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ABSOLUTE FECUNDITY OF *AMBLYCEPS MANGOIS* (HAMILTON, 1822) OF EAST SIANG RIVER OF EAST SIANG DISTRICT OF ARUNACHAL PRADESH, INDIA

Arup Buragohain

Fish Biology and Fishery Science, Department of Zoology, Gauhati University, Guwahati - 781 014, India.
e-mail: arupgu@gmail.com

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ABSTRACT : ***Amblyceps mangois*** **is commonly known as Indian torrent catfish belongs to the order Siluriformes and family Amblycipitidae Day, 1873 which islocally known as Tayek and well known for its traditional medicinal properties as people believe in Arunachal Pradesh. The statistical value of Correlation coefficient 'r' of** ***Amblyceps mangois*** **is the highest in between absolute Fecundity (F) and ovary weight (OW) (0.92, p<0.01) followed by F and ovary length (OL) (0.81, p<0.01) and F and gonadosomatic index (GSI) (0.68, p<0.01). The value of 'r' is moderate in between F and body weight (BW) (0.66, p<0.01) and exhibits less significant positive Correlation coefficient between F and total length (TL) (0. 64, p<0.01). The present finding will provide baseline information for reproductive potential, population status, attention of local people and government or non Government organization and its habitat and conservation perspective of** ***Amblyceps mangois*** **in Arunachal Pradesh, India.**

Key words : *Amblyceps mangois*, absolute fecundity and correlation coefficient.

INTRODUCTION

The term "fecundity" of a fish species can be defined as the number of eggs laid in a single batch in one season. The knowledge of the fecundity is utmost essential to assess the population stock of any fish species in any river system. This basic information on fecundity will helps to calculate the reproductive potential of a fish stock and can be used in ascertaining the age and size at which fishes attain first sexual maturity, time and duration of gravid period and development of the ovary to the final release of eggs.

Ng (2005) recognized 13 species of the genus *Amblyceps* Blyth out of which the three species also reported from different rivers and rivulets of Arunachal Pradesh namely *Amblyceps apangi* Nath & Dey, 1989, *Amblyceps arunachalensis* Nath & Dey, 1989 and *Amblyceps mangois* (Hamilton, 1822) after going through various literatures. *Amblyceps mangois* was described from the Kosi river in northern Bihar, India, a tributary of the Ganges River by Hamilton (1822).

Amblyceps mangois is belongs to the order Siluriformes and family Amblycipitidae Day, 1873 commonly known as Indian torrent catfish and locally known as Tayek in Arunachal Pradesh, which is also considered as Ornamental and food fish. It has excellent market value as people believe that it contain traditional medicinal properties. This species inhabits in torrential streams and river in pebbly beds among rocks and boulders at the base of hills and able to survive during the drying up of the streams and living in pool type habitats (Prasad *et al*, 1997) and capable of breathing air (Singh *et al*, 1989). So far, after scanning various literatures, very scanty information is available on growth dynamics, reproductive biology and population stock of this species. This may be the first report on fecundity *A. mangois* in North East India especially in Arunachal Pradesh except few works done on population ecology (Krishan *et al*, 2011); determination of age and growth rate (Krishan and Dobriyal, 2015) and length-weight relationship and relative condition factor (Krishan and Dobriyal, 2015). Few years back, from Nagaland (India) length-weight relationship and reproductive parameters of *Amblyceps apangi* (Humtsae and Bordoloi, 2015) and recently length-weight relationship and condition factor of *Amblyceps apangi* Nath and Dey from Arunachal Pradesh (India) was studied (Kachari *et al*, 2017). *Amblyceps mangois*is diagnosed morphologically with thick smooth skin, folds on lips double, rictal fold reduced, four pairs of barbels, equal jaws, caudal fin deeply forked, upper lobe of caudal fin is slightly longer and pointed, adipose fin not confluent with caudal fin but free with

rounded posterior margin, pinnate like rays present on caudal fin rays. The colour of the body is olive brown and lighter below. This species has been assessed as Endangered in India (Lokra *et al*, 2010), but the present status considered as Least Concern (LC) (www.iucnred.list, 2019). This species is distributed throughout the Ganges and Brahmaputra River drainages in India (Arunachal Pradesh, Assam, Bihar, Himachal Pradesh, Manipur, Meghalaya,Mizoram, Nagaland, Sikkim, Tripura, Uttar Pradesh, West Bengal) Nepal and Bangladesh (Pal and Ng, 2010).

In Arunachal Pradesh, a few hydroelectric projects are functioning and some are under construction and some are planning to construct in different parts of Arunachal Pradesh. The proposed construction of upper Siang hydroelectric project consists of several hydroelectric power dams in the upper Siang district of Arunachal Pradesh which may alter the entire natural fish habitat of the Siang river system. The collection of boulders and pebbles from different parts of East Siang river beds for commercial purpose greatly affected on habitat ecology and breeding ground of *Amblyceps mangois* which resultinto dwindling of the species from the natural stock in the present environment.

In the present scenario, no proper reproductive information on this species is available and also less attention is paid by any Government or non Government organization regarding conservation of this species for future. To overcome this bottleneck and importance of this species, present paper is aimed to study the absolute fecundity of *Amblyceps mangois* East Siang River of East Siang District of Arunachal Pradesh, India. The present study was undertaken to establish relationship between absolute fecundity (F) with total length (TL), body weight (BW), ovary weight (OW), ovary length (OL) and gonadosomatic index (GSI) of *Amblyceps mangois*. The present finding will provide baseline information for reproductive potential, population status, attention of local people and governmentor non Government organization, and its habitat and conservation perspective of *Amblyceps mangois* in Arunachal Pradesh, India.

Study area

Arunachal Pradesh is known as land of rising sun in India. The mighty Siang river originating from Chema Yungdung Glacier near Kubi in Tibet popularly known as Tsang-Po which transcends down in the Upper Siang district and flows through the East-Siang district of Arunachal Pradesh after it is joined by the Dihang and the Lohit in the plains of Assam to becomes the mighty river Brahmaputra. The proposed construction of upper Siang hydroelectric project consists of several hydroelectric power dams in the upper Siang district of Arunachal Pradesh which will greatly affect the East Siang River in near future.

MATERIALS AND METHODS

A total number of 30gravid adults samples having size ranges 7.6 –11 cm in length and 3.6 –9.51 g in weight were procured from fishermen who caught the samples by using different traditional fishing gears from different streams of East Siang River within Pasighat area (latitudes 28°06′ N and longitudes 95°32′ E), Arunachal Pradesh (India), during February, 2018 to August, 2018 for studying absolute fecundity (F). Before measurements were recorded, the samples were washed with clean water and moisture of the fishes was absorbed with the help of tissue paper. Individually total lengths of the samples were measured from tip of the snout to the extended tip of the caudal fin and also ovary length nearest to 0.01 mm by digital dial caliper (Mitutoyo, Japan). The body weight and ovary weight were measured nearest to 0.01 g by electronic balance (Anamed Model) individually. Weight of the eggs (three sub samples) were taken from the three cross section (anterior, middle and posterior) position of the two lobes of each ovary and the pieces were preserved in 5% formaldehyde (buffered) for studying the absolute fecundity. The eggs were counted from the three subsamples (average of two lobes) and absolute fecundity was calculated by the following the formulaas stated (Bagenal and Braum, 1978):

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

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 stated as Nikolsky (1963)

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

OW = Ovary Weight

BW = Body weight

The Correlation coefficient between absolute fecundity and other parameters (TL, BW, OW, OL, GSI%) were analyses with the help of SPSS software

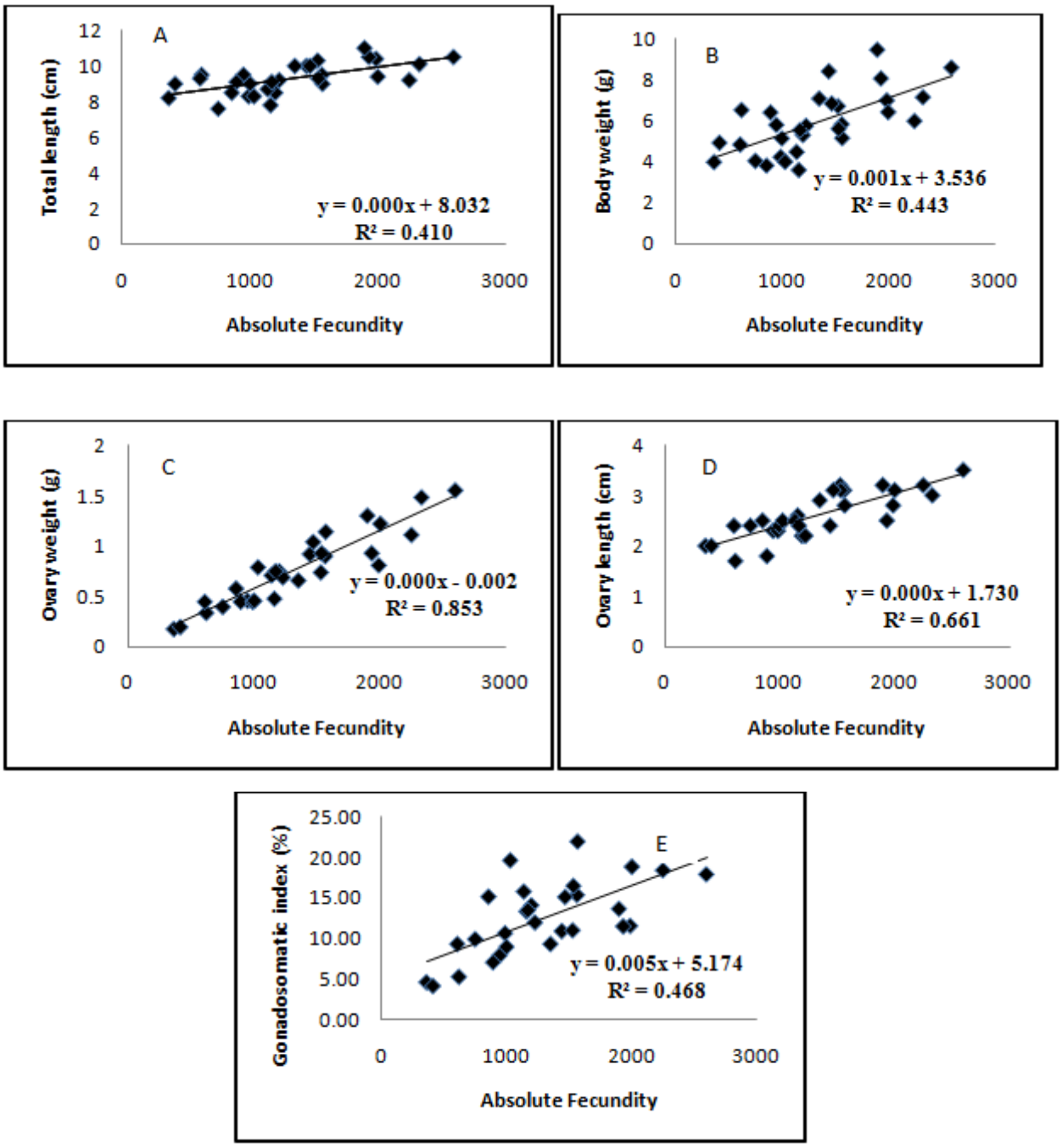

Fig. 1 : Relationship between absolute fecundity and Total length (A), Body weight (B), Ovary weight (C) ,Ovary length (D) and Gonadosomatic index (E) of *Amblyceps mangois*.

(version-16) and mean ± SD of all parameters and graph were calculated with the help of Microsoft Office Excel (version-7).

RESULTS

In the present study, the total length, body weight, ovary weight, ovary length, gonadosomatic index and absolute fecundity of *Amblyceps mangois* have ranged between 7.6 – 11 cm, 3.6 – 9.51 g, 0.18 – 1.55 g, 1.7 – 3.5 cm, 4.05 – 22.05 % and 362 – 2599 numbers of eggs respectively as shown in the Table 1. The statistical value of Correlation coefficient 'r' of *Amblyceps mangois* between F and TL (0. 64, $p<0.01$), F and BW (0.66, $p<0.01$), F and OW (0.92, $p<0.01$), F and OL (0.81, $p<0.01$), and F and GSI (0.68, $p<0.01$) shows highly positive significant value as shown in the Table 2. The regression graph between F with TL, BW, OW, OL and GSI are depicted in the Fig. 1.

DISCUSSION

From the present investigation, its shows that the absolute fecundity of *Amblyceps mangois* is highly

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)	Ovary length (cm)	Gonadosomatic index (GSI%)
1329±569 (362–2599) N=30	9.29±0.84 (7.6–11)	5.9±1.5 (3.6–9.51)	0.76±0.35 (0.18–1.55)	2.60±0.45 (1.7–3.5)	12.79±4.76 (4.05–22.05)

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)	Ovary length (cm)	Gonadosomatic index (GSI%)
Value of correlation coefficient 'r'	0.64**	0.66**	0.92**	0.81**	0.68**

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

fecund in comparison it's small in size and weight of body. Variation of absolute fecundity is also observed in different total length, body weight, ovary weight, ovary length and gonadosomatic index in the samples. The most important and the interesting finding in the present research is that all the statistical value of Correlation coefficient 'r' between Fwith different body parameters (TL, BW, OW, OL and GSI) shows the positive significant value at 0.01 level (2-tailed).

Among all the parameters, the value of 'r' is highest in between F and OW ($r = 0.92$, $p<0.01$) which was also reported in earlier finding in *Channa punctatu* (Saikia *et al*, 2013), *Ompok pabo* (Bhattacharya and Banik, 2015), in *Mystus vittatus* (Rahman *et al*, 2016) followed by F and OL ($r = 0.81$, $p<0.01$) which was contradicted with earlier finding in *Mystus cavasius* (Roy and Hossain, 2006) and F and GSI% ($r = 0.68$, $p<0.01$). Similarly, the regression graphs also shows the strong linear relationships in between F and OW followed by F and OL and F and GSI%. The value of 'r' is moderate in between F and BW ($r = 0.66$, $p<0.01$) and exhibits less significant positive Correlation coefficient between F and TL ($r=0.64$, $p<0.01$). In the present investigation, absolute fecundity is found to increases with the increase in ovary weight which may be due to gonad development period of breeding season which was earlier reported (Rath, 2000).

From the present study of *Amblyceps mangois* in East Siang River of East Siang district of Arunachal Pradesh, India that the first sexual maturity attain from 7.6 cm in total length and 3.6 g in body weight of female species in East Siang River which may be the first scientific report till date for further information. The fish of this species are less fecund having minimum 362 and maximum 2599 number of eggs measuring from 7.6 to 11 cm in total length and 3.6 to 9.51 g in body weight.

Due to lack of information on its scientific medicinal value, ecological importance in river ecosystem, size of sexual maturity, breeding ground, breeding season and its habitat in natural environment, its importance in scientific study is lacking. Further studies of this species are essential to get adequate information on different aspects of reproductive biology to promote its importance for conservation perspective and to gain attention from the local people as well as all government or non government organization to avoid different human activities like construction of large hydroelectric projects, boulder collection or prevent from rampant exploration in the habitat area in near future. It will also contribute to the Fishbase database for further research.

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