ISSN: 2063-5346
Section A-Research paper

IMPACT OF FEED ON THE YIELD OF *CHANNA STRIATUS* FISH CULTURE FROM WEST GODAVARI DISTRICT, ANDHRA PRADESH, INDIA

[a]B. Sravanthi, [b]Ch. Lalitha and [c]V. Lakshmi

[a]*Department of Biotechnology, Dr. V.S. Krishna Govt. Degree and PG College (Autonomous), Visakhapatnam-530 013, India*
[b]*Department of Microbiology, Dr. V.S. Krishna Govt. Degree and PG College (Autonomous), Visakhapatnam-530 013, India*
[c]*Department of Genetics, College of Science and Technology, Andhra University, Visakhapatnam-530 003, India*

Article History: Received: 02-05-2023 **Revised:** 03-06-2023 **Published:** 15-06-2023

Abstract
A comprehensive study was undertaken to investigate the impact of feeding practices on the growth and survival of *Channa striatus*, with the aim of developing an effective rearing technique to promote its aquaculture. The study spanned from 2015 to 2018, during which the yield of the *Channa striatus* species was closely monitored within the designated study area. In addition to analyzing the feeding patterns, the study also focused on recording various physicochemical parameters that play a crucial role in influencing the overall growth and well-being of *Channa striatus* in the area. These parameters include water temperature, pH levels, dissolved oxygen, and nutrient concentrations, among others. Furthermore, the research's long-term approach spanning multiple years allows for a comprehensive understanding of the growth trends and variations in *Channa striatus* yield over time. This time-series data is invaluable for analyzing the species' response to different environmental conditions and feeding strategies, aiding in the development of informed management practices for successful and economically viable aquaculture ventures.
Keywords: *Channa striatus*, feed, growth, effect, aquaculture, production, average body weight.

DOI: 10.48047/ecb/2023.12.si6.710

Introduction

Snakehead, scientifically known as *Channa striatus*, is a native freshwater fish found in tropical regions of Africa and Asia. It belongs to the Channidae family and is commonly referred to as Murrels or serpent-headed fish. The snakehead fish offers not only a delectable taste but also a high nutritional value, along with remarkable pharmaceutical benefits. Given its extensive use in Asian markets for medicinal purposes, the cultivation of snakehead has become commercially viable and economically attractive. Farmers can enhance their production of Snakehead fish while optimizing resource usage by obtaining valuable insights into culture techniques and nutritional requirements (Muntaziana *et al.*, 2013).

Proper feeding management and the use of high-quality feed play a crucial role in maximizing feed efficiency, reducing production costs, and minimizing environmental impact in aquaculture. The sustainable development of aquaculture heavily relies on factors such as fish nutrition, feeds, and feeding practices.

ISSN: 2063-5346
Section A-Research paper

In the present study, the focus is on fish production yield, with particular attention to the role of feed. By maintaining optimum hydrographic parameters, the researchers achieved impressive yields without causing harm to the surrounding ecosystem. This successful outcome generated significant revenue for farmers.

The findings emphasize that the crop's productivity is closely linked to the quality and quantity of feed supplied at regular intervals while maintaining the hydrographic parameters at optimal levels.

Methodology

In the study station located in kumudavalli Village, *Channa striatus* cultivation was carried out using commercial feed, and the species' growth was carefully monitored. The process began with pretreatment, during which essential minerals required for species growth were added. A day before stocking, the physicochemical parameters were assessed to ensure they met the necessary criteria for achieving maximum yield, as summarized in Table 3.

To prevent bacterial formation during stocking, probiotics were introduced, playing a vital role in enhancing aquaculture practices' overall yield. The next stage involved stocking approximately 5000-7000 seeds under optimal physicochemical conditions. These seeds were given time to acclimate to the environmental conditions for 2 to 3 days. Starting from day three, feeding commenced, and the feeding pattern can be found in Table 4. The specific contents of the feed and the probiotics used are detailed in tables 1 and 2, respectively.

Results

The careful balance of nutrients in the feed composition is crucial for the health and growth of *Channa striatus*. According to Table 1, the feed was meticulously formulated to ensure appropriate levels of moisture, lipids, protein, fiber, carbohydrates, minerals, and vitamins. This meticulous approach guarantees that the fish receive all the essential nutrients they need for their well-being.

For commercial purposes, creating the ideal compound feed involves precise calculations to determine the right proportions of ingredients and additives. The main goal is to meet the specific nutrient requirements of *Channa striatus* while optimizing production efficiency and minimizing costs. Attention was also given to incorporating probiotics, as indicated in Table 2, to enhance the fish's gut health and overall immune system.

Table 5 provides the feeding chart for a fish farming operation consisting of 1000 fish. The table presents detailed information on the daily feeding schedule from day 1 to day 120. It includes the type of feed utilized and the recommended feeding rate based on the fish's body weight.

The ideal body weight of the fish exhibits a significant variation, starting from 6 grams on day 1 and remarkably increasing to 150 grams on day 120. This progressive change in body weight reflects the successful growth and development of the fish throughout the initial 120 days.

The feeding chart is essential in ensuring the fish receive appropriate nutrition to support their growth, health, and overall well-being. By carefully following the feeding recommendations

ISSN: 2063-5346
Section A-Research paper

provided in the chart, fish farmers can optimize the farming process and obtain fish that are not only thriving but also rich in nutritional value.

The recorded weight data from Table 4 reveals the remarkable growth of *Channa striatus* with their average weight progressing from 0.05 kg to 1.1 kg. This steady increase indicates that the chosen feed strategy successfully supports their growth and development throughout the rearing period.

Table 4 further illustrates careful feeding management, with the fish receiving regular feedings twice a day. The calculated feeding amounts for 10000 *Channa striatus* were tailored to ensure each fish had enough nourishment to sustain its growth and meet its dietary needs.

In summary, the well-balanced feed composition, along with the precise formulation and feeding management, has led to impressive growth rates and productivity for *Channa striatus*. This approach can serve as a model for efficient and sustainable commercial fish farming of this species.

The data presented in Table 6, showcasing the total yield and harvest of *Channa striatus* from 2015 to 2018, highlights the variability in production over these years. This variability emphasizes the critical role of scientifically monitored conditions, such as hydrographic parameters (water quality, temperature, and dissolved oxygen) and the quality of feed, in influencing the overall yield obtained in fish farming operations.

In conclusion, the data presented in Table 6 serves as a reminder of the dynamic nature of fish yield in aquaculture, and it emphasizes the importance of adopting scientific approaches to monitor and optimize hydrographic parameters and feed quality. By staying informed about the latest research and implementing best practices, fish farmers can effectively enhance the productivity and sustainability of their *Channa striatus* farming operations.

Discussion

In the present study from a study area located in kumudavalli Village, *Channa striatus* cultivation have been monitored for their yield rate by understanding the importance feed and hydrological parameters. The yield was monitored from 2015 to 2018.

The primary goal of any hatchery system is to efficiently produce a large quantity of superior fish seeds, fry, and fingerlings using the existing brood stock. This objective holds true for the farming of snakeheads as well, considering the challenges posed by the difficulty and limitations in collecting wild seeds due to monsoon failures. Therefore, hatcheries play a crucial role in ensuring a stable and sustainable supply of high-quality fish stock for snakehead farming. (Sarowar *et al.*, 2010).

The feeding frequency has a notable impact on all the energetic components, except absorption efficiency. More frequent feeding results in increased food intake and growth, but only up to a certain threshold. Beyond this optimum level, frequent feeding not only leads to food wastage but also diminishes the conversion rate and overall efficiency of the process (Sampath, 1984). Tailoring feeding techniques to suit the specific needs of different fish species is imperative. This entails accurately determining the appropriate feed types and

ISSN: 2063-5346
Section A-Research paper

feeding frequencies that ensure optimal yield without squandering valuable resources or excessive food. Striking the right balance in feed selection and feeding schedules is vital for the success and efficiency of fish farming operations. The feeding charts included in the present study will aid in achieving this crucial balance.

The biometric and physiological responses of *Channa striatus* are influenced not only by the feeding rate and feed but also by various physicochemical parameters related to the quality of the growth medium (Djokosetiyanto *et al.,* 2017). This study also provides information on the optimal physicochemical parameters that play a significant role in the fish's growth and well-being.

Conclusion

The research undertaken was dedicated to investigating the influence of feed and feeding patterns on the growth of *Channa striatus*. The outcomes underscored the critical importance of carefully monitoring the species' feeding habits to maximize yield while avoiding unnecessary food and financial wastage. By meticulously studying the effects of various feeding techniques and feed compositions on *Channa striatus'* growth, valuable insights were obtained. The study emphasized the significance of tailoring feeding strategies to suit the specific requirements of this particular fish species. A well-optimized feeding approach not only promotes accelerated growth but also ensures efficient resource utilization, benefiting fish farmers and the ecosystem alike.

Moreover, the research highlighted the significance of striking a delicate balance between providing sufficient nutrition and preventing overfeeding. Overfeeding not only leads to economic losses but can also negatively impact water quality and fish health. Hence, the findings emphasize the need for precise feeding management to foster the overall well-being and productivity of *Channa striatus* in fish farming operations.

In summary, this study provides valuable guidance for fish farmers, enabling them to enhance their feeding practices for *Channa striatus*. By implementing the suggested strategies, fish farmers can achieve improved yields, economic gains, and environmentally sustainable aquaculture practices for *Channa striatus*, leading to improved yields, economic benefits, and sustainable aquaculture practices.

Table 1: The Composition of commercial feed for fish

S/N	Ingredient	Amount In (%)
1	Moisture	10.20%
2	Ash	1.65%
3	Protein	26.68%
4	Fiber	6.60%
5	Fat	2.90%
6	Minerals	Ca, Mg, K, Na, Se, Fe, Zn, Co
7	Vitamins	A, B, C, D, E and K
8	Wheat flour	30-35%
9	Phospholipids	0.5 - 5%
10	Soya bean meal	26-35%

ISSN: 2063-5346
Section A-Research paper

Table 2: Probiotic composition in the fish feed (commercial)

S/N	Microorganisms	Probiotic Organisms
1	Bacteria	*Bacillus subtilis, Lactobacillus, Acidophila, Lactis, Streptococcus, Thermophilus*
2	Fungi	*Saccharomyces cerevisiae, Saccharomyces exiguus*
3	Algae	*Rhodozyma*

Table 3: Temperature, pH, salinity, dissolved oxygen, alkalinity maintained for feed introduction into ponds

S/N	Physico and Chemical Parameters	Optimum Range
1	Temperature (^{0}C)	28-32
2	p^H	7.5-8.5
3	Redox potential (MV)	+100
4	Salinity (PPT)	0.5-2
5	Total Alkalinity (PPM)	40-200
6	Dissolved oxygen (PPM)	5-10
7	Turbidity (PPM)	60-300
Note: Seasonally some changes may occur in the ponds. So, pH, Temperature, DO, Hardness is tested in a week.		

Table 4: Feeding programme/ feeding guidance

S/N	Body weight (gm)	Feeding for 10,000ml/day (kg)	Feeding for 10000 *Channa straitus*/ day (Kgs)	Feed Frequency per day
1	50	25	30	2
2	100	40	40	2
3	200	70	50	2
4	300	97.5	60	2
5	400	120	70	2
6	500	137.5	80	2
7	600	150	84	2
8	700	157.5	91	2
9	800	160	94	2
10	900	173.5	99	2
11	1000	180	100	2
12	1100	187	121	2
Note: The above feeding programme is a general guideline based on biomass however the accurate feeding programme needs to be co-related with fish health and farm conditions for better feeding management				

ISSN: 2063-5346
Section A-Research paper

Table 5: Feed chart for 1000 fishes in fish farming feeding table -floating fish feed

Age of fish	Type of feeds	Feeding rate of body weight	Feeding frequency	Ideal weight of one piece
1-15 days	Fry mash	8.00%	4 X/day	6gms
16-31 days	Fry mash	7.00%	4 X/day	25gms
32-46 days	Starter	6.00%	4 X/day	36gms
47-61 days	Grower	5.00%	3 X/day	50gms
62-76 days	Grower	4.00%	3 X/day	72gms
77-91 days	Grower	3.00%	3 X/day	100gms
92-105 days	Finisher	2.50%	2 X/day	121gms
106-120 days	Finisher	2.00%	2 X/day	150gms
Note: From day 121 onwards, the cultivation or harvesting of the crop becomes optional and depends on the farmer's interest. However, keeping the crop for a longer period, from 120 days (approximately 4 months) to 6 months, does not have any adverse effects. On the contrary, maintaining the crop for a longer duration result in fish that are rich in protein content.				

Table 6: Total yield of harvest from 2015-2020

S/N	Parameters				
1	Year	2015	2016	2017	2018
2	Acres	16/Acre	12/Acre	16/Acre	16/Acre
3	Crop month	Jan-Sep	Nov-Sep	Jan-Sep	Jan-Nov
4	No. of seed	24000	18000	24000	24000
5	No. of dead	500	290	520	2000
6	Duration	9 months	11 months	9 months	11 months
7	Harvest	Good crop	Good crop	Good crop	Good crop
8	Yield of tons	48 tons	36 tons	48 tons	49 tons

Acknowledgments
I thank Dr. V.S. Krishna Government Degree and PG College (A) and Andhra University, Visakhapatnam for their support in completing my work.

References

1. Djokosetiyanto, D., Nirmala, K., Harris, E. and Affandi, R. (2017). Survival and growth of stiped snakehead fish (Channa striata Bloch.) juvenile reared in acid sulfate water and rainwater medium. Aquaculture, Aquarium, Conservation and Legislation, 10(2), 265-273.
2. Muntaziana, M.P.A., Amin, S.M.N., Rahman, M.A., Rahim, A.A. and Marimuthu, K. (2013). Present culture status of the endangered snakehead, *Channa striatus* (Bloch, 1793). Asian Journal of Animal and Veterinary Advances, 8(2), 369-375.
3. Sampath, K. (1984). Preliminary report on the effects of feeding frequency in *Channa striatus*. Aquaculture, 40(4), 301-306.

ISSN: 2063-5346
Section A-Research paper

4. Sarowar, M.N., Jewel, M.Z.H., Sayeed, M.A. and Mollah, M.F.A. (2010). Impacts of different diets on growth and survival of *Channa striatus* fry. International Journal of Biological Research, 1(3), 08-12.