			7		
57.50	10	16	6	11	15			6	3	2
62.50	17	41	16	36	34			14	19	4
67.50	28	84	49	52	36	2		31	56	14
72.50	55	49	65	67	66	13	1	61	61	47
77.50	123	46	75	65	64	26	8	118	63	49
82.50	125	88	54	50	42	7	12	109	23	22
87.50	162	125	58	59	27	4	5	85	18	10
92.50	102	73	58	51	16	1	2	28	5	1
97.50	23	43	67	77	51			19	2	2
102.50	4	24	33	2	53			6		1
107.50		7	14		35			1		
112.50		1	3		8					
SUM	653	601	500	472	455	53	28	486	250	152

Table 4.3.2. Length-frequency data of *Stolephorus heterolobus* (Rüppel, 1837) collected in South Sulu Sea in 1987.

ML\DATE	15/02	15/03	15/04	15/06	15/08	15/09	15/10	15/12
42.50						1		
47.50	2							
52.50	1							
57.50	2				4	2	2	1
62.50	1				4	4	4	1
67.50	2	1	4		10	15	12	1
72.50	1	1	18	2	15	21	10	4
77.50	5	13	26	21	20	19	15	4
82.50	6	10	6	50	19	17	7	23
87.50	21	24	8	122	8	10	19	30
92.50	32	21	22	111	8	2	30	30
97.50	32	46	74	94	9		12	29
102.50	18	37	58	27	4		2	4
107.50	7	28	32	10				1
112.50	1	6	5					
117.50	1							
122.50	1							
SUM	133	187	253	437	101	91	113	128

Table 4.4.1. Length-frequency data of *Engraulis japonicus* (Temminck and Schlegel, 1846) collected in Tayabas Bay in 1987.

ML\DATE	15/01	15/02	15/03	15/04	15/05	15/09	15/10	15/12
47.50	8	1	3	3	1			4
52.50	13	3	16	16	3			4
57.50	29	7	40	51	10			24
62.50	55	24	35	83	14			17
67.50	66	43	22	121	10	1		20
72.50	62	56	25	79	1	4	1	2
77.50	81	74	37	22	1	18	10	3
82.50	69	83	49	8		40	9	
87.50	52	73	46	10		37	6	
92.50	43	32	50	17		1	1	
97.50	25	10	33	23				
102.50	6	4	6	24				
107.50	2	7	3	44				
112.50	1	3		28				
117.50			1	15				
122.50				3				
SUM	512	420	366	547	40	101	27	74

Table 4.4.2. Length-frequency data of *Engraulis japonicus* (Temminck and Schlegel, 1846) collected in South Sulu Sea in 1987.

ML\DATE	15/02	15/03	15/04	15/05	15/06	15/07	15/08	15/09	15/11
62.50		1							
67.50		6	3				4		
72.50		16	5				10		
77.50		21	4		1	1	20	1	
82.50		23		4	5	1	22	2	
87.50	1	9	3		12	1	15	2	3
92.50	3	4	3		24	1	8	3	5
97.50	10	26	19	4	18	10	1	2	11
102.50	6	13	13	11	7	2	1	2	3
107.50		18	24	41	6	2	4		2
112.50		4	3	19	5	4	10		1
117.50		5	7	18	4	1	17		
122.50		3	1	6	2	1	7		
127.50				4			1		
132.50							1		
SUM	20	149	85	107	84	24	121	12	25

Table 5.1.1. Length-frequency data of *Cheilopogon negricans* (Bennett, 1840) collected in Camotes Sea in 1987.

ML\DATE	15/02	15/03	15/04	15/05	15/06	15/07	15/08	15/09	15/10	15/11	15/12
10.00	1	1	9	1	1					1	2
11.00			15	2	6		1		1	1	1
12.00	2	5	24	7	5	1		3	6	2	5
13.00	1	12	30	23	4	8	4		5	5	4
14.00	4	24	56	26	1	12	9	3	5	3	7
15.00	9	28	51	44	8	22	37	5	7	8	13
16.00	17	27	61	58	12	27	57	21	13	7	7
17.00	32	37	48	31	8	31	34	33	46	3	1
18.00	16	29	29	23	5	11	15	25	26	10	8
19.00	12	9	11	6	1	5	3	7	12		5
20.00	10	1	1	1							
21.00	9	1	1	1							
SUM	113	174	336	223	51	117	160	97	121	40	53

Table 5.2.1. Length-frequency data of *Cheilopogon atrisignis* (Jenkins, 1903) collected in Camotes Sea in 1987.

ML\DATE	15/01	15/02	15/03	15/04	15/05	15/06	15/07	15/08	15/09	15/10	15/11	15/12
8.00						1					2	4
9.00		2									1	6
10.00	2	3	1			1			1	1	9	10
11.00	3	8	5		2	2		1		9	7	14
12.00	3	15	6	3	9	5		1	3	10	17	32
13.00	15	21	24	5	5	16	2	8	8	8	35	42
14.00	44	50	24	6	9	19	1	19	31	18	46	45
15.00	84	69	68	7	24	15	4	20	43	38	94	88
16.00	56	74	61	8	17	5	4	20	21	40	80	56
17.00	46	71	54	11	25	4	2	11	10	13	65	36
18.00	12	62	42	11	7	5	1	4	2	8	16	14
19.00	4	40	36		2	3	3	1		3	2	1
20.00	5	26	37	4		2	3	3	2	0	1	1
21.00		11	12	5			3	3		4	2	
22.00		6	7					1				
23.00		3	2						1			
24.00			1						1			
25.00		1	1									
26.00												
27.00		1										
SUM	274	463	381	60	100	78	23	92	123	152	377	349

Table 5.3.1. Length-frequency data of *Cheilopogon cyanopterus* (Valenciennes, 1847) collected in Camotes Sea in 1987.

ML\DATE	15/01	15/02	15/03	15/04	15/05	15/06	15/07	15/08	15/09	15/10	15/11	15/12
8.00						1					2	4
9.00		2									1	6
10.00	2	3	1			1				1	9	10
11.00	3	8	5		2	2		1	1	9	7	14
12.00	3	15	6	3	9	5		1	1	10	17	32
13.00	15	21	30	5	5	16	2	8	8	8	35	42
14.00	44	50	31	6	9	19	1	19	19	18	46	45
15.00	84	69	52	7	24	15	4	20	20	38	94	88
16.00	56	74	66	8	17	5	4	20	20	40	80	56
17.00	46	71	58	11	25	4	2	11	11	13	65	36
18.00	12	62	47	11	7	5	1	4	4	8	16	14
19.00	4	40	41		2	3	3	1	1	3	2	1
20.00	5	26	38	4		2	3	3	3		1	1
21.00		11	12	5	1		3	3	3	4	2	
22.00		6	7					1	1			
23.00		3	2									
24.00			1									
25.00		1	1									
26.00												
27.00		1										
SUM	274	463	398	60	101	78	23	92	92	152	377	349

Table 5.4.1. Pooled length-frequency data of *Cypselurus negripinnis* (Cuvier & Valenciennes) collected in Bohol Sea from 1984 - 1987.

ML\DATE	15/01	15/02	15/03	15/04	15/05	15/06	15/07	15/08	15/09	15/10	15/11	15/12
7.50						8						
8.50					37	37				1	6	
9.50		1	1		27	13		2		5	7	
10.50		11	16		44	91		5	2	14	8	1
11.50	10	19	39	17	124	82	36	38	21	31	13	24
12.50	22	14	13	58	186	208	90	27	76	10	14	44
13.50	20	6	51	175	172	117	328	44	61	68	26	40
14.50	33	22	27	222	184	170	274	56	86	50	42	125
15.50	390	52	36	108	228	235	355	105	118	88	86	106
16.50	112	52	3	50	216	214	352	123	155	270	43	137
17.50	225	77	66	32	204	378	520	204	212	221	43	143
18.50	178	115	89	13	504	462	543	255	222	406	28	115
19.50	67	68	22	7	379	433	446	231	150	320	8	57
20.50	62	47	20	1	222	432	162	112	106	159	4	37
21.50	45	62	33	6	125	297	188	82	106	88		15
22.50	26	26	27	5	27	304	87	38	15	69		2
23.50	2	9	5			85	12	8	2	27		1
24.50	1	3	2	1		4	7	5	3	9		1
25.50	1	1				24	4			1		1
26.50							4			1		
27.50		3								1		
28.50		3	1		3	24				1		
29.50		3	2		2	2						
30.50		3			10	6						
31.50		3	2		7	11	6					
32.50					11	30						
33.50					7		6					
34.50												1
35.50												1
SUM	1194	600	455	695	2719	3667	3420	1335	1335	1840	328	851

Table 5.5.1. Pooled length-frequency data of *Oxyporhamphus convexus* (Weber & de Beaufort, 1922) collected in Camotes Sea from 1987 - 1988.

ML\DATE	15/01	15/02	15/03	15/04	15/05	15/06	15/07	15/08	15/09	15/10	15/11	15/12
9.00				1							1	
10.00	2		1	7	1					9	1	3
11.00	2	6	8	28	7	11	1			16	10	6
12.00	8	22	36	54	8	16	1	1	1	16	20	4
13.00	20	82	68	89	27	25	8	2	3	26	33	7
14.00	12	80	123	157	29	69	19	4	8	24	68	18
15.00	13	71	205	234	61	118	165	23	7	14	122	72
16.00	39	90	324	193	153	242	265	186	62	31	46	57
17.00	35	152	254	145	112	186	165	226	131	75	13	12
18.00	10	123	152	101	53	72	38	59	45	47	18	10
19.00	4	48	81	64	17	18	14	10	5	10	5	3
20.00		17	16	14	6	5	2	1	2			
21.00			3	1		1						
22.00				1								
SUM	145	691	1271	1089	474	763	678	512	264	268	337	192

Table 5.5.2. Pooled length-frequency data of *Oxyporhamphus micropterus* (Valenciennes, 1847) collected in Bohol Sea in 1985 and 1987.

ML\DATE	15/03	15/05	15/06	15/07	15/08	15/09	15/10	15/11	15/12
10.50			1		4			1	
11.50			6	2	12	18	14	5	
12.50			34	3	40	9	14	36	27
13.50			62	9	63	54	41	69	22
14.50	2		109	10	125	13	62	93	39
15.50	4	1	84	20	156	39	160	148	81
16.50	4	6	152	26	247	148	353	363	133
17.50	2	14	167	82	304	261	617	591	338
18.50	9	24	143	60	256	201	247	302	352
19.50	9	2	92	35	135	75	128	116	135
20.50	4	2	34	14	36	18	35	4	32
21.50				1	2				
22.50					2				
23.50						8			
SUM	34	49	884	262	1382	844	1671	1728	1159

Table 6.1.1. Pooled length-frequency data of *Nemipterus japonicus* (Bloch 1791) collected in Tayabas Bay from 1987 to 1988.

ML\DATE	15/01	15/02	15/03	15/04	15/07	15/08	15/09	15/10	15/11	15/12
10.50	7	20	47			14				
11.50	7		126			36			5	
12.50	30		85		20	1	13		14	
13.50	7		168	17	14	37	33	8	31	5
14.50	22	10	28	26	2	33	24	19	29	22
15.50	30	6	52	70	47	41	13	16	27	16
16.50		16	104	62	28	37		16	13	16
17.50		6	89	45	20	47	19	14	9	
18.50		14	125	36	65	42	6	6	11	22
19.50		10	79	18	54	44	29	5	11	5
20.50	22	26	29		18	23	29	11	1	5
21.50		32	28		15	36	22	11	3	11
22.50		40	4	9	22	39	13	3	1	5
23.50	7	60	13	9	72	5	16	2	11	12
24.50				9	39					21
25.50	7	10	44	18	42	2		1	16	16
26.50						2	13	1		
27.50										
28.50						2	13	1		
SUM	139	250	1021	319	458	441	243	114	182	156

Table 6.1.2. Pooled length-frequency data of *Nemipterus japonicus* (Bloch, 1791) collected in Leyte Gulf from 1984 to 1987.

ML\DATE	15/01	15/02	15/03	15/04	15/05	15/06	15/07	15/08	15/09	15/10	15/11	15/12
7.50								2	10		1	
8.50	8							3	21		4	
9.50	13	4						10	13	4	6	2
10.50	12	7					14	15	25	14	14	17
11.50	12	19			3	3	11	10	38	25	10	27
12.50	20	46	17		10	10	25	9	35	28	31	40
13.50	13	31	19		19	19	19	6	37	22	32	43
14.50	21	51	27		22	33	13	12	32	17	36	23
15.50	7	54	21		41	55	16	27	53	37	37	30
16.50	4	64	37		42	40	18	31	39	30	26	21
17.50		59	57	4	36	48	21	30	41	50	26	19
18.50		41	53	12	61	43	24	31	41	37	24	21
19.50		36	36	21	56	29	28	20	30	25	7	25
20.50		25	41	16	54	23	17	10	22	22	9	12
21.50	13	4	25	25	59	9	13	9	2	15	7	10
22.50	20	7	18	25	42	5	3	3	2	2	8	9
23.50	17	4	20	14	19		2			3		6
24.50	19	5	10	10	9							9
25.50	14	6	13	5								5
26.50		9	7									2
27.50			5									
SUM	193	472	406	132	473	317	224	228	441	331	278	321

Table 6.2.1. Length-frequency data of *Nemipterus marginatus* (Valenciennes, 1830) collected in Tayabas Bay in 1987.

ML\DATE	15/01	15/02	15/03	15/05	15/07	15/10
10.50	6	3		15		
11.50		18	39	8		
12.50		3	47	15	7	
13.50	6	18	60	5	16	
14.50	9	33	48	28	30	
15.50	9	18	179	41	9	
16.50	21	101	285	80	33	
17.50	6	59	184	34	16	3
18.50	18	141	231	26	16	1
19.50	18	30	225	42	25	1
20.50	23	54	263	47	16	6
21.50	20	30	209	19	39	4
22.50	12	33	151	56		
23.50	23	59	173	56	16	3
24.50	15	47	52	23		4
25.50	15	41	70	13	16	6
26.50	15	15	89			3
27.50	15	26	56	19		3
28.50	9					1
29.50		18				
30.50	20	21				
31.50						
32.50						
33.50						
34.50	3					
35.50						
36.50		3				
SUM	263	771	2361	527	239	35

Table 7.1.1. Pooled length-frequency data of *Upeneus sulphureus* (Cuvier, 1829) collected in Leyte Gulf from 1984 to 1986.

ML\DATE	15/01	15/02	15/03	15/05	15/06	15/09	15/10	15/12
3.50					23			
4.50					19			
5.50				2	15		4	
6.50				10	12		8	
7.50			4	7	6	6	2	3
8.50		6	22	19	10	17	14	20
9.50		13	9	6	16	19	1	19
10.50		11	11	4		27	4	11
11.50	18	5	6	7		17	4	2
12.50	9	8	3			23	7	
13.50	6	7	5				3	
14.50	4	4					6	
SUM	37	54	60	55	101	109	53	55

Table 7.1.2. Length-frequency data of *Upeneus sulphureus* (Cuvier, 1829) collected in Visayan Sea in 1987.

ML\DATE	15/04	15/05	15/06	15/07	15/08	15/09	15/10	15/11	15/12
6.50								1	
7.50									
8.50	1						1	7	
9.50	10	11	2			2	2	24	
10.50	17	12	17			9	28	25	
11.50	14	1	19			18	32	13	11
12.50	4	1	18	14	14	14	5	4	25
13.50	2		15	9	9	5	6	1	10
14.50	2		3	2	2	1	1		3
15.50						1			1
SUM	50	25	74	25	25	50	75	75	50

Table 8.1.1. Pooled length-frequency data of *Leiognathus equulus* (Forsskal, 1775) collected in Leyte Gulf from 1985 to 1987.

ML\DATE	15/01	15/02	15/03	15/04	15/05	15/06	15/07	15/08	15/09	15/10	15/11	15/12
10.50									5			
11.50						3			6			
12.50						5			8			
13.50		2			3	4	8		7	12		
14.50		6			6	15	6		3	4		4
15.50		11	9		4	15	15		2	15	9	21
16.50	11	12	16		9	34	19		8	21	4	22
17.50	15	13	16		10	36	21	2	5	10	8	15
18.50	25	22	27		4	37	26	5	10	13	5	27
19.50	21	14	34	3	5	14	27	6	12	7	2	10
20.50	24	19	4	6	5	16	13	2	6	10		7
21.50	15	11	2	9	1		4	3		5		6
22.50	7	1		3				2		3		5
23.50		3						1		4		7
24.50		4						1				
25.50		1						3				
26.50		2										
SUM	118	121	108	21	47	179	139	25	72	104	28	124

Table 8.2.1. Length-frequency data of *Leiognathus elongatus* (Gunther, 1874) collected in Guimaras Strait in 1986.

ML\DATE	15/01	15/02	15/04	15/05	15/06	15/07	15/08
4.75	1						
5.25	1			1			
5.75	5						1
6.25	14				2	9	1
6.75	5				10	16	8
7.25	3			1	10	51	42
7.75	4		9	9	7	37	48
8.25	10	3	19	18	10	25	8
8.75	12	12	8	4	18	4	17
9.25	30	36	17	4	12	3	7
9.75	21	9	11	3	9	1	1
10.25	14	11	15	5	3	1	1
10.75	4	4	7	5	1	1	
11.25		2	1	1	1		
11.75				2	2		
12.25				1			
SUM	124	77	87	54	85	148	134

Table 8.3.1. Length-frequency data of *Secutor ruconius* (Hamilton, 1822) collected in Visayan Sea in 1987.

ML\DATE	15/03	15/04	15/05	15/06	15/07	15/08	15/09	15/10	15/11	15/12
5.50				1				1		
6.50						1	20	3		1
7.50		1	11	6	7	14	32	14	6	17
8.50	6	25	56	43	37	24	13	59	59	12
9.50	13	23	87	72	54	34	9	56	30	11
10.50	4	1	41	46	23	42	1	21	4	6
11.50	1		4	31	3	10		18		3
12.50	1		1	24	1			3	1	
13.50				2						
SUM	25	50	200	225	125	125	75	175	100	50

Table 9.1.1. Length-frequency data of *Apogon quadrifasciatus* (Cuvier, 1828) collected in Guimaras Strait in 1987.

ML\DATE	15/01	15/02	15/03	15/04	15/05	15/06	15/07	15/08
5.50	1						3	
6.50	6	1	5	3			7	
7.50	14	49	12	24	8	2	19	1
8.50	20	83	74	76	49	13	62	1
9.50	41	124	70	137	135	42	75	1
10.50	75	149	128	172	188	39	122	40
11.50	88	206	132	175	202	99	144	42
12.50	94	148	82	113	111	42	58	16
13.50	8	30	24	40	44	13	8	8
14.50	1	2		4	1	3		1
15.50	1					1		
SUM	349	792	527	744	738	254	498	110

Table 10.1.1. Length-frequency data of *Mene maculata* (Bloch & Schneider, 1801) collected in Camotes Sea in 1987.

ML\DATE	15/01	15/02	15/03	15/04	15/06	15/08	15/10	15/11
5.00	4							
6.00	12							
7.00	21							
8.00	11	6						
9.00	3	46	4			4		
10.00		68	21			15		
11.00	1	39	18			18		1
12.00	3	23	25			7		1
13.00	8	27	15			24	1	11
14.00	9	36	31			14	11	13
15.00	8	14	16		1	3	11	8
16.00	1	4	3	1		1	8	5
17.00		6					3	
18.00		21	4		6		1	
19.00		5	6		12			2
20.00			4	4	2			
21.00			1	7				
22.00				2				
SUM	81	295	148	14	21	86	35	41

Table 11.1.1. Length-frequency data of *Scolopsis taeniopterus* (Kuhl &Van Hasselt, 1830) collected in Guimaras Strait in 1986.

ML\DATE	15/01	15/02	15/03	15/04	15/05	15/06	15/07
5.50							1
6.50		1					1
7.50	1	3				11	18
8.50	5	7	5	3	1	25	35
9.50	3	1	9	8	2	31	45
10.50	3		4	20	1	23	73
11.50	4	2	2	5	1	17	75
12.50	3	1		20	2	5	31
13.50	3		1	3	3	3	9
14.50	1			1	1	4	
15.50	1			2			1
SUM	24	15	21	62	11	119	289

Table 12.1.1. Pooled length-frequency data of *Trachinocephalus myops* (Forster, 1801) collected in Visayan Sea from 1986 to 1987.

ML\DATE	15/03	15/04	15/05	15/06	15/08	15/09	15/10
10.50		3					
11.50		4					
12.50		2					2
13.50	1	4					8
14.50	2	2	4	2			7
15.50	3	7	2	2	1	1	19
16.50	4	2	12	3	7		20
17.50	6	1	19	4	2		25
18.50	5	4	13	7	4	3	30
19.50	4	1	8	12	6	2	14
20.50		7	5	7	5	6	8
21.50		13	11	19		5	5
22.50		9	8	15		3	4
23.50		6	3	10		4	3
24.50		4	4	7		1	4
25.50		6	7	6			
26.50			4	3			
27.50				2			
28.50							
29.50				1			
SUM	25	75	100	100	25	25	149

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The estimates of the von Bertalanffy Growth Function (VBGF) parameters ($L\infty$ and K) and mortality parameters (Z and M) for some of the commercially-important species caught in the Philippine waters are presented using the FAO-ICLARM Stock Assessment Tools (FiSAT) software. The data collected from various major fishing grounds in the Philippines were utilized in the analysis. Whenever possible, the ELEFAN I method, Shepherd's method, Powell-Wetherall's Plot, Modal Progression Analysis (MPA), Length-converted catch curve, as well as, the method to estimate the maximum possible length (L_{max}), were utilized to compute for the population parameters.