

USAGE AND CHALLENGES OF LIVE MAGGOT AS FISH FOOD AMONG FISH FARMERS IN IBI LOCAL GOVERNMENT AREA, TARABA STATE, NIGERIA

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ABSTRACT

The usage and challenges of live maggot as fish food among fish farmers in Ibi Local Government area; Taraba State, Nigeria was investigated. Sixty (60) fish farmers were randomly selected from four Districts to obtain a total sample size of two hundred and twenty (240) respondents. Questionnaire and scheduled interview approach were used to obtain information from the respondents. Data obtained were analyzed through descriptive statistics such as (frequency and percentage) while inferential statistics used was Pearson Product Moment Correlation (PPMC) at $P < 0.05$. Majority (80.4%) of the fish farmers were aware of maggot usage as fish food, 45.0% were aware that live maggot is rich in nutrient compared to other conventional food, fish fed with live maggot grow faster (53.8%). Only 23.3% of the respondents fed their fish with live maggot and 58.3% of the fish farmers were willing to feed their fish with live maggot. The major challenges on use of maggot as fish food; inability to get enough quantity to buy (78.3%), dead maggot on water attract pathogenic organisms (75.0%), there is a significant relationship between awareness on live maggot as fish food and usage among the fish farmers ($r = .341$, $n = 240$, $p (.000) < .05$). It was recommended that fish farmers should be encouraged to practice intensive system of fish cum poultry to generate enough quantity of maggot as feed to reduce the cost of fish production.

Keywords: Awareness, farmers, fish, maggot, usage

INTRODUCTION

The aquaculture industry is working to meet the world's rapidly growing demand for fish in order to reduce hunger and improve food and nutritional security (FAO, 2018). The astronomically rise cost of fish food, research has shown that maggots can be a good and suitable substitute for protein sources in fish diet such as soybeans and fish meal, which are core ingredients in fish feed (Ogunji *et al.*, 2023). In the development and management of an aquaculture enterprise, fish feed plays a vital role in its growth and expansion and constitutes 40–50% of the operational cost in the intensive and semi-intensive aquaculture system. Since fishmeal is getting more and more expensive as a feed ingredient, it has been found that using unconventional feedstuffs results in good growth and superior cost-benefit ratios. Non-conventional feed resources (NCFRs) are feeds that are not usually common in the markets and are not the traditional ingredients used for commercial fish feed production. (Kolawole and Mustaphar 2023). In practice, researchers in the field of aquaculture have reported the efficacy of many unconventional protein sources of plant and animal origin that could replace fish meal and other conventional protein sources in aquaculture diet. Some of the alternatives that have been suggested include algae meal, blood meal, poultry offal, insect meal (black soldier fly, grasshopper), housefly (*Musca domestica*) maggot meal (Ogunji *et al.*, 2020). Recent high demand and consequent high prices for fishmeal/soy together with increasing aquaculture production is pushing the development of insect protein for aquaculture and poultry. Insect-based feed products have a similar market to fishmeal and soy, which are presently the major components used in feed formulae for aquaculture and livestock. The difficulty experienced by fish cultivators is the use of basic ingredients for fish meal to make pellets whose availability is inconsistent with high prices and it is imported (Meitiyani, *et al.*, 2018). The price of pellets made from fish meal is relatively high, making fish production costs more expensive. This gives catfish farmers a difficulty in saving production costs, making catfish production to decrease. Overcoming this problem requires creativity to minimize the use of pellets made from fish meal with large scale production compositions. Sources of feed can come from natural feed or artificial feed. Artificial feed is feed produced by factories, while one of the natural feeds sourced from nature as an alternative to artificial feed is highly nutritious maggot (Al Rizki *et al.*, 2021). Available evidence suggests that insect-based feeds are comparable with fishmeal and soy-

based feed formulae (Johannsson *et al.*, 2016). The study therefore investigated usage and challenges of live maggot as fish food among fish farmers in Ibi Local Government area, Taraba State, Nigeria.

MATERIALS AND METHODS

Ibi Local Government Area is one of the sixteen Local Government Areas in Taraba State. It covers the total area of 2,672 Km² and extends between latitude 8^o 19' north of the equator and 9^o 51 east of the Greenwich meridian (Taraba State Government, 2015). The town is located at the south bank of the Benue River, opposite the influence of much smaller Shemankar River. Both the Taraba River and the Donga River flow into the Benue within the local government area. Ibi local government has two seasons, the rainy season which extends from April to October and the dry season which last for five months extending November and March, the annual rainfall ranges between 1,058 mm and 1,300 mm with the temperature range of 28^oC and 39^oC. The major occupation is farming and fishing which is characterized by annual Nwonyo festival (Ogunremi *et al.*, 2023). A sampling frame was drawn from the list of fish farmers registered with the Department of Fisheries at Ibi Local Government Area, Taraba State, Nigeria. A multi-stage stratified design was used for selecting the respondents for the study. The first stage involved stratification of the Local Government Area into four districts (Sarkin Kudu, Dampar, Ibi and Rimi Uku) based on the prevalence of fish farmers in the districts. The second stage involved random selection of sixty (60) fish farmers from each of the four Districts to obtain a total sample size of two hundred and twenty (240) respondents. Questionnaire and scheduled interview approach were used to obtain information from the respondents. Data obtained were analyzed through descriptive statistics such as (frequency and percentage) while inferential statistics used was Pearson Product Moment Correlation (PPMC) at P<0.05.

RESULTS AND DISCUSSION

Awareness of live maggot as fish food

Table 1 showed the respondents on awareness of maggot as fish food. Majority (80.4%) of the respondents are aware of maggot use as fish food. Their sources of information on live maggot as fish food Seminar/Workshop (23.3%), Television (15.8%), and Internet (13.3%), Radio (9.6%), and Extension agents /other fish farmers (9.2%). Ouko *et al.*, (2023) reported in a similar study that 46% fish farmers were aware of maggot as live fish food. Farmers ought to be aware of the employment of insects in the formulation of fish feeds in order to increase fish productivity while lowering production costs. Without awareness raised by trained public extension agents and other credible service providers, farmers rely on information from their input suppliers, which may be inaccurate information (Ullah *et al.*, 2022).

Table 1 Awareness of live maggot as fish food

Variable	Labels	Frequency (%)
Are you aware of Maggot use as fish food?	No	47(19.6%)
	Yes	193(80.4%)
If yes, how did you know about the use of Maggot as fish food?	Not Applicable	47(19.6%)
	Television	38(15.8%)
	Radio	23(9.6%)
	Internet	32(13.3%)
	Seminar/workshop	56(23.3%)
	Other fish farmers	22(9.2%)
	Extension agents	22(9.2%)

Source: Field Survey, 2022

Usage of live maggot as fish food

Table 2 indicated that 45.0% of the fish farmers were aware that live maggot is rich in nutrient compared to other conventional food and that fish fed with live maggot grow faster (53.8%). Only 23.3% of the respondents fed their fish with live maggot although, majority (58.3%) of the fish farmers in the study area were willing to feed their fish with live maggot when it is made available. Maggot have high amounts of energy, protein, micronutrients (e.g., Cu, Fe, Zn), inexpensive, high-quality nutritional value, and are less troublesome to make from different sources. In general, it has high amounts of Lysine, Tryptophan, and Methionine and can be added to low-protein cereals and

legume-based diets for livestock (Shah *et al.*, 2022). Usage of maggot is attributed to high crude protein of 62.1%, lipids 18.9% and Methionine 2.2g/16g of Nitrogen (Ml'cek *et al.*, 2018, Sunday and Komi, 2022). Kolawole. and Mustapha (2023) reported that maggot is a cheap and excellent source of animal protein that could be utilized to produce fish food for diverse fish species.

Table 2 Usage of live maggot as fish food

Variables	No	Yes
Are you aware that Maggot is rich in nutrients compared to other conventional feed?	132(55.0%)	108(45.0%)
Do you feed your fish with Maggot?	184(76.7%)	56(23.3%)
If no, are you willing to feed your fish with maggot?	44(18.3%)	140(58.3%)
Are you aware that fish fed with live maggot grow faster?	111(46.3%)	129(53.8%)

Source: Field Survey, 2022

Challenges on use of live maggot as fish food

The challenges on the use of maggot as fish food as perceived by the respondents include inability to get enough quantity to buy (78.3%), dead maggot on water attract pathogenic organisms (75.0%), dead maggot may pollute the water if not eaten for days (69.2%), distance of poultry farms (66.7%). Inability of getting sufficient quantity of maggot is attributed to deep litter system of poultry keeping in the study area which does not serve as good substrate for the house fly to lay eggs before its development into maggot. When maggot dies it decomposes in water by bacteria which is a potential disease causative organism of fish.

Table 3 Challenges on use of live Maggot as fish food

Challenges	No	Yes
Inability to get enough quantity to buy	52(21.7%)	188(78.3%)
Distance of poultry farms	80(33.3%)	160(66.7%)
Other farmers should use if first	117(48.8%)	123(51.2%)
Dead maggot may pollute the water if not eaten for days	74(30.8%)	166(69.2%)
Dead maggot on water may attract pathogenic organisms	60(25.0%)	180(75.0%)

Source: Field Survey, 2022

Significant relationship between awareness of live maggot as fish food and usage among fish farmers

The result in Table 4 showed that there is a significant relationship between awareness on live maggot as fish food and usage among the fish farmers ($r=.341$, $n=240$, $p (.000) <.05$). Hence, awareness of live maggot as fish food influenced the usage among fish farmers in the study area. The result implied that the higher the level of awareness on maggot as fish food, the more the farmer develop interest or see the need to use it for feeding their fish. Usage of any aquaculture innovation either conventional or non conventional can be achieved when necessary machineries are put in place for promoting awareness among fish farmers that are the end users.

Table 4 Pearson Product Moment Correlation (PPMC) showing the relationship between awareness and usage of maggot as fish food

Variables	Mean	Std. Dev.	N	R	p-value	Remarks
Awareness on maggot fish food	5.9458	2.51048	240	.341*	<.001	Sig.
Usage of maggot fish food	4.1208	0.61873				

* Correlation is significant at the 0.05 level (2-tailed).

CONCLUSION AND RECOMMENDATIONS

Fish farmers were aware of maggot as live fish food and used by some of them. It was recommended that fish farmers should be encouraged to practice intensive system of fish cum poultry to generate enough quantity of maggot as food to reduce the cost of fish production. Also, various channels of

communication should be used by the government at different levels to create awareness on use of live maggot for feeding fish to reduce cost and encourage fish farmers to use live maggot to prevent outbreak of diseases and water pollution resulting from dead maggot.

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