

SIGANID FISHERY OF NORTHWESTERN PANGASINAN

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INTRODUCTION

Siganids or rabbitfishes belong to the Family Siganidae with 17 species found in Philippine waters as reported by Dr. Albert Herre, foremost systematist on Philippine fishes. The adult forms of these fishes are called *samaral* in Tagalog, *baliwis* and *bataway* in Bicol, *barangan* and *barangen* in Ilocano and Pangasinan, and *samaral*, *mandalaba* and *danggit* in Visayan. Their fry are called *kuyog* in Tagalog, *padas* in Ilocano and Pangasinan, *danggit* and *kuyog* in Bicol and Visayan.

This fish is available in commercial quantities in the principal fishing grounds of the Philippines with northwestern Sulu Sea as the major producer, followed by Samar Sea, Bohol Strait, San Miguel Bay, Davao Gulf, Southern Sulu Sea, Visayan Sea and Lingayen Gulf in the order of production.

The average siganid production for the last five years (1968-72) accounted for the additional 0.09% in commercial fisheries production. One percent (1%) of the catch of municipal fishermen from the coastal regions bordering the above-mentioned fishing grounds have consistently been composed of siganid species.

The area around Lingayen Gulf is noted for its siganid fishery. The siganid fry are used as fish paste for maximum protein yield. Converting siganid fry or "padas" into fish paste, although a very wasteful practice, eventually became one of the area's established industries.

Due to the abundance and seemingly inexhaustible fry and adult siganid resources, the industry has permanently supported the increasing population in the area. However, the present methods of gathering have brought about rapid depletion of the stock. Unlike milkfish, catfish, carp, and other culturable fish species in the country, knowledge on the culture potential of siganids is very limited. Preliminary results of experiments conducted at the Lucap Fisheries Station in 1960 by BFAR Regional Director Westremundo M. Rosario showed that several siganid species can be cultured successfully.

In Northwestern Pangasinan, where this fish is very much a delicacy, the increasing demand for *padas* (fry) and *barangen* (adult) has resulted in indiscriminate fishing and introduction of harmful fishing methods. Inhabitants of this region, particularly those in the town of Bolinao, realized the harmful effects of these practices. Town officials have passed a municipal ordinance calling for *padas* conservation, but its enforcement had very little effect in minimizing indiscriminate catching.

The practice of continuous gathering of fry during the peak months has forced government officials to formulate policies in managing the *padas* fishery. With this objective, the authors made a series of surveys of siganid fishery in Northwestern Pangasinan covering the towns of Anda, Bolinao, and Alaminos in April and May of 1972 and 1974. April and May are the peak months for siganid fishing which starts from February and ends in September.

General Characteristics of the Fish

The *barangen* are spiny-rayed fishes that can inflict grievous wounds with the spines extruding from their fins. The spines of siganids produce toxic substances which can cause fever and chilling in human beings. The siganids belong to the species that is characterized by the first and the last rays of their pelvis modified with spines. The skin is leathery and covered with smooth, small and closely adherent scales and hence the fish is often mistaken as non-scaled. The body is oval in shape and strongly compressed. The color is olive-green to brownish depending on the species. The discoloration occurs almost immediately after the fish dies so that identification from preserved specimens is quite difficult. (Fig. 1 illustrates the most common *barangen* species, the *Siganus canaliculatus*.)

They are herbivorous but sometimes their voracity makes them carnivorous. Generally, however, they also feed on organisms attached to the marine plants or corals so that they are found where there are plenty of marine vegetation, especially eel grasses. This preference in habitat made the northwestern portion of Pangasinan, especially the reef areas off Bolinao, one of the largest *barangen* and *padas* centers in the country.

General Ecology of the Survey Area

The eulittoral zone of the coasts of Bolinao, Anda, and Alaminos are bare at low tide, exposing the substratum of rocky, sandy, sandy-rocky and sandy-muddy areas which are rich in all forms of marine life mostly, eel grasses and gastropod mollusks. The most prominent flora is composed of the community of eel grasses (*Zostera marina*), the concentration of which was observed along the vicinity of Bolinao and several of its islands. Fig. 2 shows the survey area and the eel grass community.

In Bolinao waters, the authors observed various species of starfishes, sea urchins, sea cucumbers, sea lilies and varieties of hard and soft corals which altogether form a vast natural marine garden. These marine fauna are clearly visible when the tide is receding. This marine garden is further blessed with large quantities of different species of tropical aquarium fishes. The presence of edible seaweeds like *pukpuklo* (*Codium* sp.) and *ar-rosep* (*Caulerpa* sp.) in the local market every day indicates that seaweeds are another potential resource of the area.

Numerous saltbeds are found in several of the surrounding islets and water edge of Cabarruyan Island where the town of Anda is located. However, saltbeds were most notable in the area east of Cabarruyan Island facing Lingayen Gulf. At the west side of the Island near Lucap Bay, oyster farms are concentrated near the mouths of several rivers. The water depth in this area is about two fathoms which is very much suited for oyster culture. The Lucap Bay area has more or less the same ecological make-up as the Bolinao area, except that waters between Lucap Bay and the Hundred Islands are deeper, usually ranging from four to 10 fathoms.

About 70 fish corrals are found in the area at depths of one to five fathoms. About 14 were counted around Trinchera Point off

Bolinao, 20 in the east of Santiago Island, about seven are installed between Cabarruyan and Santiago Islands, 10 in Lucap Bay and 20 along the stretch of Anda or inner Cabarruyan Island and Tambac Bay. The sea bottom of these fish corrals is sandy-smooth with good growth of eel grasses.

Other Fishes Caught with Siganids

Other fish species that are landed daily in the area aside from siganids are several demersal coral species such as parrot fish, grouper, snapper, caesio, flatfish, surgeon fish, eels, goatfish, barracuda and mullets. Also present are invertebrates like cuttlefish, squids, crabs, spiny lobsters, shrimps and a vast majority of marine gastropods.

Examination of the catch composition of the beach seine operated in Tagaporo waters in May 1972 showed the interesting results in Table 1. The fry catch consisted of siganid fry, 78%, and the others are identified as fry of parrot fish, grouper, grunt, glassfish, cardinal fish, trumpetfish, and some unidentified species. Obviously, these species spawned at the same period.

Fishing Gear

Barangen are caught with the use of varying fishing implements which are non-commercial and antiquated. The main fishing gear consists of *pana* or spear gun, *nasa* or *bubo* or bamboo fish trap, and *baklad* or fish corral. Except for the *nasa*, catching of fish by the other two means is aided by light accessories, the *barangen* being phototactic.

A complete fishing unit includes one or several mechanized and non-mechanized bancas of about one-fourth gross ton. Mechanized bancas which have engine power range of two to 10 h.p. outnumber the non-mechanized bancas by one to three (1:3). Bamboo rafts were found very practical in holding and transporting fish and other sea products to the waiting bancas during low tide.

Fishing operations in fish corrals and by spear gun start at midnight and end at daybreak. Bamboo fish traps or *nasa* are regularly visited and their catch collected with frequency depending solely on how attractive is the bait inside the corral.

Table 1. Catch Composition of Beach Seine Operation in Tagaporo, May 10, 1972.

Species	Weight (g)	Per cent	Ave. length (mm)
1. Siganid fry	573.6	78.30	26.33
2. Parrot fish & wrasses	92.5	12.62	36.00; 39.0
3. Grouper	16.0	2.18	93.00
4. Snapper	12.6	1.72	25.00
5. Unidentified	11.7	1.60	-----
6. Grunt	9.9	1.35	26.00
7. Shrimps	6.3	0.86	-----
8. Flatfish	5.4	0.74	77.00
9. Goatfish	4.6	0.63	28.00
T O T A L	732.6	100.00	-----

Table 2. Production Record of Bolinao Waters for April 1973 and August 1974 (in grams).

Species	1973		1974	
	Weight (g)	Percent	Weight (g)	Percent
11. Halfbeak	-	-	4,900	10.61
12. Goatfish	-	-	3,800	8.22
13. Anchovy	-	-	2,200	4.76
14. Slipmouth	70	0.44	1,900	4.13
15. Goby	-	-	500	1.08
16. Rudderfish	-	-	300	.65
17. Cutlass	-	-	300	.65
18. Surgeon fish	110	.68	-	-
19. Lobster	105	.65	-	-
20. Garfish	-	-	1,000	2.16
T O T A L	16,040	100.00%	46,200	99.99%

Table 2. Production Record of Bolinao Waters for April 1973 and August 1974 (in grams). (Continuation)

Year	1973		1974	
	Weight (g)	Percent	Weight (g)	Percent
1. Siganid	3,760	23.44	8,400	18.18
2. Grouper	2,850	17.77	2,700	5.85
3. Snapper	2,310	14.40	1,800	3.89
4. Parrot fish	320	1.99	9,100	19.69
5. Flying fish	1,860	11.60	-	-
6. Crab	810	5.05	2,100	4.54
7. Octopus	1,445	9.01	500	1.08
8. Catfish	600	3.74	700	1.51
9. Squid	1,800	11.22	-	-
10. Shrimp	-	-	6,000	12.98

Fishing is always aided by strong light (Petromax and kerosene lamps) placed at the impounding section of the fish corral or on the bow of the boat when fishing with spear gun. In the impounding section of the fish corral, the fisherman scoops the light-attracted fish with a net or he swims inside the fish corral and traps the fish. With spear gun, the fisherman stalks his quarry near a fish corral or ventures to a farther place to fish.

Barangen make up 20 to 50% of the catch and the rest belong to other fish species. In one night's operation, a fisherman hauls about five to six kilos of assorted species depending on the season.

Padas Fishery

Fishing for *padas* requires an entirely different method. In Bolinao, a small beach seine 15 m long with less than two cm mesh size was used. This was dragged towards the shallower portion of the water from two opposite ends manned by six fishermen. Fishermen made a circular motion for about 20 minutes aimed at enclosing the fry. The depth where the operation took place was one-half fathom.

Another fry fishing operation was observed in Lucap Bay where a group of fishermen used a similar net but with "buri" palm leaves tied at both ends, obviously to drive the fish inside the net. In Bolinao this kind of net is called "karoked" or drive-in net. A larger version is called "kayakas" which is intended for both the fry and adult fishes.

In Bolinao, revolutionized small *basnig* and purse seines are being operated for commercial fishing up to Lingayen Gulf.

As shown in Table 3, intensified catching was observed during the month of May, 1974. Bolinao was subjected to the most intense fishing effort resulting in the landing of commercial quantities of *padas*. A great majority of inhabitants evidently attained their present economic prosperity from the *padas* fishery.

"Karoked" or drive-in net is very effective with an average catch of 27.99 tons of *padas* compared with 27.60 tons caught by small *basnigs* and purse seiners. Incidentally, the fry which are caught during this month have an average total length of 4.0 cm where the body color is already distinct. At this stage, the fry in Bolinao are

Table 3. Record of Padas Catch in Bolinao and Anda.

	Data of Catch	Quantity (by petrolam can)	Prices in Peso per petro- leum can	Gear Used
Bolinao				
Luciente I	May 13-15, 1974	1,487	P15.00-P28.00	Drive-in-net
Tupa, Ilog Patay & Balingasay	May 13-15, 1974	3,400	P15.00-P28.00	Small basnig & purse seine
Tagaporo Is.	May 13-16, 1974	3,961	P15.00-P40.00	Drive-in-net
Barog	May 14, 1974	50	P28.00	Small basnig
Barog	May 15, 1974	150	P15.00	Drive-in-net
Lucero	May 16, 1974	1,500	P20.00	Purse seine
Anda, Carot and Cabunggan	May 17, 1974	50	P35.00	Drive-in-net
	TOTAL	10,898p. cans		

¹ Petroleum can of padas yield an average of 16 kilograms.

called *darigayo* whereas in other places of the region, they are called *padas*. In some cases, because of the very small mesh size of the net, fry of less than 3 cm in length are being caught.

This was evident in the fry catch record of 1972 as shown in Table 1 which yielded *padas* size of less than 3 cm in length.

Like *bangus* fry, *padas* is not exempted from the concession system. Of the three localities surveyed, only Bolinao has the potential to operate under this system. This is mainly due to the availability of *padas* in commercial quantities in the concession areas (Table 4 and Fig. 2). The coasts of Bolinao account for the lucrative *padas* fishing industry.

Based on the rate of annual municipal concession fee as shown in Table 4, it is evident that the waters surrounding Santiago Island have the biggest *padas* resource. This may be explained by the fact that the eastern side of this island, especially around Tagaporo (Dewey), has the largest colony of eel grasses. Eel grasses constitute the ideal *barangen* habitat. Other concession areas have smaller concentration of this kind of vegetation.

Concession areas are won by bidding and concession rights are renewable yearly and can be disposed of by sub-leasing of rights. Fishermen operating within the concession area pay as much as P10 to P20 per gear, regardless of the nature of the boat and size of the gear. The minimum fee per fisherman is P10.

Catch Disposal System

Wholesaling is done in the fish landings where capitalists, capitalists-fishermen and fish dealers undertake the disposition of the catch. They are then transported to the nearest market. These group of fish merchants constitute the core of the fish marketing business.

The capitalists are investors who finance the fishing paraphernalia which may include one or several units of fishing accessories such as nets, bancas, marine engines and even bamboo rafts. They also act as the middlemen who sell the catch to the fish dealers or vendors. Sometimes the capitalists are also the fishermen.

A hired fisherman-laborer takes charge of the fishing operation using the fishing implements the capitalist provides. He is paid under a commission or percentage basis ranging from 25 to 30 percent

Table 4. Padas concession in Bolinao, Pangasinan.

Fishery Lot Number	Boundaries	Concessioners	Fee/Year (in peso)
1	Santiago Island	Felix Celli	₱1,500.00
2	Poblacion-Trinchera Pt. Westward to Dalan-Tonoy, Arnedo	Benjamin Catallo	151.00
3	Dalan Tonoy to the East Bank of the Balingasay River	Felix Sicat	115.00
4	From West Bank of Balingasay River to Piedra's Point	Anselmo Cambil	60.00
5	From Trinchera Point Southward to Lipong, Luciente I to Luciente II	Ungria Calisaan	100.00
6	From Lipong, Luciente II to Catubig	Bienvenido Horada	150.00

of the total catch. The repairs and maintenance of the fishing paraphernalia are all shouldered by the capitalist.

In the fry sharing system, the expenses for repairs and maintenance are deducted from the sale of the *padas*. The amount left after the deduction is shared equally by the investor and the fisherman-laborer. However, many fishermen-laborers own and operate simple beach seines.

Marketing and Utilization

Assorted fishes caught from the southern and northern parts of Anda and Lucap Bay are brought to the Lucap Fish Landing then transhipped to the Alaminos market. Depending on the season, *barangen*, including other varieties of siganids like *masilayao* and *malaga*, constitute 50 per cent of the catch.

Bolinao waters, including a part of northern Anda, supply the fish requirement of the municipality of Bolinao. *Barangen* is available only during the mornings of market days either in fresh or dried form. Dried *barangen* costs 20% more than the fresh ones. Prices range from ₱6 to ₱10 a kilo when fresh and ₱9 to ₱12 per kilo when dried. The fluctuation in price is brought about by seasonal supply and demand.

A well-known table condiment, *padas bagoong* commands the highest price. While still in the fresh state, a petroleum can containing at least 17 kilos costs from ₱15 to ₱40. When salted or made into *bagoong* a tall milk tin can of it cost from ₱1 to ₱2. The roe of *barangen* (called *bugui*) are salted and made into caviar which are being sold by the piece from ₱0.25 to ₱0.50 a piece depending on the size.

Padas bagoong is being exported by some enterprising Filipinos to the growing Filipino communities in Hawaii, California, and Canada, hence it is fast becoming a profitable industry. *Padas* fishery has become an established industry because of the growing demand for this delicacy.

Problems and Recommendations

The problem lies not in the structure of the fishery but in the lack of proper management of the *padas* fishery. The efficiency of even the most primitive gear in catching the fry, the tremendous

seasonal abundance, and the unrestricted number of fishermen who may enter any concession area, account for the vast quantities being landed. However, the other side of the picture shows the economic benefit the people derive from this fishery.

In May 1972, reports from Bolinao indicated unlimited catching resulting in *padas* yield of almost 40 tons for three days of operation. The intense commercial production and exploitation was abnormal for any municipal catch record. It is probable that stocks may decline due to the intensified fishing effort brought about by the growing nutritional needs of the people and the addition of fishing units which naturally follows when profits are converted into additional capital.

The problems, therefore, that beset *padas* conservation can be enumerated as follows:

1. BFAR authorities should evaluate the rationale of adopting conservation measures by amending the provision of Fisheries Administrative Order No. 40-4 to include the catching of *padas* fry, in addition to the *siliniasi* species as among those being regulated. Flexibility should be exercised in modifying such provisions so as not to impair the livelihood of the people engaged in the industry. Regulatory measures should however, safeguard the livelihood of the great majority of the inhabitants in Bolinao who owe their economic stability to the siganid fry business.
2. Lack of reliable statistical records on the monthly fry catch to serve as basis for amending the above-mentioned provision. The availability of statistical records would give factual information on the fluctuation on the catch and movement of fry in the region. The statistical record would indicate whether the industry has grown to commercial magnitude or if it has remained as a sustenance small-scale industry. BFAR personnel in the region or station and the municipal government must be encouraged to work cooperatively to secure correct fry catch data from the fishermen.

The government should also initiate an educational campaign among the residents on the need to conserve the *padas* fishery to sustain the increasing withdrawal from the fishery. Meantime, culture studies for this particular fish should be pursued further, considering that fry is readily available in this region.

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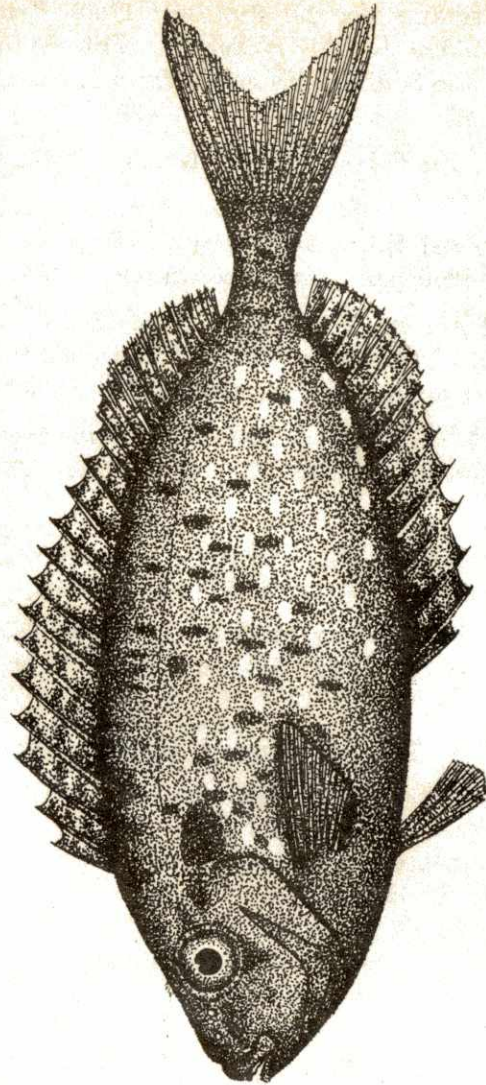


Fig. 1. S. CANALICULATUS

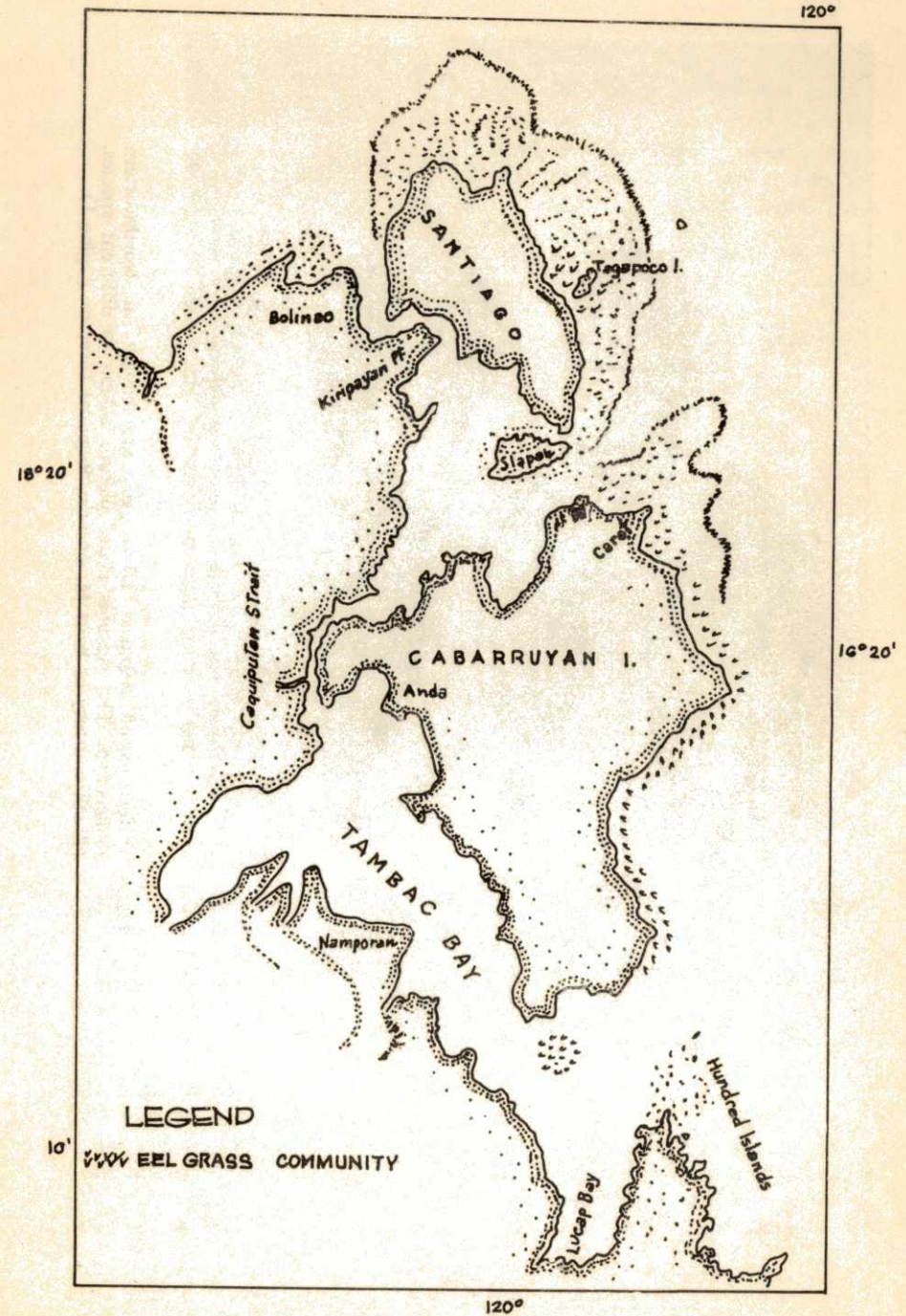


Fig. 2. THE SURVEY AREA

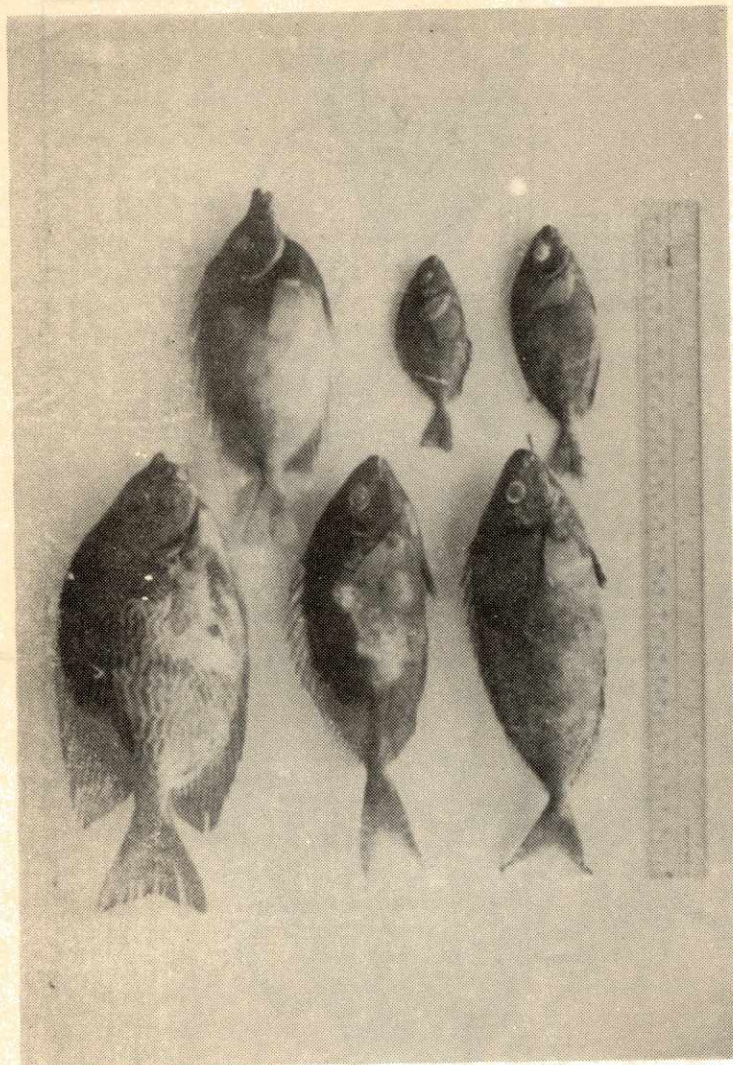


Fig. 3. Different-sized Siganids (*Barañgen*) are caught in Northwestern Pangasinan. The siganids above picture belong to different species. (Photo courtesy of West M. Rosario, Regional Director, Region I).