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STUDY OF FECUNDITY OF *LEPIDOCEPHALICHTHYS GUNTEA* (HAMILTON, 1822) OF GHATI *BEEL* OF DHEMAJI DISTRICT OF ASSAM, INDIA

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ABSTRACT : *Lepidocephalichthys guntea* (Hamilton, 1822) is locally known as *Bali botia* in upper Assam (India) belongs to the order Cypriniformes and family Cobitidae. The present paper deals with the estimation of absolute fecundity (F) and its relationships between total length (TL), body weight (BW), ovary weight (OW) and gonadosomatic index (GSI) of *Lepidocephalichthys guntea* (Hamilton, 1822) during breeding season (March – August, 2016) has been studied. The absolute fecundity of *Lepidocephalichthys guntea* as determined in the present investigation varied from 616 – 6400 with an average of 2336±1395. The value of Correlation coefficient (r) between F and OW (r=0.90, p<0.01) is highly significant followed by F and BW (r=0.83, p<0.01) > F and TL (r=0.81, p<0.01) and > F and GSI (r=0.43, p<0.05). The finding of this study will help for commercial cultivation and induced breeding of this species in near future.

Key words : *Lepidocephalichthys guntea*, absolute fecundity and correlation coefficient.

INTRODUCTION

Lepidocephalichthys guntea (Hamilton, 1822) is locally known as *Bali botia* in upper Assam (India) is also well known for its Ornamental and food value. The colouration of the fish is charcoal brown, small dark spots over the body, a series of dark blotches along mid lateral, ventral white, dorsal fin and caudal light brown. This fish is preferred by many common people as it is one of the most delicious, fleshy and possesses minute scale in their body. The species belongs to the order Cypriniformes and family Cobitidae and the common name in English are *Peppered loach*, *Guntea loach* and *Scavenger loach* (www.iucnred.list). The *Lepidocephalichthys guntea* has a wide distribution across the northern parts of South Asia, Pakistan, central and northern India, Nepal and Bangladesh and also records from Myanmar and Thailand (www.iucnred.list). It is found in flowing and clean standing water. Published information on absolute fecundity is very limited or no previous literature is available in India especially in Assam. This may be the first study of absolute fecundity of *Lepidocephalichthys guntea* in Assam (India). Though, *Lepidocephalichthys guntea* is considered as least concern fish species according to IUCN red list data, but the market price and people's demand of this fish is increasing day by day in Assam. A very few information is available regarding reproductive biology and habitat of the species. Till today culture and breeding of this species is not much known to the fish farmer in Assam (India). A clear knowledge of gonadosomatic index and absolute fecundity are considered a prerequisite in successful cultivation of a fish up to commercial level. Absolute fecundity is one of the most important biological aspects of any fish species in any natural environmental condition. The fecundity is termed as number of eggs contained in ovary of a fish (Nikolsky, 1963). In fishery, an adequate knowledge about absolute fecundity is very much essential for evaluating the commercial potentialities of its stock, life history, practical culture and actual management (Lagler, 1956; Doha and Hye, 1970).

The present investigation was undertaken to establish relationship between absolute fecundity (F) with total length (TL), body weight (BW), ovary weight (OW) and gonadosomatic index (GSI). Result of the present finding will be beneficial for studying population dynamics, further research on breeding, seed production and propagation of *Lepidocephalichthys guntea* in Assam, India.

MATERIALS AND METHODS

A total number of 30 live gravid samples having size ranges 5–8 cm in length and weight 0.86-4.22 g were collected from March, 2016 to August, 2016 from landing station of Ghati *Beel* (small tribute of Brahmaputra river basin) Dhemaji district (latitudes 27°5'27''N and longitudes 94°12'18''E) of Assam (India) for studying absolute fecundity (F). After collection, the samples were

Table 1 : Mean±Standard deviation (SD) of absolute fecundity (F), total length (TL), body weight (BW), ovary weight (OW) and gonadosomatic index (GSI%).

Absolute fecundity	Total length (cm)	Body weight (g)	Ovary weight (g)	Gonadosomatic index (GSI%)
2336±1395 (616–6400) N = 30	6.21±0.65 (5–8)	1.80±0.79 (0.86–4.22)	0.27±0.14 (0.08–0.63)	15.31±3.43 (8.38–21.95)

Table 2 : Value of Correlation coefficient ('r') between absolute fecundity (F) and total length (TL), body weight (BW), ovary weight (OW) and gonadosomatic index (GSI).

Absolute fecundity	Total length (cm)	Body weight (g)	Ovary weight (g)	Gonadosomatic index (GSI%)
Value of Correlation coefficient 'r'	0.81**	0.83**	0.90**	0.43*

**Correlation coefficient is significant at 0.01 level (2-tailed). *Correlation coefficient is significant at 0.05 level (2-tailed).

transferred to the laboratory, washed with clean water and preserved in 5% formaldehyde for study. Total length (TL) were measured from tip of the snout to tip of the caudal fin nearest to 0.01 mm by digital vernier caliper and body weight (BW) and ovary weight (OW) of the fish samples were measured nearest to 0.01 g by digital balance (Systronic Make) individually. For studying absolute fecundity, eggs from the three cross sectional samples were taken from anterior, middle and posterior position of the two lobes of each ovary and the pieces were kept in 5% formaldehyde for further study. The eggs were counted from the three subsamples and absolute fecundity was calculated by the following the formula (Bagenal and Braum, 1978) as stated:

$$F = n\,G/g$$

Where, F = Absolute Fecundity

n = average no. of ova in the sub samples of the ovary

G = total weight of the ovary (g)

g = weight of the sub sample

For estimation of gonadosomatic index (GSI), following formula is expressed as follows:

$$GSI(\%) = \frac{OW}{BW} \times 100$$

OW = Ovary Weight

BW = Body weight

RESULTS

In the present investigation, the total length, body weight, ovary weight, gonadosomatic index and absolute fecundity of *Lepidocephalichthys guntea* have ranged between 5 to 8 cm, 0.86 to 4.22 g, 0.08 to 0.63 g, 8.38 to 21.95% and 616 to 6400 number of eggs respectively as shown in the Table 1. The value of Correlation coefficient 'r' of *Lepidocephalichthys guntea* between F and TL (0.81, $p<0.01$), F and BW (0.83, $p<0.01$), F and OW (0.90, $p<0.01$) shows highly significant value except GSI (0.43, $p<0.05$) as shown in the Table-2. The regression graph between F with TL, BW, OW and GSI are depicted in the Fig. 1.

DISCUSSION

From the present study, it is observed that the body weight of *Lepidocephalichthys guntea* as well as the variation of absolute fecundity is found in different length, which was earlier reported in *Channa punctatus* (Saikia *et al*, 2013), *C. striatus* (Ali, 1999) and *C. barca* (Choudhury, 2004). The reproductive capacity of fishes varies depending on the availability of food and space (Mookerjee and Majumder, 1946) and also it depends upon latitude and location (Cushing, 1968 and Mann *et al*, 1984) and also with spawning time (Ware, 1975). Variation of absolute fecundity is observed, among the same species depending on weight, length, age and various environmental conditions (Biswas *et al*, 1984). Depending on temperature, salinity and oxygen, variation of absolute fecundity is observed in fishes (Shafi *et al*, 2012). The present finding of Correlation coefficient 'r' between F with different body parameters (TL, BW, OW and GSI) shows highest significant value in between F and OW ($r = 0.90$, $p<0.01$) which is followed by F and BW ($r = 0.83$, $p<0.01$), and exhibits less significant positive Correlation coefficient between F and TL ($r=0.81$, $p<0.01$) which was also earlier observed in *Channa punctatus* (Saikia *et al*, 2013), *Cyprinus carpio communis* (Shafi *et al*, 2012), *Carassius carassius* (Shafi, 2012), *Puntius sophore* (Phukan and Biswas, 2012), *Cirrhinus reba* (Lashari *et al*, 2007) and *Mystus bleekeri* (Musa and Bhuiyan, 2013). The correlation coefficient 'r' between F and GSI ($r=0.43$, $p<0.05$) is found to less significant compared to all other parameters which was also earlier reported in *Clarias gariepinus* (Egwui *et al*, 2007).

From the present study of absolute fecundity of *Lepidocephalichthys guntea* in Ghati *beel* in Assam

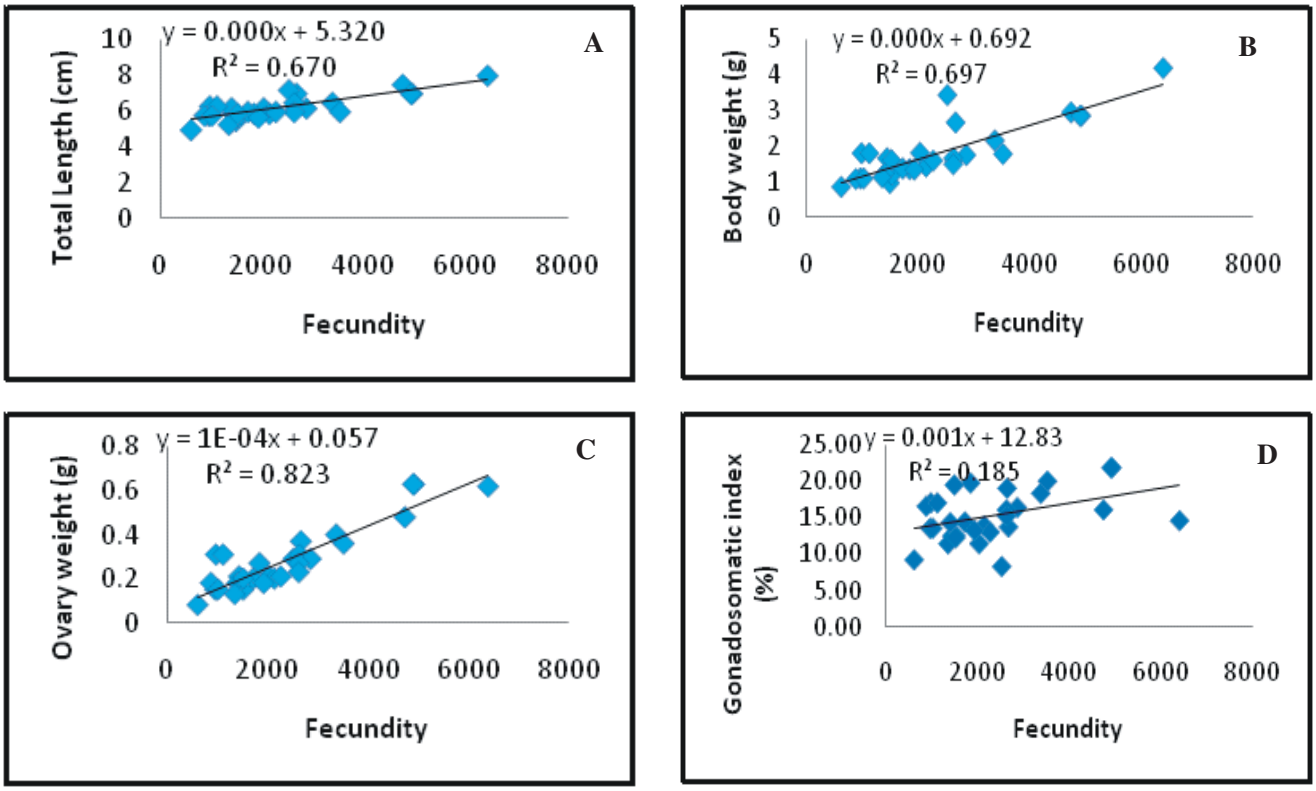

Fig. 1 : Relationship between absolute fecundity and Total Length (A), Body weight (B), Ovary weight (C) and Gonadosomatic index (D) of *Lepidocephalichthys guntea*.

(India) indicate that a fish of this species can have minimum 616 and maximum 6400 number of eggs in the species measuring from 0.86 to 4.22 cm in natural habitat. It is also observed from the present finding that the first maturity of this species start minimum at 0.86 cm length in that natural environment (Ghati *beel*). This valuable information will help for commercial cultivation and induced breeding of this species in near future.

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