

**SIZE DISTRIBUTION AND REPRODUCTIVE BIOLOGY OF  
GIANT FRESHWATER PRAWN (*Macrobrachium rosenbergii*)  
IN KAPUAS RIVER, WEST KALIMANTAN PROVINCE**

Samuel<sup>1</sup>

**ABSTRACT**

A research that aims to obtain data and information about distribution and reproductive biology of giant freshwater prawns in Kapuas River, West Kalimantan have been carried out from June to December 2005. Research was conducted by survey method by visiting the locations where the activities of catching prawns. Two times the frequency of surveys in the dry season and two times in the rainy season. The water areas surveyed were the Kapuas River in Pontianak District, City of Pontianak, Districts of Sanggau and Sintang. Data were analyzed with descriptive method and tabulation. From the survey found that in the Kapuas river, a lot of prawns were caught by fishermen using nine types of fishing gear, namely : hooklines, longlines, traps, falling gear, gillnets, coast/edge traps (belat), fish aggregating device (rumpon), electrical gear (Stroom) and surrounding traps (pukat rantau). The intensity of the fishing catches appeared dominant in the downstream waters covers an area of County and City of Pontianak. The distribution of individual weight size of prawns that was caught a lot by fishermen (mode value) of 4 times surveys varied between 17.73 to 40.00 grams (Pontianak Regency), from 19.31 to 47.01 grams (Pontianak City), 17.79-45, 35 grams (District of Sanggau) and between 25.08 to 85.52 grams ( District of Sintang). Fecundity of giant freshwater prawns varied between 7058-57887 eggs. The diameter of eggs at various of gonada maturity stages (GMS) occur in the range of 0.30 to 0.349 mm diameter in GMS-I, GMS-II, GMS-III and GMS-IV, but the diameter of the eggs in size of the middle value between 0.5745 to 0.7745 mm only exist in the broodstock of prawns with GMS-IV characterized egg gray color. Giant freshwater prawns in the Kapuas River for the first time in maturity size was 12.95 cm with a variation of value between 12.39 to 13.54 cm. Water quality at the habitat where the shrimps caught in the Kapuas River were still within feasible/reasonable limits to support the life of fish and shrimps.

**Keywords:** Giant freshwater prawns, Kapuas River, Distribution, Reproductive Biology.

**INTRODUCTION**

Giant freshwater prawn (*Macrobrachium rosenbergii*) is a species of freshwater shrimp that have a significant economic value, either as consumption or as an export commodity. The fishing of these kinds of biota in some open waters in Indonesia has been so intensive and the production of the catch from open water tends to decrease. As examples of cases that occurred in the Lempuing River, Ogan Komering Ilir, South Sumatra. In the year of 1983 and prior year period, giant freshwater prawns are a mainstay commodity for the fishermen revenue because their price is higher than the price of fish. From

1983 to 1990, the prawn's catch in the Lempuing River showed decreasing an average of 12.5% per year (Utomo, 1997) and until the year of 2006, the prawns is hard to come by or to be obtained.

Various factors causing the decline in production of prawn's catches including the brood stocks shrimp who had fertilized are a lot caught in February-March by a variety of fishing gear such as langgian (scoop net), tuguk (filtering device), empang lulung (barrier traps), bengkirai bilah (poot traps) and fishing (hook and lines) so that the presence of young shrimps from the spawning decreased (Utomo et al., 2002). Other causes besides those activities are environmental

<sup>1</sup>Research Institute for Inland Fisheries, Palembang  
Jl. Beringin No. 08 Mariana, Palembang

factors such as water quality degradation.

Price of giant freshwater prawns in West Kalimantan province are on the second level after the price of sand goby (*Oxyeleotris marmorata*), followed by the price of jelawat fish (*Leptobarbus hoeveni*) and Belida (*Notopterus chitala*) (ranked 3 and 4). Thus, prawns are still an important commodity in open waters that need to be preserved. This research aims to get updates data and information about the distribution of prawns in the Kapuas River and also aspects of reproductive biology. Observation of the distribution of prawns done to find out about the size distribution of prawns caught by fishermen at every observed location and aspects of reproduction that is the level of gonad maturity, fecundity and egg diameter. The information obtained is expected to be a useful input for resource management of prawns in

open water of the Kapuas River, West Kalimantan.

**MATERIALS AND METHODS**

Research was conducted in the Kapuas River, West Kalimantan, by surveying at the locations of observation which is determined based on the activities of catching prawns. Parameters measured included frequency of size distribution, level of gonad maturation, gonad maturation index, distribution of egg diameters and the first size of gonad maturation. As a supporting data was also measured several water quality parameters such as temperature, water transparency / brightness, pH, dissolved oxygen and free Carbon dioxide levels. The parameters were measured based on the guidance composed by APHA (1988) listed in Table 1.

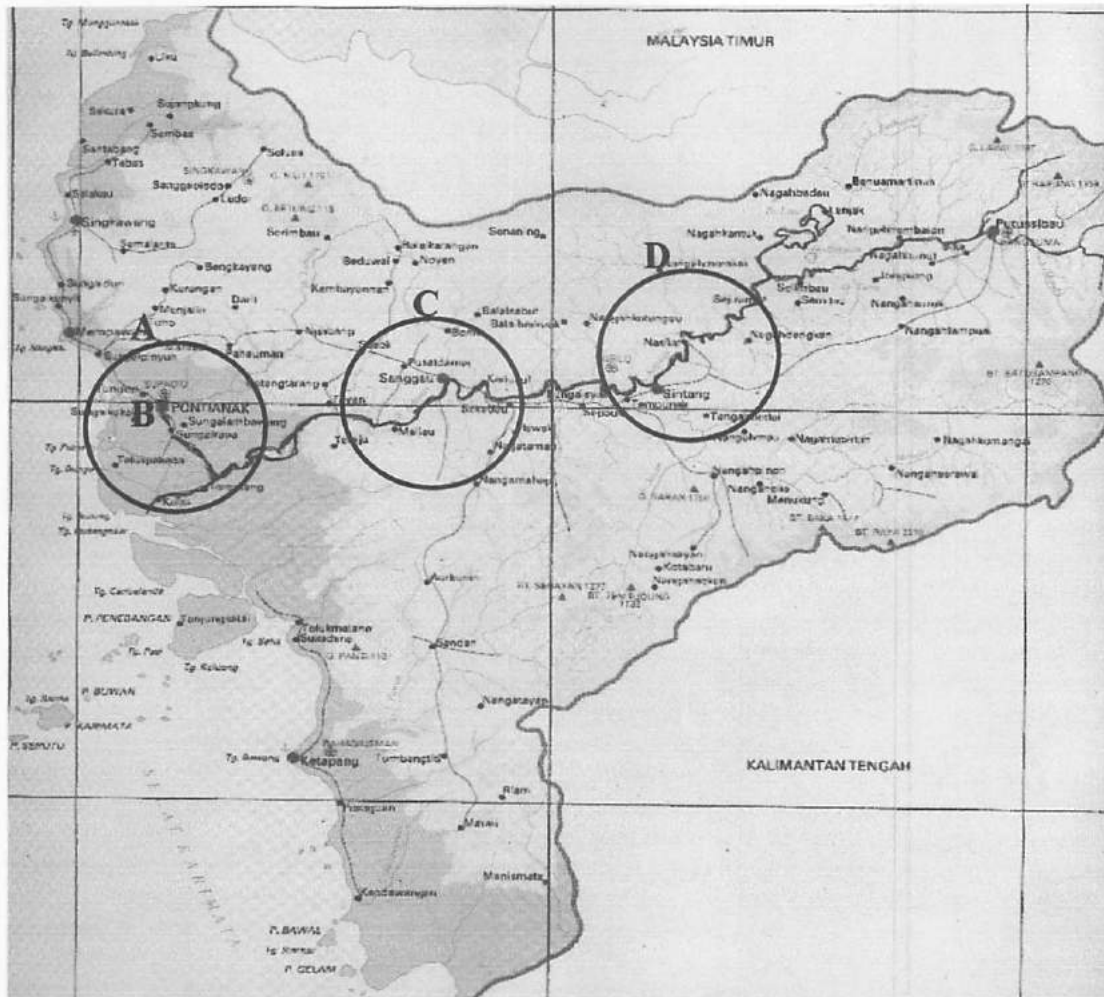
**Table 1. Physico-chemical parameters measured and Methods of measurement**

No	Parameters	Methods/Tools
1	Temperature (°C)	Thermometer Hg
2	Water Transparency (cm)	secchi disk
3	Bottom substrate	Ekman dredge
4	pH (unit)	pH Indicator Universal
5	Dissolved Oxygen (mg/L)	Titrimetri
6	Free Carbondioxide levels (mg/L)	Titrimetri

**Station and Time of observation**

Prawns are freshwater biota in their life cycle requires two habitats namely freshwater and brackishwater habitats. In the adult phase of his life mostly in freshwater, while the larvae phase requires brackishwater. From the life cycle of prawns, the determination of the observation station in the Kapuas river region was divided into 4 districts (Figure 1) were: A) Waters within the Kapuas River in Pontianak County represented by Jungkat Village and Kakap River village. In both regions, water conditions of the Kapuas River are still classified as brackishwater. B) Waters of the Kapuas River in the Regional Municipality of Pontianak. C) waters of the Kapuas River in the

Sanggau District and D) waters of the Kapuas River in District of Sintang. Kapuas waters in this Sintang District overall is freshwater. The location of the observation in the downstream districts of Pontianak, both at Jungkat Village and Kakap River Village, there are many mangrove forests, while in urban areas of Pontianak is already a densely populated residential areas and industries. Observation area in the Districts of Sanggau and Sintang was dominated by swamp forest whose condition is still good. The survey was conducted 4 times which is 2 times in the dry season (June and August) and 2 times in the rainy season (October and December).



A= District of Pontianak, B= Pontianak City, C= District of Sanggau, D= District of Sintang

Figure 1. Research Area in The Kapuas River, West Kalimantan.

**Data Collection**

Length-weight data collection, the stage of gonad maturity, fecundity and egg diameter, and water quality parameter data were done directly in the field. By way of measuring and recording the catch through interview to fishermen who were found at the location of the observation. At the time of interviews with fishermen, was also conducted sample of prawns caught and were measured the length-weight and recorded their gonad maturity stage. For the shrimp that contain eggs, the shrimp was desiccated with formalin solution and then observed fecundity and diameter of eggs in the laboratory. Measurement of water quality parameters are conducted directly in the field (in situ). Measurement of water quality parameters of temperature used a mercury

thermometer with 0.1 ° scale, the transparency / brightness using sechii disk with accuracy of 1 cm, the pH using universal indicator pH, Dissolved oxygen content (O<sub>2</sub>)-soluble and free carbon dioxide (CO<sub>2</sub>) were used titrimetry.

**Data Analysis**

Size distribution of prawns captured and egg diameter were analyzed using frequency distribution by applying the rule of Sturges (Ritonga, 1987) namely : the data length and weight measurements and the results of measuring the diameter of eggs were divided into several groups (classes) with the formula:  $K = 1 + 3.322 \log N$ , where K = number of groups or classes and N = number of samples. To find the distance or interval class was used formula i

(interval) = (NTT-NTR) / K, with NTT = highest value contained in the data measurement and NTR = lowest value. For the shrimp that contain eggs that have been fertilized, its gonad observations was conducted on "broodchamber" located between the swimming legs. According to Nikolsky in Mantel (1983), gonad maturity stage (GMS) of shrimp that has been fertilized was divided into 4 parts : GMS I = yellow colored eggs (newly fertilized), then increased to orange (GMS II), brown (GMS III) and the last grayish coloured (GMS IV), at this late stage (GMS IV) eggs were ready to hatch.

To find the average and mode values of the size and eggs diameter of prawns caught were used the formula as follows : 1) The average value ( $\bar{X}$ ) =  $(\sum FX) / N$  and 2) The mode ( $M_o$ ) =  $T_b + (d_1 / (d_1 + d_2)) i$ , with: F = frequency, X = median value, N = number of samples,  $T_b$  = the lower value of the class containing the mode,  $d_1$  = the difference between the class frequency of mode with a previous class frequency,  $d_2$  = difference between the class frequency of mode with a later class frequency and  $i$  = class interval. The first maturity size of gonad prawns ( $M$ ) was determined by using the formula of Spearman-Kärber (Udupa, 1986). The formula used was as follows : (1)  $m = (X_k + X / 2) - (X, \sum p_i)$ , the range of length size was expected by equation (2)  $\text{antilog} [m \pm 1.96 / (\text{var}(m))]^2$  and (3) the value of  $\text{var}(m) = (X)^2 \times \sum [(p_i q_i) / (n_i - 1)]$ , where:  $M$  = the first gonad maturity size (anti-log of  $m$ ),  $m$  = log value of length prawns on the first gonad maturity,  $X_k$  = log value of the middle length class of 100% on shrimp mature gonads,  $X$  = the length log added of the middle-class values,  $p_i = r_i / n_i$  = ratio of the number of shrimp that gonad maturity in each length class,  $r_i$  = the number of shrimp mature gonads at the  $i$ - class,  $n_i$  = number of shrimp samples in the  $i$ -class and  $q_i = 1 - p_i$ .

## RESULTS AND DISCUSSION

### Distribution OF Giant Freshwater Prawn in the Kapuas River

Catching the giant freshwater prawns in the Kapuas River occurred throughout the year. Catching prawns are generally conducted in the type of river habitat (Kapuas River) and its tributaries, started from downstream to upstream. Nine types of fishing gear used to catch prawns in the Kapuas River were: hook and lines (*pancing*), shrimp longline (*rawai udang*), traps (*bubu*), cast-nets (*jala*), gillnets (*jaring insang/pukat*), edge surrounding nets (*belat*), Fish aggregating device (*rompong*), coast gillnets (*pukat pantal*), and electrical fishing (*Accu Stroom*). Based on the classification proposed by Brandt (1969), the nine shrimp fishing gears can be grouped into 6 sections: 1) Fishing with lines ie. catching shrimp by using a fishing rod (included in this section were hooks and lines and shrimp longlines), 2) Fishing with traps that capture using traps (traps and edge surrounding nets), 3) Fishing with the drive in methods ie. catching by collecting shrimp / fish to a place and then were caught (included in this section were fish aggregating device and coast gillnets), 4) Fishing with falling net gear that was catching shrimp by dropping tools included in this section was cast-nets, 5) Fishing with gillnets ie. catching with using the nets (gill nets) and 6) Fishing with lift nets ie. catching by ways the lift nets, included in this section were the scoop net) with supporting tools was *Stroom* of batteries of 2x12 volt.

Giant freshwater prawn (*Macrobrachium rosenbergii*) was classified as aquatic animals that can be long migrated away. Phases of larval to juvenile, more live in the lower part of the river to the estuaries which were still influenced by sea water. In the process toward adulthood, prawns migrated to the upper part of river (upstream) upto adult. The process of egg fertilization by the male shrimp usually occurred in the middle and

upper zones, and then the shrimp will migrate back downstream to find the aquatic habitats that contained salt waters for hatching the eggs. The intensity of catching prawns in the Kapuas River looked dominant in the downstream waters in the area of County and City of Pontianak. The mainstay fishing gear used by fishermen to catch shrimp and prawns in the lower parts of Kapuas River, included the areas of Kecamatan Sungai Kakap, Pontianak District, were fish aggregating device and cast nets, whereas in the downstream of Kapuas River (Region of Jungkat), the mainstay fishing gear were hook and lines, cast nets and surrounding nets (*belat*). The catch shrimp in the observation area of Sintang and Sanggau District were dominated by the large size and fishing gears widely used were the hooks and lines (*pancing*) as well as the cast nets (*jala*). The giant freshwater prawns with size of 9.38 to 16.5 cm (in Pontianak Regency) was a measure of the most frequently caught. Based on the criteria proposed by Utomo *et al.* (2002), the giant freshwater prawns that were caught in the downstream section of Kapuas River had a small size (<12 cm) to large (> 15 cm). For the observation areas in Sintang District, the size of prawns were often caught by fishermen ranged from 13.20 to 25.99 cm, this size was a medium to large size. Fishing gears of hooks and lines which were also widely used by fishermen, time of fishing the prawns was varied between morning-noon, noon-afternoon, and some were fishing at night. Information from a fisherman, said that a good time to catch prawns with hooks and lines was at the moment "*air kandak*". Air kandak is a terms of fishermen that is a situation, where the river waters at certain times the water flow are not too swift and not very high tide. Besides, the condition of river waters turbid and chocolate colored plus many wood piles and household domestic waste, based on the experience of fishermen was a suitable aquatic

habitat and highly favored by the prawns.

#### Size Distribution of Giant Freshwater Prawns

Giant freshwater prawns caught by time (temporal distribution) and place (spatial distribution) had a different size (Table 2 and 3). The smallest total length prawn of 6.0 cm (August-2005) in Pontianak regency, the highest size of 30.7 cm (June-2005) in the region of Sanggau. The smallest average size 11.41 cm (August-2005) in Pontianak Regency, the highest average size 21.59 cm (June-2005) in the observation area of Sintang. The smallest size of the lot caught (mode value) = 9.38 cm (August-2005) in Pontianak Regency, the highest mode value = 25.99 cm (June-2005) Sintang Region. In weight unit, the smallest size was 2.7 grams (August-2005) in area of Pontianak Regency. The highest = 390 grams (June-2005) Pontianak Regency. The smallest average weight = 18.23 grams (August-2005 in Pontianak Regency), the highest average weight of 132.42 grams (June-2005) in the Region of Sintang. The smallest mode value was 17.73 grams (August-2005) in Pontianak Regency. The highest mode value of 100.57 grams f in the area of Sintang Regency.

In Table 3, the weight size distribution of prawns often caught (mode value) of 4 times of survey was varied from 17.73 to 40 grams (Pontianak District), between 19.31 to 47.01 grams (Pontianak City), between 17.79-45.35 grams (District of Sanggau) and between 25.08 to 85.52 grams (Sintang District). The shrimps which were caught in the second survey (August 2005) was considered the smallest body weight compared to the survey 1, 3 and 4. In West Kalimantan, fishermen grouped the weight size of prawns into 3 parts: the size of prawns with body weights above 100 grams were grouped in categories A, the weight size of 30 to 100 grams were grouped in categories B and size less than 30 grams were grouped in



categories C. Group A was further divided into 3 parts: A super were sized above 200 grams, size A1 between 150 to 200 grams, and A2 was the size between 100-150 grams. Group C is divided into 2 parts, ie. Ck (C minor) was a size 10 to 30 grams and Ch (C subtle) that measure less than 10

grams. From these measurements, it can be concluded that a lot of prawns caught by fishermen in the waters of the Kapuas river were included in categories B and C, while group A, although was many found in fish markets, the numbers were relatively small.

Table 2. Size distribution (total length-cm) of giant freshwater prawn captured by fishermen in Kapuas River during sampling -2005

No	Wilayah Pengamatan	Survei-I (Juni-2005)				Survei-II (Agustus-2005)				Survei-III (Oktober-2005)				Survei-IV (Desember-2005)			
		Min.	Maks.	Rata-Rata	Modus	Min.	Maks.	Rata-Rata	Modus	Min.	Maks.	Rata-Rata	Modus	Min.	Maks.	Rata-Rata	Modus
1	Kab. Ptk.	11.6	30.0	18.09	16.41	6.0	29.0	11.41	9.38	8.7	23.5	14.40	16.5	9.6	25.7	15.59	14.50
2	Kota Ptk.	12.6	29.6	19.57	18.78	8.9	26.5	14.00	13.3	6.6	23.0	13.89	12.0	8.6	26.1	15.00	14.30
3	Kab. Sgg	11.5	30.7	20.80	17.75	9.0	22.5	12.86	10.5	10.3	20.4	16.91	13.2	9.5	25.7	15.65	15.20
4	Kab. Stg	14.6	29.6	21.59	25.99	13.0	28.6	19.56	18.4	13	23.8	18.24	13.2	12.0	29.7	18.02	16.55

Table 3. Size distribution (body weight-gram) of giant freshwater prawn captured by fishermen in Kapuas River during sampling -2005.

No	Wilayah Pengamatan	Survei-I (Juni-2005)				Survei-II (Agustus-2005)				Survei-III (Oktober-2005)				Survei-IV (Desember-2005)			
		Min.	Maks.	Rata-Rata	Modus	Min.	Maks.	Rata-Rata	Modus	Min.	Maks.	Rata-Rata	Modus	Min.	Maks.	Rata-Rata	Modus
1	Kab. Ptk.	15	390	62.62	37.33	2.7	300	18.23	17.73	5.0	160	35.36	40.0	7.0	210	50.75	30.0
2	Kota Ptk.	25	385	97.55	47.01	5.0	235	34.58	19.31	2.5	160	30.79	20.0	6.0	220	45.72	25.0
3	Kab. Sgg	20	385	114.1	45.35	6.7	130	26.60	17.79	6.0	100	55.47	40.0	8.0	200	47.04	35.0
4	Kab. Stg	30	380	132.4	85.52	20.0	290	84.18	100.57	12.0	170	75.05	80.0	15.0	365	76.90	50.0

**Remark:**

Kab. Ptk= Kabupaten Pontianak, Kota Ptk= Kota Pontianak, Kab. Sgg= Kabupaten Sanggau, Kab. Stg= Kabupaten Sintang

**Reproductive Biological Aspects of Giant Freshwater Prawn**

In the downstream waters of the Kapuas River covering Regency and the City of Pontianak, there were the resource of the broodstock prawns That have been fertilized at different gonad maturity stages (GMS), which was from GMS-I (yellow colored gonads), GMS-II (orange), GMS-III (brown) and GMS-IV (gray). In the observation area of Sintang and Sanggau Districts, were rarely found Gonado maturity Stage (GMS) of prawns at stages of II, III and IV, while for GMS-I, frequency obtained was not gotten as much in the observation area in the District and City of Pontianak. The size of the smallest female prawns reaching TKG-IV was

occurred in the total length of 13 cm and body weight of 18.4 grams, its weigh of gonad = 2.23 grams with fecundity of 7058 eggs (Table 4). The largest size was 18.2 cm with 55 grams of body weight, GMS-III with 4.14 gram of gonad weight and fecundity = 49.584 eggs. Prawns fecundity was varied between 7058-57887 eggs. The diameter of eggs at various GMS (Table 5) the frequency that occurred in the range of 0.30 to 0.349 mm diameter in GMS-I, GMS-II GMS-III and GMS-IV, but the diameter of the egg to the size of the middle value between 0.5745 to 0.7745 mm were presented only in bloodstocks of prawns with GMS-IV that were characterized egg color gray. The first maturity size for the female of

giant freshwater in the Kapuas River was 12.95 cm with the size ranged from 12.39 to 13.54 cm (Table 6).

**Table 4.** Data of Length-weight, gonad maturity stage, colour, weight of gonad and fecundity of giant freshwater prawn in Kapuas River in District and City of Pontianak

No	Total Length (cm)	Body Weigh (gram)	GMS	Gonad Coloured	Gonad Weigh (gram)	Fecundity (eggs)
1	15.1	30	III	Brown	1.99	37602
2	18.2	55	III	Brown	4.14	49584
3	15.5	35	II	Orange	2.93	25868
4	16.8	45	II	Orange	1.80	27480
5	14.1	20	III	Brown	1.55	11563
6	17.3	50	IV	Gray	3.03	24066
7	16.7	45	II	Orange	1.14	16886
8	17.0	45	IV	Gray	0.96	17424
9	15.5	32.0	I	Yellow	3.45	24649
10	16.5	42.1	II	Orange	5.14	39835
11	15.5	37.4	II	Orange	3.03	17637
12	15.0	39.9	II/III	Orange	3.96	27816
13	16.0	53.1	III	Brown	4.87	57887
14	15.5	34.3	II	Orange	2.16	17934
15	17.5	52.6	III	Brown	5.74	26215
16	14.5	36.7	IV	Gray	3.30	13800
17	13.0	18.4	IV	Gray	2.23	7058
18	15.3	33.4	IV	Gray	2.53	20971

**Table 5.** The distribution of egg diameter of giant freshwater prawns on a variety of Gonad Maturity Stages (GMS)

No	Egg Diameter (mm)	Mid Value (mm)	Egg Diameter Frekuensi (%) at ...			
			GMS-I Yellow	GMS-II Orange	GMS-III Brown	GMS-IV Gray
01	0.25 - 0.299	0.27	2	33.5	44	10.5
02	0.30 - 0.349	0.32	70	36	47	33.5
03	0.35 - 0.399	0.37	22	20	8	16
04	0.40 - 0.449	0.42	2	7.5	1	8.5
05	0.45 - 0.499	0.47	0	0		0
06	0.50 - 0.549	0.52	4	3		13.5
07	0.55 - 0.599	0.57				4
08	0.60 - 0.649	0.62				11.5
09	0.65 - 0.699	0.67				0
10	0.70 - 0.749	0.72				0
11	0.75 - 0.799	0.77				2.5
**	Sum (%)	-----	100	100	100	100
**	Average Egg Diameter (mm)	-----	0.35	0.33	0.31	0.42
**	Mode of Egg Diameter (mm)	-----	0.33	0.31	0.30	0.33

**Table 6. Length distribution and estimation of the first gonado maturity size of giant freshwater prawns in the Kapuas River**

No	Length Class (cm)	Midlength (ML)	Log(ML) (X)	(n)	No. of prawn Immature stage (1,2,3)	No. of prawn Mature stage (4,5) (r)	Proportion of Mature prawn (p)	X-3S-X	q=1-p	(plogq)/ (n-1)
1	10.0 - 11.0	10.5	1.0211293	3	3					
2	11.0 - 12.0	11.5	1.0606978	3	3					
3	12.0 - 13.0	12.5	1.09691	5	5					
4	13.0 - 14.0	13.5	1.1303338	14	9	5				
5	14.0 - 15.0	14.5	1.161368	27	18	9		0.0289637	1	0
6	15.0 - 16.0	15.5	1.1903317	15	0	15	1	0.0276523	0	0
7	16.0 - 17.0	16.5	1.2174839	25	18	7	0.28	0.0255541	0.72	0.0084
8	17.0 - 18.0	17.5	1.243238	18	10	8	0.44444444	0.0241337	0.55556	0.01452433
9	18.0 - 19.0	18.5	1.2671717	11	5	6	0.545454545	0.0228629	0.45455	0.02479339
10	19.0 - 20.0	19.5	1.2900746	7	1	6	0.857142857	0.0217193	0.14286	0.02040816
11	20.0 - 21.0	20.5	1.3117579	4	3	1	0.25	0.0206846	0.75	0.0625
12	21.0 - 22.0	21.5	1.3324385							
Sum				132	75	57	3.377041847			0.13062589
Average								0.0241366		

**Remarks :**

log value of the first gonado maturity size  
 The First gonado maturity size of giant freshwater prawns  
 Variance of the m value  
 Root of the variance value  
 Confident limits of the m value  
 Standard deviation value  
 Logarithmic lower value of m  
 Logarithmic upper value of m  
 Lower value of the first gonado maturity size of prawns  
 Upper value of the first gonado maturity size of prawns

m= 1,11221355  
 M= antilog (m)= 12,94832376  
 Var(m)= 9,63032E-05  
 akar Var(m)= 0,00981342  
 m±z  
 z= 1,96 x 0,00981342= 0,019234303  
 mb= m - z = 1,092979247  
 ma= m + z = 1,131447853  
 Mb= antilog (mb)= 12,38737392  
 Ma= antilog (ma)= 13,53467565

**Water Quality**

Measurement of water quality parameters was conducted at locations where fishermen were found in the fishing activities of giant freshwater

prawns in waters of the Kapuas River. Table 7 was the result of water quality measurements at each survey in each region of observation.

**Table 7. The value of water quality parameters in the habitat of giant freshwater prawn captured by fishermen in the Region of Kapuas Watershed, West Kalimantan during the study.**

Observation Areas	Temperature (°C)	Water quality parameter measured				
		Trans- parancy (cm)	Water colour	pH (unit)	Dissolved Oxygen (ppm)	Free-CO <sub>2</sub> (ppm)
<b>The first Survey (Mel/June-2005)</b>						
District of Pontianak	27.5-28.0	30-33	brown	6.0-6.3	4.39-5.81	6.6-8.8
Pontianak City	26.5-27.5	23-35	brown, gray	5.0-6.3	4.77-5.68	6.6-8.8
District of Sanggau	27.0-27.5	30-33	gray, green	6.3	5.81-5.94	6.6-11.0
District of Sintang	27.5-28.0	25-30	brown	5.8-6.5	5.81-5.94	6.6-11.0
<b>The second Survey (August-2005)</b>						
District of Pontianak	28.0-30.0	25-35	brown, black	6.0-6.3	4.52-5.42	6.6-11.0
Pontianak City	27.5-29.0	30	brown, gray	5.0-6.3	4.90-5.81	6.6-8.8
District of Sanggau	26.5-29.0	25-30	brown	6.0-6.3	5.16-5.68	8.8-11.0



District of Sintang	27.0-27.5	20	brown	6.0-6.2	5.36-5.55	6.6-8.8
<b>The third Survey (September/October-2005)</b>						
District of Pontianak	29.0-31.0	45-60	brown	6.0-7.5	4.51-5.91	6.6-11.0
Pontianak City	29.0-30.0	35-40	brown	6.0-6.5	5.37-6.44	6.6-8.8
District of Sanggau	27.5-29.0	25-40	brown	6.0-7.0	5.37-6.44	6.6-9.9
District of Sintang	27.0-29.0	20-35	brown	6.0-6.5	5.37-6.44	8.8-9.9
<b>The fourth Survey (November/December-2005)</b>						
District of Pontianak	27.5-30.0	30-55	brown	6.3-7.2	5.30-6.06	6.6-9.9
Pontianak City	27.5-29.5	50-60	brown	5.5-6.5	4.90-6.20	7.7-9.9
District of Sanggau	27.5-29.5	30-40	brown	6.0-7.0	5.20-6.20	7.7-9.9
District of Sintang	27.5-29.0	25-35	brown	6.0-6.5	5.45-6.30	7.7-9.9

Of 4 times the survey, the lowest water temperature was 26.5°C and the highest was 31°C. Transparency/Brightness value was ranging in between 20-60 cm, water colors ranging from brown, gray to black, but overall, the Kapuas River water color was brown. pH-water of Kapuas River Basin ranged from 5.0 to 7.5, the lowest pH value (5.0) was measured at the mouth location of the Landak River in observation area of Pontianak City, while the highest (pH = 7.5) was measured at location in the estuary of Kakap River, in observation area of Pontianak Regency. Dissolved oxygen levels varied from 4.39 to 6.44 mg/L, while levels of CO<sub>2</sub>-free between 6.6 to 11.0 mg / L. The measurement results of water quality parameters of the upper Kapuas River (District Sanggau and Sintang) up to the downstream (County and City of Pontianak) did not show great differences between one area to another observation. The values measured on the parameters of temperature, transparency/brightness, pH, dissolved oxygen (O<sub>2</sub>) and free carbon dioxide (free-CO<sub>2</sub>) during the conduct of research (4 times the survey) were still within reasonable limits to support the life of aquatic organisms including fish and shrimp (APHA, 1988; Boyd, 1979; NTAC, 1968).

## CONCLUSION

Catching the giant freshwater prawns (*Macrobrachium rosenbergii*) in the Kapuas River was occurred throughout the year with their catching in the Kapuas River and its tributaries from the downstream to upstream. Fishing activities in the downstream (County and City of Pontianak) was more dominant than the upper part (Districts of Sanggau and Sintang). Various tools that were used in an effort to catch prawns both legal and illegal (electricity use/ Stroom) categories were included in the waters of the Kapuas River. Fishing gear used in the lower part was hooks (hook and line), shrimp longline, cast-net, shrimp pot traps, gillnets, surrounding nets (*belat*), Fish Agregating device (*rompong*), coast gillnets and using the electric fishing gear. Fishing gear that was often used in the upstream are hook and lines, cast nets, longlines, traps and gillnets.

Length size distribution of prawns captured varied from small to large. In the downstream area, the variation of average total length was ranged from 11.4 to 19.6 cm, where the value of the mode ranged from 9.4 to 18.8 cm. Gonad maturity stage at the downstream areas varied from GMS I to IV. In the upstream, the average size

distribution of the total length was ranged from 12.9 to 21.6 cm with the mode value of between 10.5 to 26.0 cm. The weight size distribution of prawns at the lower parts of Kapuas River had the mode value ranging from 17.7 to 47.0 grams and between 17.8 to 85.5 grams in the upper parts. A lot of prawns caught included in group B (weight 30-100 grams) and C (weight <30 grams). The first gonad maturity size of prawns in the Kapuas River was 12.95 cm by varying the size ranged from 12.39 to 13.54 cm. Water quality condition of Kapuas River was still within the normal range to support the aquatic organism life including the life of giant freshwater prawns.

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