

# OBSERVATION ON THE RATE OF GROWTH OF SIGANID FRY "PADAS" CONFINED IN CONCRETE TANKS

By

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## INTRODUCTION

Siganid are *coral* fishes known in various Philippines dialects as "dangit", "kuyog", "ngisi-ngisi" (Visayan), "padas," "yomoyubyub" (Ilocano), "kuyog" (Tagalog), "padas," and "barañgen" (Pangasinan).

"Barañgen" is the local name of the marketable-sized "padas" (siganid fry). It is very common and abundant in the coastal waters of Western Pangasinan. It is sold in the market the whole year ranging in length from 83 to 200 mm. It is often caught with spears and by fish corrals.

The prospect of siganid fry cultivation is bright because of their abundance in certain seasons of the year. Since time immemorial, this larval fish has been utilized as food.

Scientific studies about "padas" are still meager, hence, the decision to undertake the present experiment on the rate of growth of "padas" in confinement. The experiment was conducted from September 1960 to April 1961 while the author was still holding the position of Junior Fishery Technician. The experiment is expected to show fish farmers that "padas" could be cultivated as a major crop in marine and brackishwater ponds.

The "padas" are caught from the fry grounds with the following measurements: 30.0 mm in length, 7.6 mm in body depth and 0.34 gram in weight. They are pale white and transparent with few melanophores over the head, body and tail regions; the eyes are dark and prominent contrasting distinctly with the color of the body. The body is spindle-shaped. They have pectoral fins and operculum trans-

parent dark bar at the base of the caudal fin. There are also melanophores at the base of the dorsal and anal fins. The intestinal cavity is visible from outside and the caudal fin is slightly emarginated.

While confined in a concrete tank which measures 7.96 m long, 2.3 m wide and 1.0 m deep with a capacity of 4,500 gals., the fish fry were observed to be very voracious feeders, subsisting on their daily ration of algae. In the tank, they grew fast and showed morphological development in color, size, and shape and increase in body weight.

### PROCEDURES

On September 20, 1960, siganid fry numbering 3,200 were stocked in the concrete tank of the Marine Fish Farm located at Lucap, a barrio in Alaminos, in Western Pangasinan. The objective was to determine their rate of growth and feeding habits under controlled conditions.

First, the tank was cleaned and filled with clean sea water at a depth of one foot. The depth of the water was gradually increased and frequently refreshed as the fish grew bigger in the tank.

A weekly sample of 12 pieces was taken. The total lengths, body depths and their weights were taken and recorded to serve as basis of comparison for future observations. The original siganid fry stocked measured from 28 to 32 mm in length, 7 mm to 8 mm in body depth, and 0.23 to 0.4 gram in body weight. The length and depth were measured individually with a foot rule. The weight was taken by weighing the fish fry individually on a laboratory platform balance. All subsequent measurements were done in this manner.

Thereafter, random samples were measured and weighed weekly for the first month, bi-weekly for the second, and later on, monthly until the end of the experiment.

### OBSERVATIONS AND RESULTS

1. *One week in confinement:* After one week in the tank, on the average, the "padas" measured 32 mm long, 9.1 mm in body

depth and 0.44 gram in weight. (Based on 12 samples studied). This showed a growth increment of two mm or 6% in total length, 1.6 mm or 21% in body depth, and 0.14 gram or 46% in weight.

At this stage, they were observed to be swimming in schools and actively feeding on the patches of algae (*lumut*) given them suspended along the tank walls.

They showed darker color and pigmentation over the head, body and tail than the original stock. They were darker dorsally but lighter ventrally while spots were visible over the body.

2. *Two weeks in confinement:* The two-week old "padas" on the average measured 35 mm long, 10.5 mm in body depth and 0.68 gram in weight. Measurements were based on 12 samples. This showed an increase in length by 0.3 mm or 9%, by 1.4 mm in body depth or 15%, and by 0.24 gram in weight or 54%.

The two-week old "padas" did not differ very much from the one-week olds although they have grown longer and their body deeper. Their color became darker and the five vertical bands of dark or black pigments were very discernible over the body.

Food was replenished when totally consumed. They fed eagerly and swam in schools in circular motion, mostly in counterclockwise direction.

3. *Three weeks in confinement:* The three-week-old siganid grew wilder than the two-week-olds. They were sensitive to noise or any sound created near the tank. When they heard a loud noise they would suddenly dive and swim away from the supposed intruder to seek shelter among the boulders inside the tank. They also stopped feeding when the place was noisy. The dark or black vertical bands of pigments became less discernible. White spots were scattered over the body. The dorsal sides were darker than the ventral.

On the average, the 12 samples measured 42.6 mm long, 12.8 mm in body depth and 1.5 grams in weight. At this stage, there was an increment in length by 7.6 mm or 21%, 2.3 mm in body depth and 0.47 gram in body weight or 69%.

4. *Four weeks in confinement:* The four-week-old siganid had a body shape similar to the adult called "barañgen" sold in the market. They possessed the same pigmentation as the three-week-olds.

The 12 four-week-old siganid measured on the average 49.1 mm long, 15.2 mm in body depth and 1.9 grams in weight. There was an increase of 6.5 mm in length or 15%; 2.4 mm in body depth or 18%, and 0.75 gram in body weight or 65%.

5. *Six weeks in confinement:* Six-week-old siganid possessed all the external characteristics of the adult and were very voracious feeders. On November 8, 1960, the author suspended one-half kilo of *lumut* just beneath the water surface. Water was squeezed off before the *lumut* was weighed. The filamentous algae was tied at the center by a No. 6 twine and hung, allowing all the bundled algae fibers to be submerged in the water. It was hung at 1:30 p.m. and was completely gone by 2:38 p.m. It was observed that one-half kilo of algae could be eaten in one hour and eight minutes only. The said patch of *lumut* was first attacked by a group of "padas" at the bottom. Then, group after group the fish joined the first group until the surface of the *lumut* was surrounded by fishes feeding rapidly.

At the time when the surface of the algae was covered by numerous heads of feeding fishes, the *lumut* patch resembled inverted "million flowers" hanging on the water surface. Some siganid were even gliding over the others just to get their share of the suspended algae.

Intrigued by the result, the experiment was repeated. The *lumut* was gone after one hour and six minutes. This rate was two minutes faster than the first.

Average measurements of the 12 samples were: 67 mm long, 20.5 mm in body depth, and 3.9 grams in body weight. Growth increment was 7.9 mm in total length or 36%; 5.3 mm in body depth or 34%; and two grams in body weight or 105%.

6. *Eight weeks in confinement:* The eight-week-old siganid have grown to 72.5 mm long, 21.9 millimeters in body depth, and 4.3 grams in weight. The average increase in total length was 5.5 mm or 8%; 1.4 mm in body depth or 6%; 0.9 gram in weight or 23%. Measurements were taken from another 12 samples.

7. *Three months in confinement:* Within three months, the siganid grew fast. The average measurements of the samples were 83.3 mm long, 26.3 mm in body depth, and 7.85 grams in weight.

Their increment in growth was 10.8 mm in total length or 14%, 4.4 mm in body depth, or 20%; and 3.05 grams in weight or 63%.

8. *Four months in confinement:* The gonads of the four-month-old siganid were already developing. At this period the fish were most of the time observed to display bright colors. Brightly colored siganid isolated themselves in selected spots tightly guarded by another fish. This fish fans the selected spot with its pectoral fins as if excavating a hole. Any other fish that attempts to come near would be driven away by the fish that had selected the area.

At this stage they have grown to marketable size, about the same size as those being landed at the Fabella Wharf at Lucap. Those sold in the town market of Alaminos are of the same sizes. One fish sample was opened and its gonad was evidently developing.

On the average the 11 samples measured 94.04 mm long, 29.27 mm in body depth and 12.19 grams in weight. Their growth has increased by 10.75 mm in total length or by 12%, 2.97 mm in body depth or by 11%, and 4.34 grams in weight or by 55%.

9. *Five months in confinement:* The five-month-old "barañgen" have grown to 105.2 mm in total length, 32.5 in body depth, and 16.75 grams in weight. Ten samples were measured. They increased in total length by 11.16 mm or by 2%; 3.23 mm in body depth or by 11%; and 4.56 grams in body weight, or by 37%.

At this time, they were given ipil-ipil and papaya leaves instead of the algae, and the fishes were found to be receptive. This information is very important as this indicates that leaves of this terrestrial plant can be utilized as supplemental feeds in regions where algae are less abundant. It is suggested in succeeding experiments that leaves of other trees or grasses should be tried to get first-hand information regarding the response of this species to other supplemental feeds. A dead sea cucumber was given and some tried to bite it.

10. *Six months in confinement:* "Barañgen" at this stage showed retardation of growth. After six months in confinement, they have grown to 111.8 mm in total length, 33.0 mm in body depth and 17 grams in weight. The growth increment was 6.6 mm long or by 6%; 0.5 mm in body depth or 1%; and 25 grams in weight or 1%. Twelve samples were measured.

## REMARKS AND RECOMMENDATIONS

Siganid are voracious feeders. They feed on anything. However, they prefer green foods and are more or less vegetarian.

In confinement, siganid grow one inch per month on the average. Of course, it is expected that the fish will have a greater or faster rate of growth when raised in natural ponds with proper stocking ration. It was noted that the fish matures as early as four months.

The study lasted only for six months in the concrete tank. Initial data gathered regarding fish growth indicated that siganid is a good pond fish for cultivation. Since this study is quite limited, it is recommended that a similar study be conducted in natural ponds where *lumut* or algae grows.

Results of the experiment to be conducted in ponds will help solve the lack of fry supply. The eventual commercialized production of siganid will greatly contribute to the fish production in the north-western Pangasinan area and possibly other areas where the fish are found in commercial quantities. The scientific cultivation of siganid, like the established milkfish industry, would be an additional source of income for people inhabiting the areas near the shorelines.

## REFERENCES

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AVERAGE WEEKLY/MONTHLY RATE OF GROWTH OF PADAS IN THE CONCRETE TANK

Duration of Culture	G R O W T H I N C R E M E N T					
	Total Growth		Body Growth		Weight	
	mm	%	mm	%	gm	%
Fry	2	6	1.6	21	0.1	46
One week	2	6	1.6	21	.11	46
Two weeks	3	9	1.4	15	.24	54
Three weeks	7.6	21	2.3	21	.47	69
Four weeks	6.5	15	2.4	18	.75	65
1 1/2 months	17.9	36	5.3	34	2	105
Two months	5.5	6	1.4	6	.9	23
Three months	10.8	14	4.4	20	3.05	63
Four months	10.74	12	2.97	11	4.34	55
Five months	11.16	12	3.25	11	4.56	37
Six months	6.6	6	.5	1	.25	1

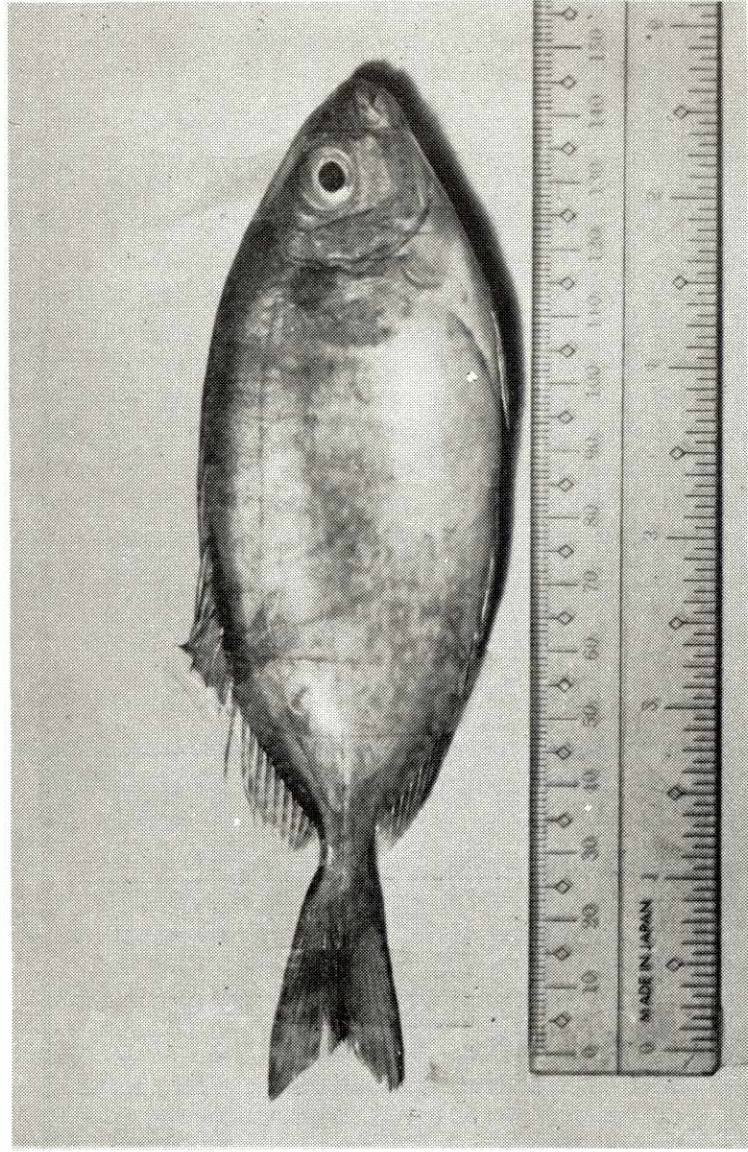


Fig. 1. Adult Barañgen; *Siganus* sp.



Fig. 2. Fresh Kitang, *Scatophagus* sp. (left) and Barañgen or samaral, *Siganus* sp. (right) are sold at a public market in Dagupan City.