Direct Research Journal of Agriculture and Food Science

The use of Male Broodstock of *Clarias Gariepinus* several times through Surgery for Milt Extraction in Induced Breeding

Vol.6 (7), pp. 157-160, July 2018
ISSN 2354-4147
DOI: https://doi.org/10.26765/DRJAFS.2018.5721
Article Number: DRJA2627095721

Direct Research Journal of Agriculture and Food Science
http://directresearchpublisher.org/aboutjournal/drjafs

Birbu'u Kutwal Y[1*]., Wade John W[2]., and Audu Bala S[2].

[1]Department of Biological Sciences, Federal University Wukari, Taraba State Nigeria.
[2]Department of Zoology, Applied Hydrobiology and Fisheries Unit, University of Jos, Plateau state, Nigeria.
*Corresponding Author E-mail: kutwalyale@yahoo.com

Received 12 May 2018; Accepted 21 June, 2018

This study was carried out to secure the matured male broodstocks that were surgically operated to extract the milt used in fertilizing the stripped eggs and same stock used for subsequent induced breeding. Eight matured brood stocks of *Clarias gariepinus* were sourced, acclimatized for two weeks before the operation. They were grouped into two with three replicates, including the Control. During the surgery, the broodstocks were not subjected to anesthesia but the heads were covered with a clean wet part of a towel and placed upside down in sterilized tray on a working Table. The abdomens were cleaned with a dry part of the same towel and incisions of 5-7cm made on the bellies from the middle part posteriorly, using new sterilized razor blade. After extraction, the incised portions were sutured with sterilized tailor sewing needle and thread using standard uninterrupted method. The opposite ends of the threads were firmly tied on the last thread lines to prevent loosing respectively and the broodstocks were released in to separate bowls for observation. Removal of the stitches was carried out on day 7 after surgery. The broodstock were not fed within this period to reduce movement and ensure proper healing of the sutured portion. The results revealed that 100% and 75% of male broodstocks survived from first and second operations respectively including the controls.

Keywords: *Clarias gariepinus,* sewing needle, thread, suture, uninterrupted surgery

INTRODUCTION

Fisheries sector worldwide, provide a source of protein and employment for millions of people. Fisheries Management is a very important task especially in fish procreation, sustainability and availability of offspring for the benefit of mankind. Unfortunately, there has been slow awareness about fisheries resources as means of sustainable wealth creation and key in stabilizing any country's economy (Beaumont and Hoare, 2003). Indeed, fisheries sector over the years have suffered neglect in terms of broodstock and hatchery management for conservation purposes. This is even worst in the wild, where one hardly finds fish, talk less of broodstocks, because they are being harvested all year round not minding selecting the matured and leaving the juveniles or immature for conservation. The most important and easily utilized or absorbable animal protein in man is derived from fish. Critical shortage of protein nourishment to a population could easily lead to low brain development, reproduction and heart functioning in the unborn children, young and even adults (Oyewole and Amosu, 2012; Wolf, 2015). Catfish species is one of the most highly priced fish food because, it is hardy in terms of withstanding adverse pond conditions such as low oxygen content (Yisa *et al.*, 2016), easily managed, fast growth rate and a good organism for genetic engineering manipulation studies. One of the impediments in expanding *Clariid* culture in Nigeria is the inadequate quality of fish seed (Yisa *et al., 2013*). Fisheries research involving surgical operation is a necessary method that will help in minimizing fish mortality and stock depletion,

while ensuring continues supply of parent stock and fish seeds of desired quality. Bhushan *et al*. (2018) reported that, fishes were successfully operated for removal of testes. They maintained that, wounds were completely healed on the tenth day and the stitched marks were very faint by the 20th day. Carp species milt in matured males can easily be released without operation by a slight press on the abdomen and the semen is stripped and used for eggs fertilization. Spontaneous release of semen in Catfish does not occur in captivity and the stripping does not yield good result because of the presence of the convoluted vas deferens attached to the testes (Egwui and wankwo, 2015). Sacrificing catfish male broodstocks has become a conventional method in induce breeding. This has led to massive destruction of matured Catfish male broodstocks as well as reduction in male population. This study therefore, simulated the practice in human surgery where matured life male catfish broodstocks are secured for subsequent breeding after removing, amending or implanting some organs and suturing.

MATERIALS AND METHODS

Brood catfish males and females, sewing needle and trend, syringe with needle, a maximum rectangular plastic tray, transparent 50L Plastics, dissection kits, new sterilized razor blade, clean towel and clean water. A total of sixteen (eight males and eight females) matured broodstocks of catfish were sourced from a reputable fish farm behind ECWA Staff Secondary School, Farin Gada, Jos North Local Government Area of Plateau State, Nigeria and were transported in a 50 L Jar can to the hatchery/laboratory where they were acclimatized for two weeks before the commencement of the work. There were two treatments, including the control in Treatment A and the other treatment B. They both had three replicates each making a total of eight treatments. Prior to the surgical operation, each male broodstock kept in its separate bowl of 50 L rectangular transparent plastics was starved for 24 hours. No anaesthesia was applied as it was part of the design that in rural areas, the traditional fishermen may not have access or cannot afford the drug. At commencement of each test, the fish head was cover with clean wet towel and turned upside down with its ventral portion up and the dorsal part down on the tray. The new razor blade (Plate 1) was used to incise the fish, following the single line on the abdomen from posterior to anterior part close to the male papilla (penis) at least 5cm (incised portion) to enable the operator's finger to locate the testes. One testis was removed during first operation to be used for extraction of milt. After the testes manipulation, the blood was completely cleaned with cotton wool and the prepared normal saline. The Tailor's sewing needle and thread were used for stitching the slit portion with an uninterrupted pattern of sewing (Plate 2). Extensions of the trend at each end were allowed and used to knob or tie on each last trend knitting from the fish skin. This helped in preventing the trend from losing. The fish were then carefully returned to the plastics bowls with clean water and monitored daily for survival. During the 7 days healing period, the fish were not fed to reduce rigorous movement and further risk of injury that could slow down proper healing of the sutured portion. The stitches were removed on the 7^{th} day from operation. The trend knob at one end was cut with sterilized new razor blade and the sterilized needle was also used to pull the sewed trend one after another from each knitting hole on the fish skin until the second knob was also cut.

RESULTS AND DISCUSSION

The results of male fish broodstocks survival rate after first operation is presented on (Table 1). The results revealed that there was 100% survival rate of the adult male broodstocks incised as observed in all the treatments, including the control. This is similar to the work done by Yisa *et al*. (2013) where the male broodstocks were operated, quantities of milt drown with sterilized needle and syringe and all of them survived. In this work, one testis was removed during first operation and the belly sutured (Plate 3). This is in agreement with the work done by Egwui and Nwankwo, (2015) on *Clarias gariepinus* where the fish was sutured and recuperated after two to three months before a second operation was done. It is also in line with the work of Diyaware *et al*. (2010) where the ablation of the testes was carried out during surgical operation on *Clarias anguillaris* to collect milt for eggs fertilization, and the second operation was for determination of the testes regeneration period and assessment of potency of the milt after regeneration. In (Table 2), there was 75% survival rate observed in Treatment B, while 100% survival rate was still observed in Treatment A (Control). This is contrary to the work of Bhushan *et al*. (2018) where 62.5% survival rate was recorded from a control treatment T3. Their control was incision without suturing contrary to the treatment in this work where the control was both incision and suturing. The results of 100% survival rates were also in line with the work of Diyaware *et al.* (2010) who sutured with catgut chromic 2/0 and Egwui and Nwankwo, (2015) who sutured with sterilized tailor sewing needle and cotton thread. There was no use of anaesthetic substance in this study contrary to that reported by Diyaware *et al*. (2010) that fish were anaesthetized to reduce stress and ensured calmness during the surgical operation. This was deliberately done bearing in mind the targeted audience (fish farmers) from the rural areas where anaesthetic substances are not sold and to worsen it the trained personals or Extension Workers are not easily found. The operated male broodstocks were subjected to 8 days

Table 1. Survival rate of male fish Broodstocks after first operation to remove one testis for milt to fertilize eggs of *Clarias gariepinus* in induced breeding.

Treatment (Operation)	DAYS								
	1	2	4	6	8	10	12	14	%
A	4	4	4	4	4	4	4	4	100.00
B	4	4	4	4	4	4	4	4	100.00

A = Incision and Suturing With Sterilized Needle and Thread (Control), B= Incision, Removal of one testis and Suturing With Sterilized Needle and Thread.

Table 2.Survival rate of male fish broodstocks after second operation for testis regeneration after four weeks from the first operation of *Clarias gariepinus*.

Treatment (Operation)	DAYS								
	1	2	4	6	8	10	12	14	%
A	4	4	4	4	4	4	4	4	100.00
B	4	4	3	3	3	3	3	3	75.00

Where, A = Incision and suturing with sterilized needle and thread (Control). B= Incision, removal of the one testis left and suturing with sterilized needle and thread.

Plate 1. Process of incision for milt extraction in *Clarias gariepinus.*

fasting, which facilitated the healing due to low pressure on the incision point or slit. The healing period in this work was 21 days contrary to the work of Yisa *et al.*(2013) where the healing was 14 days and Nguenga *et al*. (1996) who reported that cicatrisation (healing) of the cut occurred within 30 days in male *Heterobranchus longifilis* as cited by Yisa *et al*. (2013). This could be attributed to the differences in species and the climatic conditions. The healing period of the second operation was the same with the first one, 21 days when the adult male milt of *Clarias gariepinus* was drawn using needle and syringe without removing the testes. This is contrary to the work of Yisa *et al*. (2013) who reported that the healing took place after 45 days but at variance with the result of Diyaware *et al*. (2010), possibly due to differences in management practices and the fish species.

From the results of this work and others, it is plausible that matured male catfish broodstocks do not necessarily have to be sacrificed always in induced breeding, since they can be secured for future use as parent stock because of their selective qualities.

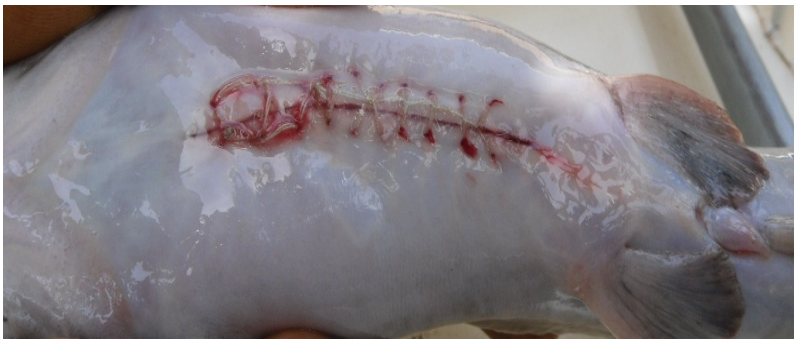

Plate 2. Uninterrupted suturing pattern of slit in *Clarias gariepinus* after testes extraction.

Plate 3. Cicatrisation (Healing) of the sutured slit of Clarias gariepinus after testes extraction for milt to fertilized eggs in induced breeding.

REFERENCES

Beaumont AR, Hoare K (2003). Biotechnology and Genetics in Fisheries and Aquaculture.*School of Ocean Sciences University of Wales, Bangor, UK* P62. Blackwell Science Ltd, Blackwell Publishing Company Editorial Offices: 9600 Garsington Road, Oxford OX42DQ *Tel*: 01865 776868.

Bhushan NS, Ambulkar RS, Smital DK, Chaturvedi, CS (2018). Post dissection Survival, Conservation and Reutilization of *Clarias batrachus* (Linnaeus, 1758) Male Broodstock. Int. J. Curr. Microbiol. App.Sci.7(02):2010-2017.doi: https://doi.org/10.20546/ijcmas.2018.702.240

Diyaware MY, Haruna AB, Abubakar KA (2010). Determination of testes regeneration period for African catfish (*Clarias anguillaris*) after Milt (Semen) collection through ablation. *Currrent Reserch* Journal of Biological Sciences 2(6):375- 379.

Egwui PC, Nwaankwo JN (2015). Suturing as an alternative to sacrificing male catfish in artificial fish breeding: Short Communication. *International Journal of Fisheries and Aquaculture Research,* 1(1): 31-33.

Nguenga D, Breine JJ, Teugels GG, Ollevier F (1996). In: Diyaware MY, Haruna AB, Abubakar KA (2010). Determination of Testes Regenartion Period for African Catfish (*Clarias angullaris*) after Milt(Semen) Collection Through Ablation. *Current Research Journal of Biological. Sciences,* 2(6):375-379.

Oyewole OE, Amosu AM (2012). Nutritional Considerations and Benefits Associated With Consumption of Catfish in South-West Nigeria. *Annals of Biological Research* 3 (8):4094-4098.

Wolf N (2015). Health Benefits of Catfish. Last Updated Feb 18 By Nicki Wolf 2015.

Yisa TA, Lamai SL, Tsadu SM, Kolo RJ (2013). Induced Breeding of *Clarias Gariepinus* Using Non-Conventional Method of Abdominal Incision. *International Journal of Biochemistry and Biotechnology*, 2(7), 484-489.

Yisa TA, Lamai SL, Tsadu SM, Kolo RJ (2016). Effects of Incision Variation Length on *Heterobranchusbidorsalis* Male Spawners to Extract Milt for Induced Breeding. *American Journal of Experimental Agriculture 10(2):1-7, Article no. AJEA.20510 ISSN: 2231-0606.*