

# Occurrence of Young Milkfish *Chanos chanos* (FORSSKÅL) in Indonesia\*<sup>1</sup>

Gunzo KAWAMURA\*<sup>2</sup>, Daniel R. MONINTJA\*<sup>3</sup>, and  
Kusman MANGUNSKARTO\*<sup>3</sup>

## Abstract

A field survey was conducted to verify the occurrence of young milkfish in coastal waters. Results include information obtained from interviews with small-scale or subsistence fishermen, supported by successful capture of the fish in shore waters and rivers in 25 locations in Madura, Bali, and Java, Indonesia.

## INTRODUCTION

The natural history of the milkfish has been studied since only very recently, starting with work at the Aquaculture Department of SEAFDEC in Iloilo, Philippines (SENTA *et al.*, 1976, 1980; KUMAGAI, 1981). The seasonal occurrence of the larvae in tremendous numbers in shore waters in tropical and subtropical Indo-Pacific, however, was "discovered" centuries ago and has been the basis of the pond culture industry. Recently, it was speculated that milkfish fry actively migrate to inshore nursery grounds, aided by wind- and tide-generated onshore currents, when drift card experiments showed "negative results" (KUMAGAI and BAGARINAO, 1979). Thereafter, BURI and KAWAMURA (1982) demonstrated the active process governing the occurrence and movement of the larvae in coastal waters, in field and laboratory experiments. There are several reports on young milkfish in shore waters, lakes, and rivers (see SCHUSTER, 1960). BURI (1980) studied the feeding of young milkfish found in coral reefs, lagoons, mangrove and nipa swamps as well as estuarine systems and concluded that depositional environments are important nursery grounds for this species. The milkfish is euryhaline, and the histology and spectral sensitivity of the retina show the typical characteristics of the teleosts which inhabit coastal waters or fresh waters (KAWAMURA and HARA, 1980; KAWAMURA and NISHIMURA, 1980).

SAANIN (1954) reported capture of young milkfish in coastal swamps along the north coast of Central Java. In this paper, further information on the occurrence of young milkfish after metamorphosis, about 2 to 50 cm in size, is provided.

---

\* 1 This study was supported by the Overseas Scientific Survey No. 5641062 from the Ministry of Education, Japan.

\* 2 Lab. Fish. Technol., Fac. Fish., Kagoshima Univ., 4-50-20, Shimoarata Kagoshima, 890 Japan.

\* 3 Fac. Fish., Bogor Agr. Univ., Raya Pajajaran, Bogor, Indonesia.

## METHOD

A field survey to collect information on the occurrence of young milkfish in coastal waters was made in Madura, Bali, and Java, Indonesia in July-August, 1981. We visited the government fisheries office in each province, interviewed subsistence fishermen and observed fishing operations.

## RESULTS AND DISCUSSION

The survey was made in 26 locations in Java, 9 locations in Madura, and 8 locations in Bali. The Brackishwater Aquaculture Development Center at Jepara has carried out intensive surveys on milkfish spawners and has useful information about the occurrence of preadult and adult milkfish in Karimun Java waters (MARTOSUDARMO *et al.*, 1976). There was no information about the young milkfish in the government fisheries office.

We were able to verify the capture of young milkfish of various sizes by small-scale and commercial fishermen in 27 of the 43 locations visited (Fig. 1). The fishing gear includes fish fence, gill net, cast net, beach seine, fish corral, and lift net in shore waters, and lift net, cast net, and filter bagnet in rivers and creeks. The gill net is the most common; we saw specimens about 25 cm total length captured with a 5 cm mesh gill net at Prenduan, south coast of Madura (Fig. 2). The size of the fish, according to the gill netters, is commonly around 25 cm in length. The size distribution of a gill net catch does not usually show the population because of the sharp mesh selectivity. If the girth-length relationship in herring (KAWAMURA, 1972) is applied to milkfish, the size distribution of milkfish captured with 5 cm mesh gill net will have a peak at 25 cm total length. At Tejakula in Bali, there is a gill net specially designed and operated for 1-2 kg milkfish from coral reefs.

A fish fence seems to be the most efficient gear for milkfish. Around Gending, East Java, fish fences 300 m long and 1.5 m high set along the sandy or muddy beach at high tide trap various species during following low tide (Figs. 3 and 4). The fishermen here believe that there are two types of milkfish, i.e., long slender ones and thicker ones: Bandeng Beru and Bandeng Biasa, respectively.

1-2 kg milkfish are occasionally caught in fish corral in Jakarta Bay, in boat seine in northern waters off Bali, and in lift net in the waters off Jepara, Central Java.

They are not limited to the sea. Young milkfish are captured quite often with filter bagnet across the Segaramadu River, some kilometers upstream. We saw milkfish about 30 cm in total length captured with cast net in the river at Tembaru, Madura (Fig. 5). Young milkfish are captured with lift nets from small streams in Sedayu, East Java (Fig. 6). According to the keepers of fish ponds in Panarukan, East Java, small young milkfish come into the ponds from the river through the pond gates at high tide, just as larvae do, and the trapped fish are cultured to market size. The pond keepers burn dried coconut husk to lure more milkfish into the ponds (Figs. 7 and 8). A researcher at the Aquaculture Development Station at Serang reported that he had observed young milkfish swimming in the waterway of a new experimental tilapia pond in Panjang Island, Banten Bay, West Java (Fig. 9). There is no milkfish pond on the

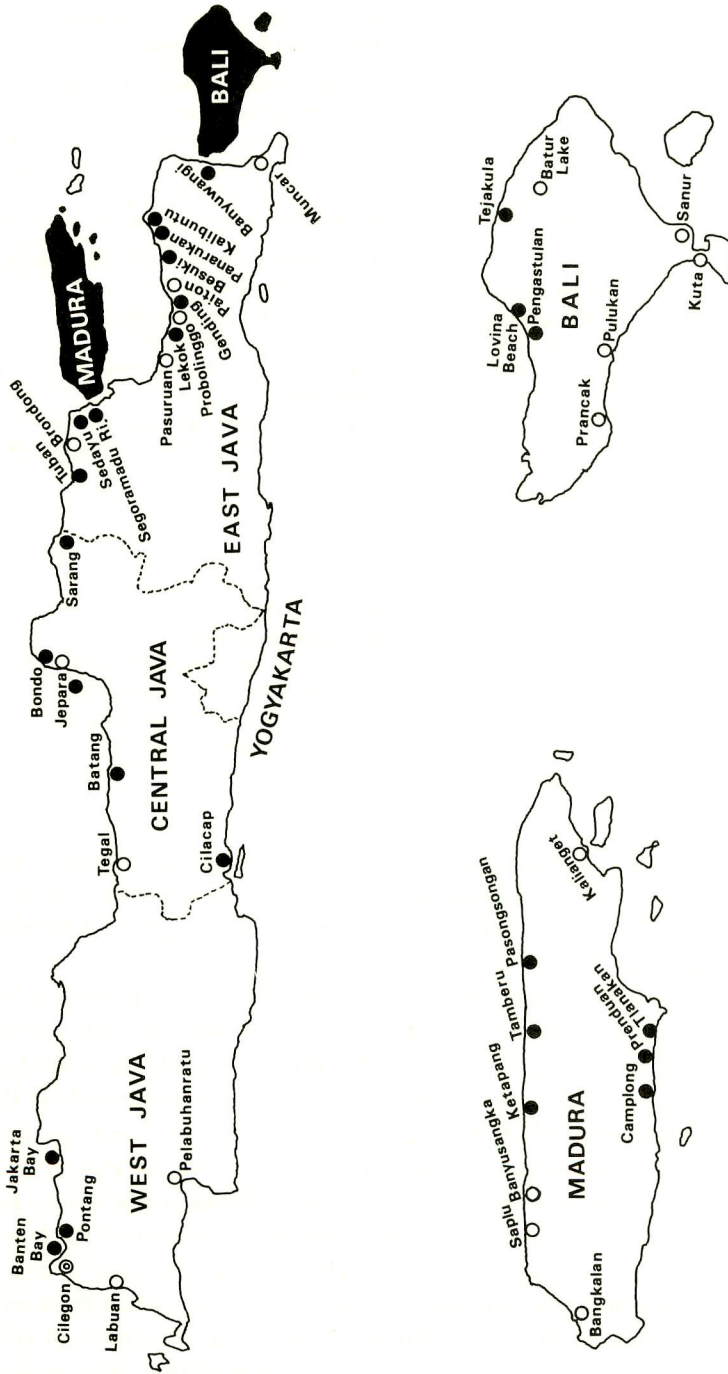


Fig. 1. The area covered by the survey, with key locations shown. Young milkfish occur in locations shown with closed circles.



Table 1. Summary of field survey results

	Location	Fishing gear ( <i>Local name</i> )	Geographical surroundings
West	Market in Cilegon		
	Java Panjang Is. Banten Bay		Concrete waterway, mangrove swamps behind, no fish pond nearby
	Pontan	Gill net	Shore waters, shallow, mangrove, bottom sandy
	Jakarta Bay	Fish corral ( <i>Cero</i> )	Offshore, 7-8 m deep, bottom sandy
Central	Batang	Gill net	Shore waters, bottom sandy, mangrove swamps, no fish pond nearby
	Java Tegal	"	Shore waters, shallow, bottom sandy
	Bondo	"	Shore waters, bottom sandy, mangrove swamps, no fish pond nearby
	Sarang	Cast net	Creek, small, bottom muddy
	Off Jepara	Lift net ( <i>Bagan</i> )	Offshore, 3-4 m deep, bottom sandy
	Cilacap	Beach seine	Shore water, bottom sandy, dense sea algae, no fish pond nearby
East	Tuban	Cast net	Creek and small river, bottom muddy, close to fish ponds
	Java Sedayu	Lift net ( <i>Brangang</i> )	River, narrow, bottom muddy
	Segaramadu River	Filter bagnet ( <i>Togo</i> )	River, wide and deep, bottom muddy
	Lekok	Gill net	Shore water, bottom sandy, shallow
	Gending	Fish fence ( <i>Swager</i> )	Shore water, bottom muddy-sand, mangrove
	Besuki	Boat seine ( <i>Payang</i> )	Offshore, deep
	Panarukan	Cast net	Fish pond creek, bottom muddy-sand, mangrove
	Kalibuntu	Gill net	Shore water, bottom sandy, mangrove, many small islands
	Banyuwangi	Cast net	Beach, shallow, bottom sandy
Bali	Pengastulan	Cast net, Gill net	Beach, clean sand
	Lovina Beach	" "	" "
	Tejakula	"	Beach, clean sand, coral reefs
Madura	Ketapang	Gill net	Shore water, bottom sandy
	Temberu	Cast net	River, narrow, bottom muddy
	Pasongsongan	"	River, wide and deep, bottom muddy, no fish pond nearby
	Camplong	Gill net	Shore water, shallow, bottom sandy, mangrove
	Prenduan	"	Shore water, shallow, bottom sandy, mangrove
	Tlanakah	"	Shore water, shallow, bottom sandy, mangrove

island.

Thus, the catching of young milkfish in shore waters and in some rivers seems common. The catch is so poor that it is generally consumed by the fishermen, but sometimes a few individuals turn up as did a milkfish about 15 cm total length sold with mullet in a market in Cilegon, West Java (Fig. 10).

The shore waters where young milkfish are caught have common geographical conditions: shallow waters, sandy beach, mangrove swamps behind, and a river nearby (Table 1). Nevertheless, we have to consider the fishing methods. In coastal waters in Indonesia, fishing activity is on a small scale and efforts are concentrated on flat sandy beaches or muddy backwaters where fishing gears such as gill nets and cast net can be easily operated. We cannot estimate the distribution of young milkfish from maldistributed fishing efforts. The occurrence of the young milkfish is not always related to that of larvae. This may be because in some locations the collection of the larvae is not made efficiently. Beach seiners in Cilacap, Central Java, have captured young milkfish (Fig. 11), although milkfish larvae have not been reported on the southern coast of Java.

It is possible that some of the young milkfish come from broken-down fish ponds, especially at times of swell and flood; some fishermen claimed that their milkfish catch is better at these times. In recent years, however, the construction of fish ponds has

improved a great deal and according to pond caretakers, it is almost impossible for fish to escape even at such bad times. They do not flood every year, but young milkfish were caught every year in locations with no milkfish pond nearby. Therefore, it can be concluded that young milkfish occur naturally where they have been caught and that these locations are natural nursery grounds.

## REFERENCES

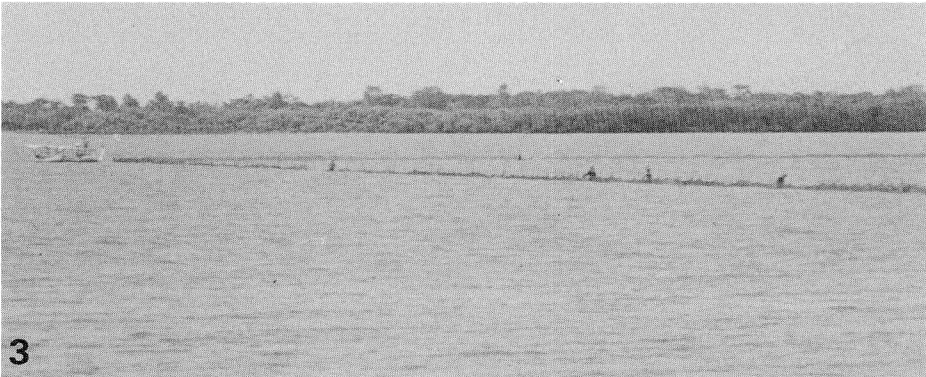
- BURI, P., 1980. Ecology on the feeding of milkfish fry and juveniles, *Chanos chanos* (FORSSKÅL) in the Philippines. *Mem. Kagoshima Univ. Res. Center S. Pac.*, 1 (1) 25-42.
- \_\_\_\_\_ and KAWAMURA, G., 1983. The mechanics of mass occurrence and recruitment strategy of milkfish *Chanos chanos* (FORSSKÅL) fry in the Philippines. *Ibid.*, 3(2), 33-55.
- KAWAMURA, G., 1972. Gill net mesh selectivity curve developed from length-girth relationship. *Bull. Japan. Soc. Sci. Fish.*, 38 (10), 1119-1127.
- \_\_\_\_\_ and HARA, S., 1980. On the visual feeding of milkfish larvae and juveniles in captivity. *Ibid.*, 46 (11), 1297-1300.
- \_\_\_\_\_ and NISHIMURA, W., 1981. S-potential from the retina of milkfish, *Chanos chanos* (FORSSKÅL). *Ibid.*, 46 (11), 1421.
- KUMAGAI, S., 1980. Ecology of milkfish with emphasis on reproductive periodicity. Research report to the Aquaculture Department of SEAFDEC, Iloilo, Philippines.
- \_\_\_\_\_ and BAGARINAO, T. U., 1979. Results of drift card experiments, with considerations on the movement of milkfish eggs and larvae in the northern Sulu Sea. *Fish. Res. J. Phil.*, 4 (2), 64-81.
- MARTOSUDARMO, B., NOOR-HAMID, S. and SABARUDDIN, S., 1976. Occurrence of milkfish, *Chanos chanos*, spawners in Karimun Jawa waters. *Bull. Shrimp. Cult. Res. Cent.*, 2 (1/2), 169-176.
- SAANIN, H., 1954. On occurrence of *Chanos* fry in Indonesian waters. *Tech. Pap. Indo-Pacif. Fish.*, 54/41.
- SENTA, T., KUMAGAI, S. and CASTILLO, N., 1980. Occurrence of milkfish, *Chanos chanos* (FORSSKÅL), eggs around Panay Island, Philippines. *Bull. Fac. Fish., Nagasaki Univ.*, 48, 1-11.
- \_\_\_\_\_, \_\_\_\_\_ and VER, L., 1976. Occurrence of milkfish eggs in the waters around Panay Island, Philippines, in April and May, 1976. *Proc. Intl. Milkfish Workshop-Conf., Tigbauan, Iloilo, Philippines, May 19-22, 1976*, 167-180.
- SCHUSTER, W. H., 1960. Synopsis of biological data on milkfish *Chanos chanos* (FORSKAL), 1775. *FAO Fish. Biol. Synopsis No. 4, FB/60/S 4*, FAO, Rome, pp. 57.

### Explanation of Plates

- Fig. 2. A fisherman with milkfish (arrow) captured with a gill net (Prenduan, Madura).
- Figs. 3. and 4. A fish fence in operation (Gending, East Java).
- Fig. 5. Cast netters in operation. A milkfish was found in their canoe (arrow) (Pasongsongan, Madura).
- Fig. 6. A lift net set in a small stream (Sedayu, East Java).
- Figs. 7 and 8. Fish ponds that young milkfish come into from the river. Dried coconut (arrow) is burnt to lure more milkfish (Pananukan, East Java).
- Fig. 9. A concrete waterway which opens to the sandy beach from an experimental tilapia pond (Panjang Island, Banten Bay, West Java).
- Fig. 10. A milkfish sold with mullet in a market (Cilegon, West Java).
- Fig. 11. A beach seine in operation (Cilacap, Central Java).



# Plate I

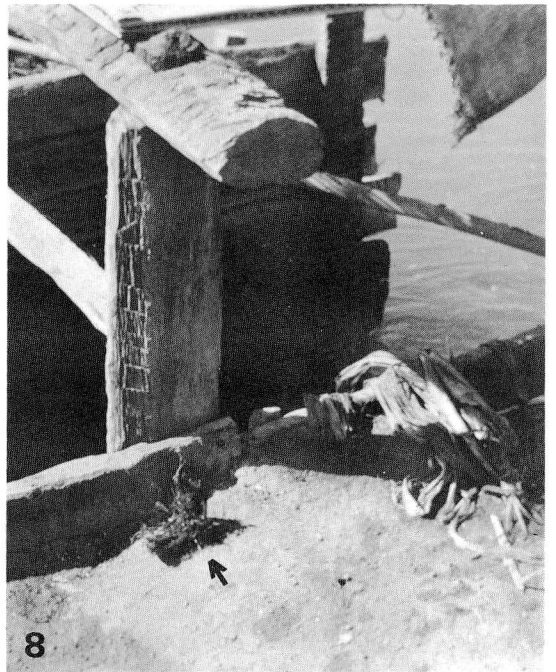


## Plate II





### Plate III



9

8

### Plate IV

