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STUDY OF SOME ASPECTS OF EGG LAYING BEHAVIORS OF FRESH WATER TELEOSTEAN FISH MASTACEMBELUS ARMATUS (LAC)

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Study of Some Aspects of Egg Laying Behaviors of Fresh Water Teleostean Fish Mastacembelus Armatus (LAC)

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Abstract – Spiny Eel is an economically important teleostean freshwater species. Because of its delicious flavor and good nutritional value, it is a famous table fish. Monthly fish samples from the NCR area were collected between January and December 2016. Male displays a small dominance over female figures. The carnivorous and active predatory habits of M. armatus indicated a well-formed toothpaste, absence of gill rakers, a firmly constructed stomach and small intestines along with the prevalence of animal matter inside gut material. Body width was roughly of total body weight, resulting in a slim body across all life stages of M. armatus. This also suggested an aggressive mobile lifestyle that is ideal for its predatory existence. Fish are raised on types of food materials, for example. Fish, marine insects and muds collected as 16.60, 14.75, 10.78, 8.50, 8.28 and 13.52 percent in average, respectively. 80.94% of the fish displayed aggressive feeding during the time.

Keywords: Mastacembelus Armatus, Growth, Induced Breeding;

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INTRODUCATION

Mastacembelus armatus is one of India's most popular teleost. It is produced from inland water species, also known as zig zag eel (local bam or bami), which are economically important (max 65 cm). Mastacembelus armatus is a caring night fish that normally happens in sandy streams and waterways. The fish is typically placed to the ground, often partially submerged in sand or substratum. The diet and feeding patterns of fish shift over the year, due to temperature and water quality fluctuations. Mastacembelus armatus is widely valued as a food fish when sold live, but its natural population is the cause of the supply that endangers the animal. There have been scarcely any concerted attempts to grow trout.

The Mastacembelus armatus fish is one of India's commercially valuable animals. Therefore, any component of its reproductive physiology must be understood to determine commercial potential. The animal tends to escape light to the degree that they can and wants to hide in the sand throughout the day. Because of its habit, the potential function of melatonin in the secretion of prolactin and thus in the reproduction of fish may be better examined by using it as an animal model. As far as I know, no prior study has been carried out on the disparity in the behavior of prolactin cells on the development of male and female fish in this specific genus. This research was therefore conducted to establish the precise function of this hormone in M. Armatus by evaluating monthly plasma calcium, testosterone and prolactin combinations. The prolactin cell reproductive and seasonal activities were traced by simulcasting testosterone and serum calcium levels with the hypothesis that the hormone prolactin might play a key role in the reproduction of calcium homeostasis in this species as discussed in another teleost.

FOOD AND FEEDING HABIT

Most previous scientists reported Mastacembelus armatus, except for carnivorous fish. Who has recorded his herbivorous practice of eating.

Its choice for eggs and other fish fry though referring to the fact that this fish feeds primarily on crustaceans. This species' young fish primarily prey on crustaceans and eggs, while the adults devour tiny fish and tadpoles. Its piscivil existence though is a selective insectivorous fish.

The major food sources for these fish populations are fish, shrimps and insects. Young fish have the greatest preference for marine insects and annelids, while adults favor crustaceans and fish water insects and annelids.

Observe the well-formed toothbrush, the absence of gill rakers, the firmly constructed stomach and small intestines, the carnivorous and active predatory habit of the Mastacembelus armatus, along with the domination of animal matter. Dipteral larvae, salty shrimps (Brachipus sp.), earthworms (aquatic oligochaetes) and tiny carps (cyprinids) were recorded as favored food items for the frequency of their occurrence in the gut. Crustaceans and potatoes were recorded as the fundamental food for adults while annelids and aquatic insects were identified as the essential food for young people. They have not reported any substantial changes in diet between young and adult fish.

Spiny eel is a feeder for zooplankton while young and is insectivorous in later periods. − Earthworms and insects feed adults, microcrustaceans and larvae of other marine invertebrates. The major foods for Mastacembelus armatus are fish, aquatic insects, crustaceans, molluscs and annelids. Fish and creams are the most favorite foods.

REPRODUCTIVE BIOLOGY

Sexual dimorphism

Only during the breeding season will male and female Mastacembelus armatus be separated, witnessing some individual characters. Males are active and colored lighter whereas females are potted and dull in colour. When there is some pressure on the abdomen, milt emerges in males, while eggs in females ooze out.

Sex ratio

Female's dominance in their analyzed Mastacembelus armatus population though equal proportion of men and women is recorded in their research.

Gonad maturity stages

Four maturity phases, centered on the morphological and histological features of the gonads, (repository period, preparatory period, pre-packing phase, spawning and post-pacing phase) for both men and women of the Mastacembelus armatus. Furthermore, no comprehensive details on this factor is accessible.

MORPHOLOGICAL CHARACTERS

Mastacembelus armatus morphological characters summarized here. The body is lean, lengthy and somewhat compact. The maxilla reaches beneath the front eye. Pre-opercular spines are usually marked by 2 or 3 spines; however, one or more often may be embedded in skin. The pre-orbital spine is solid and pierces the skin normally. The mouth is a cross-sectional slit bounded by a top and the bottom of the tongue. The upper jaw stretches before the lower jaw and takes part in the creation of the tri-lobed snout consisting of a rigid, strong and pointed medium process, two soft and hollow projections at the side.

A triangular tongue, composed of the glossohyal embedded in a dense mucous membrane, is present on the surface of the Bucco-pharynx. Teeth and pharynx are available; there is no vomerine or palatine teeth available. Teeth are sub-equal, small, pointed and inclined in patches. Fin: There is a broad dorsal and anal fin that reaches the caudal fin. Dorsal spinal fin is inserted above the center or back third of the pectoral fines. The last dorsal spine under the skin is thin and concealed. Colour: Vivid dark brown becomes brighter on the belly, though generally with zigzag lines; it often connects to a network but almost never hits the belly. A blackish band extends across the eye and persists on the upper half of the side to the caudal fin in an undulating course. There is a series of black spots above this band at the base of the soft dorsal fin and a short black band over the back of the spine. Pectoral fins are typically spotted; the spotting or spotting is typically dorsal and anal fins (Figure 1).

Figure 1. Specimen of Mastacembelus Armatus

MATERIALS AND METHODS

Domestication of M. Armatus

To create an effective M-breeding technique. Armatus, 270 baim were collected via fishers from natural habitat and were held with a total of thirty fish. Three separate treatments (treatment I, II and III). Both services contained continuous water sources through porous, plastic air tanks, inlet and outlet, fish shelter and supplementary feeds, i.e. exchange supplementary feed, waste fish and chicken viscera (treatment I, treatment II and treatment III respectively). Although the fish appear to hide, two sections of PVC pipe (0.91 m long and 0.10 m diameter in diameter) were used as protection in each cistern. The mega-food (protein 33,72%, lipid 6%, ash 10% and dry matter 88,98%) was supplied to the fish at a pace of 5% of body weight in treatment I. Treatment fish II and III were supplemented with basil (55.20% protein, 10.80% lipid, 21.60% dry and 22.40% dry), and chicken viscera (47.58% lipid, 13.45% ash, 5.65%, and 13.80% dry matter), respectively with a rates of 5% bodyweight (dry weight). As fish are customary at night, feed was delivered in the early morning and at night. Monthly sampling was conducted routinely. For a period of 6 months from October 2011 to March 2012, the weight (g) and duration (cm) were calculated using an electrical balance and the measuring scale. The Celsius thermometer, digital DO meter, and portable digital pH meter were also reported weekly with water quality parameters such as (° C), dissolved oxygen (ppm), and pH.

DEVELOPING INDUCED BREEDING TECHNIQUE

Selection and conditioning of brood fish

The secondary sexual features have been described as mature male and female broods. Males were comparatively broad, dark colored and moderate, and mature females were comparatively small, light in colour, with a delicate, bloated belly after stripping. Picked broodfish have been preserved in cisterns for about 6 hours until the hormone was administered. Fish processing and transport have been performed very closely to eliminate damage and secondary infection. In different cisterns, males and females were held and the water movement proceeded to ensure adequate aeration. Experimental design, experimental design. Four mediated breeding experiments have been done in order to maximize PG dose for M. armatus.

Treatment I

Twelve pairs of thoughtful male and female breeds were selected for induced breeding in the first trial. At doses of 100, 90 and 80 mg.kg-1 body weight, females were treated with PG extracts in three different treatments (I, II and III), each with two replications. Males were also treated with 5 mg.kg-1 body weight in both therapies after the second injection of women.

Treatment II

I have been chosen to have the same numbers of mature male and female broods as used in the research. In this procedure women were controlled with a body weight of 60, 55 and 50 mg PG.kg-1 under three treatments (I, II and III) each with two replications. Males were offered the same dosage as in the study I.

Treatment III

Treatment III employed twelve pairs of male and female mature broods for development. In this experiment, doses from trial II were significantly decreased. Dose 45, 40 and 35 mg PG.kg-1 body weight of females is treated with three therapies (I, II and III) with two replications. Males in both therapies earned 10 mg in PG.kg-1 fish body weight.

Treatment IV

Two adult male and female broods have been used to reproduce in Care IV. In this procedure, a single dose of 40 mg PG.kg-1 of female body weight was used to validate the doses of PG for female activation of ovulation. Males, on the other side, were handled with PG.kg-1 10 mg.

Injecting the PG extract to broods

Just before hypophysis, selected women and males were caught by a scoop net from the cistern. The fish is covered with a fluffy cloth during the administration of the injection and lied on saturated foam. The PG solution was inserted intramuscularly behind the pectoral fin on the dorsal side. During the injection, the needle was placed at an angle of around 45 ° and the spawners treated very carefully. For each treatment, the total female dose was divided into two. The first dose (30%) and the second (70%) were given 6 hours apart. In the other side, males in both procedures were administered once during the 2nd female injection. Care males and females were held in the same net-covered cistern and aerated by porous PVC pipes.

Stripping, collection of milt and ovulated eggs and fertilization

Fish were examined every two hours after six hours of the second female injection and went up to 20 hours. Eggs were gathered in a fertilization tray shortly after the ovulation by placing subtle pressure on the abdomen from front to back. Milt was collected in the same way as for egg collection followed. Fertilized eggs have been cleaned with clean water many times to eliminate excess milt, semen, etc. The fertilized eggs were transferred for incubation to a circular mini-plastic hatchery (50 L capacity). Analysis of data. The results collected in the present studies were statistically analyzed to see whether or not the therapies varied substantially. This was achieved by one-way variance analysis accompanied by a Duncan multiple range test (DMRT) with a likelihood amount of 0.05.

Incubation and hatching of the fertilized eggs

The fertilized eggs were moved to and distributed in plastic bowls for incubation as homogenously as possible. The water flow was obtained to ensure sufficient ventilation for all incubators. After every 3 hours, dead eggs were removed and their number carefully registered. The number of hatchlings was also counted and registered after the hatching was done.

PG dose efficacy indexes: Percent ovulation, percent fertilization and a percentage hatching metrics were used to assess the efficacy of various PG doses:

The method for determining percent ovulation was as follows: The ovulation percentage was determined using the following formula:

$$\% \text{ ovulation} = \frac{\text{No. of fish ovulated}}{\text{Total no. of fish injected}} \times 100$$

To verify fertilization and hatching percentage, the following formulas were used:

$$\% \text{ fertilization} = \frac{\text{No. of fertilized eggs}}{\text{Total no. of eggs (fertilized + unfertilized)}} \times 100$$

$$\% \text{ hatching} = \frac{\text{No. of eggs hatched}}{\text{Total no. of eggs}} \times 100$$

RESULTS

The original average treatment longitudinal weights in treatment I, II or III is 76,19 ± 1,36, 76,20 ± 2,53 and 75,93 ± 1,48 g respectively, 25,42 ±2,39, 26,59 ± 2,04 and 24,81 ± 2,14 cm respectively. After six months of experimentation the difference ($P<0.05$) was important among therapies fed with 3 separate feed styles i e. Additional commercial food (mega feed), basket and chicken viscera (treatment I, treatment II, and treatment III). In treatment II was found the largest length / weight gain and SGR (19.34 ± 3.12 cm, 67.70 ± 16.49 g, and 0.15 ± 0.03) relative to treatment I and III (Tab. 1 and Figure 1). Treatment II and III also showed a higher survival rate of fish (96%) than Treatment I (94%). Fish were found to readily take trash fish and chicken viscera as food, but the same did not occur when formulated feed was given. For the stable growth and maturation of fish gonads, feeding is quite critical. Egg production relies on the quality of the food supplied.

Parameters	Treatment I	Treatment II	Treatment III
Initial weight (g)	76.19 ± 1.36^a	76.20 ± 2.53^a	75.93 ± 1.48^a
Final weight (g)	127.65 ± 10.72^c	143.90 ± 15.29^a	133.15 ± 6.26^b
Weight gain (g)	51.47 ± 10.97^c	67.70 ± 16.49^a	57.22 ± 6.42^b
Weight gain (%)	67.63 ± 14.93^c	89.28 ± 23.29^a	75.43 ± 8.85^b
Initial length (cm)	25.42 ± 2.39^a	26.59 ± 2.04^a	24.81 ± 2.14^a
Final length (cm)	39.78 ± 3.75^c	45.92 ± 1.69^a	41.67 ± 2.92^b
Length gain (cm)	14.36 ± 4.62^c	19.34 ± 3.12^a	16.86 ± 2.38^b
Length gain (%)	57.86 ± 22.03^c	73.92 ± 18.33^a	68.57 ± 12.56^b
SGR (%/day)	0.12 ± 0.02	0.15 ± 0.03	0.14 ± 0.00
Survival rate	94 %	96 %	96 %

Table 1. Mastacembelus armatus (baim) fed in mega feed (Treatment 1), trash fish (Treatment II) and egg viscera's (Treatment III) during the time of domestication for six months Development and survival rate.

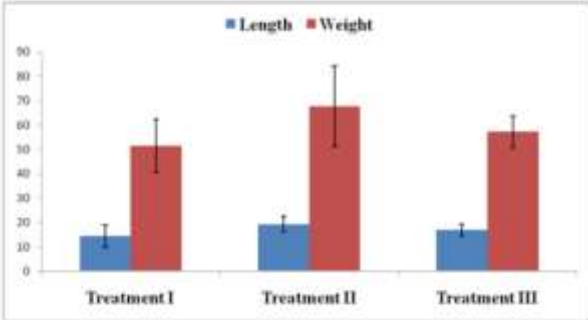

Figure 1. Net benefit differences in M. armatus (baim) during the domestication period of six months under three treatments

The freshwater eels sometimes spend their days concealed beneath cracks, stone and dirt. Various scientists have used artificial shelter for better growth and survival in different fish species. PVC pipes were supplied as a shelter for enhanced M development in this experiment. Armatus. Armatus. We discovered that PVC pipes and water jacinth's are appropriate shelters for better M growth and survival. Armatus. Armatus. Female fish develop faster than male fish and in a specified period of time achieve a higher height. Similar observations for the spiny ael were reported during this research. 85 fish with a smooth and slender skin, epidermis, are long snake-like American Journal of Food Science and Technology and have various mucus glands. The care of live eel was quite complicated during the present research. That may be because of the thick mucus secretions that made the fish slick. This may also have been triggered by the wobbling, serpentine and strong action of fish.

Water quality parameters play an important role in aquatic animals' growth and survival. Temperature altered the speeds of metabolic processes, and the development of poikilotherm animals may be predicted to be important. We find that metabolic rates were directly related to variations in surrounding water temperature. The parameters of water quality were also reported during the study period and found to stay within the acceptable range of other results.

Treatments	Dose of PG (mg/kg body weight)	Weight of females (g)	Ovulation status of females		Latency period (Hour)	Average fertilization rate (%)	Average hatching rate (%)	Remark
			Response	Average (%)				
T_1	80	725	-	-	-	-	-	-
		750	-		-			
		1150	-		-			
T_2	100	700	+++	100	22	71.66 ± 7.64^a	48.33±7.64	Considerable no. of larvae hatched
		750	+++		24			
		1200	++		21			
T_3	120	650	+	100	20	12.50 ± 2.50^b	7.50±2.50	Few larvae hatched
		700	+		21			
		1150	+		18			
T_4	140	725	+	100	20	-	-	-
		800	+		20.5			
		1125	+		19.5			

Table 2 Impact of various doses of PG on female ovulation and spiny eel M. armatus fertilization and hatching of eggs.

In breeding studies, I, II, III, and IV separate doses of PG extract were used as a triggering agent for females. The PG doses of 140, 120, 100, 90, 80

Dr. Vivekanand Prasad*

mg.kg-1 fish weight did not react to female fish. The 100 mg PG.kg-1 dosage has therefore been observed, inducing ovulation and effective striping of ovulated eggs. The time interval between carp PG extract injection and ovulation (latency period) in any case ranged between 22 and 24 hours of injection. The fertilization rate at the same dose was 71.66 ± 7.64 and embryo growth was observed until the stage of gastrula, but hatching was not observed. On the other side, 80 mg PG.kg-1 female body weight indicated that people were partly ovulated, but no fertilization happened. The PG dose of 80 mg.kg-1 was low to cause ovulation. The fish handled with a weight of 120 mg of PG.kg-1 demonstrated large doses to stimulate ovulation. Dose optimization is also very critical for ovulation of fish mediated breeding. In the mating season, armatus. But they didn't get the results they planned. Spawning depends largely on the synchronization of release from ova and sperm only possible during peak season of breeding. During this experiment, fertilized eggs were incubated at water temperature from 25 ° C and 28 ° C in mini circular hatchery and no eggs were hatched. The key deciding element is the fertilized eggs during incubation temperature. An experiment with the influence of temperatures on incubation periods and hatching of Clarias macrocephalus eggs, we observed that the higher temperature still lowers incubation periods but it has an impact on eggs' survival and hatching rates. They found that the incubated eggs at 20 ° C did not hatch but at 25 ° C they began hatching after 34 hours of incubation and were done by 58 hours. On the other side, after 22 hours of incubation, eggs incubated at 35 ° C began to hatch and completed by 30 hours. Thus, incubation period is more species-specific and temperature-related

The experimental findings indicated that M was increasing. Armatus was safer in a restricted setting than formulated feed and chicken viscera when fed with trash fish because of the high amount of protein in waste. The 40 mg PG.kg-1 body weight of fish in breeding studies showed improved performance. There is therefore space for additional studies with varying doses of different hormones using single or double injections for the perfection of the specific breeding strategy for the M. armatus.

CONCLUSION

M. Armatus is an endangered fish, but in natural water sources it was common a few years ago. However, environmental and anthropogenic practices have degraded and disturbed the existing breeding and nurseries of the animals. It is also necessary to preserve fish species otherwise, because in the foreseeable future they will be extinct. One approach to conserve biodiversity is to improve induced breeding strategies and seed development. Mediated M replication. In this research, armatus was possible through the use of pituitary gland extract and larvae persisted. This technique may therefore be used to grow seed of the species on commercial scale in hatcheries, and may also be used to breed other endangered fish species in the region.

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