

Study on Gender Ratios of Shrimp and Prawn Species in U-To Creek, Ayeyarwady Region, Myanmar

Myint Myint Aye
Lecturer
Department of Zoology
University of Yangon
Yangon, Myanmar

Yee Yee Lwin
Lecturer
Department of Zoology
University of Yangon
Yangon, Myanmar

Sandar Win
Associate Professor
Department of Zoology
University of Yangon
Yangon, Myanmar

Abstract:- The present study was conducted to know gender ratios of prawns and shrimps from U-To Creek of Chaungtha, Patheingyi Township, Ayeyarwady Region from January to December 2017. Samples of prawn and shrimp were collected from monthly visit (three consecutive days / month). From the monthly collection of females and males, twenty subsamples of each species were randomly taken from fisherman. Genders were determined as males, females and ovigerous females. A total of 14 species belonging to five genera under three families were recorded. Male, female and ovigerous female proportion of different species were different seasonally in the catches. Highly significant catch weight of female was recorded more than male.

Keywords:- Prawns and Shrimps; Overall Sex Ratio; Ovigerous Females.

I. INTRODUCTION

Crustaceans, especially members of the order Decapoda (shrimp, crabs, lobsters, etc.) are ecologically and economically important. According to [7], the prawns/shrimps include about 33 genera with about 2,500 species, of which less than 300 species are of economic interest throughout the world. Food and Agricultural Organization of the United Nation (F.A.O) lists that a total of 342 species which are actually or potentially significant commercially [2].

Generally there are two kinds of species such as freshwater species (prawn) and marine species (shrimp) [7] stated that the shrimp refer to the smaller animals and prawns to the larger one.

The knowledge about the reproduction of a species is an important element for investigating physiological and ecological aspects [15]. The present work was conducted with the following objectives:

- To record the species composition of shrimp and prawn species in the study area
- To observe the seasonal variation of shrimp and prawn species in the study area

- To investigate the gender ratio of shrimp and prawn species

II. MATERIALS AND METHODS

The present study was conducted at U-To Creek situated on the Rakhine Coastal Zone of Patheingyi Township, Ayeyarwady Region (Lat 16° 56' N, Long 94° 28' E) from January to December, 2017. Samples of prawn and shrimp were collected from monthly visit (three consecutive days / month). From the monthly collection of females and males, twenty subsample of each species was randomly taken from fisherman. Genders were determined as males, females and ovigerous females. The monthly gender ratio (male:female) was calculated, and the results were record. Some collected specimens were preserved in 10 % formalin or 70% alcohol for further identification, and their sexual characteristics. In penaeid species, male and female were readily identified on the presence or absence of a petasma or a thelycum according to Burukovskii (1985). In palaemonid and alpheid species, males without petasma, females without thelycum. Gender was determined using morphometric features, such as presence of an appendix masculina on the second pleopods and appendix interna in the male while only the appendix interna was present in the female [6].

III. RESULTS AND DISCUSSION

U-To creek of Chaungtha possessed brackish water with an abundant supply of aquatic animals during the study period 14 species belonging to five genera and three families were recorded. Among them six species from family penaeidae, seven species from family palaemonidae and one species from Alpheidae were recorded (Table 1).

No.	Genus	Species	Common Name	Vernacular Name
1	<i>Penaeus</i>	<i>P. monodon</i> <i>P. indicus</i> <i>P. merguensis</i> <i>P. canaliculatus</i> <i>P. semisulcatus</i>	Giant tiger prawn Indian white prawn Banana prawn Striped prawn Green tiger prawn/ Flower prawn	Kyar-pazun Pazun-phyu Pazun-phyu Zebra / Chey-pyar pazun / Kyar / Flower Pazun Sein Gya/ Flower
2	<i>Metapenaeus</i>	<i>M. papuensis</i>	Papua prawn	Thae-khe / Gyawt
3	<i>Macrobrachium</i>	<i>M. rosenbergii</i> <i>M. idae</i> <i>M. equidens</i> <i>M. javanicum</i> <i>M. lamarrei</i> <i>M. malcolmsonii</i>	Giant river prawn Orana river prawn / Cameron Orana Rough river prawn Java river prawn Kuncho river prawn Monsoon river prawn	Ye-cho-pazun-htoke Myet-pazun / Bu-htoke Gaung-pu / Bu-htoke Bu-htoke Bu-htoke / Gaung-pu Ye-cho-pazun-htoke
4	<i>Leptocarpus</i>	<i>L. fluminicola</i>	Gange delta prawn	Bu-htoke / Pazun seik
5	<i>Alpheus</i>	<i>A. euphrosyne</i>	Nymph snapping shrimp	Nga-let-phyauk

Table 1:- Lists of Recorded Shrimp and Prawn Species

Male and female proportion of different species were different seasonally in the catches (Table 2 and Fig 2).

No.	Scientific Name	Cool season (Nov – Feb)			Dry season (Mar – May)			Wet season (Jun – Oct)		
		M	F	Ovi.	M	F	Ovi.	M	F	Ovi.
1	<i>P. monodon</i>	10	90	-	11.7	88.3	-	17	83	-
2	<i>P. indicus</i>	13.8	86.3	-	18.3	81.7	-	16	84	-
3	<i>P. merguensis</i>	16.3	83.8	-	16.7	83.3	-	19	81	-
4	<i>P. canaliculatus</i>	11.3	88.8	-	11.7	88.3	-	13	87	-
5	<i>P. semisulcatus</i>	11.3	88.8	-	13.3	86.7	-	13	87	-
6	<i>M. papuensis</i>	12.5	87.5	-	13.3	86.7	-	19	81	-
7	<i>M. rosenbergii</i>	11.3	18.8	70	-	-	-	11	22	67
8	<i>M. idae</i>	11.3	22.5	66.3	8.3	53.3	38.3	9	26	65
9	<i>M. equidens</i>	10	30	60	11.7	50	38.3	11	8	81
10	<i>M. javanicum</i>	12.5	26.3	61.3	11.7	45	43.3	13	14	73
11	<i>M. lamarrei</i>	7.5	32.5	60	8.3	53.3	38.3	9	25	66
12	<i>M. malcolmsonii</i>	10	45	45	-	-	-	7.5	38.8	53.8
13	<i>L. fluminicola</i>	10	31.3	58.8	-	-	-	7	19	74
14	<i>A. euphrosyne</i>	11.3	40	48.8	13.3	43.3	43.3	10	31	59

Table 2:- Seasonal Variation of Male and Female Proportion of Different Species

No.	Scientific Name	% of Males	% of Females	% of Oviparous females	M : F
1	<i>P. monodon</i>	13.33	86.67	-	1 : 6.50
2	<i>P. indicus</i>	15.83	84.17	-	1 : 5.32
3	<i>P. merguensis</i>	17.5	82.5	-	1 : 4.71
4	<i>P. canaliculatus</i>	12.08	87.92	-	1 : 7.28
5	<i>P. semisulcatus</i>	12.5	87.5	-	1 : 7.00
6	<i>M. papuensis</i>	15.42	84.58	-	1 : 5.49
7	<i>M. rosenbergii</i>	11.11	20.56	68.33	1 : 8.00
8	<i>M. idae</i>	9.58	31.67	58.75	1 : 9.43
9	<i>M. equidens</i>	10.84	25.83	63.33	1 : 8.23
10	<i>M. javanicum</i>	12.5	25.83	61.67	1 : 7.00
11	<i>M. lamarrei</i>	8.34	34.58	57.08	1 : 11.0
12	<i>M. malcolmsonii</i>	8.34	40.83	50.83	1 : 11.0
13	<i>L. fluminicola</i>	31.25	18.33	50.42	1 : 11.0
14	<i>A. euphrosyne</i>	11.25	37.08	51.67	1 : 7.89

Table 3:- Proportion of Male and Female of Shrimp and Prawn Species

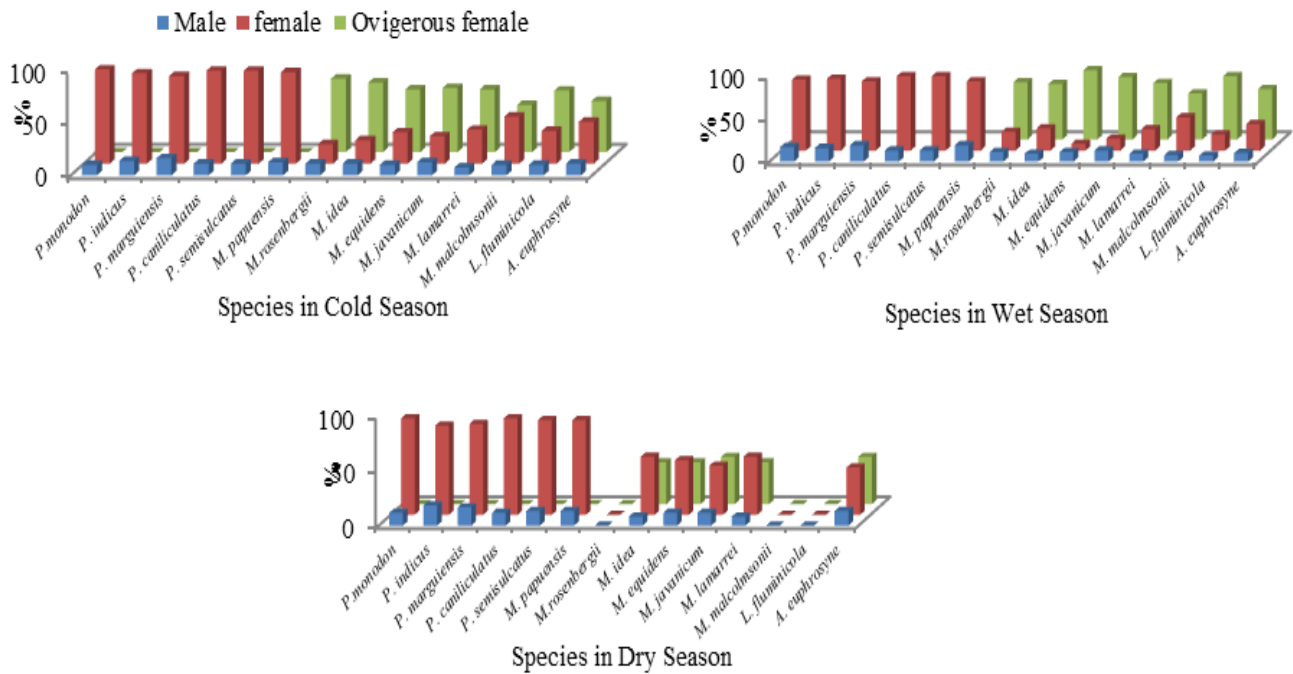


Fig. 2:- Seasonal Variation of Male and Female Proportion

Male and female were clearly differentiated in all recorded species. Highly significant catch weight of female was recorded more than male (Table 3 and Fig. 3).

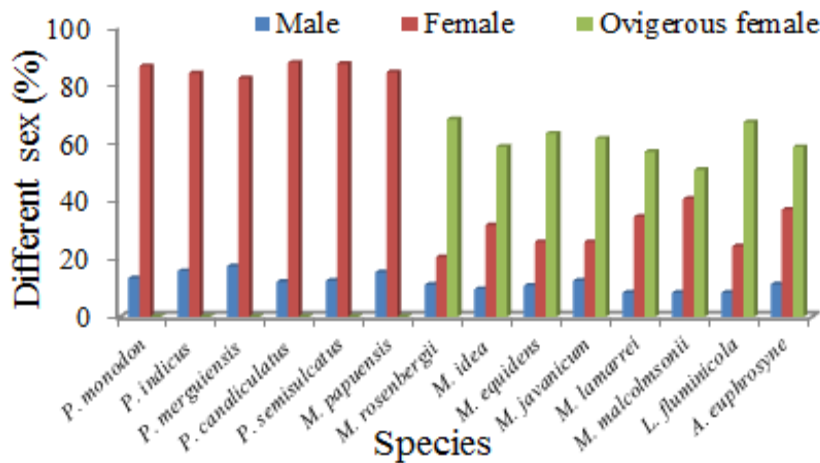


Fig. 3:- Percent mature male and female recorded during the study period

As their reproductive status, ovigerous females of the family Penaeidae were not recorded in the study area through the study period. [12] stated that the penaeid prawns migrate into the sea for maturation and breeding and their larvae enter into estuarine areas and grow there till sub adult stage.

In the present study regarding to *Macrobrachium* species, ovigerous female were recorded in all species throughout the year. More ovigerous females were recorded in wet season. [4] reported that the sex was not equally distributed in the fishery of prawn and shrimp. [10] stated that the most adult *Macrobrachium* species are known to migrate to the brackish water for breeding purpose.

Regarding to the gender ratio, the number of females was significantly greater than that of males in samples throughout the year in the study periods. It was similar with the finding of [11] stated that all females dominated the males in all the months but the extent of dominance of females over males was more prominent during peak breeding months. In addition, [3] stated that in general, the gender ratio is known to be close to 1: 1 (males: female) in nature in contrast to [4] reported that the genders were not equally distributed in the fishery. [9] suggested that the optimum gender ratio for maximum oviposition in *M. rosenbergii* were 1:4, 1:5. [16] recommended 1:3, 1:4 or 1:5 and [14] suggested a 1: 4 male: female. In the present result found that 1: 8 of *M. rosenbergii*. This ratio was agreed to the result of [13]. The annual gender ratio of *P. indicus* population in coastal waters of Malacca was 1: 2.10 (males: females) [1]. In the present study, the gender ratio

in *P. indicus* was 1:5.32. [8] stated that a skewed gender ratio can be caused by different mortality rates between genders and different behavioral characteristics such as migration. It may be associated with changes in water temperature and food availability.

IV. CONCLUSION

A total of 14 species belonging to five genera, three families, and one order were recorded from U-To Creek of Chaungtha, Patheingyi Township, Ayeyawady Region. Male and female were clearly differentiated in all recorded species. Highly significant catch weight of female was recorded more than male. In the present study regarding to *Macrobrachium* species, ovigerous female were recorded in all species throughout the year. More ovigerous females were recorded in wet season. The awareness for the conservation of prawn and shrimp species in the study area may sustain the healthy ecosystem for the next generation.

ACKNOWLEDGEMENTS

We are greatly indebted to Professor Dr. Thida Lay Thwe, Head of the Department of Zoology, University of Yangon for her encouragement to do researches; Dr. Aye Mi San, Department of Zoology, University of Yangon for her encouragement.; Dr. San San Hmwe, Lecturer, Department of Zoology, University of Yangon for her encouragement and supervision; to all field assistants and local fishermen from U-To Creek, Chaungtha for their helps.

REFERENCES

- [1]. S.M.N. Amin, V. Arshad, J.S. Bujang, S.S. Siraj, Age structure, mortality and yield-per-recruit of sergestid shrimp, *Acetes indicus* (Decapoda: Sergestidae) from the coastal waters of Malacca, Peninsular Malaysia. *J. Appl. Sci.* 9: 801 – 814, 2009.
- [2]. I. Dore, C. Frimodt, *An Illustrated Guide to Shrimp of the World*. Van Nostrand Reinhold, New York, 1987.
- [3]. RA. Fisher, *The genetical theory of natural selection*, 2nd edn. New York. Dover, 1958.
- [4]. M.J. George, K. Raman and P.K. Nair, Observation on the offshore prawn fishery of Cochin. *Indian J. Fish.*, 10(2)A:460-499, 1963.
- [5]. M.J. George, K. Raman, P.K. Nair, Observation on the Offshore Prawn Fishery of Cochin. *Indian J. Fish.*, 10(2): 460 – 499, 1968.
- [6]. Holthuis, L.B. 1950. The palaemonidae collected by the siboga and Snellius Expeditions, with the Remarks on other species. 1. Subfamily Palaemoninae. Leiden, Holland.
- [7]. L.B. Holthuis, FAO Species Catalogue, Vol. I Shrimps and Prawns of the World. *FAO Fisheries Synopsis No. 125*, Volume I. Food and Agriculture Organization of the United Nation, Rome, 1980.
- [8]. S. Kim, Population structure, growth, mortality and size at sexual maturity of *Palaemon gravieri* (Decapoda: Caridea: Palaemonidae). *J. Crustacean Biol.* 25: 226-232, 2005.
- [9]. S.R. Malecha, Commercial seed production of the freshwater prawn, *Macrobrachium rosenbergii*, in Hawaii. In CRC Handbook of Mariculture Vol.1 205 – 230. In Mc Vey. J.P. and Moore, J.R. (Ed.) CRC Press, Boca, Raton, FL, 1983.
- [10]. N.K. Panikkar, Osmotic behavior of shrimps and prawns in relation to their biology and culture. *Bull. FAO French*. BCSP/67/E/25, 1967.
- [11]. S. Parakash, Some aspects of distribution and biology of freshwater prawns in Gangetic Ecosystem. *Indian J. Fish.* 36(2): 133 – 140, 1989.
- [12]. S.M. Pillai, T. Rajyalakshmi, P. Ravichandran, An ecological interpretation on the distribution of early stage of Penaeid prawns along Orissa Coast. *J. Env. Sci.* 2(2), 1986.
- [13]. R.M.G. Ratnayake, T. Sivananthawerl, C.N. Walpita, U. Edirisinghe, Determination of optimum male: female ratio and salinity level for larval production of *Macrobrachium rosenbergii* (De Man 1879) under Sri Lankan condition. *Tropical Agriculture Research*. 22(4): 410 – 415, 2011.
- [14]. S. Sureshkumar, B.M. Kurup, Reproductive activity of male morphotypes of *Macrobrachium* (De Man) and their performance in brood stock rearing and larval reproduction. *Journal of Aquaculture in the tropics*. 13: 87-94, 1998.
- [15]. W.C. Valenti, J.T.C. Mello, V.L. Lobão, Dinâmica da reprodução de *Macrobrachium acanthurus* (Wiegmann, 1836) *Macrobrachium carcinus* (Linnaeus, 1758) do Rio Ribeira de Iguape (Crustacea, Decapoda, Palaemonidae). *Ciênc. Cult.* 38(7): 1256 – 1262, 1986.
- [16]. A.G. Varghese, A.L. Muthuraman, G. Gopakumar, Sex-ratios in broodstock rearing of the giant prawn, *Macrobrachium rosenbergii* (De Man) a critical factors for oviposition and larval production., 12-14, In: Silas, E.G. (Ed). Ind freshwater Prawns, Proceeding kerala Aquaculture University, Thrissur, India, 1992.