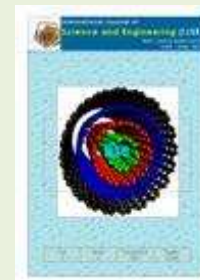




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## The Potential of Tiger Prawn Fry from Delta Mahakam, East Kalimantan Indonesia

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**Abstract**—Most of the life cycle of tiger prawns were estuarine (Delta Mahakam). In the juvenile stage life in estuarine and the adult stage in marine. The research objective is to assess the potential of the tiger prawn fry catches in the Mahakam Delta, as a source of tiger prawn fry in the Mahakam Delta area farms. Research using interviews and descriptive analysis through monitoring with fishermen. The results showed that the fry tiger prawn from the Delta Mahakam there on the beaches or the edge of the sea where the water is shallow and slightly brackish, as in the Delta Mahakam. Fry can be captured by using rumpon. Tiger prawns fry from Delta Mahakam durability is relatively higher than fry from the hatchery. But the number and continuity of fry very limited because it depends on the season. Abundance of fry is determined by the number of larvae produced in the wild and their survival is greatly influenced by the availability of food.

**Keywords**—Tiger prawn, fry, Mahakam delta, potential(;)

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### I. INTRODUCTION

Fry supply is the most important initial requirement of shrimp farming; however, this issue did not receive much attention until severe shortages in wild fry supply were experienced. Most of the world's wild stock of shrimp is now overexploited, which has led to strong reliance of shrimp farms on the wild shrimp fries. Shrimp fry collection has also been reported as a major cause of the steady decline in the coastal fisheries resources and, consequently, shrimp fry fishery has become an important concern too (Islam *et al.*, 2004)

In general, the penaeid shrimp are cultivated in ponds comes from marine shrimp. In the wild this shrimp occupy different habitats, based stage life cycle. At the young stage penaeid shrimp migrate into estuaries as the breeding (nursery ground). Most of the life cycle of tiger prawn in estuarine (Delta Mahakam), usually juvenile stage found in the estuarine and adult stage in the sea. According to Suyanto and Mujiman (2005), the fry from the wild found in the beaches or the edge of the sea where the water is shallow and slightly brackish, so easily captured by using net. The fry types of shrimp caught, there are white shrimp, black tiger, and other, sometimes with a variety of fish. Catchers have to separate the tiger prawn from the crowd.

The fry from wild can be distinguished by size (Suyanto and Mujiman, 2005), which is still fine (post larvae) and a rough fry (juvenile). Generally, Post larvae are found at the edges of the beach. Post larva is still pelagic with reddish brown color, the length between 9-15 mm. Head straight or slightly curved like the letter S. Shape like the letter S is called the sigmoid, the

overall shape like a jet. Tail spread out like a fan, which looks like a small stick straight Maunder, large and tufted front section. The juveniles migrate to estuaries or canal. Juveniles life is benthic, namely love dwells near the bottom waters. Striped whiskers alternating brown and white or white and bluish green, blue-green or brown to blackish. The base of the swimming legs yellow striped blue.

The life-cycle of inshore penaeid prawns typically involves a marine adult phase followed by a planktonic period of egg and larval development prior to migration of postlarvae into estuaries. This makes them major candidates for coast-wise dispersal of eggs and larvae according to local current patterns (Forbes and Cyrus, 1991). Life cycle characteristic of *P. monodon* that habitat changes follow the development stage. Planktonic shrimp stage are nauplii, protozoa, mysis and post larvae. Adult stage in the ocean and spawn in depths of 30-60 meters. broodstock can spawn 200,000 to 1,000,000 eggs (Perry, 2008).

Darmono (1990) stated shrimp life cycle is (1) Embryo, when the egg after fertilization, (2) larvae, after the eggs hatch, consists of three levels of stage, namely: Nauplius, molt 6 times, zoea, experienced molt 3 times over 4-5 days; Mysis, three-phase and three times for skin, (3) Post-larvae, when after larvae molted 1-2 times, (4) Juvenil (young shrimp) is the life after post-larvae, the organs are complete but not perfect, (5) immature, past and immature forms (6) mature, adulthood. In nature, adult stage living in waters in the middle of the ocean, being larvae, post-larvae and young shrimp live in places that are shallow coastal waters (Soeseno, 1983).

Traditionally, prawn farmers have preferred to stock their gher (prawn farms are locally known as gher) with wild post larvae rather than hatchery-produced fry, because the production of hatchery post larvae has been limited and farmers consider them to be of lower quality (Angell, 1992; Ahmed et al., 2005). In addition, the survival of wild post larvae is reported to be much higher than that of hatchery-produced fry (Muir, 2003). Prawn farmers begin stocking in gher as soon as post larvae become available in nature, typically in April, and continue stocking until June (Ahmed, 2001). The research objective is to assess the potential of the black tiger shrimp catches in the Delta Mahakam, as a source of fry in the Mahakam Delta area farms

## II. MATERIAL AND METHOD

The study was conducted in Delta Mahakam, East Kalimantan Province, Indonesia. The area of Delta Mahakam consists of big and small estuary lands which gather at the mouth of Mahakam River. Geographically, the area is located on 170°15'0"-170°36'46.2" east longitude and 00°20'48"-00°48'49.8" south latitude. Delta Mahakam region: Anggana district, Muara Jawa and Muara Badak.

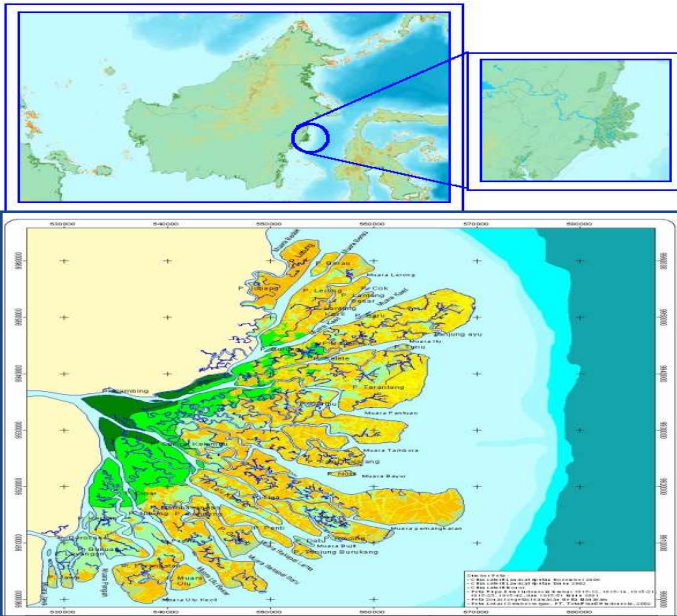


Figure 1. The location of Delta Mahakam in East Kalimantan province, Indonesia.

Delta Mahakam land area of about 1500 km<sup>2</sup> and has a distance to the edge of the Eurasian plate about 25 km from the delta land. Delta Mahakam has a fluvial discharge varies seasonally but no inundation (flooding) is significant. Waves up and down on the front of the estuary, which is on the coast of detrital peat with no sandy beach. Delta Mahakam region contains many phytoplankton and zooplankton, dominated by mangrove ecosystems around 150,000 hectares, made up of a long process of sedimentation from the Mahakam river, which has a length of 770 km with a water flow rate of 1,500 m<sup>3</sup>/second charge and suspended solids concentrations reached 80 mg/l. Shrimp ponds scattered areas Anggana district, Muara Jawa and Muara Badak.

Research using interviews and descriptive analysis of the monitoring results with the fishermen in the Delta Mahakam region. Delta Mahakam is a coastal region with geological and ecological conditions specific, which is characterized by geological characteristics and estuarine delta. Questionnaire interviews with postlarvae fishers were preceded by preparation

and testing of the questionnaire, and training of enumerators to fill in questionnaires. Fishers were interviewed on the Anggana location, with researchers reaching them in a hired boat. The interviews, which lasted about three hour, focused on prawn post larvae catching use rumpon (traditionally tools). Direct observations of postlarvae fishing were made from January to December 2011. Selected fishers in each fishing method were observed on single-day fishing to cross-check the information provided in interviews. Quantification of postlarvae catches was performed by 3 volunteers from the fisher community.

Participatory rural appraisal is a group of methods to collect information in a participatory fashion from rural communities. Focus group discussion was the main method used in this study, with interviews conducted with groups of postlarvae collectors, fry traders, transporters and intermediaries.

## III. RESULT AND DISCUSSION

The presence of tiger prawn fry in Delta Mahakam follows the life cycle of shrimp, starting from the eggs hatch and develop into the first larva stage, called a nauplius. The eggs hatch after 16 hours of fertilization. Nauplius survive by eating food that he got up for a few days. This phase consists of six stages that the length of about two days. Furthermore nauplius began to develop into protozoae. Protozoae consists of three phases and lasted five days. Protozoae eat algae and will metamorphose into misis. Misis also consists of three phases and lasts four to five days. Misis will eat algae and zooplankton. Generally, Misis've had a lot of characters like adult shrimp, after it evolved into megalops for six to thirty-five days and is commonly called as postlarva. The transition from juvenile to praadult takes approximately 135 to 255 days. To reach sexual maturity takes about ten months (Motoh, 1984). Larval life on the beach at the water surface that has a lot of phytoplankton and zooplankton. The larva then slowly moving toward the coast, along with the body. Once adult, the shrimp back into the sea. This cycle will take place continuously in the process of breeding shrimp to produce offspring.

Although artificially produced shrimp PL provides the major source of shrimp seeds, shrimp farms still depend on wild source in many frys. However, the target species, the tiger shrimp, *P. monodon* constitutes only a very small portion of the total catch.

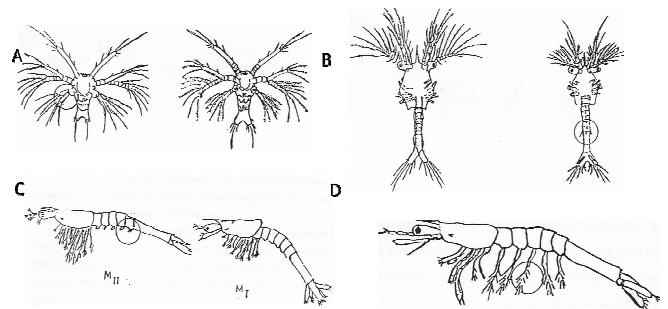


Figure 2. Description of tiger prawn fry stage  
 A. Tiger prawn (*Penaeus monodon* Fabricus) Nauplius Stage.  
 B. Tiger prawn (*Penaeus monodon* Fabricus) zoea Stage.  
 C. Tiger prawn (*Penaeus monodon* Fabricus) Mysis Stage.  
 D. Tiger prawn (*Penaeus monodon* Fabricus) Post Larvae Stage.

Shrimp fry from wild found in the beaches or the edge of the sea where the water is shallow and slightly brackish, as well as in the Delta Mahakam, so it can be captured by using the rumpon. Fry were arrested stick on rumpon, so easily separated with the other shrimp. Rumpon is a simple technology, in the form of descriptions knot ropes that were located between each rope

about 1.5 m, a length of 2 km strands rumpon. Examples of rumpon used catch shrimp fry is in Figure 3.



Figure 3. Rumpon fishing gear to catch the tiger prawn fry from the wild in the Delta Mahakam

Catching shrimp fry of wild has been carried out by coastal communities in the Delta Mahakam. Until now, catching the fry are still intensively conducted in particular by using rumpon. It shows that the interest of the farmers to use the fry from the Delta Mahakam shrimp still rising, despite the availability of fry from hatcheries at cheaper rates and large numbers have also increased. Because the fry of the wild durability and have higher survival than hatchery production of fry, but the number and continuity of very limited and depends on the season.

Some fry capture activities on a seasonal basis arrests centers, following the wild population abundance. Amount of natural fry to many, usually occurs in the west. Fry from the wild populations in the season reaches a very high density and typically lasts only a few months. Natural, increasing fry population in the wild in certain seasons will affect plankton populations as feeding. A change in environmental conditions and predation pressure in the season, causing the phytoplankton population change, according to the balance between the carrying capacity of the environment and the rate of predation.

The abundance of shrimp fry from the Delta Mahakam is on the west season, around December to February. This season in some coastal along the Delta Mahakam is associated with breeding shrimp season in wild. Wind patterns and currents in the season led to the transport of fry from the wild, newly hatched from the sea to the coast of the Delta Mahakam. A high concentration of shrimp in the coastal waters of the Delta causing plankton predation pressure, especially relatively large phytoplankton. The result is a change in the abundance of plankton populations fairly quickly and eventually lead to changes in the primary productivity anyway. If the primary productivity did not increase over time before the peak to peak abundance of fry, then the consequences can be assured that most of the fry will die, due to lack of food. If the environmental conditions are very bad, and the food is insufficient or of poor quality, will cause the shrimp die (Bondad-Reantaso *et al.*, 2001). Additionally Fluctuations environmental conditions, such as temperature, dissolved oxygen and salinity will trigger stresses (Yoshikawa *et al.*, 2007).

At high tide (neap), the average yield of a single strand of rumpon 2 km in length is 220 shrimp fry, whereas when receding

around 134 fry. Recapitulation of fry from Delta Mahakam retrieval using rumpon in Muara Badak, as shown in Figure 4.

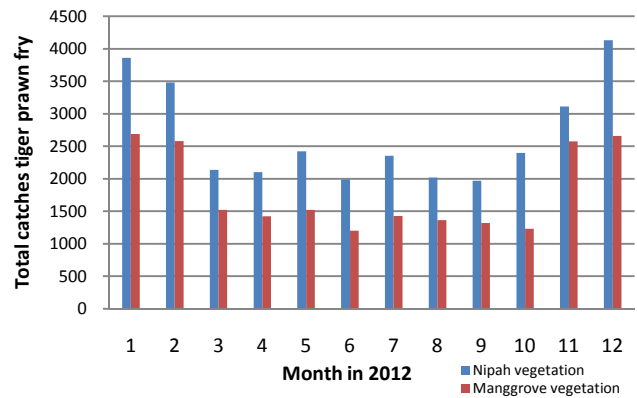


Figure 4. Catches (by 1 fisher) of juvenile of *P. monodon* using Rumpon in one year with different vegetation at Anggana sub district

Plankton populations are composed of a variety of taxa or genera very well allow for differences in the response to environmental factors as well as the predation pressure. Suspicion that not all types of phytoplankton and zooplankton consumed in equal amounts by healthy shrimp population, then this could potentially lead to differences in the abundance and population dynamics among species of plankton. Fry that are planktonic and also eat plankton is strongly influenced by the phytoplankton and zooplankton populations, as well as other lower animals larvae. When it reaches the peak season, the shrimp population increase absolute require a lot of food high.

#### IV. CONCLUSION

Tiger prawn fry from Delta Mahakam there are many on the beaches or marine edges and slightly brackish shallow water, so it can be easily captured using rumpon. Advantage of the fry from Delta Mahakam compared with hatchery production, is having the endurance and survival rates are relatively high, but the number and continuity of very limited and depends on the season. Abundance of fry is determined by the number of larvae produced in wild and subsequent survival in larval stage developments very influenced by the availability of food.

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