Small Pelagic Fisheries Investigations in the Philippines Part II: The Current Status*

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Introduction

In Part I of this contribution (Dalzell 1988), a brief synopsis was given of the findings of a review of secondary data on Philippine small pelagic fisheries by the Small Pelagics Management (SPM) project. The review concluded that Philippine small pelagic fisheries were, in common with other marine fisheries in Southeast Asia, severely overfished. In this concluding second part, a synopsis is given of the results from a recent sampling program of small pelagics undertaken by the SPM project. The purpose of the sampling program was to obtain a contemporary portrait of the Philippine small pelagic fisheries and from this suggest ways in which management-related monitoring programs can be improved.

The sampling program

Sampling of small pelagic catches took place at eight landing sites in the Philippines. These eight locations were known from routine statistics to be areas of high small pelagic fish production. Over a fourteen-month period, records were made of catch, fishing effort, catch composition, species composition, length frequencies and economic data. Records were made for about 20 different gear types (including dynamite!) and for over 40 different species of small pelagic fish. All raw data were summarized into a number of data volumes which were deposited at the Bureau of Fisheries and Aquatic Resources (BFAR) and at ICLARM Headquarters, both in Manila.

Results

Not all records were particularly extensive, given the large numbers of species and gears. However, 25 records on 13 different gear types permitted estimation of contemporary catch rates of the major small pelagic gears. Average catch rates in the small-scale or municipal fisheries ranged from 14 to 100 kg/haul for a variety of different liftnets, fish corrals and gillnets. The lowest catch rates were made by a specialized drive-in-net fishery in the Camotes Sea, Central Philippines which targeted on flyingfishes. Overall, the dominant species caught by the municipal fisheries were anchovies (*Stolephorus* spp. and *Engraulis japonicus*) and sardines (*Sardinella* spp. and *Amblygaster sirm*).

Catch rates of the commercial or large-scale industrial small pelagic gears ranged from 60 to 900 kg/haul for a variety of liftnets, purse seines, ring nets, trawls and a specialized drive-in-net used, with rather destructive effects, on Philippine coral reefs and known as muro-ami. Trawlers in the Philippines, although normally associated with demersal fish and crustaceans, catch substantial quantities of small pelagic fishes. In this survey, small pelagics comprised between 16 to 24% of sampled trawl catches. Commercial small pelagic landings tended to be dominated more by open water neritic species, particularly the roundscads (*Decapterus* spp.) and mackerels (*Rastrelliger* spp. and *Scomber* sp.). Sardines and to a lesser extent, anchovies, still featured prominently in commercial landings, however.

The sample data permitted an estimation of the species composition of the total landings of small pelagic fishes in the Philippines. Five species, *Decapterus macrosoma, Sardinella fimbriata, Stolephorus heterolobus, Decapterus maruadsi* and *Amblygaster sirm* comprised 60% of total landings. These and another five species, *Rastrelliger faughni, Selar crumenophthalmus, Rastrelliger kanagurta, Dussumieria acuta* and *Decapterus russellii* accounted for 75% of total small pelagic production in the Philippines.

Other studies

The SPM project provided assistance in analyzing five years of catch, effort and length-frequency data from the ring net fishery in the Camotes Sea, collected by BFAR Regional staff. The SPM project sampled the same fishery but did not concentrate on the dominant species in the catch, the bullet tuna, *Auxis rochei*. The BFAR project collected data mainly on this species. When analyzed using the ELEFAN suite of programs (Pauly 1987), it was clear that length distributions were very biased towards juvenile fishes (Jabat and Dalzell (1988) and see Fig. 1) and could not be used for growth or mortality estimates. Based on these results, the ongoing monitoring routines of the BFAR staff were shifted to give more emphasis to other species in the catch.

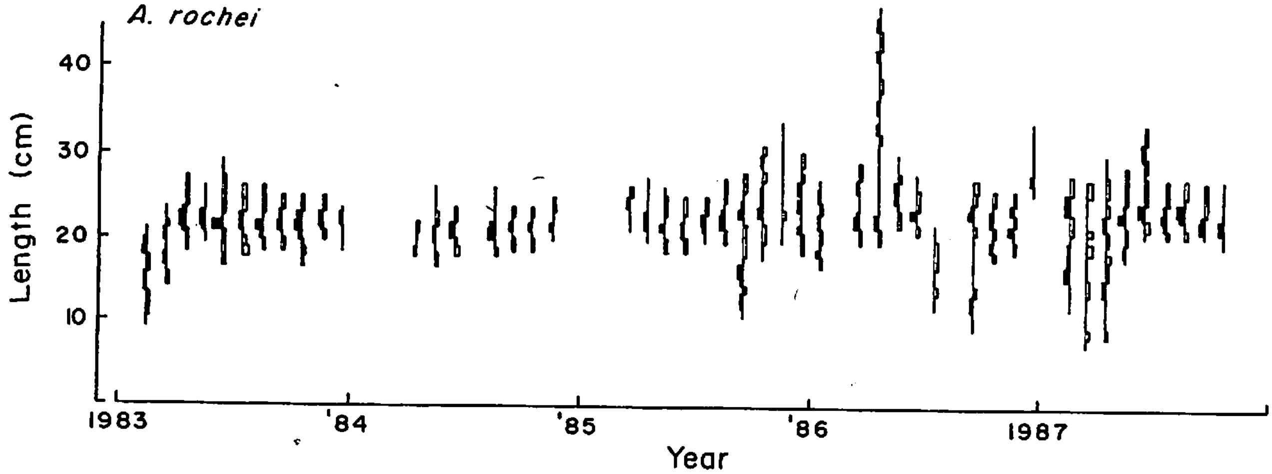

Fig. 1. Length-frequency data for *A. rochei*, 1983-1987, from the Danao ring net fishery, restructured by ELEFAN I. Note the non-representativeness of most of the length distributions; only one month contained fish > 40.0 cm.

Other specialized studies included age and growth of *Selar crumenophthalmus* from length-frequencies and from daily growth increment analysis of the otoliths (see Morales-Nin 1988). Age estimates from the otoliths of *S. crumenophthalmus* from the Camotes Sea were comparable to those of the same species from the Mariana Islands (Ralston and Williams 1988). Estimates of growth parameters from length-frequency analysis and the length-at-age data showed good correspondence and this will be documented in the primary literature.

Particular attention was also paid to the small drive-in-net fishery for flyingfishes mentioned earlier. Most flyingfishes in the Philippines are taken by gill nets. This fishery, however, uses a less selective gear and length frequencies for *Cheilopogon nigricans*, *Cypselurus opisthopus* and *Oxyporhampus convexus* were used to determine growth, mortality and recruitment parameters for these species in the Philippines. Apart from *Selar crumenophthalmus*, all population parameters were determined using length frequencies and the various ELEFAN programs. An example of the output for *Amblygaster sirm* from the Southern Philippines is shown in Fig. 2.

Discussion and conclusions

The multispecies, multigear nature of Philippine fisheries in general provide a great many problems for the fishery biologists and fishery managers who wish to monitor and regulate the fisheries. In a lesser developed country such as the Philippines, these problems are compounded by the lack of resources to ensure that adequate monitoring data is available to management personnel. The results of the review of secondary data, discussed in Part I of this contribution, and the results of the sampling program discussed here can help make the best of the resources available.

Although there are many gears catching small pelagics, only five gear types, purse seines, liftnets, gillnets, beach seines and trawls, take 80% of the catch (Dalzell and Ganaden 1987). Similarly, of the large number of small pelagics caught, only ten species account for three quarters of landings. Monitoring and sampling programs with emphasized collection of data from these gears and species may give a greater return for effort than trying to cover all aspects of landings.

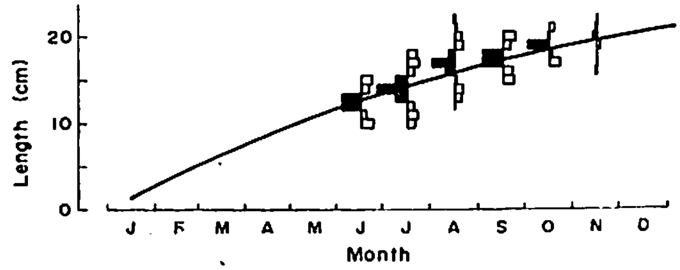

Fig. 2. An example of the graphics output of ELEFAN I for *Amblygaster sirm* from the Camotes Sea. The growth parameters derived from this method were $L_\infty = 29.0$ cm and $K = 1.30$.

Given this type of streamlined approach, sufficient quality data can be gathered to make use of length-based stock assessment computer packages such as ELEFAN (Pauly 1987) or LFSA (Sparre 1987). Use of specialized techniques such as otolith daily increment counts also becomes feasible where only a few species are considered. Despite these technical improvements, however, the issues central to Philippine fisheries management as a whole remain to be properly addressed. These are the gross overfishing of both pelagic and demersal stocks as shown by this and other studies (e.g., Silvestre and Pauly 1986; Pauly and Chua 1988) and the marginalization of small scale fishermen in areas where overfishing is acute. Such issues are inherently political in nature and need to be considered in the general context of urban and rural development programs.

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Errata

Fishbyte (1988) 6(2), 2-4. Small pelagic fisheries investigations in the Philippines Part I: History of the Fishery.

a. The above article was ICLARM Contribution No. 495.

b. Fig. 2, page 4. Curve equation should read:

$$Y = X \cdot e^{1.751} e^{-3.893 \cdot 10X^{-6}}$$

*ICLARM Contribution No. 497.

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