



Fecundity Estimation of *Mystus tengara* (Ham.-Buch., 1822), A Freshwater Catfish from West Bengal, India

KEYWORDS

Fecundity, *Mystus tengara*, West Bengal, India

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ABSTRACT Fecundity is one of the most important aspects of reproductive biology study of any fish species. Though very little work so far has been done on fecundity study of different species of *Mystus*; but there exists a lacuna regarding the same for *Mystus tengara* specifically in the agro-climatic context of India. The study has revealed that the fecundity of *Mystus tengara* ranged from 6,770-21,708 with an average of $13,365.84 \pm 7,260.40$; thus representing the highly fecund nature of this fish species. On the other hand, fecundity has shown highly significant ($P < 0.01$) positive relationship with Total Body Weight, Total Length, Ovary Weight and Ovary Length; but comparison of correlation coefficients of fecundity with these above said parameters have indicated that variation in fecundity can be explained better in terms of Ovary Weight, Ovary Length and Total Body Weight than in terms of Total Length for this fish species.

Introduction

Mystus tengara is commonly known as tetra which is a freshwater species, inhabits both flowing and standing waters. This species is a preferred food fish in West Bengal due to its good taste, high nutrient profile; and in recent times it has also got its importance as ornamental fish too.

Study of the reproductive biology of any fish species is essential for assessing commercial potentialities of its stock, life history, culture practice and actual management of its fishery (Doha and Hye, 1970) and fecundity is one of the most important aspects of fish biology that must be understood to explain the variations in the level of population, to understand the demography of fish populations as well as to make efforts to increase the amount of harvest (Alam and Pathak, 2010). Fecundity is defined as the total number of mature eggs present in ovary of a fish before spawning that should be laid in a single species not in a constant number but fluctuates within certain ranges which is species specific and is the indicator of auto recruitment of that species (Alam and Pathak, 2010). The knowledge of fecundity is of great value in fish culture (Bhatt et al., 1977) as it can be used to assess the abundance and reproductive potential of the spawning stock (Sarker et al., 2002). Fecundity varies from one species to another, depending on the environmental conditions, length, age, location etc. (Musa and Bhuiyan, 2007; Alam and Pathak, 2010) and even among the individuals of the same species depending on various factors like size, age, condition, genetic potential etc. (Alam and Pathak, 2010)

Very little works have been done on fecundity study of different species of *Mystus* (Bhatt et al., 1977; Rao and Sharma, 1984; Khan et al., 1992; Hoque and Hossain, 1993; Dasgupta, 2002; Sarker et al., 2002; Roy and Hossain, 2006; Musa and Bhuiyan, 2007; Islam et al., 2011) but there exists a lacuna on this aspect for *Mystus tengara* in Indian scenario. So, the present work has been performed to study the fecundity of *Mystus tengara*.

Materials and methods

Monthly samples of *Mystus tengara* have been collected from September, 2008 to August, 2009 from an undisturbed wetland near Baruipur, South-24-Paraganas, West Bengal (Latitude N 22°34', Longitude E 88°43'). In total, 131 specimens have been collected during the entire study period for fecundity study. Total Length in cm has been measured for each of the individual fish from the tip of the mouth to the tip of the upper lobe of the caudal fin using a measuring scale to the nearest of 0.1 cm and the Total Body Weight in grams

has been measured for each individual fish species to the nearest of 0.01 gm using an electronic balance. After that fish specimens have been dissected out carefully ventrally; then ovaries have been taken out cautiously and the surface moisture of the ovaries has been removed using the blotting paper. Ovary Weight and Ovary Length have been measured to the nearest of 0.01 gm and 0.1 cm respectively.

Fecundity has been estimated using mature and ripe ovaries following the gravimetric method (Khan et al., 2002; Hussain et al., 2007). The relationship of fecundity with Total Body Weight (TBW), Total Length (TL), Ovary Weight (OW) and Ovary Length (OL) has been studied. To establish the relationship, the values of regression co-efficient (b), point of intercepts (a), co-efficient of correlations (r) and standard deviation have been calculated on those parameters by the least square method. "t" test has also been performed for testing the significance of co-efficient of correlation (r) between the above sited parameters.

Results

Fecundity has been observed to vary between 6,770 (for a fish of total length 8.21 cm, body weight 6.02 gm; ovary weight 1.04 gm and ovary length 1.13 cm) to 21,708 (for a fish of total length 11.2 cm, body weight 18.28 gm; ovary weight 2.68 gm and ovary length 3.06 cm) with an average of $13,365.84 \pm 7,260.40$ (mean total length 9.96 cm; mean body weight 10.67 gm; mean ovary weight 1.55 gm and mean ovary length 2.55 cm).

Fecundity (F) has shown significant ($P < 0.01$) positive relationship with TBW, TL, OW and OL and the relationships are as follows:

$$F = 4725.62 + 689 \text{ TBW} \quad (r = 0.73, P < 0.01, SE = 1968.15)$$

$$F = -4000.51 + 1613.70 \text{ TL} \quad (r = 0.53, P < 0.01, SE = 2442.56)$$

$$F = 5981.97 + 3930.74 \text{ OW} \quad (r = 0.85, P < 0.01, SE = 1532.41)$$

$$F = -3372.71 + 6069.77 \text{ OL} \quad (r = 0.84, P < 0.01, SE = 1578.70)$$

Discussion

Khan et al. (1992) reported the fecundity of *Mystus tengara* to be ranged from 720-5,223. Rao & Sharma (1984), Hoque & Hossain (1993) and Islam et al. (2011) reported the fecundity of *Mystus vittatus* to be ranged from 3,500-18,800; 2,534-60,746 and 18,210-44,620 respectively. Sarker et al. (2002) and Dasgupta (2002) reported the fecundity of *Mys-*

tus gulio to be ranged from 11,436-23,481 and 425-18,199 respectively; Musa and Bhuiyan (2007) reported fecundity range of 4,652-57,932 in *Mystus bleekeri*; Bhatt et al. (1977) reported fecundity of 20,064-46,443 and 3,314-63,135 for *Mystus seenghala* and *Mystus cavasius* respectively; and Roy and Hossain (2006) reported the fecundity of 4,026-25,960 in *Mystus cavasius*. So, the result of the present study though is not in accordance to the earlier result of Khan et al. (1992) but depicting that just like other species of *Mystus*, *Mystus tengara* is also highly fecund in nature. Variation in fecundity of equal sized fish has been observed during the study period; fish measuring 10.7 cm in total length (gonad weight 1.32 gm) has been observed to produce 12,341 eggs; where as another fish of the same length (gonad weight 2.56 gm) has been observed to produce 16,159 eggs. This type of varia-

tion earlier has also been reported in many fishes (Musa and Bhuiyan, 2007; Akter et al., 2007; Saha and Saha, 2011) and may be due to variation in age, condition factor, availability of space and food etc. (Dube, 1993). Fecundity has shown highly significant ($P < 0.01$) positive relationship with TBW, TL, OW and OL; but comparison of correlation coefficients of Fecundity-TBW ($r=0.73$), Fecundity-TL ($r=0.53$), Fecundity-OW ($r=0.85$) and Fecundity-OL ($r=0.84$) have indicated that variation in fecundity can be explained better in terms of OW, OL and TBW than in terms of TL for this fish species.

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