The paper deals with reproductive capacity and its relation to length and weight and sex ratio of Macrobrachium dayanum from Gho-Manhasan stream, Jammu, Jammu & Kashmir, India.

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**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 6.4 cm in length and 2.25 gm to 2.7 gm in weight respectively. The sex ratio showed that Macrobrachium dayanum deviated from the ratio 1:1 and male dominated in Macrobrachium dayanum. The correlation of fecundity-total length, fecundity-body weight relationship and sex ratio 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 their 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 (0800-1200). Most of the live specimens were collected from Gho-Manhasan stream because of easy assess and availability in abundance throughout the year. Since stream is located at a short distance thus live specimens could be brought safely with less stress to the laboratory. During the catch operations, net was manually 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 when they were oxygen packed in polythene bags and brought to department laboratory, where 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 immnetly. These plastic troughs are provided with aerators.

**Fecundity and sex ratio:**

Absolute individual fecundity was calculated by

\[ F = \text{Total no. Of eggs in the ovaries of a prawn prior to spawning.} \]

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 4.8 cm with body weight of 2.25 gm and the average fecundity was 71.8 while the largest specimen with a total length of 6.4 cm and body weight of 2.7 gm 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 total length 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.

\[ \log F = \log 1.53 + 0.37 \log BW \quad (r = 0.784; P < 0.001) \]

\[ F = 2.7BW^{0.75} \quad (r = 0.75; P < 0.001) \]

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. \( F = 0.94 TL^{0.78} \quad (r = 0.784, P < 0.001) \). 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, Figure 1. The female prawns are maximum during the breeding season, whereas the sex ratio is 1:1.06 has been recorded, the reason behind this ratio is that male mature earlier and then disappear whereas female predominates the whole breeding season. The overall sex ratio of Macrobrachium 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 Goloubier (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 Dekee 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.

<table>
<thead>
<tr>
<th>MONTH</th>
<th>SEX RATIO</th>
<th>Number</th>
<th>Sex ratio</th>
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<tr>
<td></td>
<td>Male</td>
<td>Female</td>
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<tr>
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<tr>
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<tr>
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<tr>
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<td>16</td>
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<tr>
<td>TOTAL</td>
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Table 2. Fecundity of Macrobrachium dayanum.