Research Paper

Volume : 2 | Issue : 7 | July 2013 • ISSN No 2277 - 8179

Fecundity length weight relationship and sex ratio in fresh water prawn Macrobrachium dayanum from Gho-Manhasan stream,Jammu, Jammu & Kashmir, India

Zoology

KEYWORDS : Fecundity, sex ratio, Macrobrachium dayanum, Gho-Manhasan

Seema Langer	Department of Zoology, University of Jammu, Jammu 180006(India)
Krishan Raj Kant	Department of Zoology, University of Jammu, Jammu 180006(India)
Dr.Sumit Koul	Department of Zoology, University of Jammu, Jammu 180006(India)

ABSTRACT

The paper deals with reproductive capacity and its relation to length and weight and sex ratio of Macrobrachium dayanum collected from stream Gho-Manhasan in Jammu, J&K. Fecundity of prawn varied from a minimum of 37 to maximum of 135 in prawn measuring from 4.8 cm to 6.4cm in length and 2.25gm to 2.7gm in weight respectively. Sex ratio showed that Macrobrachium dayanum deviated from the ratio 1:1 and female dominate over male Macrobrachium dayanum. The correlation of fecundity-total length, fecundity-body weight relationship of all the species were positive.

Introduction

Freshwater prawn belong to order Decapoda and family Palaemonidae of class crustacea. On the basis of information made available by several workers (Chopra, 1943; Penniker and Menon, 1956; Rajyalakshmi, 1960,1961,1964; Randhir and Rajyalakshmi, 1969; Jhingran, 1982) has enlisted nine culturable species of freshwater prawns of the genus *Macrobrachium.* Two species of *Macrobrachium* , *Macrobrachium dayanum* and *Macrobrachium kistensis* has been reported from Jammu region of J&K state.Tonbarapagha and Erondu (2013) studied the sex ratio, GSI and fecundity of African River Prawn *Macrobrachium vollenhovenii* (Crustacea, Palaemonidae) in the lower Taylor Creek, Niger Delta, Nigeria. The sex ratio showed that *Macrobrachium vollenhovenii* deviated significantly from the ratio of 1:1 and male dominated in *Macrobrachium vollenhovenii* .This paper deals with the reproductive capacity and sex ratio of the *Macrobrachium dayanum* in order to explore the reproductive capacity of the fin fish from Jammu water body.

Material and Methods.

Collection area: Prawns were collected from thier natural habitat from a stream at Gho-Manhasan. Gho-Manhasan is located at a distance of 20 km.North west of Jammu city.(32 67 lat N; 74 79 Long E.

Method of collection: Prawns were collected with the help of rectangular haul / sweep net with 1620 cm sq. Mouth area (1mm mesh size) and 80 cm long during morning hours (800-1200). Most of the live specimens were collected from Gho-Manhasan stream because of easy assess and availabilty in abundence throughout the year. Since stream is located at a short distance thus live specimens could be brought safely with less stree to the labortary. During the catch operations, net was mannually dragged upto a distance of 10-15 feet and the entrapped individuals were transferred to the bucket filled with stream water. Live specimens were then carried to the Gho-Manhasan fish farm wher they were oxygen packed in polythene bags and brought to department laboratory, wher they were kept in plastic troughs.

Acclimatization: Captured prawns and live specimens were acclimatized in the laboratory plastic troughs at room temperature for about 5-6 days. They were fed on live food (plankton). Water was changed alternatively and dead specimen were removed immetially. These plastic troughs are provided with aerators.

Fecundity and sex ratio:

Absolute individual fecundity was calculated by

F = Total no. Of eggs in the ovaries of a prawn prior to spawning.

Monthly sex ratios were estimated from the specimens collected. The deviation from 1:1 ratio was tested using the chi-square test.

Results

Fecundity of 90 specimens of *Macrobrachium dayanum* showed that the number of eggs in this species ranged from 37 to 135. The smallest sample was 4.8cm with body weight of 2.25gm and the average fecundity was 71.8 while the largest specimen with a total length of 6.4cm and body weight of 2.7gm had the average fecundity of 110.6. The mean total fecundity recorded for 90 specimens was recorded as 89.811 eggs with average body weight of 2.49±0.37 gm and average totallength of 5.6±1.44 cm.

Relationship between fecundity and body weight: The relationship between the total number of eggs and body weight of *Macrobrachium dayanum* was established.

Log F= Log 1.53± 0.37 Log BW (r= 0.784; P< 0.001)

Or F= 2.7BW 0.75 (r= 0.75; P<0.001)

The regression coefficient 'r' for body weight and fecundity relationship was 0.75 which is simple significant (Table 2 ,Figure 2).

Relationship between fecundity and total body length : The total body length of prawn ranges from 4.8 to 6.4 cm with average total length of 5.6 cm. The relationship between the total number of eggs and total body length of *Macrobrachium dayanum* was established. F= 0.94 TL 0.78 (r= 0.784, P<0.001). The correlations were all positive and regression coefficient for body length and fecundity was 0.78 which is simple significant (Table 2 and Figure 3).

Sex Ratio : The sex ratio of *Macrobrachium dayanum* are given in Table 1, Figure1. The female prawns are maximum during the breeding season, we=hereas the sex ratio is 1: 4.25 male: femaleas compare to non-breeding season ,only 1:1.06 has been recorded,the rezason behind this ratio is that male mature earlier and then disappear whereas female predominates the whole breeding season. The overall sex ratio of *Macrobracium dayanum* estimated from 450 prawns was 1: 2.13 male/female. The sex ratio deviated significantly from the ratio 1:1. P<0.001.

Discussion:

The fecundity value obtained for *Macrobrachium dayanum* were highly variable. This situation had been reported by Klemleva and Golouber (1986) while studying the fecundity of *Macrobrachium vollenhovenii,* who observed that many crustaceans have highly variable absolute fecundity values, even in females of similar size. Various authors have reported the fecundity of *Macrobrachium vollenhovenii.* Ville(1970) reported 300-1000; Miller (1971) reported 12000-45000 while Anetekhai (1986) reported 49979-401212, with a mean of 173940 eggs per female.Chalotra (2003) reported the similar results of fecundity in *Macrobrachium dayanum* . Fecundity total length relationship and fecundity body weight relationship has been carried

out by many authors Albertoni *et.al* (2002) in *Macrobrachium acanthurus* , Hart *et.al* (2003) in *Macrobrachium felicinum* and Deeke and Abowel (2010) reported the relationship between fecundity and total length which showed an increase in number of eggs produced with increasing female size in *Macrobrachium macrobrachion* (Herklots, 1851) the results are similar to present study.

Table 1. Seasonal variations in mean monthly sex ratio of *Macrobrachium dayanum*.

MONTH	Number		Sex ratio`
SEX RATIO	Male	Female	Male: Female
SEP	13	19	1: 1.46
OCT	8	15	1: 1.86
NOV	11	21	1: 1.9
DEC	9	23	1: 2.5
JAN	11	24	1: 2.18
FEB	6	14	1: 2.33
MAR	4	17	1: 4.25
APR	5	21	1: 4.2
MAY	7	24	1: 3.42
JUNE	12	21	1: 1.75
JULY	10	24	1:2.4
AUG	15	16	1: 1.06
TOTAL	111	239	1: 2.13

Body length	Body weight	Volume X=L3	Y=No. Of eggs per female (Fecundity)										Y*	No. Of individuals
4.8	2.25	110.592	54	57	65	78	86	97	95	93	45	48	71.8	10
5	2.35	125	90	92	76	87	54	86	83	92	67	71	79.8	10
5.2	2.4	140	45	39	49	37	76	87	88	96	98	110	72.5	10
5.4	2.45	157.464	56	67	65	75	57	79	98	90	106	114	80.7	10
5.6	2.5	175.616	112	102	90	78	79	89	83	96	91	117	93.7	10
5.8	2.55	195.112	115	98	90	97	95	98	110	83	76	89	95.1	10
6	2.6	216	102	105	95	98	75	120	105	98	111	99	100.8	10
6.2	2.65	238.328	115	98	105	112	102	125	89	83	106	98	103.3	10
6.4	2.7	262.144	135	120	105	127	114	99	97	95	112	102	110.6	10

Table 2. Fecundity of *Macrobrachium dayanum.*

Figure1. Seasonal variations in mean monthly sex ratio of Macrobrachium dayanum.

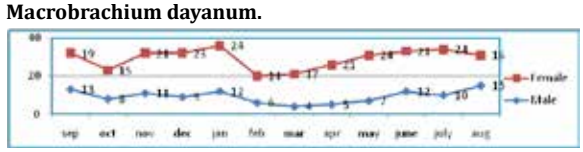


Figure 2. Relationship of Body weight and Fecundity of M. Dayanum.

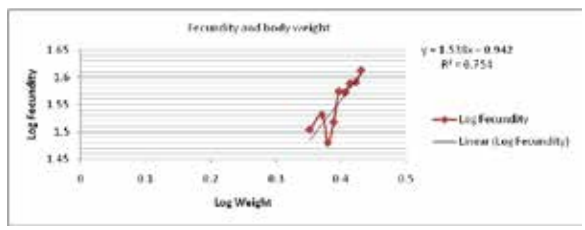
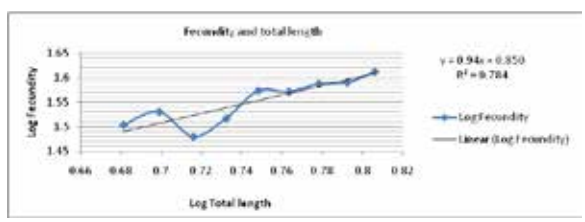


Figure 3. Relationship of Body length and Fecundity of M. Dayanum.



REFERENCE

Albertoni E, Palma-Silva C and Esteves F (2002). Fecundity of Macrobrachium acanthurus Eiegmann, 1836 (Decapoda: Palaemonidae) in a tropical coastal lagoon subjected to human impacts (Macae, Brazil). Acta Limologica Brasiliensia, 14(1): 71-80. | Anetekhai M A (1986). Aspects of the Bioecology of the African river prawn Macrobrachium vollenhovenii (Herklots) in Asejire Lake, Oyo State, Nigeria. Ph.D Thesis, University of Ibadan, 225p. | Chalotra R (2003). Reproductive biology of freshwater prawn Macrobrachium dayanum from Jammu water bodies. M.Phil. Dissertation, University of Jammu, Jammu. | Chopra B N (1939). Some food prawns and crabs of India and their fisheries. J. Bombay.Nat. Hist. Soc., 4(2): 221-234. | Deekae S N, Abowel J F (2010). The fecundity of Macrobrachium macrobrachion (Herklots, 1851) from Luubara Creek, Ogoni Land, Niger Delta, Nigeria. International Journal of Animal and Veterinary Advances, 2(4): 148-154. | Hart A, Ansa E and Sekibo I (2003). Sex ratio , sexual dimorphism and fecundity in pond reared Niger River prawn, Macrobrachium felicinum (Holthius, 1949). The Zoologist, 2(1): 56-61. | Jhingran V G (1982). Fish and Fisheries of India Hindustan Publishing Corporation, India (1982). | Khmeleva N N and Golobev A P (1986). La Production chez les crustacea role dans les ecosystems et utilization. Ifremer, 198p. | Miller G C (1971). Commercial fishery and Biology of the fresh water shrimp Macrobrachium in the lower ST. Paul River. Liberia, 1952-53. US Dept. Of Commerce special Sci. Report. No. 626.13 p. | Pannikar N K and Menon M K (1956). Prawn fisheries of India. Prtoc. Indo-pacific Fish. Coun, 6(3): 328-344. | Rajayalakshmi T (1960). Observations on the embryonic and larval development of some esturine palaemonid prawns. Proc. Net. Inst. Soc., Ind., 26B (6): 395-408. | Rajayalakshmi T (1961). Studies on maturation and breeding nof some esturine palaemonid prawns. Proc. Net. Inst. Soc., Ind., 27B (4): 79-188. | Rajayalakshmi T (1964). On the age of some esturine prawns. Proc. Indo. Pacific. Fish. Coun., 11th seeds-II: 52-83. | Randhir H and Rajayalakshmi T (1969). The commercial prawns Macrobrachium malcomsonii. H. M. Edw. Of River Godawari. A discussion on the trends and characterization of population during 1963-66. FAO. Fish. Rep., 57(3): 903-921. | Tonbarapagha K and Erondu E S (2013). Reproductive biology of African river prawn Macrobrachium vollenhovenii (Crustacea, Palaemonidae) in the lower Taylor Creek, Niger Delta, Nigeria. Ecologia Balkanica. Vol. 5, Issue 1. | Ville J P (1970). Researches sur la reproduction des Macrobrachium des languness ivoiriennes. I-La fecondite precoce chez les Macrobrachium de Cote-d Ivoire. – Annales de I Universite d' Abidjan, Serie E. Ecologie, 3(1): 253-261.