HATCHABILITY AND SURVIVAL OF H. LONGIFILIS FERTILIZED AT VARYING LATENCIES

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Abstract:

In determining the optimum latency period of *H. longifilis*, of which the.
Hatchability and higher Survival percentage were used as a determining factors to determine the optimum latency period of *H longifilis*. The result from these varying latencies period shows that the best latency periods at the ambient temperature of 26°c, that support mass production and higher survival of *H longifilis* ranges between 15-19 hours. There was low or zero hatchability from the egg stripped early and the one stripped late.

Key words: latency, optimum, hatchability and survival.

INTRODUCTION

Success in fish farming begins from selection of brooders and hatchery management; presently there are three commons species of Heterobrancus namely *H. longifilis*, *H. bidorsalis* and *H. isopterus*. Each of this species has its own's potentials. Such as a better growth, early maturity and Cannibalism free.

Among these three species the commonest of them all is *H. longifilis* of which its popularity among the farmers might be due to it ability to tolerate low dissolved oxygen, and acidic condition, above all it can be easily managed and re-produce in the hatchery. Having the full – knowledge of the biology of any domestic animal, such will definitely enhance it productivity latency is an aspect of the biology of aquatic animal (fish) which must be known and understood for higher production. Latency period is the delay between hormonal injection and Ova collection, which is the key factor in the success of this types of operations (Woynarovitah and Horvath (1980) Stated that eggs which are stripped too early tend to have a treacly consistency that is, it is always much safer to strip eggs later than earlier, eggs supposed to ooze out very easily if stripped at the right time. Also many factors have been suggested as possible determinants of eggs quality, including the nutrition, husbandry conditions, genetic make up of the brood fish, fertilized zygote size, chemical composition, microbial colonization and also over – ripening of the egg (Bromage et al 1988). Assuming every things being equal what about the optimum time / period that the eggs need before it will be ready for fertilization.

Richter and Vanden Hurk (1982) Concluded that early collection of gemmates lead to low hatching rate and a large proportion of deformed larvae as in the case of *C. gariepiuns*. Now from all indications after ovulation, the maximum lapse of time assuring high fertilization rate and normal eggs development though varies according to species. This experiment is now designed to investigate the hatchability and survival of *H logifilis* at varying latency with uniform temperature of 26°c.

MATERIALS AND METHOD.

Broodstock of *H. longifilis* were obtained from the wild, around Kainji river basin, Nigeria, the fish were kept and nursed in the holding concrete tanks of the Biotechnology programme (fish genetics) of the National Institute for freshwater fisheries research (NIFFR) for about two years, a male and female were collected for this study. Ovaprin hormone was used to induce ovulation at a single dosage of 0.5 ml per /kg. The weight of the brooders: Female 800g and male 900g respectively.

The latencies used were grouped into three parts with sub-units.

This unit comprised of four combinations from cross between delayed eggs with delayed sperm at 17 and 19 hour latencies as shown below.

FERTILIZATION PROCEDURE

The latencies used were grouped into three parts with sub – unit.

Unit A*: This unit comprised of four combination from cross between delayed eggs with delayed sperm at 17 and 19 hours latencies as shown below.

1. 17hr latency, 15x15 (combination)
2. 17hr latency, 15x14 (combination)
3. 17hr latency, 15x17(combination)
4. 17hr latency, 15x15(combination)

Unit B**: It comprised of nine combinations, three of them were crosses between delayed eggs with fresh sperm tagged B** (1) the remaining six combinations are the reciprocal of B** (1) that is: fresh eggs crossed with delayed as indicate bellows.

B(i)1) 17hr latency 15 x 17 (combination)
2) 19hr latency 15 x 19 (combination)
3) 21 hr latency 15 x 21 (combination)
B(ii)4) 15hr latency 15 x 14 (combination)
5) 17hr latency 17 x 15 (combination)
6) 17hr latency 17 x 14 (combination)
7) 19hr latency 19 x 17 (combination)
8) 19hr latency 19 x 15 (combination)
9) 21hr latency 15 x 17 (combination)

Unit C***: In this, the combinations were made of fresh eggs with fresh sperm

(1) 15hr latency 15 x 15 (combination)
(2) 17hr latency 17 x 17 (combination)
(3) 21hr latency 19 x 19 (combination)

During the fertilization procedure, the female fish refused stripping at an hour of 10 and 12 hours respectively, due to this zero result were recorded.

RESULT AND DISCUSSION

The results of hatchability and survival of *H. longifilis* fertilized at varying latencies shown in table 1.

From category A* that consisted of fertilization between 17hrs and 19hours after hormonal injection. At 17hrs the eggs and milt (spermatozoa) that had been kept for 2hrs after stripping were used to fertilize each others; the hatchability percentage recorded was 81.9% with an indoor survival of 83.0% after 21days of rearing. Within this group, the least hatchability was 13.6% from the combination of the delayed eggs and milt kept for 4 hours before fertilization. This result is an indications that both eggs and sperm deteriorates rapidly once they are removed from the body of fish and this deterioration affect their quality, Kjorsvik and Lonnine (1983) reported that, egg sample of marine fish Cod, *Gadus morhua* lost their fertilization capability after 1hour when they are kept dry. Considering the last two combinations of this category both the one that gave 13.6% and 23.1% hatchability many of the hatchlings were dead during 21 days of indoor rearing . Category B** comprises of kept eggs and milt (sperm); and also freshly stripped eggs and milt.

From the combination 15 x 17 hours fertilized at 17hours, 44.8% hatchability was recorded, followed by 10.3% and 0.0% hatchability which was when the eggs kept in Petri-dion for 7hours before eventually used to fertilize freshly obtained milt. In this group a range of 67.7 and 81.7% hatchability and higher survival of up to 90% were achieved when freshly stripped eggs (though delayed in the egg sac of the female between the ranges of 1hours to 7 hours period. The highest percentage hatchability of 81.7% (and 71% survival in door) were achieved in the female stripped 17hours after hormone injection with sperm that was just delayed for 1hour. This result shows that spermatozoa kept in sperm sac for a period of 7hours can still be potent (viable) or even more hours if the sperm sac is not cut opened.

Four category C^{xxx} consisted of freshly stripped egg with freshly collected sperm egg stripped at 15 hours after hormone injection and fertilized with freshly collected milt at 15 hours, yielded 81.7% hatchability, the indoor survival record near 14.0%, but the overall highest percentage was 84.5 achieved from fertilizing egg stripped at 17 hours after hormone injection with milt freshly collected at the same 17 hour.

Nwadukwe (995) reported 7hours in the same species but in rain forest southern part at Nigeria, while Olufeagba (999) reported 15 hours, for the same species considering this report, one can conclude that latency is temperature dependence with other climatic factors.

TABLE 1: HATCHABILITY AND SURVIVAL OF HETEROBRANCHUS LONGIFILIS FERTILIZED AT VARYING LATENCIES

Varying latecies in Hours after Hormony Injection (time)	Combination	No Fertilized Eggs	Hatchability (%)	Survival for21 Days in-door (N=100)	Survival out Door for 80 Days
A* 17	delayed x delayed eggs sperm "f" "m" 15 x 15	492	403(81.9%)	83(83.0%)	57
17	15 x 15	268	150(56.0%)	82(82.0%)	76
19	15 x 17	81	11(13.6%)	0(0.0%)	
19	15 x 17	91	21(23.1%)	0(0.0%)	
B**(i)	Delayed x fresh eggs sperm				
17	15 x 17	337	151(44.8%)	84(84.0%)	32
19	15 x 19	153	25(16.3%)	0.0.0%)	
21	15 x 21	53	0(0.0%)	0(0.0%)	
B** (ii)	Fresh x Fresh	344	210(61.0%)	79(79.0%)	61
17	17 x 15	905	800(80.4%)	67(67.0%)	72
17	17 x 14	734	600(81.7%)	71(71.1%)	22
19	19 x 17	607	460(75.8%)	87(87.0%)	77
19	19 x 15	700	500(71.4%)	90(90.0%)	40
21	21 x 19	86	600(64.7%)	49(49.0%)	32
C***	Fresh x Fresh eggs sperm				
15	15 x 15	465	380(81.7%)	41(41.0%)	58
17	17 x 17	593	501(84.5%)	86(86.0%)	63
19	19 x 19	806	608(75.4%)	66(66.0%)	41
21	21 x 21	1306	600(47.0%)	47(47.0%)	37

A*: Eggs and milt kept in Petri indish for 15.

B**: Peri-dish kept eggs or sperm (delayed) fertilized with freshly stripped eggs/fresh perm.

C***: Freshly stripped egfgstilized with freshly collected sperm

Conclusions and Recommendation

This study shows comprehensive effect of latency on breeding programme and for a fish breeding to have maximum utilization of time and resources available during breeding. There should be proper monitoring of exact latency period for any type of fish to avoid over-ripped and under-ripped in other to achieve maximum fertilization, hatchability and survival of hatched ones, many a times what lead to partial or zero hatchability could be traced to ageing of the eggs without being fertilized at the optimum hours that would have favours higher fertilization, when this over-ripeness set-in, series of morphological and compositional changes and progressive loss of quality or viability will set in, (Sakai et al 1975, springate 1984). These two authors went further that, it does not matter even if the eggs were retained in the body of fish, there will still be loss of quality, which was confirmed during this experiment. Likewise the eggs that were retained in the body of fish, *H longifilis* for 21 hours, recorded lowest hatchability from the category C***. From category B**, the stripped eggs kept out of the body of fish for 4 hours recorded zero percentage. Moreover, the fertilization done before the optimum time of 17hr, never hatched but the one closer to the optimum hours, when the hatched none or little survives.

In summary, eggs should not be allowed to over-ripe or under-ripped for better result, this phenomenon affect not only hatchability but survival also which is very important to an hatchery operators. Bromage et al (1988) stated that fertilized zygote and their survival and hatchability will be the proper standard to determine the optimum hours to strip eggs for fertilization from all indications and from data so far collected and analyzed, 17 hours period and at the temperature of 26°c proved the best as an optimum lately period for *Heterobranches longifilis*.

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