

การศึกษาเบื้องต้นการเลี้ยงกุ้งก้ามกราม (*Macrobrachium rosenbergii*) ในร่องสวน

A Preliminary Study on Rearing of Juvenile *Macrobrachium rosenbergii* in Ditch

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ABSTRACT

Three ditches designated as KU-1, KU-2 and KU-3 at Kasetsart University, Bangkok were used for rearing the juveniles of *Macrobrachium rosenbergii*. Area of KU-1, KU-2 and KU-3 were 50, 50 and 100 sq. meters, respectively. Before stocking, the ditches were drained, the mud was taken out and predatory fish were eradicated with derris root at $2\frac{1}{2}$ kg. per 100 sq. meter of the ditch area. The ditches were fertilized with NPK ratio of 1-2-0 at 2 kg. per rai per month. Pond weed, Ipomea was also placed in the ditches for shelter and food for the stocked prawns. On September 28, 1970, one thousand juvenile prawns were stocked at 5 prawns per one sq. meter of the ditch area. Prawns were fed with chopped snail flesh, *Pila* spp. as supplemental food thrice a week. Ditches were drained on December 25, 1970 for determining growth and survivals. The second draining was on June 8, 1970. But no prawn were presented on the draining. Possibly, the depletion of dissolved oxygen in ditches caused the death of the prawns. Results of the first draining showed that prawns that were reared in KU-1 ditch attained a bigger size, and yielded a higher production than those in KU-2 and KU-3. The number of prawns remaining in KU-1 was less than those in KU-2 and KU-3. KU-2 also produced a better growth and higher production than those in KU-3. The differences were possibly due to competition for food between stocked prawns and the undesirable Kung foi (*Macrobrachium lanchesteri*) predatory Plachons as well as the fertility of the ditches before stocking because these ditches had been used for growing crops for at least 20 years.

Because of the great demand for and the high price of giant fresh water prawn, *Macrobrachium rosenbergii* both in Thailand and abroad, farmers and some business men attempt to culture this economical species of prawn on a commercial basis. Spawning and rearing of the larvae of giant fresh water prawn upto a matured prawn was successful in Thailand, Malaysia (2), and Hawaii (1). Rearing juvenile prawn to marketable size on a commercial scale at Kasetsart University is still under experimentation. In this step of rearing, knowledges of size and stocking rate, food preference, growth and survival, environmental factors related to the growth of

prawn, yield, etc. are important. Without such knowledge, culture of the giant fresh water prawn on a commercial project is not possible. In this paper, preliminary results on the rearing of the giant fresh water prawn from laboratory rearing juveniles in ditches at Kasetsart University will be reported.

Materials and Methods

Three ditches designated as KU-1, KU-2 and KU-3 belonging to the Department of Soils, Kasetsart University, at Bangkok were used for this experiment. The area of the first two

ditches is 50 sq. meters each, but the third is 100 sq. meters. The ditches were drained, mud was taken out, and the predatory fish were eradicated by poisoning with derris root at the rate of $1\frac{1}{2}$ kg. per 100 sq. meters of the ditch area. They were filled with the water from the adjacent ditch to the depth of about 75 cm. A chemical fertilizer with an NPK ratio of 1-2-0 was applied at 2 kg. per rai on September 13, 1970. Fertilizer was added each following month at the above rate during the period of experiment. Ipomea, pond weed, placed in all three ditches provided shelter and food for the prawns. A 60 watt Philips bulb was turned on over each ditch to attract insects to come and fall down as food for the prawns during the night.

One thousand laboratory reared juvenile prawns of the same brood, ranged from 3.3 to 5.7 cm. in body length (measured from the posterior margin of the eye orbit to the tip of the telson) and average weight about 0.3 gm. were stocked at the rate of 5 prawns per one sq. meter.

On September 28, 1970, fresh water snail, *Pila* spp. were chopped into small pieces as a supplementary food thrice a week. By determining the amount of snail flesh left over from the previous days as a guide, about 50 and 100 grams of snail flesh were supplemented each time for KU-1, KU-2 and KU-3 respectively.

Ditches were first drained for determining growth and survival on December 25, 1970 (89

days after stocking). All recovered prawns were measured in cm, counted, and weighed. Then they were returned into the same ditch for further rearing. The second draining was on June 8, 1971 or 253 days after the initial stocking. Unfortunately, none of them survived. Possibly, the depletion of dissolved oxygen in the ditch during the hot days of March and April caused the death of the prawns. Water was unavailable for adding to the ditches that period. The depth of water in the rearing ditches during that rearing period was about 40 to 50 cm.

Results

KU-1 Ditch

After 89 days of rearing, out of 250 juvenile prawns that were stocked, only 101 prawns survived. They ranged from 5.2 to 11.9 cm. in length and 3.0 to 41 grams in weight. Their total weight was 1490 grams. The weight gained was 1415 grams. The projection of the gain in weight for 89 days of rearing was 45.28 kg. or 185.70 kg. per rai per year. Survival rate was 40.4 per cent (Table 1 and 2). Accumulative length frequency shows that half of harvested prawns attained 5.2 to 8.9 cm. and 3.0 to 12.01 grams in weight. Total weight of this group of prawn was 440 grams. The remainders fall within 9 to 11.9 cm. in length their total weight was 1050 grams.

Table 1 Number, length, weight and survival rates of prawns captured in 3 experimental ditches.

| Ditch No | Stocking numbers | Harvested numbers | % of survival | Body length mm. | | Weight - grams | |
|----------|------------------|-------------------|---------------|-----------------|-----------|----------------|----------|
| | | | | mean | range | mean | range |
| KU-1 | 250 | 101 | 40.4 | 86.95 | 5.0-119.0 | 14.95 | 3.0-41.0 |
| KU-2 | 250 | 153 | 61.2 | 59.10 | 3.2-104.0 | 5.25 | 1.0-27.5 |
| KU-3 | 500 | 293 | 58.6 | 51.2 | 3.0-119.0 | 3.30 | 0.5-45.0 |

Table 2 Weight gained and projected yield of prawns reared in 3 experimental ditches.

| Ditch No | Stocking wt. (grams) | Weight gained (grams) | Projected wt. gained kg/rai/89 days | Projected wt. gained kg/rai/year |
|----------|----------------------|-----------------------|-------------------------------------|----------------------------------|
| KU-1 | 75 | 1415 | 45.28 | 185.70 |
| KU-2 | 75 | 790 | 25.28 | 103.68 |
| KU-3 | 150 | 949 | 15.184 | 62.27 |

Fourteen oviferous females (8.6 to 10.2 cm. in length, 12 to 25 grams in weight) were found. Some females carried dark gray eggs which means that they would hatch out within a few days. A few females also showed that their eggs were just released. The number and size of oviferous females are presented in Table 3. The conversion ratio of the weight of supplemental snail flesh to the gain in weight of prawns was 0.88:1. Fifty six of young Plachon, *Ophicephalus striatus* (7 to 10 cm. long) and their parent (one male and one female fish) were captured in this experimental ditch

KU-2 Ditch

One hundred and fifty three prawns were captured from this rearing ditch. They attained a length ranged from 3.2 to 10.4 cm. and weighed 1.0 to 27.5 grams. Weight gained by all the prawns totalled 790 grams. An estimated projected wt. gained 25.28 kg. per rai for 89 days of rearing or 103.68 kg. per rai per year. Survival percentage was 61.2 (Table 1 and 2).

There were only 4 oviferous females (8.1 to 10.0 cm. long, 15 to 35 grams in weight) were collected (Table 3).

Table 3 Numbers size and weight of oviferous females harvested from experimental rearing ditches.

| Ditch No. | Number | body length mm. | | weight - grams | |
|-----------|--------|-----------------|------|----------------|-------|
| | | range | mean | range | mean |
| KU-1 | 14 | 86-102 | 93.7 | 12-25 | 18.07 |
| KU-2 | 4 | 81-100 | 93.3 | 15-35 | 22.80 |
| KU-3 | 4 | 81-101 | 96.5 | 18-27 | 21.30 |

The conversion ratio of the supplemental snail flesh to the gain in weight of prawn was 1.72 :1. Four Plachons totalled 985 grams and 1508 grams (approximately, 5000 in numbers) of Kung foi (*Macrobrachium lanchester*) were captured. As a matter of fact, many Kung foi could not be picked out and were left in the ditch because of the mud.

KU-3 Ditch

Two hundred and ninety three prawns (3.0 to 11.9 cm. long, 0.5 to 45 grams in weight) were harvested. The weight gained 949 grams. The projected wt. gained of 15.184 per rai per 89 days of rearing or 62.27 kg. per rai per year. Survival rate was 58.6 per cent (Table 1 and 2). Four

oviferous females were captured (Table 3). The conversion ratio of the supplemental snail flesh to the gain in weight of the prawn, was 3.03:1. Two Plachons totalled 700 grams and 850 grams (approximately, 2800 in numbers) of Kung foi were captured.

Results from the 3 rearing experimental ditches indicated that prawns were reared in KU-1 attained a bigger size and provided a higher production than KU-2 and KU-3. But the percentage of the survival of prawn in KU-1 was less than the percentage of the 2 ditches. Comparison of prawns presented in KU-2 and KU-3 showed that the average body length and production of prawn in KU-2 was better than those of KU-3.

Differences in size and production of prawns in these 3 ditches might be the differences in the residue of the fertilizers that were applied in the ditches formerly, because this plot of land was

used for crop growing for at least, 20 years. Another possibility is that there were many Kung foi presented in KU-2 and KU-3. These undesirable small prawns competed for the same supplemental food as the rearing *Macrobrachium*. After placing snail flesh in the feeding board in the ditches, the researcher saw many Kung foi carry snail flesh away. Plachon also caused the difference in size and production of the stocked prawns.

Literature Cited

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