MUD CRAB FISHERIES IN KAPOR BAY, RANONG PROVINCE

Praveena Chaono
Department of Fishery Management, Faculty of Fisheries, Kasetsart University, Chatuchak, Bangkok 10900, Thailand. g5162001@ku.ac.th

Sangtien Ajjimangkul
Department of Fishery Management, Faculty of Fisheries, Kasetsart University, Chatuchak, Bangkok 10900, Thailand. ffissaa@ku.ac.th

Shettapong Meksumpun
Department of Marine Science, Faculty of Fisheries, Kasetsart University, Chatuchak, Bangkok 10900, Thailand. ffisspm@ku.ac.th

Urirat Netharn
Department of Fishery Management, Faculty of Fisheries, Kasetsart University, Chatuchak, Bangkok 10900, Thailand. ffisurnh@ku.ac.th

Introduction

Kapor Bay was restored by mangrove forest replantation for over 10 years which results in habitat of commercial crab resources. At the present, the trend of mud crab demand in international market has been rising (DOF, 2009). Moreover, mud crab has been cultured for value added in form of soft shell mud crab. The production of mud crab has been decreasing from the past from 41,000 tons in 1997 to 38,000 tons in 2003 and to 33,000 tons in 2007 (DOF, 2009). The objectives of this research were to study mud crab species, mud crab fishery, compare the catches among areas of Kapor Bay, Ranong province, and study the opinion of fishermen on mud crab management practice in Kapor Bay in order to achieve optimal mud crab management approach further.

Materials and methods

Study site

The study areas were 4 sites of mangrove forest around Kapor Bay. Three mangrove forests, Muang-gluang mangrove forest where was the most close to the sea, Kapor mangrove forest where was located most inner of the bay and receive freshwater from the headwaters from the

mountain, and Banghin mangrove forest where was composed of many water canals, were situated in Kapor district. Another study site, Naka mangrove forest where was Naka canal and Bangbon canal crossing over, was in Suk Sumran district (Figure 1).

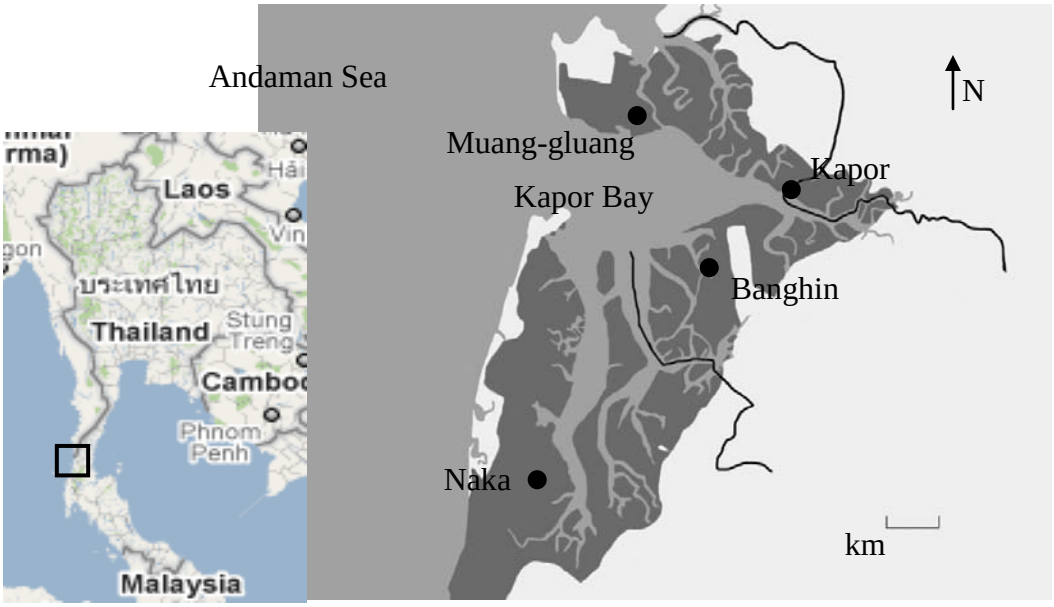

Figure 1 Location of study sites in Kapor Bay, Ranong Province, Thailand

Data collection

Mud crab samples were collected using crab traps and crab lift nets from August 2009 to June 2010 in 3 seasons; summer season (March-June), rainy season (July-October), and dry season (November-February).

Twenty seven fishers were obtained from statistic analysis in order to estimate population proportion at 95% confident level and ± 5% precision (total population was 1,059 with 20% of crab fishers). Total 35 fishers were interviewed for the opinion on fishery resources, crab resource management, and news and information perception.

Data analysis

The crab samples were sex identified, weigh (gram), and measure for length of carapace (cm). Inferential statistics for testing the hypotheses of difference were performed by One-way ANOVA when data distribution is normal and Kruskal-Wallis H test when data

distribution is not normal. The correlation analysis was tested by Spearman's rank correlation coefficient.

Results

The result from 13,349 crabs showed that the crab were composed of 13,341 *Scylla olivacea* (99.9%), and 8 *Scylla paramamosain* (0.1%) which were found only in Kapor and Banghin mangrove forest (Figure 2).

Scylla olivacea *Scylla paramamosain*

Figure 2 Mud crab

Mud crab fishery and product

Fishers operated crab fishing in spring tide which was 15-20 days/month. Fishers from Muang-gluang, Banghin and Naka sub district used main fishing gear as crab traps. An average number of crab trap was 66.0±22.0 traps/trip which was yielded 100.0±46.5 gram/trap. An average Catch Per Unit of Fishing Effort (CPUE) of crab trap was 6.5±3.3 kg/trip. Fishers from Kapor sub district used only crab lift nets to harvest crab. An average number of crab lift net was 65±15.0 nets/trip which was yield 80.0±35.6 gram/net. An average CPUE of lift net was 5.1±2.1 kg/trip. An average yield from trap and net were not significantly different ($p>0.05$).

Male crab had carapace width (CW) 4.5-16.2 cm when matured female crab had CW 6.3-15.0 cm and immature female crab had CW 4.2-12.0 cm.

Crab weight was highest in dry season (99.8±43.1 gram/trap). The crab production per trip was highest in dry season (7.7±2.3 kg/trip) and lowest in rainy season (5.3±2.6 kg/trip) (Table 1). Crab weight per trap was significantly different between areas ($p<0.05$). The highest weight was found at mangrove forest in Muang-gluang sub district (117.0±59.0

gram/trap) and the lowest one was found in mangrove forest of Naka sub district (79.2±26.5 kg/trap).

Crab production was classified by size as small crab (61.3%) (>20 crabs/kg = 9.9% and 10-20 crabs/kg = 51.4%) with average price of 40 baht/kg, medium crab 7-10 crabs/kg (22.7%) with average price of 60 baht/kg, and big crab <7 crabs/kg (16.0%) with average price of 82 baht/kg. The crab productions were significantly different between seasons ($p<0.05$).

Crab productions per trip were significantly different between areas ($p<0.05$). The highest production was from mangrove forest in Banghin sub district (7.2±3,6 kg/trip) and the lowest production was from mangrove forest in Kapor sub district (4.9±2.3 kg/trip).

Table 1 Average production of mud crab fisheries

Seasonal	Area (Mean±SD)				
	Overall	Muang-gluang	Kapor	Banghin	Naka
Overall					
g/trap	95.7±45.1	117.0±59.0	84.9±40.6	99.2±41.8	79.2±26.5
kg/day	6.2±3.1	5.5±2.8	4.9±2.3	7.2±3.6	6.7±2.5
Dry (Nov-Feb)					
g/trap	99.8±43.1	108.8±51.4	85.6±44.4	105.8±42.4	86.9±27.1
kg/day	6.5±3.4	5.2±2.8	4.7±2.2	7.4±3.7	6.9±2.5
Summer (Mar-Jun)					
g/trap	89.4±24.7	91.9±35.6	88.4±18.6	106.0±13.9	74.2±21.3
kg/day	7.7±2.3	7.0±3.1	5.4±2.5	9.9±1.9	8.0±2.5
Fall (Jul-Oct)					
g/trap	92.6±51.4	126.9±65.6	83.8±41.5	77.5±39.8	74.4±28.4
kg/day	5.3±2.6	5.4±2.8	5.0±2.4	5.5±3.0	5.8±2.3

Mud crab resource management

The opinion of fishers on fishery management was composed of the study of resource and ecosystem of the Bay, rule and regulation of crab fishery, learning activities for understanding ecosystem, participation in community analysis, cooperative in problem

solving, and capacity building on natural resources awareness encouragement. The result indicated that 68.6% of fishers had opinion on coastal resource management at medium level when the highest and lowest level was found from 17.1% and 14.3% of fishers, respectively.

The opinion of fishers on crab management, additional crab fry releasing in conservative areas, mangrove forest zoning for parental crab, and crab size limits for fishery, was found to be in medium level (94.3%) and low level of agreement (5.7%).

The interest in news and information of fishers was mostly found in medium level (77.1%) when low and high level were found at 17.1% and 5.7%, respectively. The fishers had collaborative learning at medium level (80.0%), high level (17.1%), and low level (2.9%), respectively (Figure 3).

The opinion of fishers on coastal resource management had positive relationship with news and information perception ($p<0.05$) and with collaborative learning of fishers ($p<0.05$) at medium level (43.5%) and low level (33.7%), respectively.

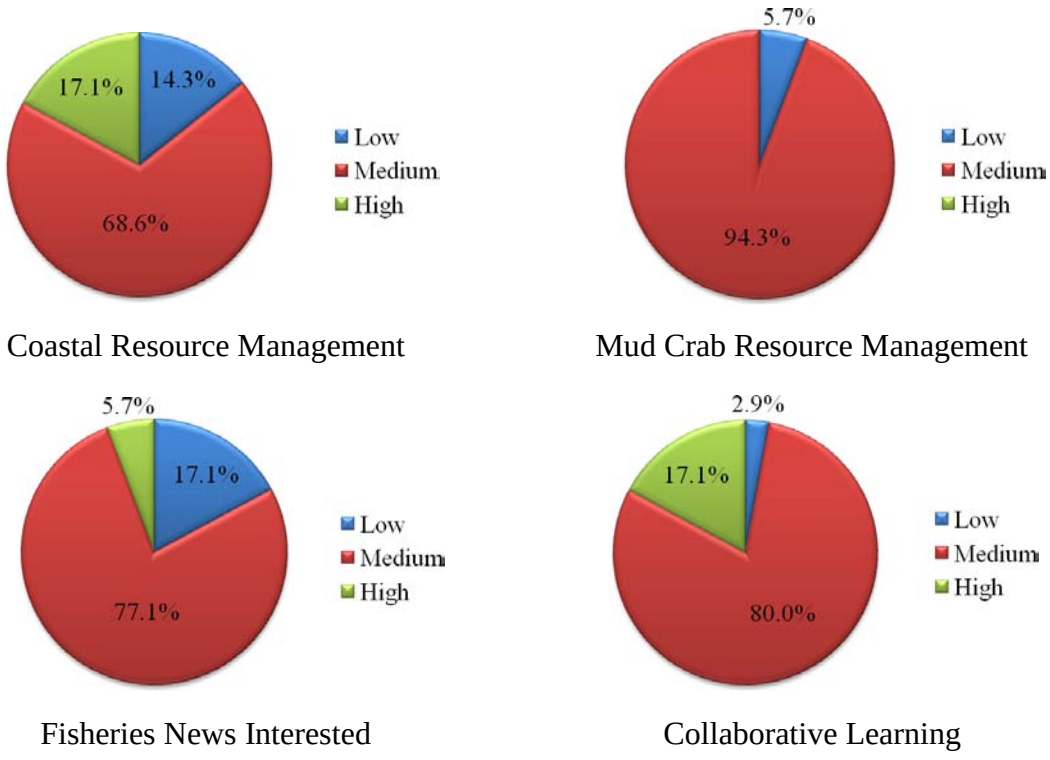

Figure 3 Attitude of Fishers

Discussion

Fishers operated crab fishing in spring tide due to the wide range changing of water level which was benefit in bringing the smell of bait to the crab and lead them to the trap finally. The average number of traps was 66.0±22 traps/trip and average number of lift nets was 65.0±15 nets/trip. Average CPUE was 6.2±3.1 kg/trip with average crab weight of 95.7±45.1 gram/trap. The yields were not significantly different between gears. This was contrast to the study result of Poomikong *et al* (2006) who found an average crab production of 370.2 gram/trap in Klong Ngao, Ranong Province which was 4 times higher than the production in this study. The CW width of crab was range from 4.2 to 16.5 cm when the smallest crab was smaller than the crab from the study of Moser *et al* (2005) who had surveyed the ecosystem of Kapor mangrove and found the crabs were sized from 5.0 to 13.5 cm. This indicated that small crab resource in Kapor Bay was harvested for aquaculture. The small crab was captured (61.3%) with the size of <20 crabs/kg (9.9%) and 10-20 crab/kg (51.4%). The middleman in Kapor Bay collected crab with the size of <20 crabs/kg and sold to soft shell crab aquaculture farmers when small crabs in other areas were released by the fishers to the natural habitat.

The productions per trip were significantly different between areas ($p<0.05$). The highest production (7.2±3.6 kg/trip) was found in Banghin mangrove due to the area was characterized by small water canals which were the shelter for the mud crab. Kapor mangrove yielded the lowest production (4.9±2.3 kg/trip) since the area got freshwater from the mountain passing through Kapor canal. Moreover, the crab weights of each trap were significantly different between areas ($p<0.05$). The average crab weight per trap from Muang-Gluang mangrove was the highest (117.0±59.0 gram/trap) due to the area was close to the sea. The lowest crab weight per trap was from Naka sub district with the size of 79.2±26.5 gram/trap.

The opinion of fishers on coastal resource management had positive relationship with news and information interest of fishers and collaborative learning ($p<0.05$) at medium (43.5%) and low level (33.7%) of relationship, respectively. Increasing the level of news and information perception and exchanging would result in increasing of collaborative resources management and mud crab management of fishers further.

Conclusion

Crab composition was composed of *Scylla olivacea* and *Scylla paramamosain*. Fishers operate crab fishery all year round. An average product of each fisher, average product per trip, and average weight per trap were significantly different between seasons. Increasing exchange and perception on news and information of fishers would increase the opinion level of fishers on crab management. Fishers need to collaborate analyze management approach under the areas perspective which affect the size and production of mud crab in decreasing continuously. In case of leaving the crab to grow in natural water for 15 days, income would increase from 20 baht/kg to be 80 baht/kg (20 baht/20 crabs/kg and 40 baht/10 crabs/kg). Fishers in Kapor Bay should be strengthen in collaborative learning and establish the management approach in order to sustain crab resource utilization further.

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