

Innovations

Fish Bacterial Management in the University of Calabar Fish Farm

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Abstract: *The research study is to control fish bacterial diseases or infections through application of bio control methods such as vaccines etc several methods have been tried to control fish diseases including the use of antibiotics but their haphazard use is associated with potentially negative effects as drug resistance and drug residues. The Clariidae is a freshwater fish family of the Siluroidei which apparently originated from Africa. The Clariidae are the African catfishes - so-called because of their whiskers resemble those of cats. Their geographical range currently extends to the Middle East and South-east Asia. The genus Clarias occurs in both Africa and Asia. Listed 12 african genera with 74 species. The catfish are the preferred candidates for aquaculture in Nigeria accounting or over 60% of total aquaculture production of approx 88,000 metric tonnes. The advantages they bring to culture include their air-breathing capabilities which enables them to withstand oxygen- deficient conditions which characterize most culture conditions, generally hardy nature and resistance to diseases and fairly rapid growth-rate. As a result of these, they can be adapted for intensive production at densities of over 1000kg/m³. Market acceptability due to the large size, firm flesh and good taste add to the mix. The culture of catfishes currently is in the increase in Nigeria mainly due to the current availability of commercial feeds though at a high cost. I received funding from the International Foundation for Science (IFS) Based in Sweden for research into the pathogen problems militating against increase hatchery production of the various species of catfishes cultured in Nigeria and Africa as a whole. Our research disclose a range of important pathological conditions inimical to the culture of African Clariidae. In general single cell, direct life cycle pathogens more*

likely to cause harm to cultured fish on account of the high densities and the lack of need for an intermediate host or vector. In spite of myriad pathogens capable of infecting catfishes, here we shall concentrate on those capable of causing harm under culture conditions particularly intensive culture systems.

Keywords: *Fish bacteria, probiotics, vaccination, bio control measures*

Introduction

Fisheries play a great role in food security and livelihood and are a source of income and social development in developing countries. Recently, the sector attracted great attention and it is growing rapidly through the development of aquaculture. New technological advances and increased demands for fish as a source of animal protein are the main reasons for the industry's growth because of expansion of the industry; the culture: methods are become more intensive for producing higher yield. Huge loss of production in aquaculture is occurring because of many reasons. Among these causes, a disease is the most serious constraint that causes damage to the livelihood of farmers, loss of job, reduced incomes, and food insecurity. Study shows that almost 50% of production loss is because of diseases which are more severe in developing countries. This is because 90% of the aquaculture firm is in the developing world. Disease is rarely a simple association between a pathogen and a host fish.

Materials and Method

It is a well-known part that research methodology is the structuring of in order to identify the key variable and establish relationships among them. So this chapter presents the research design method and tools used in carrying out the study it is discussed under the following sub heading.

Area of the study

Research design

Methodology survey

Sample size and sample techniques

Data collection

Data analysis

Area of the study

The area chosen for the purpose of carrying out this study is the University of Calabar Fish farm. The fish farm is geographically located between the Calabar River and the great Qua River with elevation of 41 meters above sea level. This area has Latitude of 04 55.9 N and Longitude 0826E respectively with a total surface area of three hectares(3Ha) (Prof. Amabasi).

Research design

A research design chosen for this study was survey research design. This is to make it easy for the appraisal of the challenges of application of antibiotics or therapeutic agent in the fish pond or farm.

Survey

Although this study was carried out in the University of Calabar fish farm, Cross River State Nigeria. That was the area of study with a population of 250 fishes. The species of fish was in the family of catfish known as *Clarias gariepinus*.

Sample size and sample techniques

For the convenience of the study, the sample size chosen out 250 she was 150 fishes. This was necessary in order to eliminate bias in the determination of the size of the sample selected for the study. We obtained that there was 95% chance that the sample is distributed in the same way as the population. We also chose a significant level of 0.05%

Therefore, random sampling technique was applied for the purpose of effective data collection. This was done in order to avoid emission and for easy establishment of a h farm.

Data collections

The data collected for the purpose of this study was from the primary and secondary sources. Now the primary data was obtained from:

1. Personal observation
- 2 Fish Bacteria Management Questionnaire (FBMQ)

Data analysis

- Then the secondary source of data was obtained from:
- The research materials by other people
- Online sources

Data analysis

The data collection was processed using descriptive analysis

The descriptive analysis was mainly in terms of percentage and frequency of distribution to show the socio-economic profile of respondents in the study area.

Results

It dealt with the presentation of samples, analysis of data, the interpretation of the analyzed data. Data were collected through the administered questionnaire among others using the research questions Ways were created to cope with bacterial challenges on fish health was treated with possible measures.

Sampling presentation

Sample collected from the University of Calabar fish pond were presented, analyzed and interpreted in order to draw conclusions on the issues under investigation to accomplish the objectives of the study. The researcher used simple percentage to analyze the response of the respondent from the questionnaire administered.

Table 1: What are the factors to be considered in fish health management

Options	Variables	No of response	Percentage
A	Feeding regime	6	42.9%
B	Water quality	3	21.4%
C	Environmental sanitation	2	14.4%
D	Bio security	3	21.4%
	Total	14	100%

Source: Field work 2023

In the above Table 1 shows that out of the fourteen returned questionnaires, 6 representing 42.9% said that feeding regime is one of the important factors to be considered in fish health management, while 3 respondents representing 21.4% choose water quality while 2 respondents representing 14.3% see that environmental sanitation can help in maintaining a good fish management and 3 respondents which represent 21.4% choose biosecurity.

From the outcome, it means that feeding regime water quality, environmental sanitation and biosecurity were the factors to be considered in fish health management.

Table 2: Responses to research questions

Options	Variables	No of response	Percentage
A	Formalin	5	35.7%
B	Potassium permanganate	1	7.1%
C	Salt	2	14.3%
D	Tetracycline	6	42.9%
	Total	14	100%

Source: Field work 2023

Table 2 above shows that out of fourteen returned questionnaire, 5 respondents represents 35.7% said that formalin can be used in treating a fish with bacterial infection. while I respondent representing 7.1% said potassium permanganate, also 2 respondents representing 14.3% chooses salt while 6 respondents representing 42% were of the option of tetracycline.

From the outcome, it means that all of the above are treatment that can be administered to a fish with bacteria infection

Table 3: Responses to research questions

Options	Variables	No of response	Percentage
A	Avoiding stress	9	64.3%
B	Keeping good water	4	28.6%
C	Proper environmental		
D	All of the above	-	-
	Total	14	100%

Source: Field work 2023

In the table iii above, 9 respondent representing 64.3% said that avoiding stress, while A respondents representing 28.6% keeping good water quality, and also 1 respondent representing 7.1% proper environmental sanitation - this is to say that

the measure means of preventing bacteria infection listed by 64.3% of the respondent is to avoid

Discussion

This research work was carried out by many researchers and it was discovered that there were many methods of administering treatment to disease infected fishes with bacterial infection such as vaccination, probiotics and bacteriophage therapy (Ram and Parvato, 2012). In the work, immersion vaccination method was used where the vaccine were applied to the surface of the fish. Before this treatment, there were signs in the fish indicating that the sick fish were infected. Some were unable to eat, having swollen belly and eyes, and being dropsy etc. there was use of formalin with the measurement in part per mil (Ppm) and the result obtained after 3 days of treating the fishes. S. Thanigaivel et al., (2023) reported that the use of seaweeds Le the Brown and green Seaweed extract on our sick fish for 45 days in concentration of 2-5 and 5g/kg, in conjunction with their meals made were very effective against infection. The method is not actually vaccination method but bacteriophage therapy, Nakai T., Park, S. C. reported that vaccination is the ideal method for prevention infectious diseases, therefore, limiting its application.

Conclusion

Quarantine is an important risk-management measure that can be applied to reduce the risks posed by serious aquatic animals disease when aquatic animal are move internationally or domestically between different regions or zones. The quarantine of brook stock and other life cycle stages entering aquaculture production facilities can be routinely applied to reduce the livelihood of introducing serious disease to the facility that will cause morbidity, mortality and associated production and financial loses.

References

1. *FAO, the state of world fisheries and culture, contribution to food security and nutrition for all, and aquaculture organization of the United Nations, Rome, Italy 2010*
2. *Catlin. D. M. Peredo, A. M. (2012) Prebiotics and Probiotics; definition and application. Southern Regional Publication Centre, SRAC Publication. 4711. Harper, C. & Wolf, J. C. (2009). Morphologic Effects of the Stress response in Fish, ILAR J. (4), 387-396.*
3. *Imelda J. Asha A. (2020) Genomics and Biotechnological advances in Veterinary, Poultry and Fisheries.*

4. *Oblekezie, A. I. (1986) Haematozon of the tongue sole, Cynoglossus senegalensis (Kaup, 1858) (Teleostei, Cynoglossidae) from the West African Coast. Rev Zool. Afr. 99, 225-261.*
5. *Rico, A., Satovani, I. I., & Haque, M. M. (2012) "use of chemicals and biological product in Asian Aquaculture and their potential environment risks; A critical review. "Review in aquaculture, 4(2), 75-93.*
6. *Roy, P. E. & Yanong, V. M. D. (2022). Tropical Aquaculture Laboratory, Institute of food and agriculture Science, University of Florida. Last review/may 2022/modified Oct. 2022*
7. *Ruth Francis-Floyd (1990), Professor, department of large animals clinical sciences (college of veterinary medicine) and department of fishery and aquatic sciences, Florida cooperatives extension services; institute of food and agricultural sciences, University of Florida, Gainesville, 32611*
8. *Silva, Y. J., Moreirinha, C., Pereira, C., Costa, I., Rocha, R. J., Cunha, A., Gomes, N. C. Calado, R., Almeida, A. (2016) Biological Control of Acronomas Salmonicida infection in Juvenile Senegalese Sole (Solea senegalensis) with phage AS-A. Aquaculture, 450, 225-233.*