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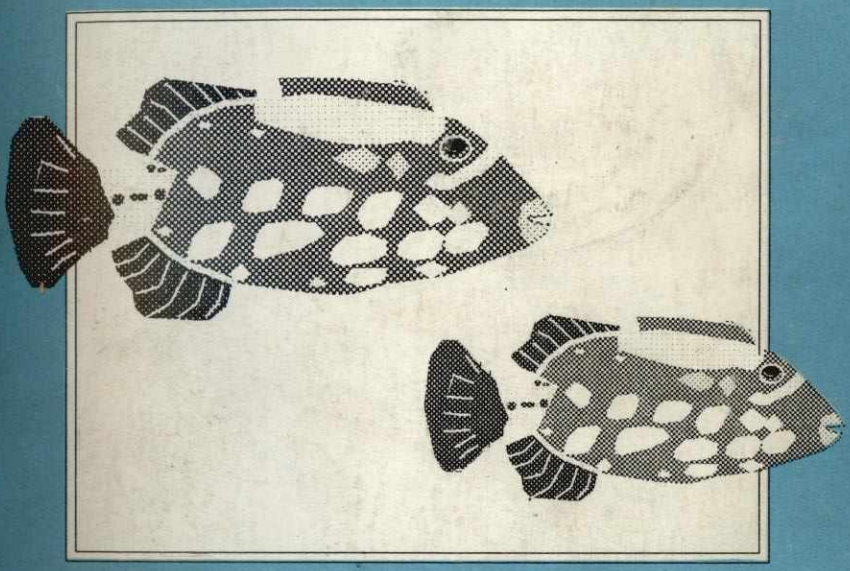

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# The Status of Tayabas Bay Fisheries in the 1980's

**Zelpha C. Jeremias**
*Aquaculturist II, BFAR*

**Salud R. Ganaden**
*Chief, Demersal Section, BFAR*

## ABSTRACT

**An analysis of catch, effort, catch per unit of effort and relative abundance of catch of the major fishing gears operating in Tayabas Bay was made based on six years of observations, from 1983 to 1988.**

**Five gears with high average production were selected for the analysis. They were: commercial bag net, gill net, beach seine, set longline, and fish corral.**

**Results of observations showed that the estimated average landings of the five most used gears in Tayabas Bay fluctuated as follows: bag net landings from 266.7 - 1,151 mt, gill net from 105.5 - 212.6 mt; beach seine from 21.6 - 76.5 mt, set longline from 6.4 mt - 29.4 mt, and fish corral 2.0 - 54.4 mt.**

**Likewise, observations on CPUE showed that bag net had the highest CPUE in January and March to July which ranged from 274 - 2,054 kg, gill net ranged from 16 - 38 kg/boat; beach seine had a steady level of catch for each boat; set longline had also a steady catch at 9 - 15 kg/boat; and fish corral ranged from 17 - 442 kg/boat.**

**Keywords**: catch/effort, Tayabas Bay

## INTRODUCTION

The need to assess the marine fisheries of the country for management purposes gained more attention in the 1980s through the implementation of the Regional Resources Assessment Project. The Bureau of Fisheries and Aquatic Resources (BFAR) and the Philippine Council for Agricultural Management and Research Resource Development (PCAMRRD) in coordination with the South China Sea Program (SCSP) and the International Council for Living Aquatic

Resources Management (ICLARM) held a training on Resource Assessment in May 1982 for biologists of the Regional Offices in order that assessment capability may be developed and institutionalized in the regions. With the knowledge gained and following the objectives of the project, the study areas by region were selected and data collection was undertaken in one or two landing centers.

For Region IV, Tayabas Bay was chosen as the study area and Dalahican, Lucena City, was selected as the landing center to be observed.

Tayabas Bay is an open area of water covering about 350 square miles located between the southwest coast of Quezon and Marinduque (Fig. 1). The north end of the bay consists of a narrow strip of shelf with an average depth of 25 fathoms extending southeastward of Calaylayan Bay. The shelf between Marinduque and Tayabas (now Quezon) mainland is approximately 200 square miles of apparently smooth, muddy and sandy ground with an average depth of 40 fathoms. Atolls and coralline areas along the coasts make Tayabas Bay productive.

The fisheries of Tayabas Bay is exploited by both commercial and municipal fishermen. Catches from the bay are mostly landed in Dalahican Landing Center, Lucena.

BFAR Statistics from 1983 to 1987 show Tayabas Bay to have an annual average marine production of 30,144 mt which is 2.5% contribution to the total marine production. The data showed an increasing trend. Production estimates in the Dalahican Landing Center suggest more or less how much are landed from Tayabas Bay (Table 1).

## MATERIALS AND METHOD

Data collection followed the standard design adopted in the Tuna Assessment Study coordinated by the South China Sea Program of the Food and Agriculture Organization (FAO) in the late 1970s. This involved trips every two days or at least 8 to 10 days every month to the landing center to collect data on the total number of boat landings during the observation day, the major gear used, total catch, catch composition, and size of the chosen species.

Data for six years were compiled, processed and analyzed in the current project, which could be useful for future assessment studies in the area.

## RESULTS AND DISCUSSION

About twenty kinds of fishing gear are operated in Tayabas Bay by both commercial and municipal fishermen. The most popular are the bag nets. Based





on estimated average landings of each gear during the study period, commercial and baby bag nets were found to make the greatest contribution, while the filter net, fish pot and crab lift net contributed the least (Fig. 2). All of the twenty gears had an estimated catch ranging from 725 - 1,759 mt. (Fig. 3).

In studying the status of the Tayabas Bay fisheries, five gears with the highest average production were selected for the analysis. They were the commercial bag net, gill net, beach seine, set long line and fish corral (Fig. 4). The landings of commercial bag net fluctuated from 266.7 - 1,151 mt; gill net from 105.5 - 212.6 mt; beach seine from 21.6 mt - 76.5 mt; set long line from 6.4 - 29.4 mt and fish corral from 2.0 - 54.4 mt.

### Bag net fishery

At the start of the study period in 1983, when the number of units was only 266, the catch per boat was highest at 1,504 kg/boat. In 1985, when the number of units increased almost three times, the CPUE declined although the total landings correspondingly increased. Continued decline was observed in 1986 and 1988, even with reduced effort, but still double that of 1984. The almost steady number of efforts in 1986 to 1988 showed a high fluctuation of catch which theoretically indicated a fully exploited fishery (Fig. 5a).

The catch composition of bag net was dominated by the Family *Scombridae*, followed by *Engraulidae* and the invertebrate group (Fig. 5b). In six years, the dominant family *Scombridae* was dominated by the small tuna species, *Auxis thazard*, the family *Engraulidae* by the two *Stolephorus* species and the invertebrate group by the squid, *Loligi* spp (Fig. 5c).

The monthly mean CPUE of bag net was highest in January and March to July. It ranged from 274 - 2,052 kg (Fig. 5d).

As to the seasonality of species group caught by bag net, *Auxis thazard*, the dominant catch, had a high catch during January and March (Fig. 6). The roundscad, *Decapterus* spp. had a high catch during the month of December and fairly satisfactory in January to February (Fig. 7). As to the *Engraulidae* family, abundance occurred in September through February, with higher catch in January to February (Fig. 8). The invertebrates represented by squid had a higher catch in October and December and March to May (Fig. 9).

### Gill net fishery

The unit landings of gill net in Dalahican ranged from 3,125 - 6,709 kg annually. With more or less steady level of unit landings in 1983 to 1985 and in 1987, no increase in catch was shown, except in 1988 when effort was reduced (Fig. 10).

The catch of gill net was dominated by the Family *Clupeidae*, followed by *Scombridae*. Higher catch of *Carangidae* was shown in 1983, 1986 and 1987 (Fig. 11). By species, the Family *Clupeidae* was represented by *Sardinella longiceps* in 1983 to 1986, and by *Sardinella fimbriata* in 1987 to 1988. Family *Scombridae* was represented by skipjack *(Katsuwonus pelamis)* and the stripe mackerel *(Rastrelliger kanagurta)* (Fig. 12). Good catch per gill net boat was shown to be from March to May. It ranged from 16 - 38 kg/boat (Fig. 13).

### Beach seine fishery

Observation showed that beach seine landings ranged from 21.0 - 76.0 mt annually. From 1983 to 1986 increasing unit landings did not show any increase in catch. Little increase in catch was shown in 1987 with more unit landings. But considerable increase in catch was shown in 1988. The CPUE trend did not show any correlation at all. It only showed a steady level of catch for each boat (Fig. 14).

Catch composition showed that Family *Dussumierridae* dominated in four years (1983-1986) followed by *Engraulidae*. *Gobiidae* showed a higher contribution beginning 1985 up to 1988 (Fig. 15). By species, *Dussumierri* spp. and *Stolephorus commersonnii* sustained the catch of beach seine (Fig. 16).

Better catch were shown during February to April and during the month of June. It ranged from 17 - 79 kg. (Fig. 17).

### Set long line fishery

The gear is usually operated in the nearby coralline areas. The graph shows a fairly improved catch with less effort. Much better catch in 1987 probably caused more units to be operated in the next year, which turned out to have considerably lower production (Fig. 18). The mean monthly catch per boat remained steady at more or less 9 - 15 kg per boat from February to October and comparatively lower in December and January (Fig. 19). The catch is composed of the Family *Lethrinidae Polynemidae, Nemipteridae, Priacanthidae* and *Serranidae* (Fig. 20). By species, *Monotaxis grandoculis, Polynemus* spp., *Priacanthus* sp. and *Nemipterus* sp. were the main catch of this gear (Fig. 21).

### Fish corral fishery

Data used in the analysis were not the number of fish corral units but the number of boats that landed fish corral catches.





The catch of fish corral was mainly composed of squid, *Loligo* sp., with no other fish catch recorded in 1988. Fish catch in 1983 to 1987 were of the Family *Teuthidae, Carangidae, Polynemidae* and *Lethrinidae*. By species, the catch was composed of *Teuthis* sp., siganids, *Polynemus* sp., *Caesio* sp., (dalagang bukid) and *Epinephelus* sp. (grouper) (Fig. 22 and 23).

The highest catch of fish corral was shown in March; it was fairly good from April to August and from January to February, ranging from 17 - 42 kg per boat (Fig. 24 and 25).

By species, more squids were caught the whole year round, but more siganids in March to July and November to December, Caesio in January, and grouper in March and December (Fig. 26a to 26d).

## INTERPRETATION AND RECOMMEDATION

The fluctuating production recorded in Dalahican of the five gears representing the various unit fisheries confirms the fully exploited situation in Tayabas Bay. Regardless of effort the catch remained more or less the same. Furthermore, the increase in the catch of squid in the soft grounds where fish corrals are installed indicates a resource replacement when previously abundant species becomes less. Trawl catch, although not presented here, showed considerable catch of squid beginning 1986. This suggests there had been overfishing.

The abundance of squid has been established as an indicator of overexploitation in the Gulf of Thailand. This concept has also been observed in Manila Bay and other areas where important fish species get fewer. Based on experience and observation, areas where this pattern occurs might be considered overexploited. One result of overexploitation is conflict among groups of fishermen due to reduced catches.

In consideration of the situation, Tayabas Bay has been chosen one of twelve bays where resource enhancement strategies will be carried out under the Fishery Sector Program. It was hoped that interventions like enforcement, installation of artificial reefs, reservation of an area for sanctuary purposes, and reduction of fishing effort through provision of other livelihood projects, would enhance the fisheries of Tayabas Bay. It is important therefore, that assessment be continuously done so that the impact can be documented. Crucial to this is the employment of personnel in the region for the resource and ecological assessment (REA) component of the FSP in the area. Their expertise must be developed to sustain the proper resource management adopted in the region. Without assessment, no basis can be made for proper resource management.

## ACKNOWLEDGMENT

*The authors acknowledge the assistance of Soledad Monsod of Region IV in the collection of the data used in this study and Fe L. Gonzales of BFAR Fisheries Resources Research Division for her assistance in the preparation of the graphs with the aid of the computer.*

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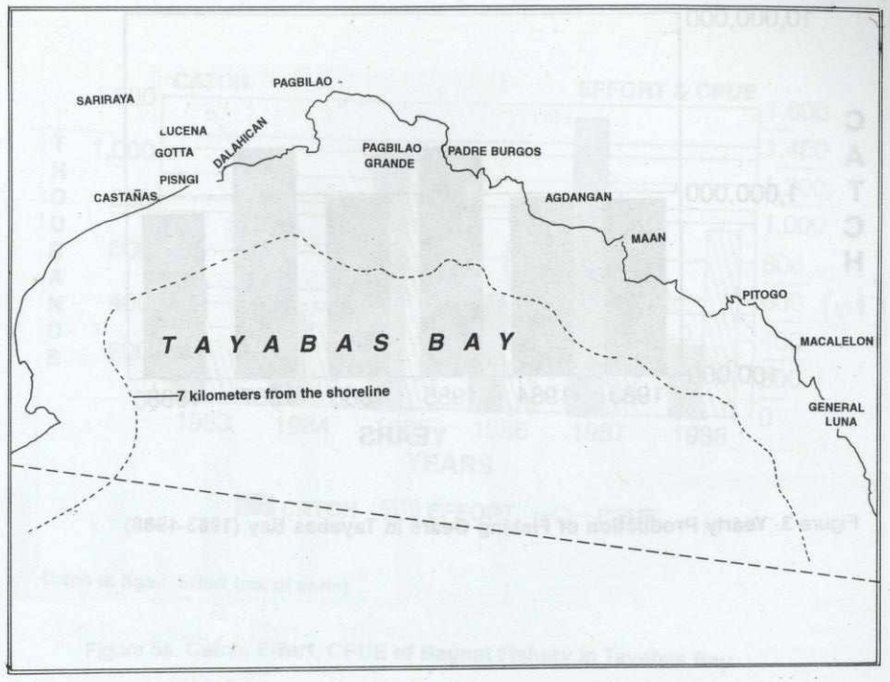



Figure 1. **Map of Tayabas Bay**

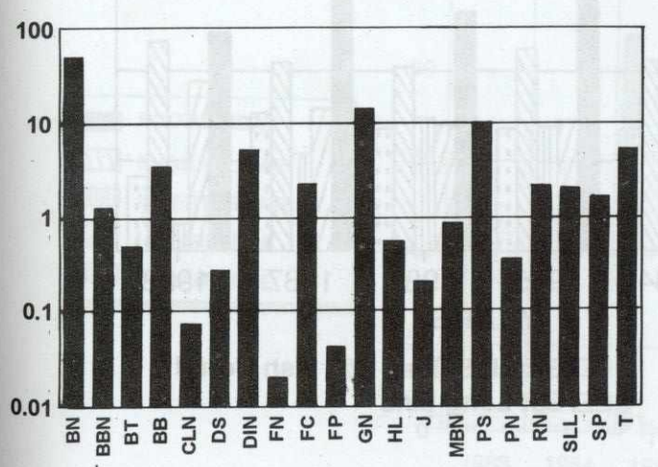



Figure 2. **Production Gear**

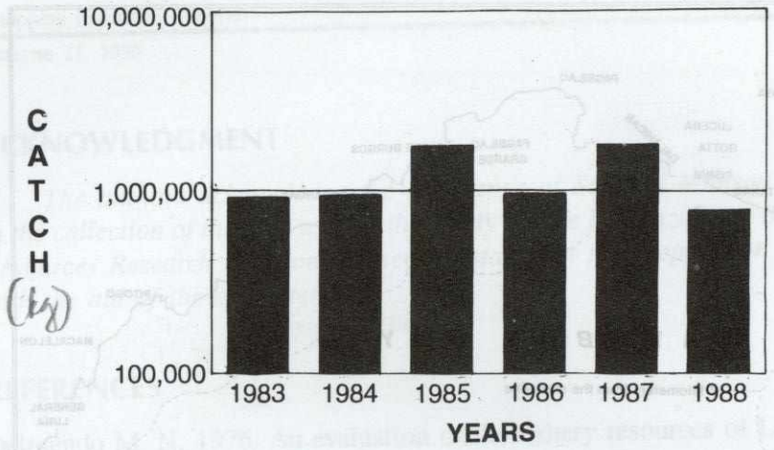



Figure 3. **Yearly Production of Fishing Gears in Tayabas Bay (1983-1988)**

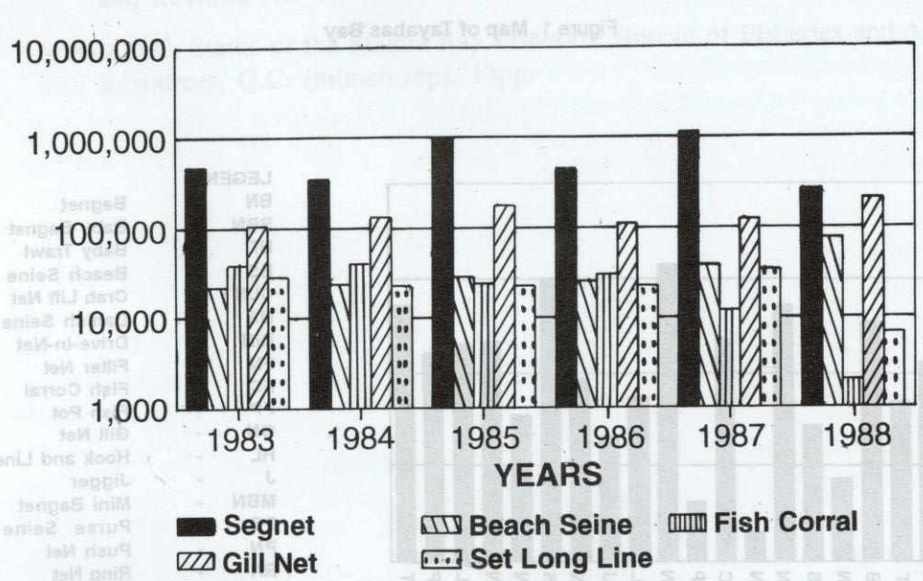
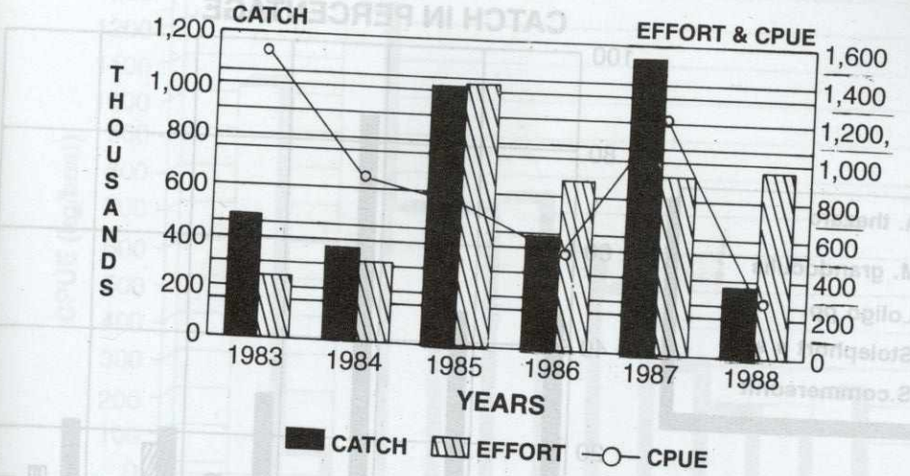



Figure 4. **Production of 5 Most Dominant Fishing Gears in Tayabas Bay**






**Catch in Kgs.: Effort (no. of units)**

Figure 5a. **Catch, Effort, CPUE of Bagnet Fishery in Tayabas Bay**

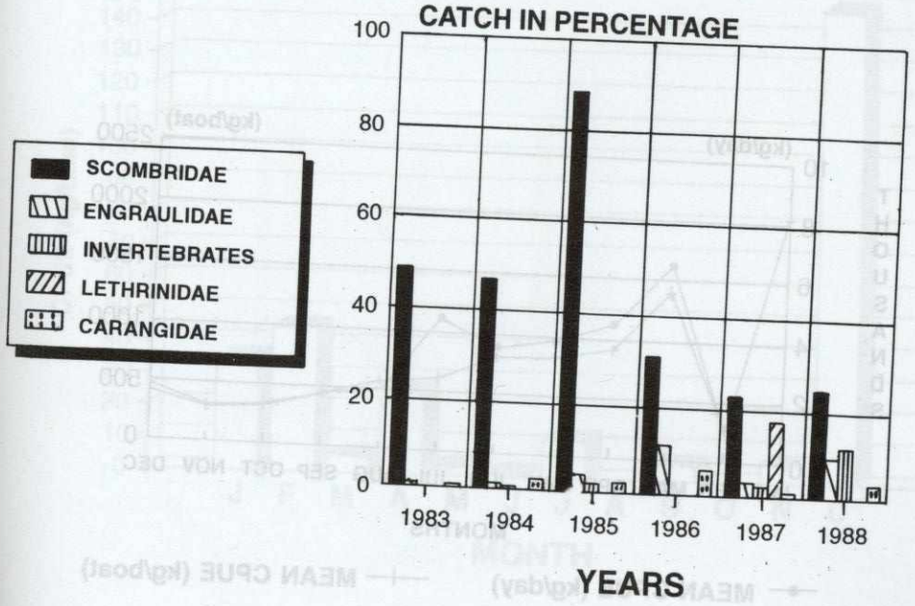



Figure 5b. **Catch Composition of Bagnet in Tayabas Bay (1983-1988)**

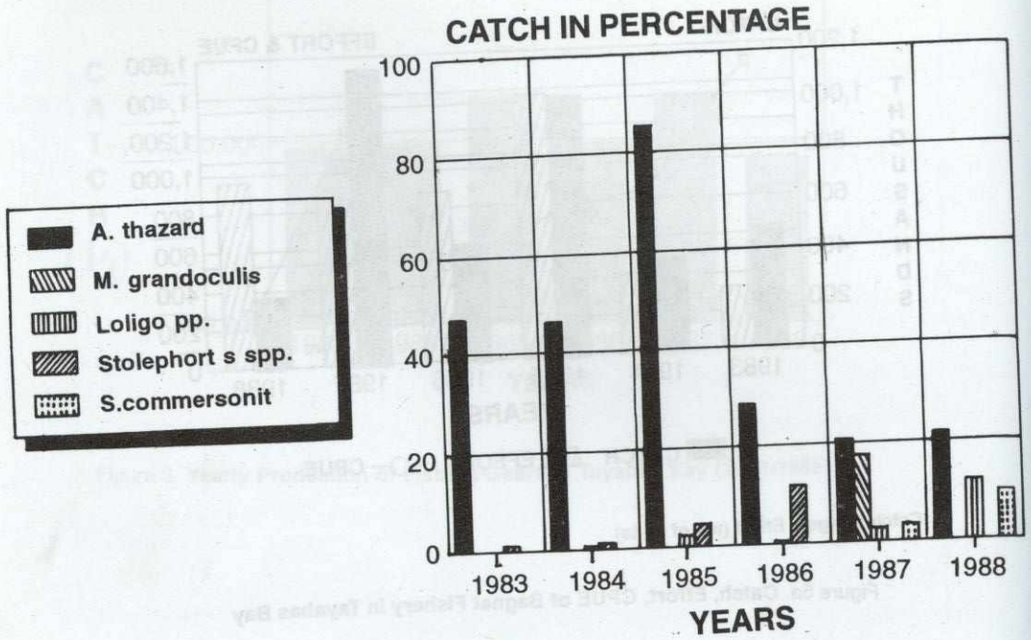



Figure 5c. **Dominant species caught by Bagnet in Tayabas Bay (1983-1988)**

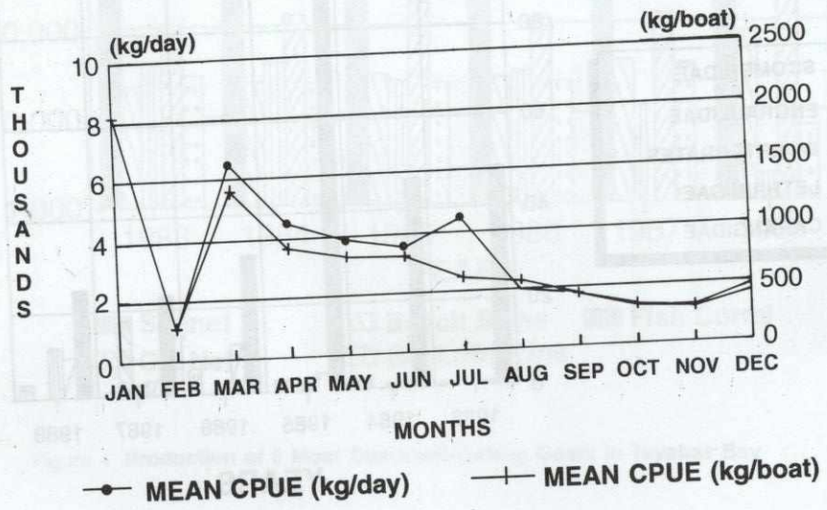



Figure 5d. **Monthly mean CPUE of Bagnet Fishery in Tayabas Bay (1983-1988)**



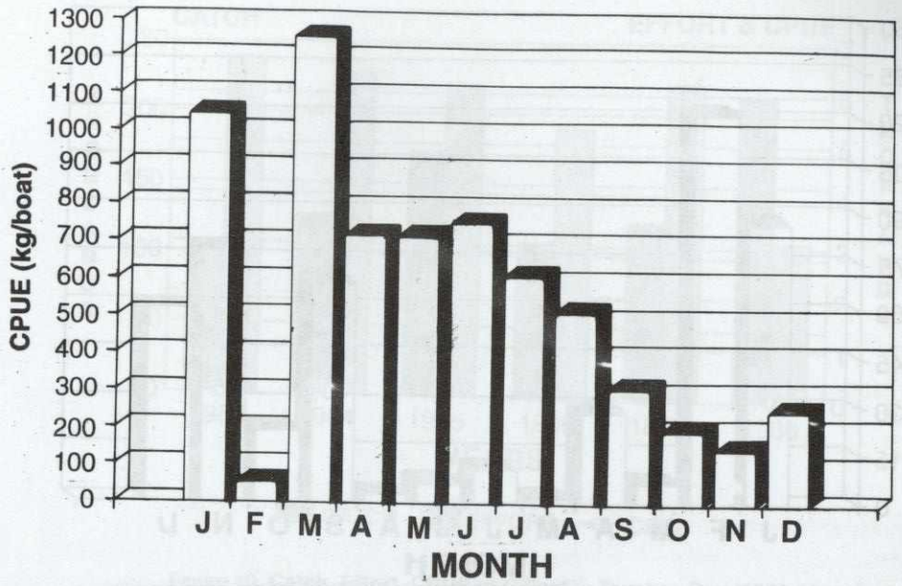



Figure 6. **CPUE of Auxos thazard caught by Bagnet in Tayabas Bay, 1983-1988**

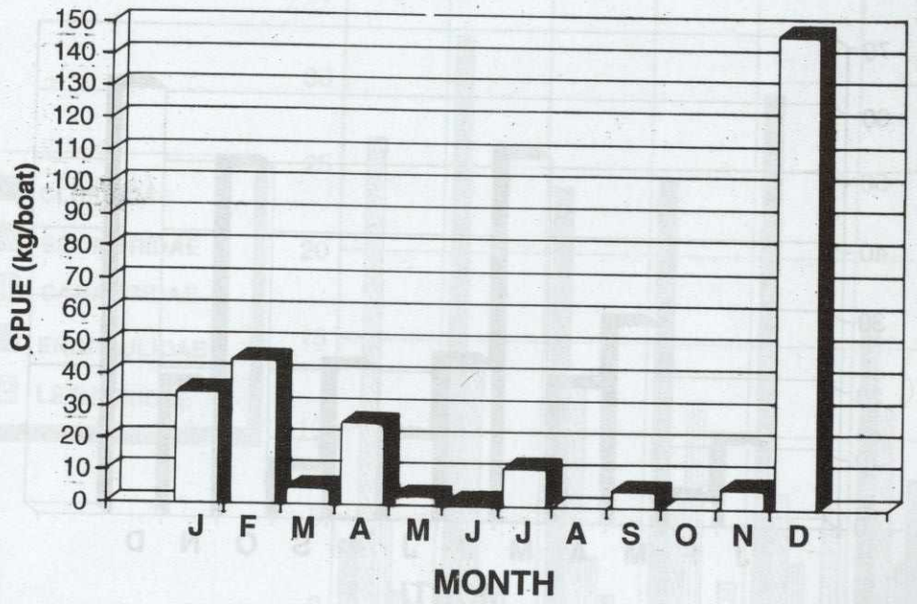



Figure 7. **CPUE of Decapterus spp. caught by Bagnet in Tayabas Bay, 1983-1988**

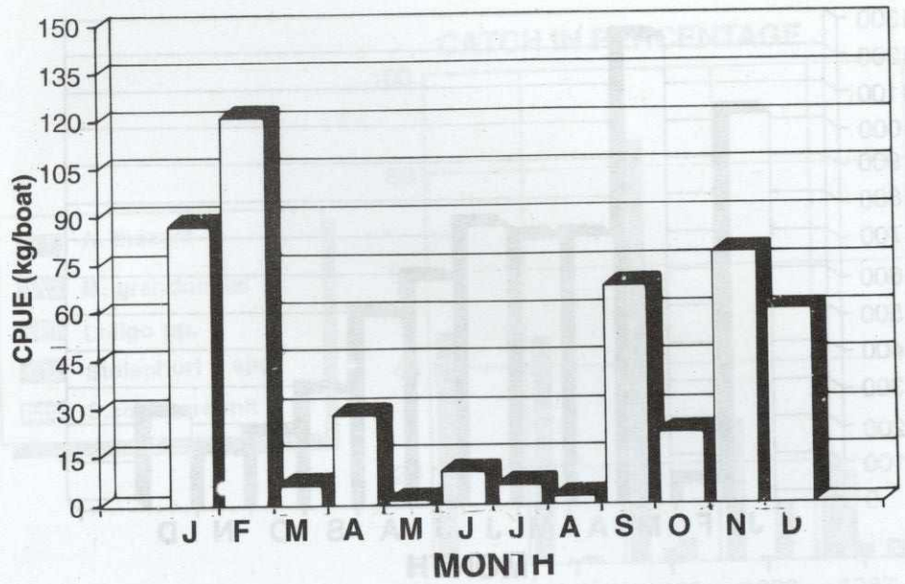



Figure 8. **CPUE of Stolephorus spp caught by BAgnet in Tayabas Bay, 1983-1988**

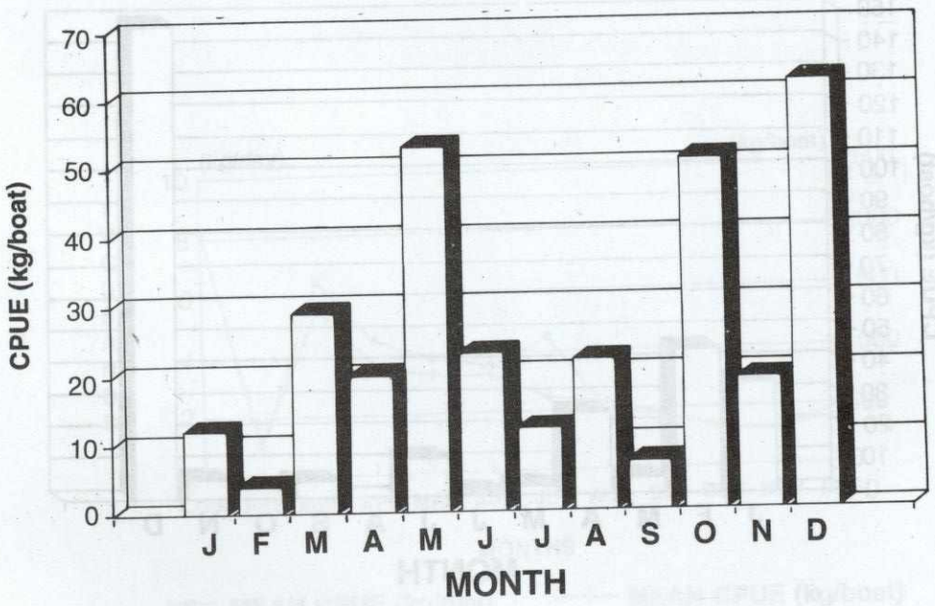



Figure 9. **CPUE of Invertebrates caught by BAgnet in Tayabas Bay, 1983-1989**



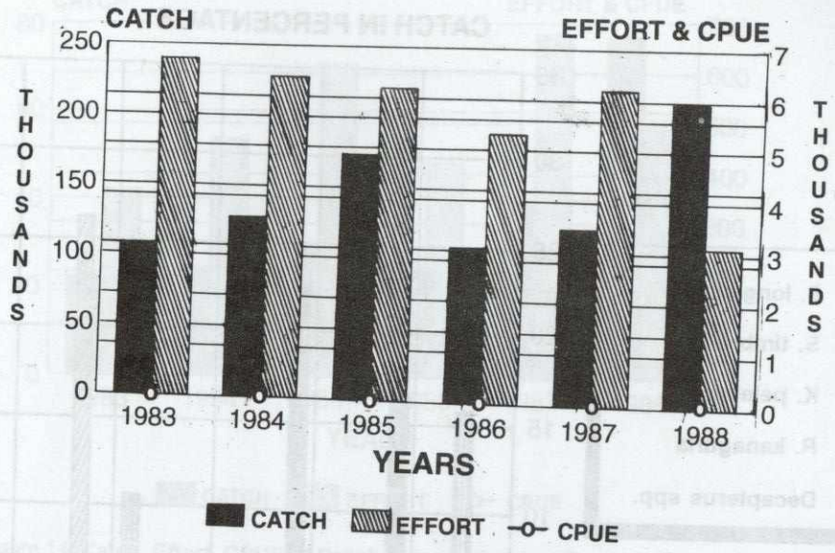



Figure 10. **Catch, Effort, CPUE of Gillnet in Tayabas Bay (1983-1988)**

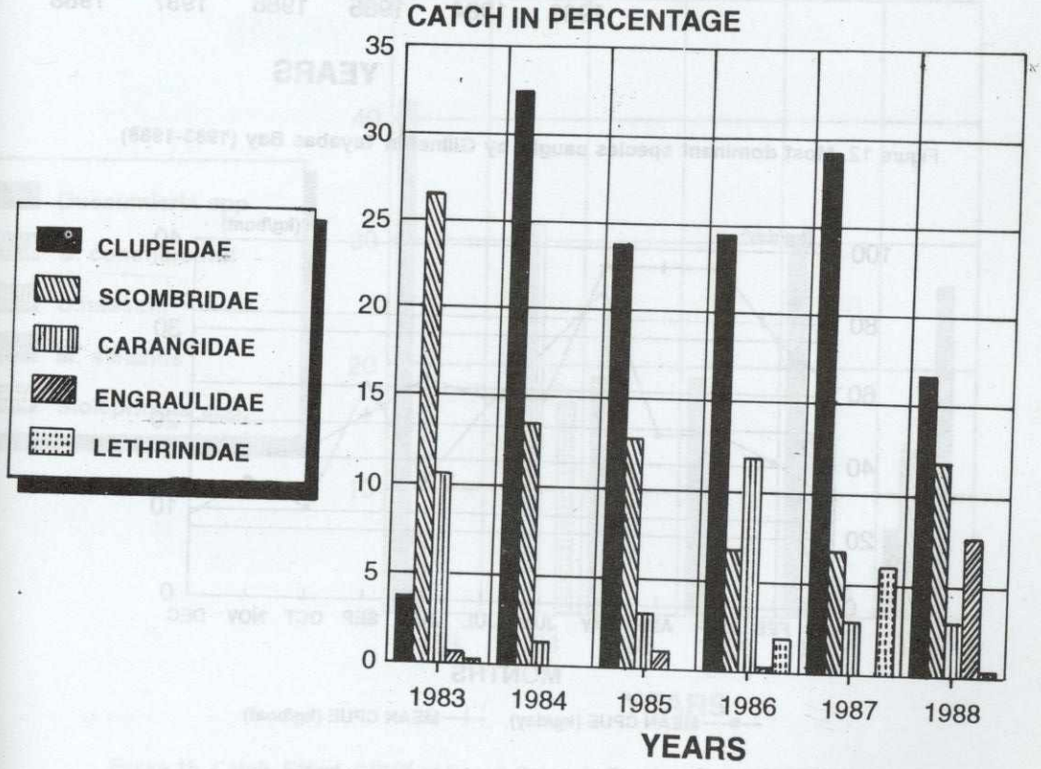



Figure 11. **Catch composition of Gillnet in Tayabas Bay (1983-1988)**

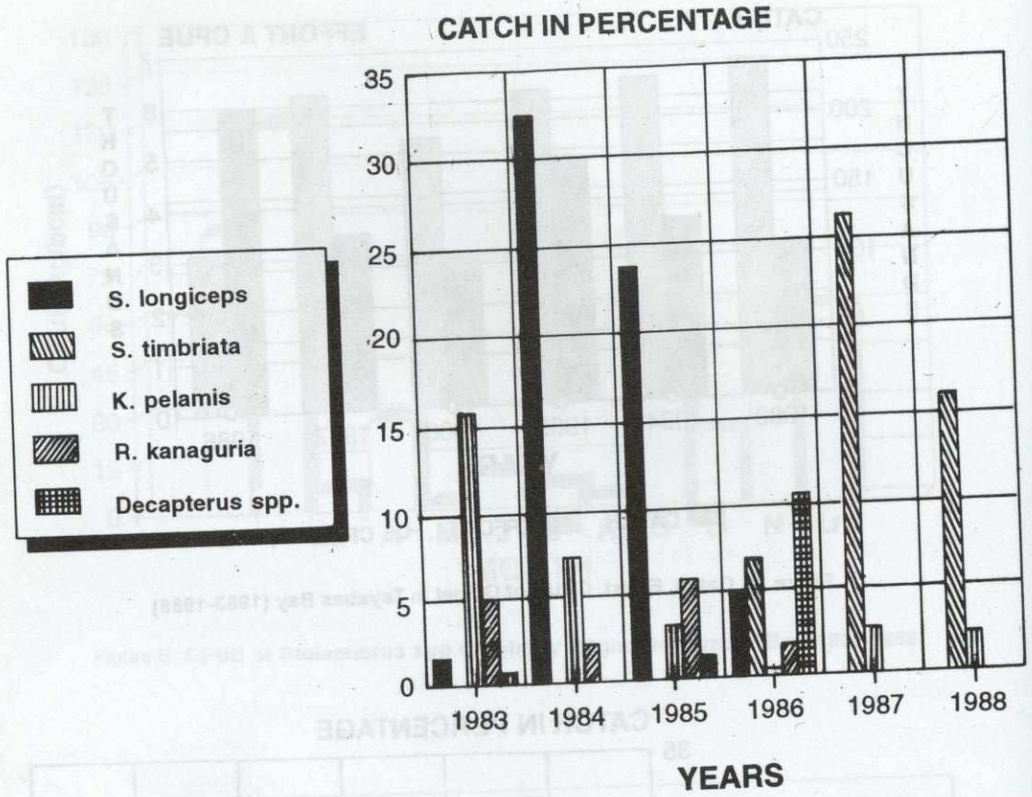



Figure 12. **Most dominant species caught by Gillnet in Tayabas Bay (1983-1988)**

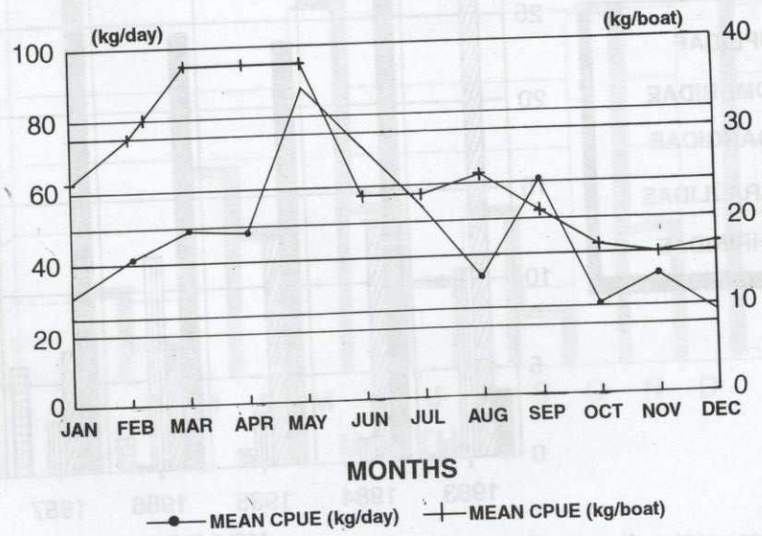



Figure 13. **Monthly mean CPUE of Gillnet in Tayabas Bay (1983-1988)**



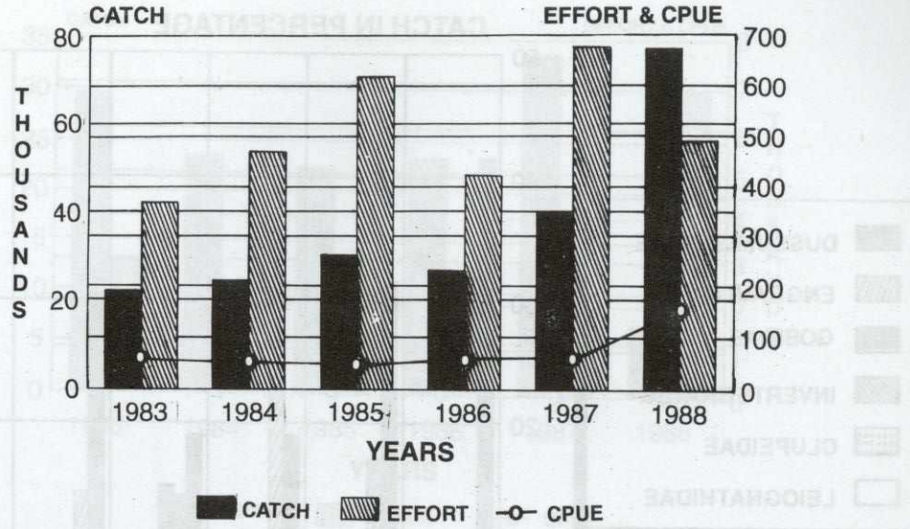



Figure 14. **Catch, Effort, CPUE of Beach Seine in Tayabas Bay (1983-1988)**

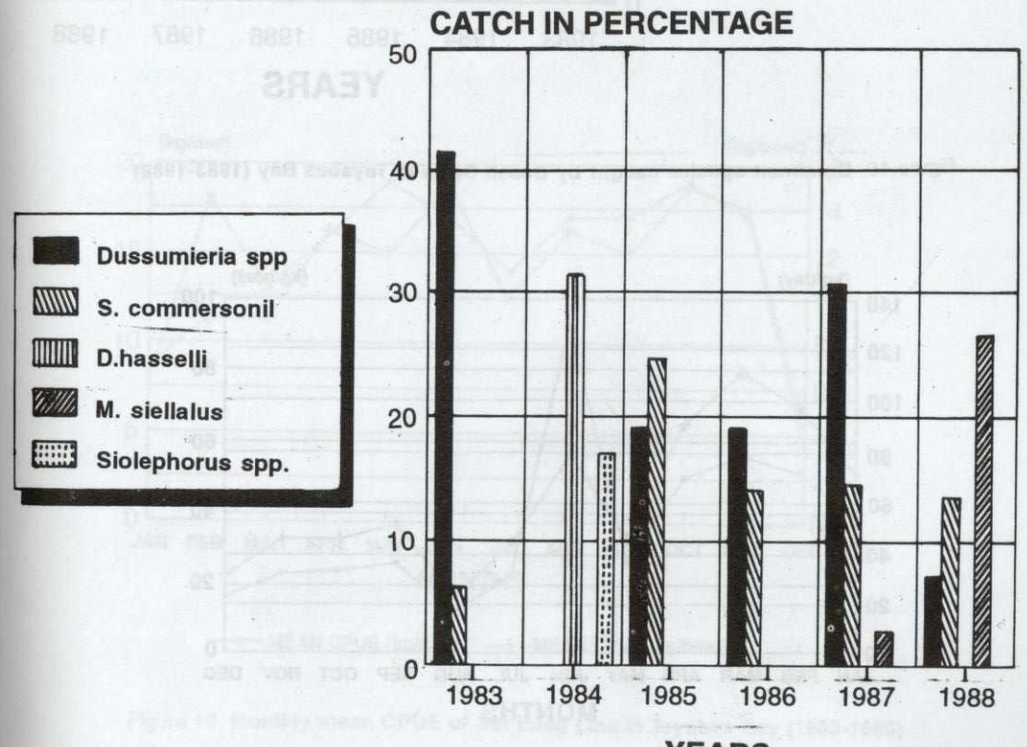



Figure 15. **Catch, Effort, CPUE of Beach Seine in Tayabas Bay (1983-1988)**

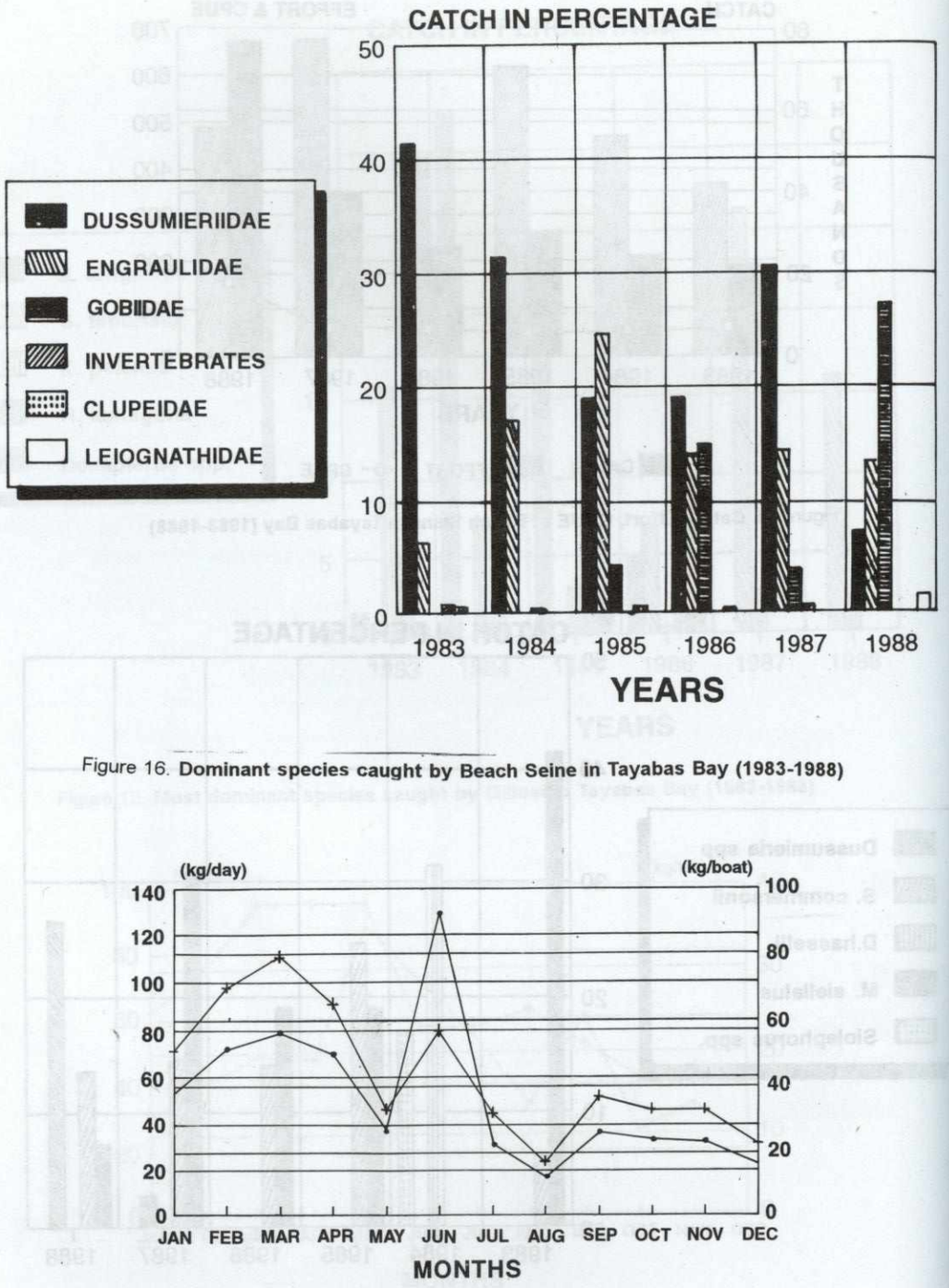



Figure 16. **Dominant species caught by Beach Seine in Tayabas Bay (1983-1988)**




Figure 17. **Monthly mean CPUE of Beach Seine in Tayabas Bay (1983-1988)**



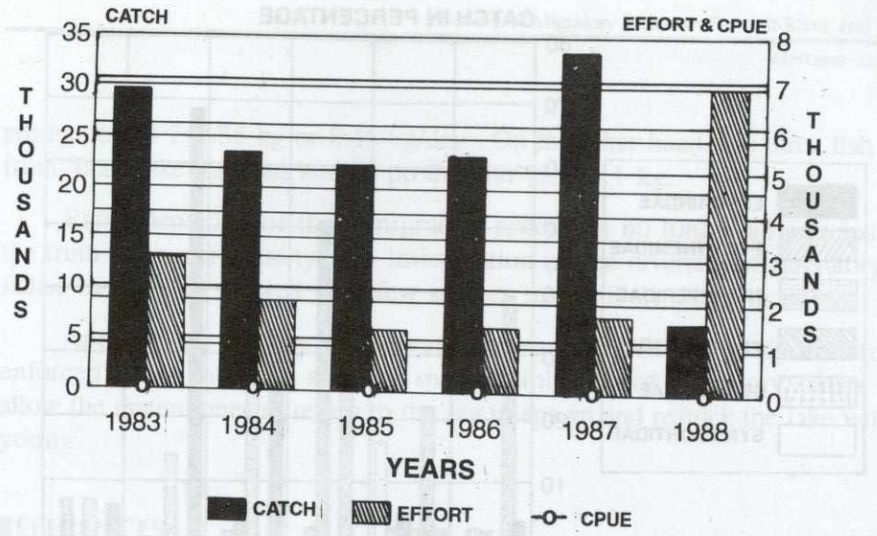



Figure 18. **Catch, Effort, CPUE of Set Long Line in Tayabas Bay (1983-1988)**

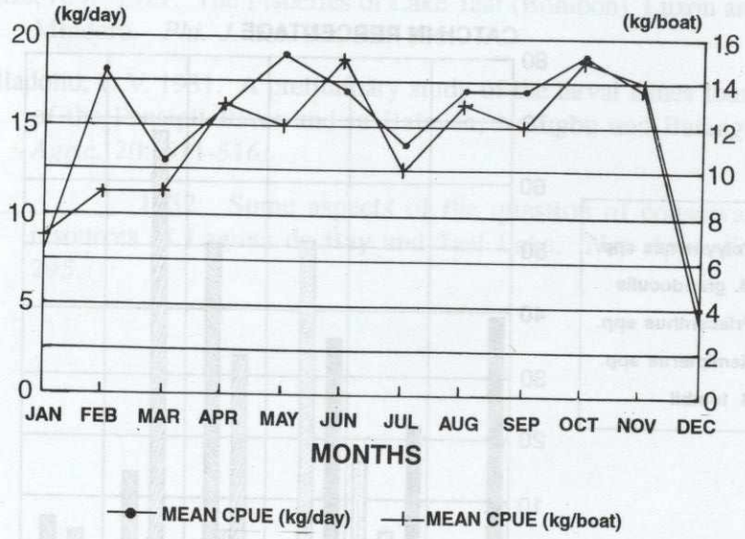



Figure 19. **Monthly mean CPUE of Set Long Line in Tayabas Bay (1983-1988)**

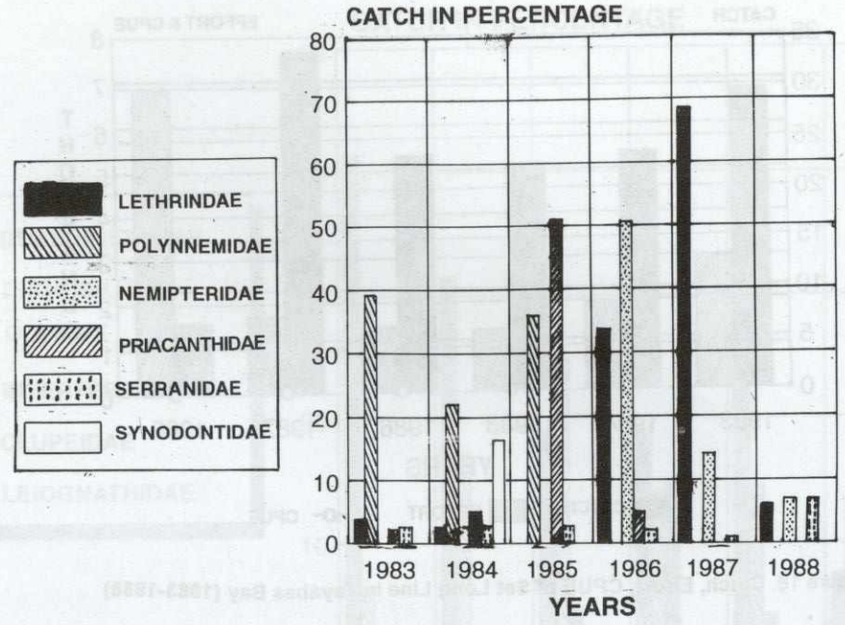



Figure 20. **Catch composition of Set Long Line in Tayabas Bay (1983-1988)**

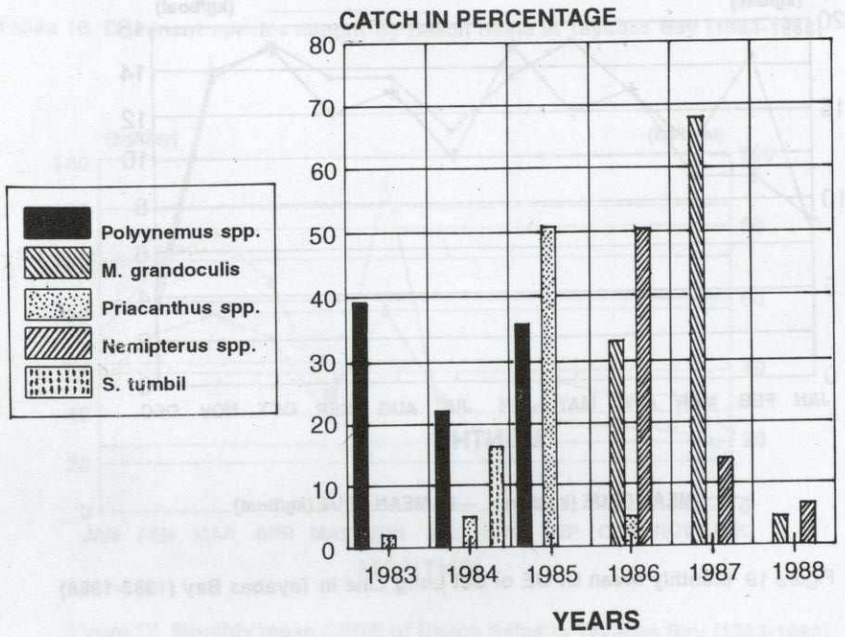



Figure 21. **Dominant species caught by Set Long Line in Tayabas Bay (1983-1988)**





production of 262.35 kg or 8.46 kg/day. On the other hand, the three fish corrals from Taal Lake gave an annual production of 981.1 kg.

Rapid depletion of these migratory species is no longer an anticipation of the truth but a stark reality. An investigation on the diversity of migratory larval fishes in the lake showed very few species in relatively small quantities.

Appropriate fishery conservation measures should be formulated and enforced immediately to stop the over-exploitation of migratory fishes and to allow the mature ones to return to the sea to spawn and restock the lake with their young.

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Table 1. **Total production (in kg) of Pansipit Fish Corral, July 1983 to June 1984**

| | EEL *Anguilla mauritiana* | MUSLO *Caranx marginatus* | MULLET *Mugil* sp. | GREY MULLET *Mugil ceramensis* | ALSO *Lutianus argentinaculatus* | TOTAL Prod. (kg) |
|---|---|---|---|---|---|---|
| **1983** | | | | | | |
| July | 551.0 | 219.7 | | | 89.7 | 860.4 |
| August | 87.1 | 123.4 | | | 17.9 | 228.4 |
| September | | 40.0 | | | | 40.0 |
| October | 196.1 | 102.0 | | | | 298.1 |
| November | 216.3 | 230.4 | | 2.0 | | 448.7 |
| December | 377.8 | 69.3 | 14.8 | 37.6 | | 499.5 |
| **1984** | | | | | | |
| January | 158.7 | 153.2 | | 4.7 | | 316.6 |
| February | 61.3 | 54.4 | | | | 115.7 |
| March | | 182.5 | | | | 182.5 |
| April | | 116.0 | | | | 116.0 |
| May | | 14.9 | | | | 14.9 |
| June | 9.8 | 17.5 | | | | 27.3 |
| **TOTAL** | 1,658.1 | 1,323.3 | 14.8 | 44.3 | 107.6 | 3,148.1 |
| **AVE.** | 138.18 | 110.28 | 1.23 | 3.69 | 8.97 | 262.35 |
| **%** | 52.7 | 42.03 | 0.47 | 1.40 | 3.41 | |

Table 2. **Total production (in kg) of Taal Lake fish Corral, July 1983 to June 1984**

| | MALIPUTO *Caranx ignobilis* | MUSLO *Caranx marginatus* | MANIPIS *Caranx* sp. | EEL *Anguilla mauritiana* | ALSO *Lutianus argentimaculatus* | TOTAL Production |
|---|---|---|---|---|---|---|
| **1983** | | | | | | |
| July | 204.1 | | 1.2 | 14.8 | | 220.1 |
| August | 3.1 | | | 10.2 | | 13.3 |
| September | 2.4 | 2.2 | | 11.0 | | 15.6 |
| October | 48.2 | 1.3 | | 11.5 | | 61.0 |
| November | 2.4 | 2.4 | | | | 4.8 |
| December | | 1.0 | | | | 1.0 |
| **1984** | | | | | | |
| January | | 16.8 | | | | 16.8 |
| February | 15.1 | 108.9 | | | | 124.0 |
| March | 411.2 | | | | | 411.2 |
| April | 78.7 | 20.2 | | | | 98.9 |
| May | - | - | - | - | - | - |
| June | 4.4 | | | 3.0 | 7.0 | 14.4 |
| **TOTAL** | 769.6 | 152.8 | 1.2 | 50.5 | 7.0 | 981.1 |
| **AVE.** | 64.13 | 12.73 | 0.1 | 4.21 | 0.58 | 81.75 |
| **%** | 78.44 | 15.57 | 0.12 | 5.15 | 0.7 | |



**APPENDIX A**

**FISH CORRAL SURVEY FORM (PANSIPIT RIVER)**

| Date | Time | Fish Species | Quantity | Size (cm) | No. of pcs. per kilo | Remarks |
|---|---|---|---|---|---|---|
| | | | | | | |

production of 262.35 kg or 8.46 kg/day. On the other hand, the three fish corrals from Taal Lake gave an annual production of 981.1 kg.

Rapid depletion of these migratory species is no longer an anticipation of the truth but a stark reality. An investigation on the diversity of migratory larval fishes in the lake showed very few species in relatively small quantities.

Appropriate fishery conservation measures should be formulated and enforced immediately to stop the over-exploitation of migratory fishes and to allow the mature ones to return to the sea to spawn and restock the lake with their young.

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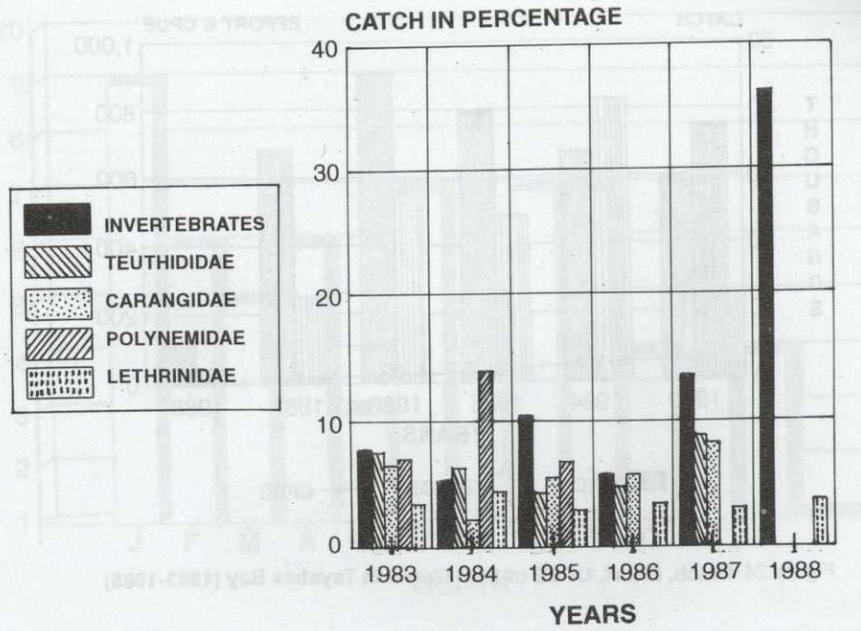


Figure 22. **Catch composition of Fish corral in Tayabas Bay (1983-1988)**

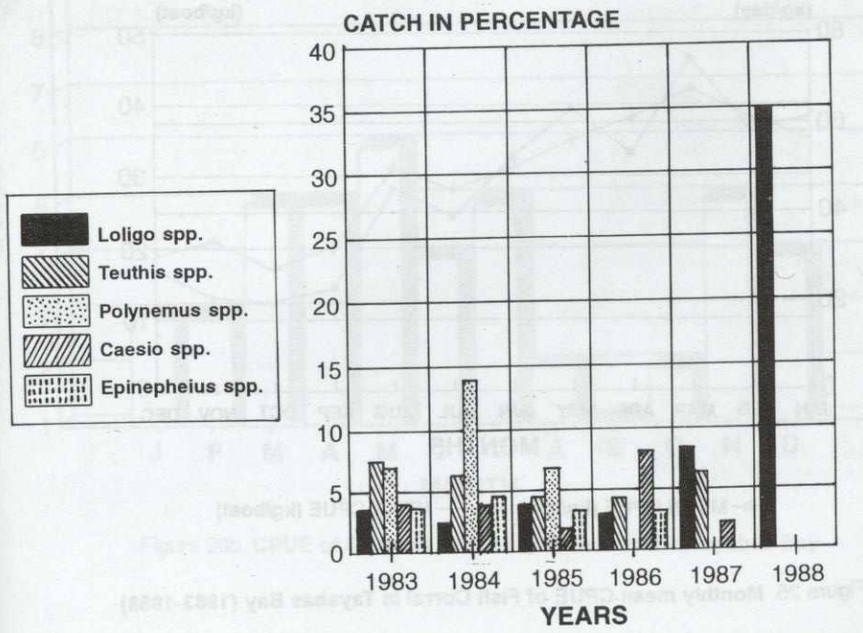


Figure 23. **Dominant species caught by Fish corral in Tayabas Bay (1983-1988)**

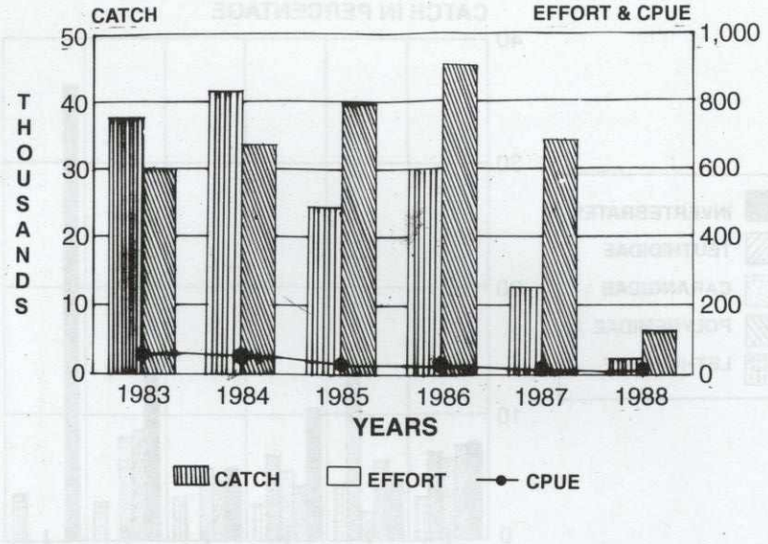


Figure 24. **Catch, Effort, CPUE of Fish Corral in Tayabas Bay (1983-1988)**

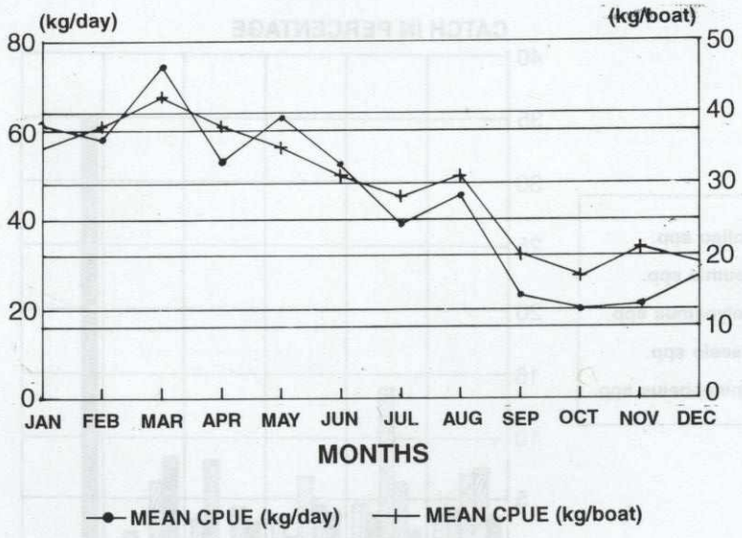


Figure 25. **Monthly mean CPUE of Fish Corral in Tayabas Bay (1983-1988)**



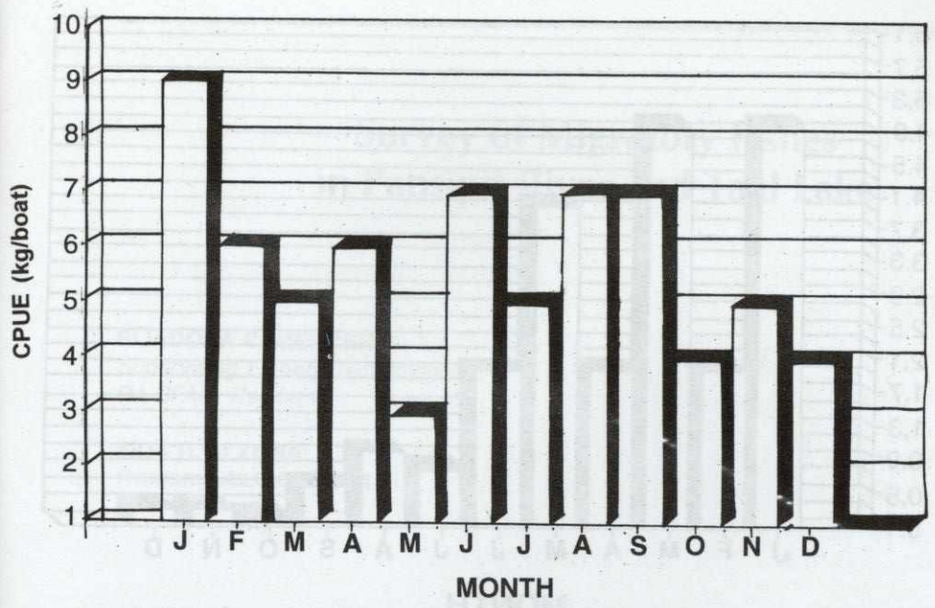


Figure 26a. **CPUE of Loligo spp. caught by Fish Corral in Tayabas Bay, 1983-1988**

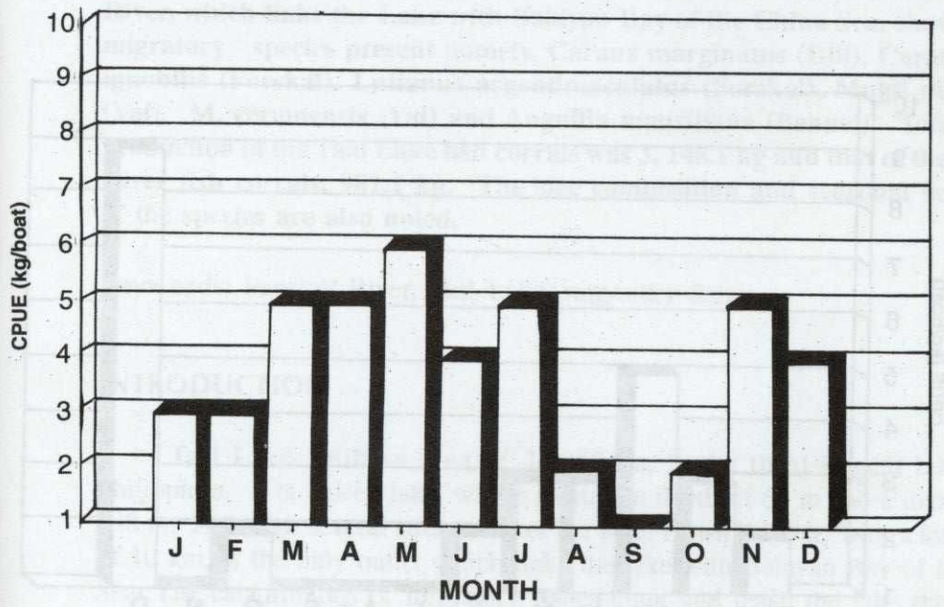


Figure 26b. **CPUE of Siganids caught by Fish Corral in Tayabas Bay**

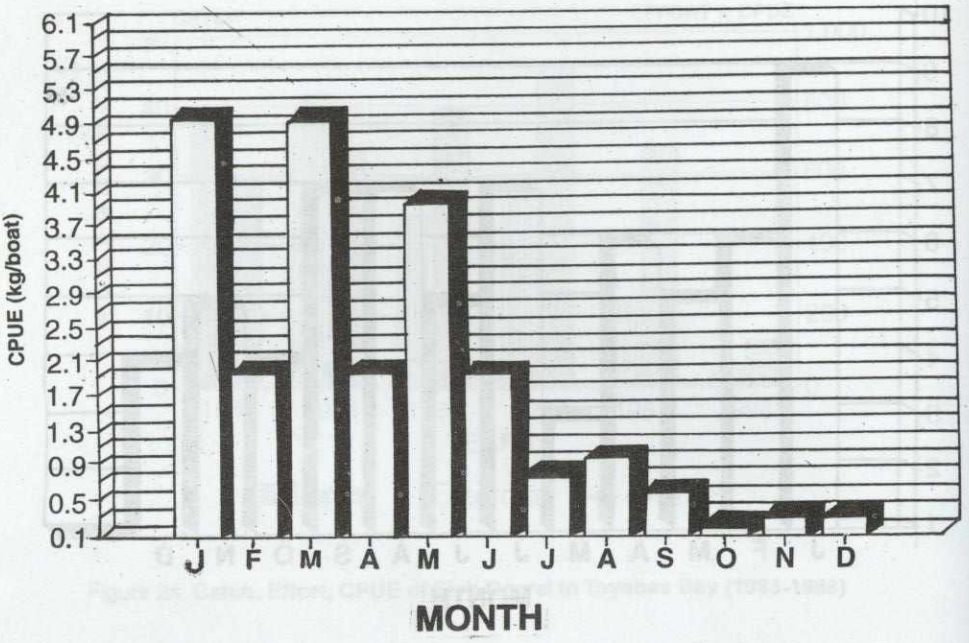


Figure 26c. **CPUE of Caesio sp. caught by Fish Corral in Tayabas Bay, 1983-1988**

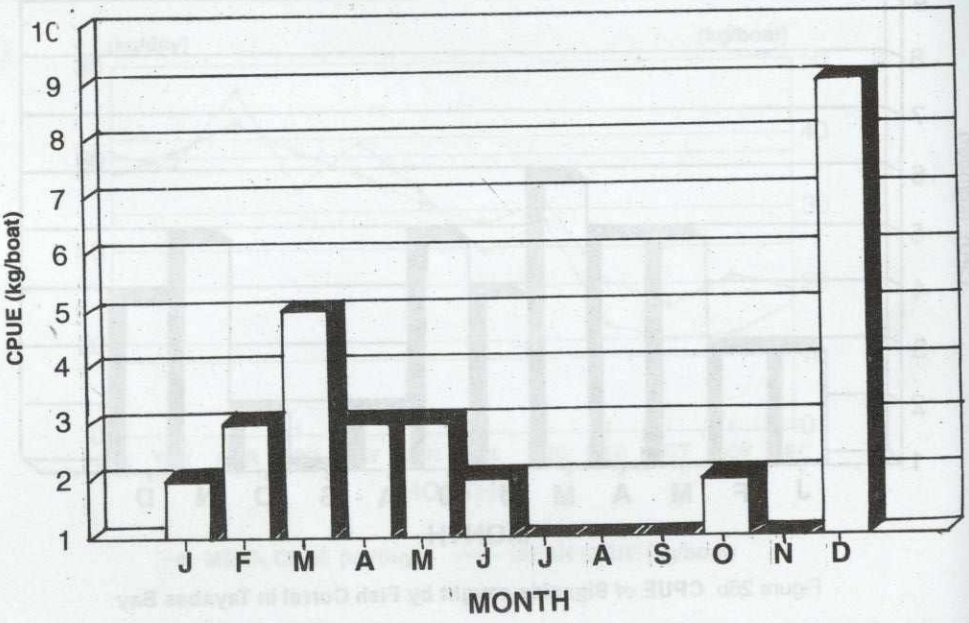


Figure 26d. **CPUE of Groupers caught by Fish Corral in Tayabas Bay, 1983-1988**