Food and Feeding habits of walking catfish, *Clarias batrachus* and other commercial fish: A review

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Abstract

The walking catfish, *Clarias batrachus*, is a highly adaptable and euryhaline freshwater species known for its unique locomotion capabilities and remarkable ability to survive in diverse aquatic environments. It is an opportunistic feeder with a broad dietary spectrum, exhibiting both carnivorous and omnivorous tendencies. The main objective of this review is to understand the food and feeding habits of commercially important fishes and comparing different feeding methodologies with special significance on fish *Clarias batrachus*. Feeding behavior and strategies employed by fishes are influenced by various factors, including water temperature, dissolved oxygen levels and prey abundance. The study of fish food and feeding habits has been an ongoing area of research that has provided valuable insights into the ecological dynamics of aquatic ecosystems. Recent studies have utilized advanced techniques such as gut content analysis, stomach content analysis, Stable isotope analysis, Direct observation, acoustic telemetry, feeding trials, to unravel the intricacies of fish diets and feeding preferences. These investigations have revealed the importance of studying food and feeding habits of different fishes to understand the trophic interactions, prey availability, and environmental factors that play vital role in aquatic ecosystem. Understanding the food and feeding habits of fishes is vital for effective management and conservation efforts. In conclusion, the study of fish food and feeding habits has a rich historical background and continues to evolve with recent advancements and interdisciplinary approaches.

Keywords: *Clarias batrachus*, feeding habits, dietary preferences, gut content analysis.

Introduction

India observed 12-fold rise in aquaculture production from 1980 to 2016. With an output of 11.41 million tonnes of commercial fish in 2016 - 17, India became second-largest fish producer in world [1]. Among these *Clarias batrachus* is an important fish valued for its nutritional benefits [2]. It is prescribed for anemic and malnutrition people for convalescence [3]. It is commonly known as the walking catfish or Mangur, found in shallow freshwater s located in South and Southeast Asia. It is nocturnal, omnivorous and opportunistic feeder that can be fed on variety of food like pellets, worms, shrimps, insects, crustaceans and small pieces of fish and plants [4]. Being easy to culture and having high nutritional value, it is source of livelihoods too and therefore how it interacts within trophic levels is an interesting area of study. There are many standard methods for studying feeding habits, namely 1. Gut content analysis [5][6][7][8][9], 2. Stomach content analysis [10, 31], 3. Stable isotope analysis, 4. Direct observation [5, 6], 5. Acoustic telemetry, 6. Feeding trials, etc. Feeding habits are dependent on many factors. Similarly, growth too depends on factors like age, population density, health of water body, quality of food and management techniques [11, 12, 31]. In artificial environment or culture ponds type and quality of food remains a major factor that helps achieve healthy growth. If we can determine which food type helps acquire maximum growth of a fish, it is likely to increase production and hence this study holds enormous importance. Researchers actively keep looking for ways that can help in making commercial fish production better. Numerous studies were done in this direction, we are discussing important ones here in this review.

Methodology

PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines provide a comprehensive framework for conducting and reporting review papers [13]. We used these guidelines to prepare this review. As the first step of its methodology, we defined our research question by establishing inclusion and exclusion criteria for selecting the relevant studies. A comprehensive search strategy is then implemented across multiple databases to identify eligible articles. The chosen papers go through a thorough screening procedure that starts with title and abstract screening and ends with full-text evaluation. A standard procedure used for data extraction to extract important data from each included study. The important topics and patterns found throughout the literature were highlighted in an analytic and cohesive presentation. The PRISMA principles helped us organize and summarize the results. Three query words "Food", "Feeding habit" and "Fish" were used. Using these we found 448000, 1095 and 1611 publications on Google Scholar, PubMed and J-Gate respectively. On replacing the query word "Fish" by "Catfish" total number of publications found were 25400, 22 and 96 on Google Scholar, PubMed and J-Gate respectively. For further screening we added the keyword "Walking" to Google Scholar and found 18,300 papers. On replacing keyword "walking catfish" by "*Clarias batrachus*" total number of publications found on Google Scholar were 6920 out of which 14 were found relevant to this study. Out of 22 papers, 11 papers were found relevant from PubMed database. In case of J-Gate out of 96 papers 7 papers were found relevant. Overall, we summarized findings of 32 papers here that we found relevant for this systematic review as shown in Figure 1.

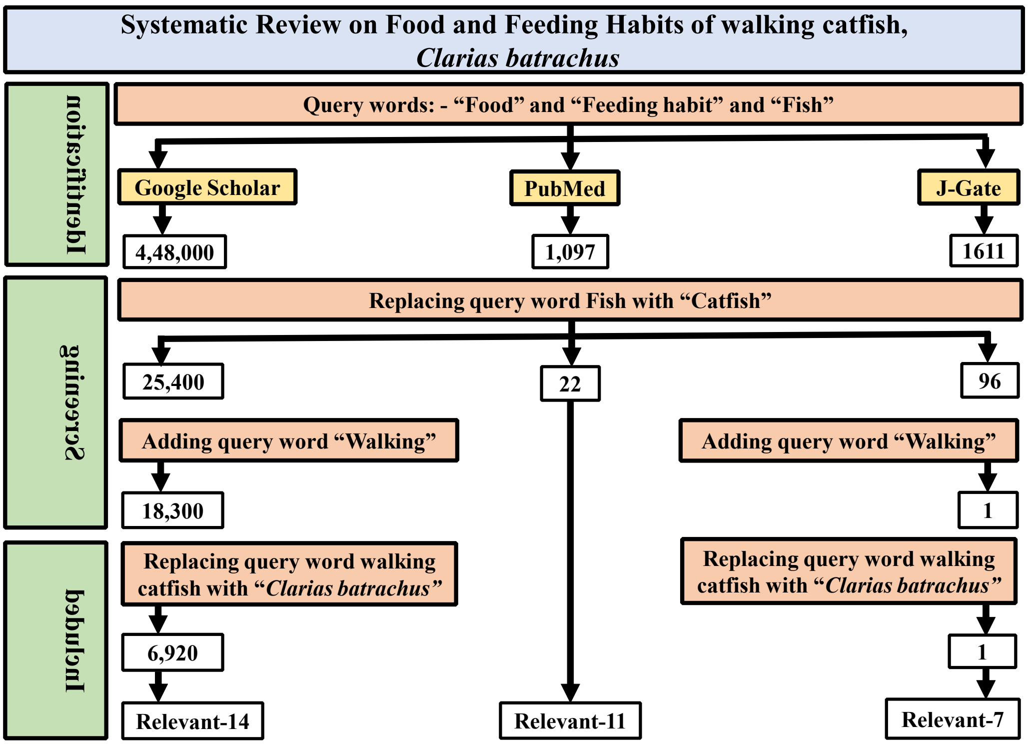

Figure-1: Schematic of the methodology adopted for this systematic review following PRISMA Guidelines is given above. We used 3 query words "Food" and "Feeding habit" and "Fish" as our query words. For reviewing literature three databases i.e., ***Google Scholar, PubMed*** and ***J-Gate*** were used. Using the above-mentioned keywords 448000, 1095 and 1611 papers were found on ***Google Scholar, PubMed*** and ***J-Gate*** respectively. On replacing the query word "Fish" by "Catfish" total number of publications found were 25400, 22 and 96 on ***Google Scholar, PubMed*** and ***J-Gate*** respectively. For further screening we added the keyword "Walking" to ***Google Scholar*** and found 18,300 papers. On replacing keyword "walking catfish" by "*Clarias batrachus*" total number of publications found on ***Google Scholar*** were 6920 out of which 14 were found relevant to this study. Out of 22 papers, 11 papers were found relevant from ***PubMed*** database. In case of ***J-Gate*** out of 96 papers 7 papers were found relevant. Overall, we summarized findings of 32 papers that we found relevant for this systematic review along with other required publications needed to fill in background information and complete this review.

Results and Discussion

Based on feeding type different fishes were classified into various broad groups. Table below explains the kinds of feeding habits we found in various fishes we studied for this review. The table also introduces us with the terms that are used to indicate a particular type of feeding habit along with their explanation in layman language.

Table-1- Explanation of feeding types.

S. No	Feeding type	Explanation
1.	Opportunistic feeder Ex- *Clarias batrachus*	It is an organism that exhibit a flexible feeding strategy and will consume whatever food is easily available at a given time and place [12].
2.	Planktivorous Ex- *Catla catla*	It refers to organism that primarily feed on planktons, including both plants (phytoplankton) and animals (zooplanktons) [14].
3.	Herbivorous Ex- (adult) *Labeo rohita*	Organisms that primarily feed on plant or plant-based material as their main source of nutrition [15].
4.	Carnivorous Ex- *Channa punctatus*	It refers to the organisms that feed on flesh or meat of other animals as their main source of nutrition [16].
5.	Omnivorous Ex- *Mystus montanus*	It refers to the organisms that feed on both plant-based and animal-based material and have ability to consume nutrition form a variety of food sources [17].
6.	Bottom feeder Ex-*Tachysurus tenuispinis*	A bottom feeder primarily feeds on the organic matter and detritus found at the bottom of a body of water or on the ocean floor [18].
7.	Scavengers Ex- *Clarias gariepinus*	A scavenger is an organism that feed on dead, decaying organic matter like dead plants and animals' materials [19].
8.	Crustacean feeder Ex-*Heteropneustes fossilis*	They are the organisms that consume crustaceans as their main sources of nutrition and have specialised feeding mechanism that enable them to target and capture crustacean prey [20].
9.	Detritus feeder Ex-*Auchenoglanis occidentalis*	Detritus feeder feed on dead organic matter or debris derived from plants, animals, or micro-organism. [19].
10.	Lepidophagy Ex-*Pachypterus khavalchor*	Lepidophagy is a feeding behaviour in which an organism primarily consumes scale or scale-like structures [21].

Table-1: Different types of terms used to classify feeding types and definitions of the terms. This table enlists the major types of feeding habits fond in freshwater fishes we studied for this review. We defined each term for the readers to make them understandable. The table also mentions the freshwater fishes that represent the feeding type along with reference where it is taken from. As the environment changes feeding habits change too and hence, they are representative of whether their environment is changing for good or environmental conditions are deteriorating. If we examine carefully the gut contents tell us a lot that requires our attention.

Feeding based classification studies:

After introduction of terms important for this review, we are discussing here studies that lead to the classification of fishes into five major categories, namely: **1)** Carnivorous, **2)** Planktivorous, **3)** Omnivorous, **4)** Bottom feeder and **5)** Scavengers.

1). Fishes classified as *Carnivorous*

(a) Feeding habits of *Clarias batrachus*

As our focus was *Clarias batrachus* here, we started with the studies done on this fish. It was found that their gut contents are comprised of insects (35%), crustaceans (22%), decomposed organic debris (15%), molluscs (8%), mud (5%) and unidentified material (5%) [6]. *Clarias batrachus* fed on earthworms (*Perionyx* *sansibaricus*) showed better growth as compared to those fed on *Pila bengalensis* or goat liver indicating importance of type of food their in growth [12]. It was shown that given choice larvae of insects (31.08%) were preferred food type for the fish throughout the months of study followed by fish larvae (25.61%), worms (19.78%), shrimps (17.0%), organic debris (4.48%) and zooplanktons (2.03%). They also showed that feeding intensity is higher in post-spawning period [22]. Since they are nocturnal it is not likely for them to encounter frog tadpoles therefore, they devour less tadpoles of frogs and toads [23]. Diet is species specific and depends on what is available as food resource [24]. Food selection also depends upon other factors too like sex, size, degree of development, season, time of day. In general fishes exhibit varying degrees of food selectivity [25]. Catfishes are fed 70–90% fish and 10–30% rice bran. Early stages need more animal content in their food [26]. Based on this observation *Clarias batrachus* was classified as carnivorous and column to bottom feeder.

(b) Feeding habits of other fishes

In *Labeo rohita* fingerlings preferred zooplanktons [15]. *Channa punctatus* prefers crustaceans over insects followed by molluscs and fishes and thus was classified as carnivorous. 76.25% of food was found to be of animal origin. Both juveniles and adults are surface feeders that prefer crustaceans. Rest of food are insects followed by molluscs and fishes [16, 27, 28]. Gut content analysis of *Wallago attu* showed that 90% of the food was of animal origin containing *Mystus rosenbergii* (27.53%), *Chanda name* (24.03), *Catla* (7.15%), *Channa sp*. (6.04%), *Ompok* (5.8%), *Labeo rohita* (3.68%), and digested material (17.14%). These are carnivorous too [29]. Juveniles of *Oreochromis mossambicus* are Carnivorous. Their food consists of rotifers (35%), copepods (30%), insects (5%) and plant materials (30%) [30]. *Clarias gariepinus*, a fish that is largely responsible for the aquaculture expansion in Nigeria prefers 82% of its food to be of animal origin. They prefer mainly insects followed by macrophytes and zooplanktons (60%), fish (26.8%) and fish egg (16%). Authors classified them as carnivorous [21]. *Heteropneustes fossilis* from Manchar lake, Pakistan was found to be carnivorous and crustacean feeder. Its food contents were crustaceans (60%), animal matter 30% and worms (10%) [20]. In *Oreochromis niloticus* snails were found to be the main food category preferred [32].

2). Fishes classified as *Planktivorous*.

Catla catla (Indian Major Carp) from Udai Sagar Lake of Udaipur was classified as planktivorous (feed on planktonic food, including zooplanktons and planktons) similarly. Gastro-osmotic index was found higher in winters [14]. In *Labeo rohita* eating habits were observed to change as it grows from a fingerling to an adult. Fingerlings preferred zooplanktons whereas adults selectively preferred phytoplankton. Adult fish is thus planktivorous [15]. In *Oreochromis mossambicus* food of adults contained 70% plant material followed by rotifers (15%), copepods (10%) and insects (5%). Juveniles are active feeders and carnivorous whereas adults consume plant-based food mainly and classified as planktivorous [30]. In Nile tilapia, *Oreochromis niloticus* plant-based food was found as major food type making them planktivorous [32].

3). Fishes classified as *Omnivorous*.

Gut examination of *Heteropneustes fossils*, Minor Carps (*Rasbora daniconius*, *Danio melabaricus, Puntisticto, Puntius sarana*) fingerlings of major and common carps, snake heads (*Channa stratus* and *Channa punctatus*) and *Mastacembalus armatus* revealed that their food included molluscs, crustaceans, annelids, insects, snails, fish, macrophytes and different types of algae. They were all therefore classified as omnivorous [6]. In Nigerian endemic fish *Schilbe mystus*, gut contents were broadly categorized into crustaceans, insects, plankton, mollusks, macrophytes, etc. Post analysis of diet they categorized this fish as a benthic omnivore [9]. *Mystus montanus* from Tambaraparani River, was found to be an omnivore and bottom feeder. Gut contents were small fishes (12.6%), Cladocera's (11%), molluscs (10.8%), annelids (10.5%), rotifers (9%), insect larvae (7.8%), copepods (7.6%), detritus (7.6%), crustaceans (7.6%), fish scales (5%), algae (5%) and unknown items (5.5%) which led to their classification as omnivorous [17]. *Tachysurus tenuispinis* is another bottom feeder. Food contents included Polychaetes (26%). Molluscs (6.5%), Teleost fishes (6.3%), Ophiuroids (4.2%), and miscellaneous items classified as omnivorous [18]. *Auchenoglanis occidentalis* another benthic omnivore and detritus feeder. *Clarias gariepinus* is also omnivorous and scavenger fish that consumes both meat and plants [19].

4). Fishes classified as *bottom feeders*

Schilbe mystus, is categorized as a bottom feeder and omnivore [9]. *Mystus montanus* from Tambaraparani River, was found to be an omnivore and bottom feeder [17]. *Tachysurus tenuispinis* is another bottom feeder [18]. *Auchenoglanis occidentalis* is another bottom feeder, omnivore and detritus feeder [19]. The Angler catfish, *Chaca chaca* is a bottom feeder [33].

5). Fishes classified as *scavengers*

Clarias gariepinus is classified as a scavenger fish that consumes both meat and plant materials [19]. This fish is invasive and is rapidly replacing *Clarias batrachus* from Asian countries like India and Pakistan and hence is considered as a threat to the existent of *Clarias batrachus.*

Summary of Systematic Review

Not much information is available on food and feeding habits of commercially important fishes. In this review we summarized feeding habits of commercial fishes. Fishes that eat them form their next trophic level and this way all organisms in an ecosystem are interconnected. Wellbeing of one species affects the survival of others. This review will help understand role of a fishes at various trophic levels and how they help maintain balance in the food chains and food web. It also tells us why maintaining diversity is important and ultimately help in management of fishes on large scale for improved production. The table given below presents summary of the studies done in this area. Name of fish species, their alternative names, feeding habits and respective references are given. This information was derived systematically from all research papers that we found relevant and it offers valuable insights into the diverse feeding behaviours exhibited by these fishes. Table serves as a valuable resource for researchers and enthusiasts seeking to understand fish nutrition and feeding behaviour.

Table-2- Feeding habits of different commercial fish.

S. No.	Fish	Another name	Feeding habit	References
1.	*Clarias batrachus*	Walking catfish	Opportunistic feeder	[4][12]
2.	*Catla catla*	Catla	Planktivorous	[14]
3.	*Labeo rohita*	Rohu	Adult-Herbivorous	[15]
4.	*Channa punctatus*	Snakeheads	Carnivorous	[16]
5.	*Mystus montanus*	Kala-tenguah	Omnivorous, bottom feeder	[17]
6.	*Tachysurus tenuispinis*	Thinspine sea catfish	Bottom feeder	[18]
7.	*Wallago attu*	Helicopter catfish	Carnivorous	[29]
8.	*Oreochromis mossambicus*	Mozambique tilapia	Adult- Herbivorous	[30]
9.	*Schilbe mystus*	African butter catfish	Benthic omnivorous	[9]
10.	*Clarias gariepinus*	African sharp tooth catfish	Omnivorous, scavengers	[19][31]
11.	*Heteropneustes fossilis*	Asian stinging catfish	Carnivorous, Crustacea feeder	[20]

12.	*Auchenoglanis occidentalis*	Giraffe catfish	Benthic omnivorous, Detritus feeder	**[19]**
13.	*Rita rita*	Bagrid catfish	Opportunistic feeder, Carnivorous-omnivorous	**[34]**
14.	*Pachypterus khavalchor*	lepidophagous catfish	Dual-feeding, lepidophagy, carnivorous	**[21]**
15.	*Synodontis membranaceus*	A moustache catfish	Bottom/benthic feeder	**[35]**
16.	*Mystus gulio*	Long whiskers catfish	Carnivorous, Omnivorous	**[36]**
17.	*Sarotherodon galillae*	Mango tilapia	Omnivorous	**[32]**
18.	*Oreochromis niloticus*	Nile tilapia	Herbivorous	**[32]**
19.	*Farlowella vittata*	Twig catfish	Herbivorous	**[37]**
20.	*Hypostomus punctatus*	Common pleco	Herbivorous, Detritus feeder	**[38]**

Table-2: Table represents the studied fishes for this review, their common names, feeding habits and references. The table below presents a comprehensive overview of fish species, their alternative names and feeding habits. The information contained in this table offers valuable insights into the diverse feeding behaviours exhibited by different fish species. By examining feeding behaviour one can gain a deeper understanding of the intricate relationship between fish and their food sources and are then classified accordingly. For example, bottom-feeder, herbivorous, carnivorous, planktivorous, omnivorous and more. The table was made after collating data from multiple publications and serves as a valuable resource for researchers and enthusiasts seeking to understand fish nutrition and feeding behaviours.

Contents of stomach and their relation with pollution levels

The contents of stomach also give us insights into the pollution levels of the water body. A study done on *Mystus gulio*, the long whiskered catfish from Ulhas River estuary and Thane Creek, Mumbai indicated increased presence of non-food components in their stomachs. These components are found to be of anthropogenic origin. This study tells us that the conditions prevailing in that water body are severely degraded threatening existence of life. Though this fish is considered resistant still its survival is questionable in the area [36]. Availability of food also results into reproductive success of species followed by nurturing of higher trophic levels [37]. If lower-level fishes die, bigger fishes will not survive either. All these fishes that are sick and poorly fed will ultimately come to our table. It has already started happening. In one study researchers found change in the flavour of fish fillets (meat) of Common Carps, Silver carps and African catfishes. Later it was found to be associated with changed food habits due to changing environmental conditions [39]. With change of environment feeding habits of *Hypostomus punctuates* also changed indicating that diet of a species depends on environmental conditions [38]. More pollution means less fishes or diseased fishes and ultimately lesser fish diversity in our world.

Physiological changes due to feeding habits

In Angler catfish, *Chaca chaca* development of secondary lamellae and mucus goblet cells increase surface area and add to efficiency of gaseous exchange which helps them survive in deep waters [33]. If feeding area changes it will introduce some physical changes as well. *Synodontis membranaceus*, A moustache catfish is bottom/benthic feeder [35]. *Mystus gulio* long whiskers catfish is carnivorous, omnivorous [36]. *Sarotherodon galillae* or Mango tilapia is omnivorous [32]**.** *Oreochromis niloticus*, Nile tilapia is Herbivorous [32]. *Farlowella vittate*, the Twig catfish is herbivorous [37]. *Hypostomus punctatus*, the common pleco is primarily herbivorous, and detritus feeder [38]. Availability of food results into reproductive success therefore more food will mean increased production [37]**.** Herbivorous fishes like Glass Carps tend to have lengthier intestines and higher glucose uptake. Omnivorous fishes like channel catfish (*Ictalurus punctatus*) have intermediate lengths and medium glucose uptake. In carnivorous fishes like largemouth black bass (*Micropterus salmoides*) intestines are short and glucose uptake is reduced. All these examples suggest that feeding habits can even affect size of internal organs especially intestine. They also proved that if short episodes of fasting are introduced, it can significantly alter intestinal form and function which can later be restored by normal feeding [40] . Quantity of food also differs in males and females of a species which means it is affected by gender as well.

Factors affecting food and feeding habits

In Nigerian endemic fish, *Schilbe mystus*, feeding is shown to vary with sex, size and season [9]. *Clarias batrachus* shows significant better growth when fed on earthworm (*Perionyx sansibaricus*) which indicated type of food matters [12]. They also showed that feeding intensity is higher in post-spawning period whereas it is low in spawning periods [22]. In *Wallago attu* the Gut was found empty during spawning season (July and September) [29]. *Heteropneustes fossilis* gives lowest preference to worms as food [20]. In *Channa punctatus* feeding is restricted during spawning periods [27][28]. In Angler catfish, *Chaca chaca* development of secondary lamellae takes place to increase efficiency because they are benthic feeders [33]. Availability of food also results into reproductive success of species [37]. In Schilbe mystus quantity of food found in stomachs of males and females differed considerably [41].

Methods of doing feeding studies

There are different conventional methods that are employed to do feeding studies. Table below enlists some very popular methods along with a small description of the method of how these studies are done. One or more than one may be suitable for a study whereas some work on particular species of fish only.

Table-3- Methods of Fish feeding analysis.

S.No.	Methods	Explanation
1.	Gut Analysis	Gut analysis involves dissecting the fish and examining the contents of its digestive tract. This method provides insights into the recent diet of the fish. Gut analysis helps determine the trophic level and feeding preferences of the fish.
2.	Stomach Analysis	Stomach analysis is similar to gut analysis but specifically focuses on the stomach contents. It involves removing the stomach from the fish and examining its contents. Stomach analysis provides more detailed information about the immediate feeding behavior, prey size, and prey species consumed by the fish.
3.	Stable Isotopes Analysis	It is a powerful tool for studying fish feeding habits over longer time scales. It involves analysing the stable isotopes of carbon and nitrogen present in the fish tissues, such as scales, muscles, or otoliths. The isotopic composition reflects the isotopic signatures of the food sources consumed by the fish.
4.	Direct Observation	It is a method of studying the feeding habits of fish by directly observing their behavior in their natural habitat. It involves visually observing and recording the feeding activities and prey capture techniques exhibited by the fish.
5.	Acoustic telemetry	It is a method used to study the feeding habits of fish by tracking their movements and behaviours using acoustic signals. It involves the use of acoustic transmitters and receivers to monitor fish activity in their natural habitats.

Table-3: Given above are the methods conventionally used for understanding feeding behaviour of fishes. The table given below highlights conventional methods that are available for determining the feeding habits of fish, along with a concise explanation about each method. Understanding the feeding behavior of fish is crucial for studying their ecological roles and developing appropriate conservation strategies.

The gut analysis method

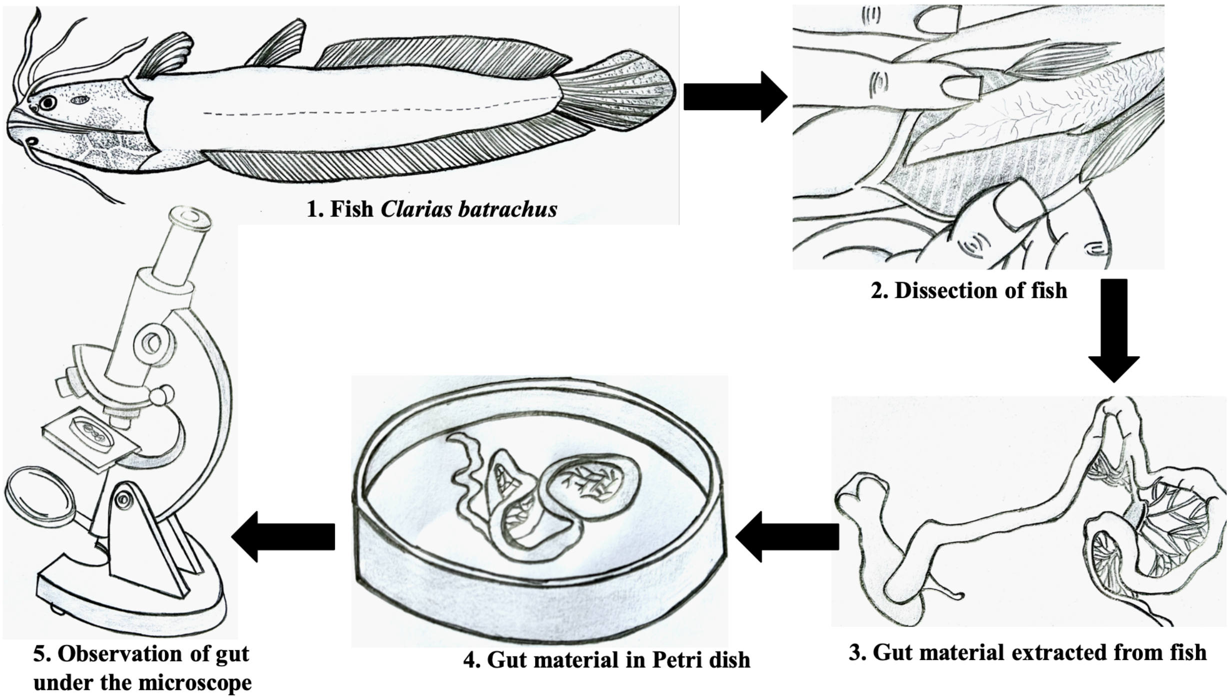

Figure-2: The given figure shows the steps of "gut analysis method" followed in many studies [42]. Animal is taken from their natural habitat and dissected to take out the gut. Here we have taken *Clarias batrachus* as an example to explain the procedure. Gut contents are then physically examined for identification of food contents. Contents are further analysed under compound microscope for further analysis. By this method it is decided what kind of food the animal prefers and where it might be feeding within the water body. Then the fish is classified into broad categories as described in table 2 above. The analysis also tells us what kind of water body this fish will grow better in or adding which organisms to their diet will help the fish achieve better growth.

Economical aspects

Fishmeal has high-quality lipid and protein content and hence is it very nutritious for us. It is worth considering economics of fish industry. Cost-benefit analysis is important to those who work in this industry. Like all other species, fishes need a healthy diet to flourish. They eat a wide range of diets including both natural and manufactured food. Replacing an expensive fish food by natural food or less expensive food will mean profit to the fish farmer. Experimental findings suggest that fishmeal can be omitted from catfish supplemental diet without losing growth or production. For example, fishmeal is much more expensive than other components in fish feed. The cost of production for example in this study was Rs. 27/kg for T1 (fishmeal + rice bran) and Rs. 20/kg for T4 (groundnut oilcake + rice bran), which amounted to a 28.6% lower cost of production and no appreciable differences in output was observed. It was determined that groundnut oilcake and rice bran combined in a 1:1 ratio is the most economical combination diet for *Clarias batrachus* [4]**.** Such calculations can also be done for other commercial fishes making fish culture more profitable as a Business.

Conclusion

Walking catfish *Clarias batrachus* is a commercially important fish known for its nutrition. Small fishermen can raise them even in small water puddles around their houses. They are very easy to raise for they are air breathing and eat all kinds of food (opportunistic feeder). They consume a wide range of food sources including aquatic plants, insects, crustaceans, small fish, and detritus. Their ability to assimilate both plant and animal matter as food allows them to thrive in diverse habitats, such as ponds, swamps, and flooded fields. Understanding the feeding habits of walking catfish is crucial for managing their populations in both natural and aquaculture settings. Another walking catfish species *Clarias gariepinus* is an invasive species and is capable of negatively impacting local ecosystems by outcompeting native species for food resources. These fishes grow very quickly and feed voraciously leaving no scope of food for other fishes. Furthermore, they are very hardy species and can tolerate a wide range of environmental conditions. All these characters make it difficult to control their growth and population and hence they are considered a threat to biodiversity. On the other hand, *Clarias batrachus* another species that has a regular growth pattern and feeding habit and is not considered threat to biodiversity. For biodiversity conservation it is very important to deeply understand feeding habits of the organism. Further, research is required to delve deeper into understanding feeding habits of walking catfish *Clarias batrachus*. It's feeding habits, feeding rate and dietary preferences when known fully will be economically beneficial for commercial cultures. Knowing food type will help acquire maximum growth in appropriate time which will increase fish production. Such studies will also help in developing effective fish management strategies. As global temperatures rise and aquatic ecosystems undergo significant transformations, understanding how fishes adapt to these changes will be crucial for their long-term survival and sustenance. Investigating their responses to altered food availability, shifts in prey distributions, and changes in water quality parameters will provide valuable insights into their resilience. All this will help in species conservation and species management. Hence this study is important.

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