

Health status of cultured catla (*Gibelion catla*) in Hill tracts region of Bangladesh

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ARTICLE INFO

Received article: 25-06-2021

Accepted article: 05-08-2021

Published article: 10-08-2021

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ABSTRACT

A study was carried out for a period 8 months from March 2020 to October 2020 to observe the health status of cultured catla (*Gibelion catla*) in three Upazilas viz., Khagrachari Sadar, Ramgarh and Mahalchari upazila of Khagrachari district through clinical procedures. Data were collected through personal contact, sampling, questionnaire interview and discussions with key informants. Clinically, Fish from Vhaibonchara and Perachara at Khagrachari Sadar Upazila, Patachara at Ramgarh Upazila were found to be healthy during summer. During rainy season, catla of Mahalchari Upazila were affected with dropsy like clinical signs where major signs were swollen of abdomen, removal of scales and superficial injury. Tail and fin rot affected catla were collected from Ramgarh Upazila having erosion of fins and tail and the presence of white spots in fin and tail region. Cultured catla in rainy season were more affected than those of summer season. However, catla of summer season had reduced clinical changes than those of rainy season. From clinical and pathological point of view healthy catla were noticed in summer and moderately infected in rainy season. It could be mentioned that production and health status of catla were increased in summer season of Khagrachari Sadar area compared with other areas and season. During the study period water temperature were ranged between 23°C to 35°C in summer and 23°C in rainy season. The highest pH was 8.2 ± 0.20 recorded from Mobachari of Mahalchari in summer and the lowest was 6.5 ± 0.25 from the Perachara of Khagrachari Sadar Upazila. Thus necessary measures need to be taken especially during rainy season.

Keywords: *Gibelion catla*, health status, Hill tracts region

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1. Introduction

Bangladesh is blessed with different types of natural water bodies and become self-sufficient country with a total fish production of 43.84 lakh MT in FY 2019-2020. Whereas 3440 MT in FY 2019-2020 from Khagrachari Hill district. The per capita fish consumption of 60 g/day and 23kg/year

(DoF, 2020). According to the FAO (2020) Bangladesh ranked 3rd in inland open water capture fisheries production, 4th in freshwater fisheries production and 5th in aquacultural production in the world. With the rising commercialization and rapid intensification of aquaculture production, diseases and deterioration of the environment stand major problems in fish farming and the industry facing massive economic

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challenges. For the prevention and control of diseases. It is alarming that various chemicals are using indiscriminately in aqua farms of Bangladesh. With the expansion of aquaculture in Bangladesh, there has been an increasing trend in using chemicals in aquatic animal health management (Uddin *et al*, 2020). Biosecurity implies the process of taking precautions to minimize the risk of diseases introduction as well as the spread of infectious organisms into or between populations. Faruk *et al.*, (2004) reported the average economic loss of BDT 20,615/ha/year (equal to US\$ 344) to rural freshwater fish farmers due to fish disease in Bangladesh. The disease is considered one of the important factors to decrease in fish production, both in farming systems and in wild conditions. Large-scale mortality of fish often occurs in ponds due to environmental stress followed by parasitic invasion and bacterial, fungal, protozoan and monogenic infections. Farmers are using a range of chemicals to control fish disease. The purpose of use chemicals and drugs is to improve growth and disease resistance capacity of fish and shrimp (MA Uddin *et al*, 2019).

Despite the huge potential, production and productivity fish farming in Bangladesh are in declining trend due to frequent disease outbreak may happen because of inadequate supply of disease free seed, quality inputs, improper farm infrastructure, water supply, lack of farmer knowledge on appropriate improved farming methodologies and access to finance and services (DoF, 2018). Clinical knowledge is vital to determine the health status of fish. Clinical signs describe behavioral, external, physical or gross pathological changes. In fish, the most obvious external clinical signs are red and white spots on the body, infection in skin fins by parasites, erosion of fins and tails, excess or less slime, swollen of abdomen, black/white gill and lethargy (MA Uddin *et al*, 2019). Thus proper attention should give in order to obtain disease and pathogen free healthy fish from hill areas in Bangladesh.

3. Materials and Methods

3.1 Study area: The study was conducted from March 2020 to October 2020 at three different Upazilas *viz.*, Khagrachari Sadar, Ramgarh and Mohalchhari upazila of Khagrachari district (Fig. 1).



Fig.1. Selected upazilas of the study area in Khagrachari district.

3.2 Data collection

Data were collected through questionnaire interview with shrimp farmers considering two farms from each Upazila (Table I). For questionnaire interview a set of questionnaire was developed composed of open form of questions. A total 36 farmers were personally interviewed including 6 key informants.

3.3 Sample collection

Fish samples were collected from ponds of three stations (Upazilas) at two months' interval. For clinical signs collected catla were examined by naked eye to observed any superficial injury, infection, and other abnormalities in live condition. Record of health status were done farm wise and season wise.

3.4 Record of water quality parameters

Water quality parameters were recorded with 2 months' interval from cultured ponds. Water quality parameters like temperature, dissolved oxygen (DO), pH and ammonia were determined by respective test kits.

Table I. Target groups of the study areas

Name of the Upazilas	Sampling areas	Target groups	Sample quantity for clinical observation	
			Summer	Rainy
Khagrachari Sadar	Vhaibonchara	CIG Farmers Shenobay Shamity Ltd.	10	10
	Perachara	CIG Farmers Shenobay Shamity Ltd.	10	10
Ramgarh	Ramgarh	CIG Farmers Shenobay Shamity Ltd.	10	10
	Patachara	CIG Farmers Shenobay Shamity Ltd.	10	10
Mohalchhari	Mohalchhari	CIG Farmers Shenobay Shamity Ltd.	10	10
	Maischari	CIG Farmers Shenobay Shamity Ltd.	10	10
Sub-Total			60	60

4. Results

4.1 Clinical observation

Clinically normal and healthy fish were in Vhaibonchara and Perachara at Khagrachari Sadar Upazila, Patachara at Ramgarh Upazila. On the other hand, during rainy season catla of Mahalchhari Upazila were affected with dropsy like clinical signs where major signs were swollen of abdomen, removal of scales and superficial injury. Tail and fin rot affected catla were collected from Ramgarh Upazila having erosion of fins and tail and the presence of white spots in fin and tail regions. Major signs included lethargy, red and white spots on the body, infection in skin fins by parasites, erosion of fins and tails,

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excess or less slime, swollen of abdomen, black/white gill. Fish infected with argulas parasite were observed in Maischari of Mahalchari Upazila showing lethargy, loose skin, often reddish discoloration and the presence of white spots in the inside surface of the skin and abdominal region. Fish from Perachara at Khagrachari Sadar Upazila had reddish discoloration on the body surface. Black gill disease was recorded fish from Mobachari of Mahalchari Upazila during rainy season. Big head but small body calta were from Patachara of Ramgarh upazila during rainy season had some remarkable clinical changes such as hemorrhagic gills, swollen digestive gland. Argulas parasites affected fish was noticed from Ramgarh Union of Ramgarh Upazila during rainy season.

4.2 Water quality parameters measurement of the selected shrimp culture ponds

In any fish farming, management of water quality is of primary consideration particularly in ponds with higher stocking rates. Degradation of water quality is detrimental to fish growth and survival. The recorded water temperature was ranged between 23°C to 35°C in summer and 23°C to 28°C in rainy season (Table 2). The highest temperature was 32°C during summer season recorded from Mobachari of Mahalchari and the lowest was 23°C from Perachara of Khagrachari Sadar in rainy season. Uddin *et al.*, (2020) observed that, the highest temperature was 34°C recorded during summer from fish culture ponds of Teknaf upazila. Mazid (1994) stated that fish production would be better at temperature 25-30°C which was slightly lower than the present study. Dissolved oxygen were varied between 4.5 to 6.8 mg/L. The highest dissolved oxygen was 6.8 mg/L recorded from Mobachari of Mahalchari during summer season and the lowest was 4.5 mg/L from Ramgarh of Ramgarh during summer. Uddin *et al.*, (2020) observed that highest level of dissolved oxygen (DO) was 6.8 mg/L during summer season from Unique Aquaculture of Teknaf upazila and the lowest was 4.5 mg/L observed Rabiul's farms of Maheshkhali upazila. Zafar (2012) observed that dissolved oxygen ranged from 6 to 13 mg/L during dry season and 4 to 6 9 mg/L during wet season with a mean of 8.5 mg/L and 6.5 mg/L in prawn and fish ponds. DoF (2005) stated that optimum range of dissolved oxygen for shrimp and fish was >4mg/L which is almost similar of the findings of the present study. pH values were ranged between 6.5 to 8.2. The highest pH was 8.2 recorded from Vhaibonchara of Khagrachari Sadar in summer season and the lowest was 7.0 recorded from the Perachara of Khagrachari Sadar (Table 2). Hossain *et al.*, (2017) reported that the highest pH value was 7.8 recorded during summer from culture pond of Botiaghat upazila and the lowest pH was 6.6 recorded during winter from culture pond of Dacope upazila. Ammonia values were ranged between 0.0 to 0.8 mg/L during the study period. Maximum level of ammonia was 0.8 mg/L recorded from Vhaibonchara of Khagrachari Sadar during summer season and minimum level of ammonia was 0.1 mg/L recorded from Mobachari of

Mahalchari in summer season. According to Ahmed *et al.*, (2009) increased value of ammonia and decreased value of temperature and dissolved oxygen (DO) during winter season could lead to an increased prevalence of disease in fish. However, the above value of ammonia was more or less similar with the result of present study and which are suitable for calta fish culture (Table 2).

Table 2. Seasonal variation of water quality parameters of different sampling areas

Sampling areas	Seasons	Dissolved oxygen (mg/l)	Temperature (°C)	pH	Ammonia (mg/l)
Vhaibonchara	Summer	5.0 ± 0.22	30.00 ± 0.95	8.1 ± 0.20	0.8 ± 0.00
	Rainy	5.5 ± 0.10	26.25 ± 0.55	7.4 ± 0.15	0.1 ± 0.00
Perachara	Summer	6.0 ± 0.43	31.77 ± 0.43	6.5 ± 0.25	0.1 ± 0.00
	Rainy	6.5 ± 0.56	23.00 ± 0.72	7.1 ± 0.17	0.0 ± 0.00
Ramgarh	Summer	6.8 ± 0.75	32.00 ± 0.65	7.8 ± 0.21	0.1 ± 0.00
	Rainy	5.0 ± 0.23	26.00 ± 0.29	7.3 ± 0.34	0.0 ± 0.00
Patachara	Summer	5.0 ± 0.76	31.00 ± 0.76	7.8 ± 0.13	0.1 ± 0.00
	Rainy	6.0 ± 0.31	27.00 ± 0.52	7.1 ± 0.30	0.7 ± 0.00
Mobachari	Summer	4.8 ± 0.65	31.00 ± 0.78	8.2 ± 0.20	0.1 ± 0.00
	Rainy	5.5 ± 0.40	27.00 ± 0.23	7.3 ± 0.26	0.4 ± 0.00
Maischari	Summer	4.5 ± 0.34	31.00 ± 0.49	7.1 ± 0.10	0.6 ± 0.00
	Rainy	5.0 ± 0.60	26.00 ± 0.75	7.5 ± 0.15	0.3 ± 0.00

4.3 Production of catla fish From the present study, fish production was recorded from 1050 kg/ha to 11,795 kg/acre in the study areas. The highest production was recorded from Vhaibonchara at Khagrachari Sadar and the lowest was from Patachara at Ramgarh Upazila (Table 3)

Table 3. Catla fish production in the study areas

Study area	Farm area	Production of catla fish (kg/ acre)
Ramgarh	Patachara	1050
	Ramgarh	1235
Khagrachari Sadar	Perachara	9075
	Vhaibonchara	11795
Mahalchari	Mobachari	10886
	Maischari	9980

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5. Discussion

From the present study, normal and healthy fish were in Vhaibonchara and Perachara at Khagrachari Sadar Upazila, Patachara at Ramgarh Upazila. On the other hand, during rainy season catla of Mahalchari Upazila were affected with dropsy like clinical signs where major signs were swollen of abdomen, removal of scales and superficial injury. Tail and fin rot affected catla were collected from Ramgarh Upazila having erosion of fins and tail and the presence of white spots in fin and tail regions. From the observation of Uddin *et al.*, (2020) Fish were found to be affected during colder months of January and February. But, during March and April most of the fish were found normal and healthy. From field and laboratory observations it was revealed that the study area had potentiality for gulsha culture.

Clinical and pathological point of view it would be mentioned that fish of rainy season were more affected compared with summer season. This would be due to abnormal water quality parameters during the period. Thus more precautionary measures should be taken during the period i.e., rainy season. Overall condition of calta fish from Khagrachari Sadar areas were healthy whereas fish from Ramgarh areas had average health status and fish from Mahalchari areas fish had poor health condition.

The highest temperature was 32°C during summer season recorded from Mobachari of Mahalchari and the lowest was 23°C from Perachara of Khagrachari Sadar in rainy season. Hossain (2017) observed that, the highest temperature was 34°C recorded during summer from catla culture ponds of Dacope upazila. Mazid (1994) stated that fish production would be better at temperature 25-30°C which was slightly lower than the present study. Dissolved oxygen were varied between 4.5 to 6.8 mg/L. The highest dissolved oxygen was 6.8 mg/L recorded from Mobachari of Mahalchari during summer season and the lowest was 4.5 mg/L from Ramgarh of Ramgarh during summer. Hossain *et al.*, (2017) observed that highest level of dissolved oxygen (DO) was 6.00 mg/L during summer season from culture ponds of Botiaghata upazila and the lowest was 3.00 mg/L observed during winter from culture ponds of Dacope upazila.

The highest pH was 8.00 recorded from Vhaibonchara of Khagrachari Sadar in summer season and the lowest was 7.0 recorded from the Perachara of Khagrachari Sadar (Table 4). Hossain *et al.*, (2017) reported that the highest pH value was 7.8 recorded during summer from culture pond of Botiaghat upazila and the lowest pH was 6.6 recorded during winter from culture pond of Dacope upazila. Ammonia values were ranged between 0.0 to 0.8 mg/L during the study period. Maximum level of ammonia was 0.8 mg/L recorded from Vhaibonchara of Khagrachari Sadar during summer season and minimum level of ammonia was 0.1 mg/L recorded from Mobachari of Mahalchari in summer season.

6. Conclusions

Catla has a valuable demand for local fish market export. Culture of catla is very easy and it mostly it does not affect by different types of microbes and diseases. For safe catla production intensive/ semi intensive methods need a lot of aqua drugs and chemicals. Catla production were recorded from 1050 kg/acre to 11795 kg/acre in the study areas. The highest production was recorded from Vhaibonchara of Khagrachari Sadar and the lowest was from Patachara of Ramgarh upazila. Production in summer were more than rainy season due to optimum water quality parameters. From the present study it was observed that optimum water quality parameter helps to keep pond environment safe and leads to boost and healthy fish production.

7. References

1. Ahmed GU, Faruk MAR, Rahman MK, Haque MN. Aqua-drugs and chemicals: Impact on fish health and production in Mymensingh, Bangladesh. Research in Agriculture Livestock and Fisheries. 2009; 2 (1): 161-168.
2. DoF. Fish Fortnight 2005 (leaflet), Department of Fisheries, Ministry of Fisheries and Livestock, Dhaka, Bangladesh.
3. DoF. National Fish Week Compendium (in Bengali). Department of Fisheries, Ministry of Fisheries and Livestock, Dhaka, Bangladesh. 2018; pp. 121.
4. DoF. National Fish Week Compendium (in Bengali). Department of Fisheries, Ministry of Fisheries and Livestock, Dhaka, Bangladesh. 2019; pp. 145.
5. FAO. The State of World Fisheries and Aquaculture, contributing to food security and nutrition for all, 2020. Food and Agriculture Organization of the United Nations, Rome, Italy.
6. Faruk MAR, M. Alam MJ, Sarker MMR and Kabir MB. Status of fish disease and health management practices in rural freshwater aquaculture of Bangladesh. Pakistan Journal of Biological Science. 2004; 7(12):2092-2098.
7. Hossain SMS, Sultana S, Kabiraj M, Dey SR. Recent scenario of application of aqua drugs and chemicals in fish and shell fish health management in southwestern region of Bangladesh. International journal of fisheries and aquatic studies. 2017; 6: 203-210.
8. Mazid MA. An overview of the social and economic impact and management of fish and shrimp disease in Bangladesh, with an emphasis on small-scale aquaculture. Primary aquatic animal health care in rural, small scale aquaculture development. FAO Fisheries Technical paper.1994; 406: 21-25.
9. Uddin MA, Ahmed GU, Aktar MNAS, Ahmad MU. Health status of cultured shrimp (*Penaeus monodon*) in Cox's Bazar region. Bangladesh Journal of fisheries. 2019; 31(2): 295-303.
10. Uddin MA, Hassan R, Halim KMA, Aktar MNAS, Yeasmin MF, Rahman MH, Ahmad MU, Ahmed GU. Effects of aqua drugs and chemicals on the farmed shrimp

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(*Penaeus monodon*) in southern coastal region of Bangladesh. Asian Journal of Medical and Biological Research. 2020; 6(3):491-498.

11. Uddin MA, Aktar MTNAS, Halim KMA, Hasanuzzaman K M, Islam MA. Health and disease status of cultured Gulsha (*Mystus Cavasius*) at Mymensingh region of Bangladesh. Research in Agriculture Livestock and Fisheries. 2020; 7(1): 139-151.

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