

A Note on the Population Dynamics of *Pomadasys kaakan* (Haemulidae) from Pakistan*

MUHAMMAD IQBAL
Department of Zoology
University of Karachi
Karachi 75270
Pakistan

Introduction

Of the production of 410,000 t (in 1985) of the fishery sector in Pakistan, 333,000 stem from over a thousand kilometers of coastline along the Arabian Sea (Northwestern Indian Ocean). However, very little management-oriented research has been conducted on the marine resources of Pakistan - even the catch data are not reliable.

About 25% of the marine catch of Pakistan is consumed locally, 20% (mainly shrimps) is exported, while 55% is turned into fish meal (NCA 1988).

These items indicate the urgent need for assessment of the marine resources of Pakistan. The present note on javelin grunter *Pomadasys kaakan* (Cuvier 1830, Family Haemulidae, Fig. 1) may be seen as a first small contribution to this end.

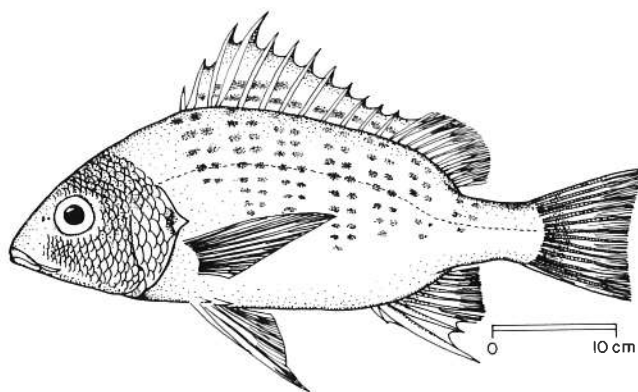


Fig. 1. *Pomadasys kaakan*, Family Haemulidae (from Fischer and Bianchi 1984).

Materials and Methods

The length-frequency data analyzed here (Table 1) were obtained during the 1983-84 survey of the R/V Fridtjof Nansen off Pakistan (details in Nakken 1983).

*This note was written during the author's study stage at ICLARM, from 13 November-3 December 1989. The travel grant of the University of Karachi is gratefully acknowledged.

As the three length-frequency samples in Table 1 turned out insufficient for estimation of growth parameters using the ELEFAN I program (because young fish were not represented in the samples), the method of Wetherall (1986), as modified by Pauly (1986) and incorporated in the Compleat ELEFAN package of Gayanilo et al. (1989) was used to obtain preliminary estimates of L_{∞} and Z/K . This was

Table 1. Length-frequency distribution of 867 *Pomadasys kaakan* (Haemulidae) sampled by R/V Nansen off Pakistan in 1983.

Midlength (cm)	Frequencies ^a		
	January	June	September
15	-	-	6.69
17	-	-	8.02
19	-	-	10.37
21	-	-	12.37
23	3.33	-	17.05
25	8.33	-	23.74
27	15.67	-	26.75
29	22.67	-	34.11
31	29.33	0.33	31.43
33	31.00	1.00	35.44
35	30.00	2.33	30.09
37	25.00	3.00	29.76
39	21.00	3.67	25.08
41	19.00	4.33	31.76
43	20.00	5.34	38.12
45	24.67	4.67	38.12
47	21.33	3.33	33.10
49	15.33	2.33	30.76
51	5.67	1.67	29.76
53	1.67	1.00	23.41
55	-	-	13.71
57	-	-	6.02
59	-	-	2.67
61	-	-	1.34
63	-	-	0.33
Sums	294.00	33.00	540.00

^a Monthly summaries assembled from several samples each.

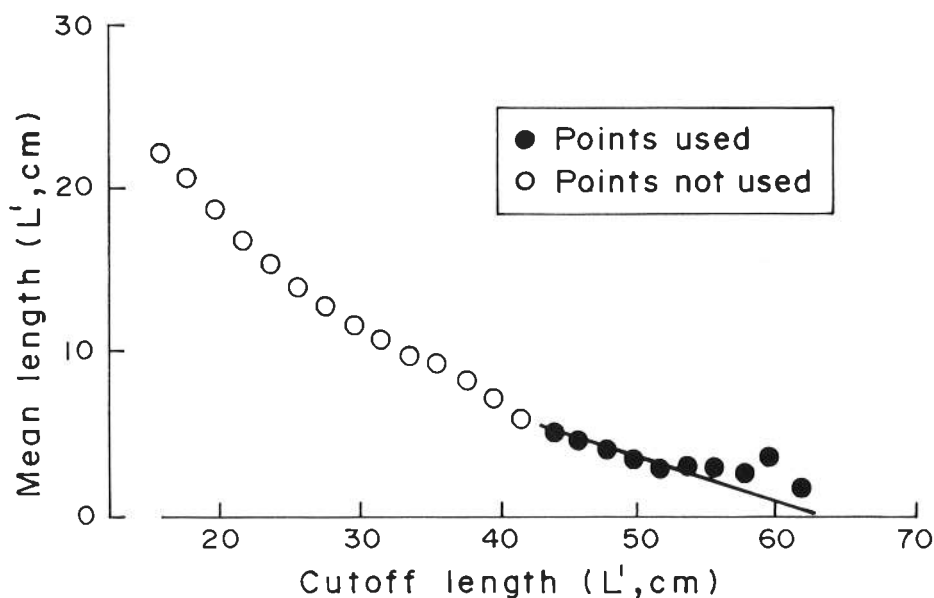


Fig. 2. Modified Wetherall plot for estimation of L_{∞} and Z/K in *Pomadasys kaakan* from the Pakistan coast (based on data in Table 1; see text for results). Note that points used in regression are weighted by their cumulative frequency, for which reason points pertaining to the largest fishes have little impact position of regression line and hence on estimate of L_{∞} and Z/K .

performed by first combining the three samples in Table 1 into one single sample by simple addition of frequencies such as to obtain a sample roughly representative of a steady-state population.

Then, the mean length (L_i) computed from successive cutoff lengths (L'_i) were estimated and plotted, such that

$$L_i - L'_i = a + b L'_i \quad \dots 1)$$

from which (for the fish completely recruited):

$$L_{\infty} = a/|b| \quad \dots 2)$$

and

$$Z/K = (1 + b)/|b| \quad \dots 3)$$

Results and Discussion

The estimates resulting from the Wetherall plot are $L_{\infty} = 62.5$ cm and $Z/K = 3.0$ (Fig. 2). The former estimate is reasonable in view of the "common and maximum" lengths of 50 and 80, respectively, reported by Fischer and Bianchi (1984). Deshmukh (1973) suggested that *Pomadasys hasta*, a close relative of *P. kaakan*, has a longevity (t_{max}) of 4 - 7 years. This would lead, if one accepts that $(t_{max}) \approx 3/K$ (Pauly 1983), to a range of K values of 0.75 to 0.33 year^{-1} , and hence, to $Z \approx 1 - 2.25 \text{ year}^{-1}$.

Acknowledgments

Thanks are due to the staff of ICLARM, especially to Dr. D. Pauly, Mr. F.C. Gayanilo, Jr., Ms. Abbie Cruz and the library staff for providing training facilities, access to computers and literature for future studies. Thanks are also due to Messrs. T. Strømme and S.C. Venema for providing me with R.V. Fridtjof Nansen data and the relevant literature.

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