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The Scallop Fishery of Lingayen Gulf, Philippines*

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Abstract - The major landing site for the scallop *Amusium pleuronectes* in Lingayen Gulf, northern Philippines, was monitored during a 10-month period to obtain information on catch and effort. An overview of the scallop marketing of the commercial and small-scale trawl fisheries is presented.

Marked seasonality in catch per effort (c/f) was noted with the period April-June representing the peak scallop season. Scallops are taken as a bycatch with an estimated average c/f of 0.19 kg/trawling hour. An annual scallop catch of 7.6 t was estimated for the commercial trawl fishery. Scallops caught in the Gulf are all marketed locally.

The scallop, *Amusium pleuronectes* (Linné), redescribed by Habe (1964), occurs from Taiwan and the Philippines to northern Australia (Sotto and von Cosel 1982). FAO fisheries statistics do not specify species of scallops, but show annual average scallop catches over the period 1974 to 1985 for Indonesia and the Philippines of 387 and 953 t, respectively.

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In the Philippines, the meat of *A. pleuronectes* is harvested for human consumption while shells are used for the shellcraft industry. This species has been reported from Lingayen Gulf, the Visayan Sea (Llana 1983), and the southern parts of the Philippine archipelago, such as Surigao, Agusan and Davao Gulf.

Catch statistics show that, for the period 1974 to 1984, exported frozen or chilled scallops totalled more than 800 t, valued at over P2 million (₱20.0 = US$1.0 in 1987). The species is not specified but *A. pleuronectes* is the only scallop taken in commercial quantities.

This note is part of a larger study on the biology and culture of *A. pleuronectes* in the Lingayen Gulf. Aspects of the population biology were discussed in del Norte (1986). Baseline information on the scallop fishery in the area is presented here.

Major landing sites for scallops in the Lingayen Gulf area were identified. On the basis of this information, informal interviews with commercial fleet owners/brokers and fishermen, as well as with personnel of the Bureau of Fisheries and Aquatic Resources (BFAR) stationed in these sites, were conducted to derive information on the type, pattern and location of scallop fishing in the area. Catch and effort data were recorded based on landings every other day in Damortis, La Union, the major landing site (Fig. 1). These data were used to compute average monthly catch per effort (c/f). Data were collected from March to December 1986. To test whether mean c/f varied significantly from month to month, one-way ANOVA was used (Sokal and Rohlf 1981). Bartlett's test was used to test homogeneity of variances (Walpole and Myers 1985). Due to difficulty in sampling, no municipal catch and effort data were recorded.

The marketing of scallops caught in the Gulf was studied by interviewing fleet owners and brokers. Information derived included outlets (local or export), amounts marketed, selling price and form of selling. No standard questionnaires were used.

The commercial scallop fishery of Lingayen Gulf is centered in two major landing sites, Damortis and Dagupan (Fig. 1). The commercial fleet is comprised of 19 fishing vessels (8 owners) in Damortis and four vessels (4 owners) in Dagupan. These vessels are trawlers (10-40 gross tons) which primarily fish for shrimp and finfish.

Most fishing activities are located from Damortis to Bauang (Fig. 1). Depth of fishing ranges from 14 m to about 100 m. Except during very strong typhoons and engine trouble, frequency of fishing trips is regular, each trip lasting three days and two nights. An average of 10

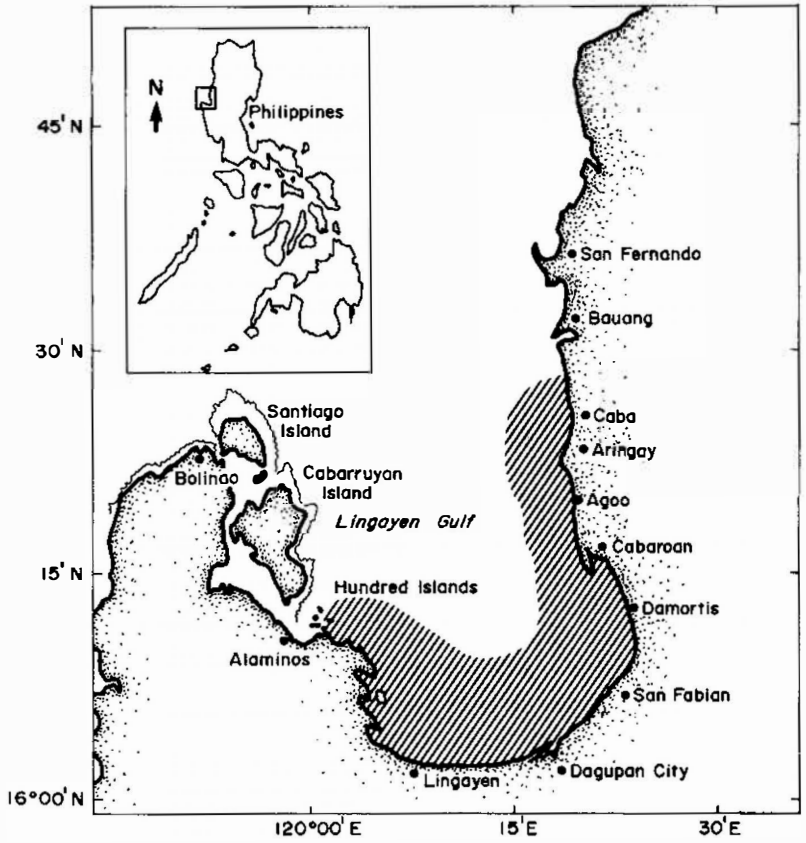

Fig. 1. Lingayen Gulf showing locations discussed in the text. Shaded area represents the trawling grounds.

hauls (normally lasting three hours each) is done each fishing trip. A typical crew consists of nine persons.

Table 1 shows the scallop catch and effort data. The monthly average catch per unit effort (c/f) was 0.19 kg/fishing hour. From this and the average monthly fishing effort (3,330 fishing hours), an annual catch of 7.6 t is estimated. Although the annual catch estimate was made from less than one year's data, it is considered reasonable, since from personal observations January and February catches are almost nil. The period with peak catches occurred between April and June, while the leanest months probably occur between November and March. Statistical analyses showed that mean monthly c/f varied significantly ($F = 2.37$, $p < 0.05$; $b = 0.6787$, $p < 0.01$).

Table 1. Catch and effort data for scallops *(Amusium pleuronectes)* caught by commercial trawlers in the Lingayen Gulf and landed in Damortis, La Union, March-December 1986.

Month	No. of fishing vessels sampled[a]	Scallop catch (kg)	Fishing effort (hours)	Average C/F (kg/fishing hour)		Total landed catch (kg)	Proportion of scallops in total catch (%)
				X	S.D.		
March	31	79	927	0.09	0.10	67,280	0.12
April	38	253	1,134	0.25	0.30	108,808	0.23
May	44	343	1,311	0.27	0.40	71,909	0.48
June	47	536	1,575	0.36	0.31	75,610	0.71
July	61	219	1,953	0.11	0.10	69,151	0.32
August	55	390	1,893	0.20	0.08	60,444	0.65
September	55	280	1,839	0.13	0.10	63,689	0.44
October	56	277	1,875	0.15	0.06	69,311	0.40
November	63	243	2,091	0.19	0.23	76,402	0.32
December	62	242	2,049	0.11	0.07	85,426	0.28
Sample total	512	2,862	16,647			748,030	
Monthly total[b]		5,724	33,294			1,496,060	
Monthly ave.	51	572	3,330	0.19		149,606	0.39

[a]Fleet size was 23 vessels. Most were sampled more than once.
[b]Sample total multiplied by 2, since sampling frequency was every other day.

Scallops commercially caught in the Lingayen Gulf are usually marketed locally in Bauang, San Fernando and Dagupan. Scallops landed are not shucked, but packed whole in wooden boxes with ice and transported by land to the markets, where they are sold at ₱25-30/kg, depending on supply and demand.

The small-scale scallop fishery of the Lingayen Gulf is also primarily centered in Damortis, where about 20 "baby trawlers" (i.e., motorized dug-out canoes called *karkar*), usually operated by two fishermen, are based. Thus, the fishery employs approximately 40 full-time fishermen. Catches are usually made up of fish, penaeid shrimps, scallops and squids. These are normally landed in Damortis or Aringay (Fig. 1).

The fishing activities of the small-scale fishermen are located between Damortis and Dagupan, in depths between 12 m and about 30 m. Frequency of trips is daily, depending on weather conditions. Around July, during the southwest monsoon which brings strong winds and heavy rainfall, fishing is usually done in the calmer southeastern part of the Gulf. This is also true during the periods of strong currents in December to March. During the months of April-June (northeast monsoon), when weather conditions are more favorable, small-scale fishermen are able to work in the more open areas. Normally, fishing trips are made overnight from 1800 to 0600 hours, with an average of five 2-hour hauls per trip.

These small-scale fishermen sell their scallops in nearby villages, i.e., in Aringay, Agoo and Bauang (Fig. 1). The scallops are sold fresh and unshucked at about ₱25/kg. Returns are shared equally between the two fishermen.

Scallop landings from the Lingayen Gulf in 1983 were previously estimated at 108 t from small-scale trawlers and 12 t from commercial trawlers (Lopez 1986). These are overestimates because total catch was derived from c/f data during the peak season. No catch estimate for the municipal sector was made in the present study, but it is probable that the Lopez (1986) figure of 108 t is similarly overestimated.

The generally low c/f estimates derived in this study do not necessarily imply low fishing mortality rates, as the scallop biomass in the area is unknown. *A. pleuronectes* has been shown to be a fast growing (L_∞ = 106 mm; K = 0.98 year^{-1}) and short-lived (longevity ≈ 2 years) species (del Norte 1986). Size at sexual maturity for *A. pleuronectes* is reported to be 54 mm shell height or about 1 year relative age (as computed from the von Bertalanffy growth curve, Llana and Aprieto 1980; del Norte 1986).

Although the peak catches occurred when waters in the Gulf were calm (April-June), the seasonal pattern of catches cannot be attributed only to environmental factors. Pectinids of the genus *Amusium* are among the most mobile of bivalves (Morton 1980), so that migration which might affect catches cannot be ruled out. Periods of high catches might well coincide with the time when new recruits (which have undergone their first breeding season) reach fishable size or enter the fishery. The derived length at first capture (Lc) is 70.6 mm (≈ 1.3 years relative age) (del Norte 1986). Thus, the scallops have spawned before they are harvested. To maintain the viability of the fishery, a minimum size of capture of 54 mm is proposed.

Philippine fishery statistics show larger commercial and small-scale (listed as "municipal" in BFAR statistics) annual catches from other regions. Information from informal interviews with dealers and exporters at the Food Terminal Inc. (FTI), Bicutan, Metro Manila, revealed that scallops exported from the Philippines originate mostly from the Bicol region (i.e., Sorsogon, Mercedes, Camarines Norte and Naga City) and to a lesser extent from the Visayan region (i.e., Bacolod, Roxas City and Iloilo) (F. Lorica, pers. comm.).

This report confirms that the Lingayen Gulf scallop catches do not enter the export market, possibly due to the low catches of this fishery. Comprehensive resource assessment is necessary to identify areas where larger concentrations of scallop occur. In addition, a gear more efficient than the trawl may have to be identified if scallop harvests are to increase.

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