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Perception of Abidjan District Poultry Farmers Regarding the Use of Black Soldier Fly Larvae in Poultry Feed

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Abstract | **Original Research Article**

In the face of rapid population growth in Côte d'Ivoire, the demand for animal protein is increasing significantly for both human and animal consumption. In this context, it is essential to identify sustainable protein alternatives to meet the growing market demand and consumer expectations. One such alternative that is gaining increasing interest in poultry farming is the use of insects—particularly fly larvae—as a replacement for or supplement to traditional poultry feed. However, the adoption of this practice by poultry farmers largely depends on their perceptions and level of awareness. This study aimed to assess changes in the perceptions of poultry farmers in the Abidjan district regarding the use of maggots in poultry feed. To this end, the opinions of 362 poultry farmers from the communes of Yopougon, Port-Bouët, and Abobo, as well as the towns of Bingerville and Anyama, were collected. The results showed that all the farmers surveyed were familiar with fly maggots. However, only 2.21% actually used them in their poultry feed. Among those who had heard of the practice, 37.7% discovered it through social media, while 62.3% learned about it via training sessions organized by promoters. Following an awareness campaign, 92.94% of farmers who were initially non-users expressed support for incorporating maggots into their animals' feed. Only 7.06% remained hesitant. In conclusion, the majority of poultry farmers are open to using maggots as an alternative protein source. Additional training and awareness-raising initiatives appear essential to promote broader and more sustainable adoption of this practice.

Keywords: Poultry Farmers' Perception, Maggots, Proteins, Poultry Feed, Abidjan District.

1. INTRODUCTION

Côte d'Ivoire's food security is strongly supported by its poultry farming industry, which provides over 170,000 jobs and supplied an estimated 89 eggs per person in 2020, along with 96% of the country's poultry meat needs (Chatterjee R *et al*., 2022; OECD/FAO, 2024). Between 2000 and 2015, per capita poultry meat consumption increased from 0.60 to 2.00 kg, reflecting growing demand (OECD/FAO, 2024). Projections for poultry meat and egg consumption in Côte d'Ivoire by 2030 are more than double the production levels forecast for 2025 (OECD/FAO, 2024).

Given this rising demand, it is crucial to assess the capacity of production systems, with particular attention to animal feed (FAO 2013; FAO 2019). Feed represents up to 70% of operating costs (Ky I *et al*., 2023) and relies heavily on imported corn, soy, and fishmeal. This dependency leads to price volatility, which disproportionately affects small-scale producers (Oladokun V & Johnson A, 2012; Koffi-Koumi M, 2019).

In response to these challenges, there is growing interest in exploring sustainable alternatives, including the use of insects as a protein source (Kowalska D, 2023). The larvae of the black soldier fly (*Hermetia illucens*) are rich in protein (48.85%) and low in fat (3.93%) and minerals such as phosphorus and calcium. Studies have shown that they can effectively replace part of the soybean and fishmeal in poultry feed without compromising animal growth (Sankara F, *et al*., 2023; Mboma M, *et al*., 2024). This solution also offers environmental benefits, as insects can be reared on organic waste.

Despite their nutritional potential, fly maggots often evoke mixed reactions, as they are culturally associated with uncleanliness (Lang J & Benbow M, 2013). Against this backdrop, the present study aims to analyse the socio-demographic characteristics of agro-breeders in the Abidjan district, identify the factors influencing the acceptability of fly maggots in poultry feed, and propose strategies to promote the inclusive and sustainable modernization of the sector. The study is based on a field survey designed to better understand the social dynamics and implementation conditions of this innovation in a rapidly evolving urban environment.

2. METHODOLOGY

1.1 Survey Area

The survey was carried out among 362 randomly selected poultry farmers in the Abidjan district (i.e. the communes of Yopougon, Port-Bouet and Abobo, and the towns of Bingerville and Anyama).

1.2 Survey Procedure

The survey form used in this study was divided into three sections. The first section focused on the respondent's socio-demographic profile, collecting information on gender, age, and level of education. The second section assessed respondents' knowledge of and experience with black soldier fly maggots, including their uses and sources of supply. The third section addressed the type of training received by poultry farmers. The survey included both men and women, grouped into three age categories, and encompassed both literate and illiterate individuals.

3. RESULTS

1. Characteristics of the Interviewees

The characteristics of the respondents are presented in Table 1. The majority of surveyed farmers were literate (91.72%), male (98.62%), and belonged to the 36–55 (59.94%) and over 55 (27.9%) age groups. Among the literate respondents, 46.1% had completed elementary education, 49.39% had attended secondary school, and 4.51% had received higher education.

Table 1: Characteristics of poultry farmers participating in the survey

Characteristics	Variables	Number	Percentage (%)
Gender	W	5	1.38
	M	357	98.62
Age (year)	20-35	44	12.15
	36-55	217	59.94
	>55	101	27.9
Education level	Illiterate	30	8.28
	Literate	332	91.72
	Primary	153	46.1
	Secondary	164	49.39
	Higher	15	4.51

W: woman**, M:** man.

2. Geographical Distribution of Surveyed Poultry Farmers in the Abidjan District

Table 2 shows the distribution of poultry farmers by area and gender. Analysis of the table reveals male dominance in poultry farming and low female representation. The Abobo and Yopougon zones have the highest proportion of women.

Table 2: Geographical distribution of poultry farmers by gender

Area	Effective (%)	
	Women	Men
Abobo	2.00	98.00
Anyama	1.25	98.75
Bingerville	1.39	98.61
Port-Bouet	0.00	100
Yopougon	2.00	98.00

3. Knowledge and Perceptions of the Use of Fly Maggots in Animal Feed

Table 3 presents the knowledge and perceptions related to the use of fly maggots in animal feed. The analysis reveals that all surveyed poultry farmers (100%) were aware of fly maggots. However, only 2.21% reported actually using them in poultry feed. Among those who did, 37.7% learned about the practice through social networks, while 62.3% received training from promoters.

The maggots are typically obtained naturally by scavenging decomposing feed scraps, poultry droppings, or stored cattle dung. Once collected, they are either fed fresh to the birds or, when the harvest is abundant, dried, ground, and incorporated into the feed.

Despite being informed about the practice, poultry farmers expressed differing views on its adoption. While 92.94% of those previously unaware indicated a willingness to incorporate maggots into their animals' diets, 7.06% remained opposed.

The survey ultimately identified three categories of poultry farmers based on their stance toward maggot use: those who wish to adopt the practice, those who already use maggots, and those who reject it.

Regarding farming systems, the majority of respondents practiced traditional poultry farming (71.67%), followed by improved systems (28.33%) and modern systems (0.55%). Most farmers raised chickens (96.96%), while a small minority (3.04%) raised guinea fowl.

Table 3: Types of farming, knowledge and perceptions of the use of fly maggots in animal feed

	Number	**Percentage (%)**
Poultry farmers who use maggots	8	2.21
Poultry farmers who do not use maggots	354	97.79
Poultry farmers' supply locations	Gathered in the wild from decomposing food scraps, poultry droppings or beef purses	
Farm types	Traditional, improved and modern	
How maggots are used	Fresh maggots fed directly to poultry or dried and ground maggots, with the meal incorporated into poultry feed	
After raising awareness among poultry farmers who do not use maggots		
Poultry farmers now wishing to use the maggot	329	92.94
Poultry farmers not wishing to use the maggot	25	7.06

4. Training Methods for Poultry Farmers in the Abidjan District

Table 4 shows that, regarding the training of poultry farmers, 62.3% of those who received instruction on formulating poultry feed with maggots were trained by promoters, while 37.7% were self-taught using the internet. Notably, none of the farmers received any training in maggot production, whether through self-learning or from promoters.

Table 4: Training methods used by poultry farmers in the Abidjan district

	Maggot food formulation		**Breeding maggots**	
	Number	Percentage (%)	Number	Percentage (%)
Self-training (Internet)	3	37.7	0.00	0.00
Training by promoters	5	62.3	0.00	0.00

4. DISCUSSION

The survey reveals that poultry farming is predominantly practiced by men, with the largest age group being 36–55 years old. Poultry farmers generally have a secondary school education and are literate. However, some farmers have a higher level of education. The educational level of the surveyed poultry farmers could be explained by the variety of training opportunities available in Abidjan, the economic capital of Côte d'Ivoire, and the ever-increasing number of graduates receiving training. Unemployment among young graduates is a concern in developing countries, with some turning to entrepreneurship (in agriculture, poultry farming, technology, etc.) to secure employment and create jobs (Alladatin J. et al., 2021; Moussa A. et al., 2023); Bamba *et al*., 2024). Poultry farming is particularly attractive due to its low investment costs and potential for rapid profitability. Therefore, encouraging young graduates to develop poultry farming in major African cities such as Abidjan could modernize the sector and create local economic opportunities. Nevertheless, this potential could be realized more effectively through technical organization, financial support, and appropriate urban regulation.

This survey also shows that poultry farming is predominantly a male activity due to the perception that animal husbandry is physically demanding and requires technical management skills. Socio-cultural, economic and institutional factors therefore limit women's access to poultry farming, despite their active involvement in selling and producing poultry for domestic consumption (Brou G, *et al*., 2020; Traoré I, *et al*., 2022). Against a backdrop of increasing urbanization and economic crisis, women in large African cities, particularly in Abidjan, are seeking viable economic alternatives to support their families. Poultry farming is a short-cycle, income-generating activity that can be adapted to urban realities. However, this sector remains male-dominated and insufficiently structured to enable women to take full advantage of it (Konan *et al*., 2023; Ayssiwede S, *et al*., 2013; Arbelot *et al*., 2023).

All of our respondents are familiar with the fly maggot. They are familiar with this maggot, which appears in environments that are unhygienic. They find them in all kinds of decomposing waste, such as rubbish dumps and rotting animals. They regard it as a disgusting element of the environment. They consider it to be a waste vector of multiple diseases that must be eliminated

(Pomalégni S, *et al*., 2016 and 2021; Traoré I, *et al*., 2023). Nevertheless, some poultry farmers use fly maggots as animal feed. This practice is justified by the fact that poultry naturally feed on earthworms, cockroaches, locusts and other insects, and by the training some farmers have received in using maggots in animal feed (Van H, *et al*., 2020; Idriss H, *et al*., 2021; Seyedalmoosavi M, *et al*., 2022; Kowalska D, 2023; Kim S, 2024). Fly larvae incorporated into avian nutrition are collected from decomposing natural sites in the breeders' immediate environment. However, they cannot raise or purchase these maggots due to a lack of reliable technical information on production methods or places where maggots are raised and sold (Sogbohossou, 2018; FAO, 2020). Despite the rapid and growing development of peri-urban livestock farming in Abidjan and its outskirts (Anyama, Bingerville, Yopougon-Songon, etc.), there are currently no viable structures or policies in place for producing maggots for animal feed.

The survey also shows that most poultry farmers are reluctant to include fly maggots in their animals' feed. This is due to various social and cultural constraints (Assanvo J *et al*., 2014). Although urban and peri-urban livestock farmers are more receptive to technical innovations, these constraints sometimes persist in slightly different forms than in rural areas. Indeed, perceptions of dirtiness, disgust and altered taste linked to the use of maggots persist, in addition to purely urban or peri-urban ones. As the urban market is highly competitive and sensitive to perceived quality, a farmer who uses maggots without guaranteeing their wholesomeness, nutritional quality or social acceptance would lose their customers (Boko A; Ministry of Animal and Halieutic Resources, 2022). Despite these negative perceptions of maggots in poultry farming, most farmers in urban and peri-urban areas change their minds radically when they learn about the potential benefits of incorporating maggots into poultry feed. Thus, 92.94% of respondents who were previously opposed to the use of maggots now wish to use them in their animals' feed in the Abidjan district. The advantages are economic, nutritional and environmental. Firstly, maggot production stabilizes and makes the protein content of animal feed more accessible. Secondly, as maggots are rich in protein, using them considerably reduces the cost of imported protein ingredients (such as fishmeal and soya) in animal feed. Thirdly, poultry fed with maggots grow rapidly. These advantages all lower the costs of poultry farming, enabling substantial savings to be made (Bouafou K., 2011; Sankara F, *et al*., 2023; Ssepuuya G, *et al*., 2023).

5. CONCLUSION

Despite their limited knowledge, poultry farmers remain optimistic about using insects in poultry feed. The majority are in favour of using maggots as an alternative source of protein. Training and awareness campaigns are needed to encourage wider and more sustainable adoption of insects in poultry feed in the Abidjan district.

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