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Study of Guinea Fowl (*Numida meleagris*) Production System in the Urban Commune of Madarounfa, Niger

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Authors' contributions

This work was carried out in collaboration among all authors. Author MHO did the methodology, data curation, writing original draft, formal analysis and conceptualization. Author BN did the writing review and editing. Author YOM did the data collection. All authors read and approved the final manuscript.

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ABSTRACT

The local guinea fowl (*Numida meleagris*) is native to Africa and belongs to the Gallinaceae family. A study was conducted among guinea fowl breeders in the urban commune of Madarounfa to determine the constraints of guinea fowl production in the area. Sixty (60) breeders were interviewed using a structured questionnaire in six (6) villages 15km apart to collect information on the conduct and practice of guinea fowl breeding. Results revealed that the guinea fowl breeders from this study are men. The production purpose of the guinea fowl in the urban commune of Madarounfa is for selling (53%), self-consumption (32%), and gift/donation (10%). Scavenging is

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the feeding system (100%) which is mostly used. Constraints related to guinea fowl production as identified by the study are mainly diseases (32%), lack of training (22%), lack of feed (17%), and lack of funding (17%). It is clear that the development of the sector necessarily involves strengthening the surveillance of avian diseases, coupled with veterinary monitoring and supervision of producers.

Keywords: Guinea fowl; guinea fowl breeders; poultry farming.

1. INTRODUCTION

Family poultry farming is very popular and important in developing countries [1]. Local poultry occupies a prominent place in poultry production in sub-Saharan African countries. As a result, traditional poultry farming appears to be an excellent means of household resilience in rural and urban areas [2,3,4].

The grey guinea fowl or common guinea fowl (*Numida meleagris*) is the most domesticated strain in the world. According to Le Coz-Dawn [5], it originated in West Africa. Guinea fowl breeding first spread throughout Africa in the form of farm breeding, then later spread to Europe, Asia and America. Strains adapted to the sub-Saharan African region are called hardy, because they have only been subject to natural genetic selection. They are characterized by a very slow growth rate. The motley appearance of the plumage gave rise to the name "pintata" in Portuguese, then "pintada" in Spanish, from which finally came the French name of "pintade" [6].

Livestock farming in Niger is practiced by nearly 87% of the active population either as a main activity or as a secondary activity after agriculture [7]. Among the poultry species raised in Niger, guinea fowl comes in second place after chicken with 26% of the poultry herd. It plays a vital nutritional, socio-economic, and cultural role due to its short production cycle, the absence of religious prohibitions in its consumption, its accessible cost, and its capacity to regenerate income compared to ruminant breeding [8]. Despite this importance, the productivity of local poultry (meat and eggs) is below the demand expressed by consumers [9]. Therefore, poultry productivity must be improved.

Guinea fowl meat is more appreciated than chicken meat due to its organoleptic qualities; according to Baeza et al. [10], the carcass yield is 68.7% in males compared to 68.2% in females. In West Africa, guinea fowl is highly valued for its meat and eggs [11]. Its breeding occupies a prominent place, given its social and nutritional importance in the lives of populations [12]. Guinea fowl meat has a higher protein content than chicken meat [13]. It therefore constitutes a source of income for communities [14]. That's why the guinea fowl is a poultry very appreciated by the population of Niger. Only Niger knows very few studies on guinea fowl breeding. However, to improve livestock production, it is necessary to know the production system and identify the constraints. That justifies this study with the main objective of characterizing the local guinea fowl production system in the urban commune of Maradarounfa to contribute to the development of guinea fowl breeding in Niger.

2. METHODOLOGY

2.1 Study area

The urban commune of Madarounfa is located in the department of Madarounfa in the region of Maradi/Niger. The urban commune of Madarounfa is limited to the north by the commune of Djiratawa, to the east by the commune of Dan Issa, to the west by the commune of Safo and to the south by the commune of Gabi. The population is essentially made up of Hausa (65%), Fulani (18%) and Tuareg (9%) [15].

Madarounfa has a forest classified by decree No. 4400 of 1950 with an area of 830 ha. The forest is located near Lake Madarounfa where the pedoclimatic conditions are favorable to the development of vegetation (sandy soils, alluvial plains). The wooded savannah forest heritage has been well preserved and the floristic composition is varied, composed of species such as *Tamarindus indica, Mitragina inermis, Anogessus leocarpus, Acacia albida, Bauhiniarufescens, Acacia seyal, Acacia senegal, Diosperos mesphilimermis, Haephaene thebaica, Piliostigma reculatum*, etc. The 800 ha Madarounfa lake is a refuge for an abundant and varied birdlife (storks, ducks, teals, sandpipers, camerons, pelicans, etc.) [16].

2.2 Survey

A survey was carried out among guinea fowl breeders in the urban commune of Madarounfa based on the questionnaire to determine the guinea fowl production system and the flock size of poultry of each producer.

2.2.1 Choice of villages

The investigation concerned the urban commune of Madarounfa. six villages were chosen. The choice of these villages was made with the support of the Madarounfa departmental livestock directorate. The criteria for choosing villages are a significant number of guinea fowl producers per village and that the villages are at least 15km apart.

2.2.2 Choice of respondents

In each village ten guinea fowl producers were chosen. A total of sixty producers were questioned as part of this work. The choice of producers was guided by the village chief who knows the guinea fowl producers in his village.

2.3 Statistical Analysis of the Data

After preparing the data collected in excel 2016, authors carried out a descriptive analysis with SPSS version 26 software [17].

3. RESULTS AND DISCUSSION

3.1 Socio-economic Characteristics of Producers

The producers of guinea fowl breeding in the urban commune of Madarounfa are men even if the study reveals that among managers there is 5% of women (Table 1). This situation can be explained by the fact that the management of this breeding is complicated and that men would be better able to resolve amicably the conflict situations that the breeding of guinea fowls could cause [18,19]. This result is slightly different from that found by Moussa et al. [20] in the urban commune of Tessaoua where women represent 13% of producers. However, in Burkina Faso poultry farming in general is a women's activity [21]. These producers are mostly married (98.3%) and 60% of them are between 30- and 50-years old similar results were found by Issa et al. [22] in Chad and by Mbengue [23] in Senegal. The practice of guinea fowl breeding in Niger is an old activity (81.7% of the respondents kept guinea fowl for more than 5 years). All the producers have never received training or capacity building on the practice of guinea fowl breeding. The main objective of guinea fowl breeding in Niger is selling (53%), self-consumption (32%), and gift/donation (10%) (Table 1). This result is similar to the result found by Moussa et al. [20] in the urban commune of Tessaoua.

3.2 Composition of the Poultry Flock

The poultry flocks consisted of several species. The average flock size of chickens represents the largest proportion. Out of a total of 2443 poultry encountered, 56.6% are chicken. This number of chickens is followed by the guinea fowl (42.4%), then the duck (0.6%) and finally the pigeons (0.4%) (Table 2). This composition somewhat reflects the national distribution of poultry in Niger which shows the predominance of chicken followed by guinea fowl then pigeon, duck, etc. [24].

3.3 Favorite Guinea Fowl Colors

The Guinea fowl with gray plumage were mainly preferred for 68.3% of producers (Table 3). They were followed by the ashes, the gray with white breast and the white with 25%, 5% and 1.7% respectively. This result corroborates that obtained by Moussa et al. [20] in the urban commune of Tessaoua. The choice of these colors is mainly due to personal preference for 46.7% of producers and due to the tradition (26.7%).

3.4 Technical Characteristics

3.4.1 Housing and feeding

Guinea fowl does not have a specific habitat. 58.3% of producer kept their bird outside the house. Scavenging is the main production system. This free-range breeding method is found in the majority of regions of sub-Saharan Africa [25,26,27]. The principal reason for choosing this production system is the lack of infrastructure for 51.7% of the producers. But the majority of producers (91.7%) are giving supplement to their bird. The type of supplement is the agricultural sub-products (Table 4).

3.4.2 Health monitoring

Among producers, only 16.7% vaccinate their guinea fowl and 95% do not receive visits from

veterinary agents at their farm. The mortality rate per year is above 50% for 75% of producers. For this reason, the majority of producers noted a period of inactivity of the local chicken production due to avian diseases (61.7%) (Table 5). These results are similar to those found par Moussa et al. [28] on local chicken production system in Niger.

Table 1. Socioeconomic Status of the guinea fowl breeders of the urban commune of Madarounfa

Parameters and variables	Sample size	Frequency (%)	Parameters and variables	Sample size	Frequency (%)
Producer gender			**The main activity of guinea fowl breeder**		
Male	60	100	Breeding	30	50
Female	0	0	Farming	30	50
Total	60	100	Total	60	100
Age group			**Seniority in guinea fowl breeding**		
<30 years	8	13.3	2-5 years	11	18.3
30-50 years	36	60.0	>5 years	49	81.7
50-70 years	15	25.0	Total	60	100
>70 years	1	1.7	**Purpose of guinea fowl breeding**		
Total	60	100	Sell	32	53
Manager of guinea fowl breeding			Gift/donation	6	10
Men	44	73.3	Distraction	3	5
Women	3	5.0	Self-consumption	19	32
Son	13	21.7	Total	60	100
Total	60	100	**Training in guinea fowl breeding**		
Marital status			Yes	0	0
Married	59	98.3	No	60	100
Single	1	1.7	Total	60	100
Total	60	100			

Table 2. Composition of poultry flocks in the urbain commune of Madarounfa

Species of poultry	Sample size	Frequencies (%)
Guinea fowl	1037	42.4
Chicken	1382	56.6
Pigeon	9	0.4
Duck	15	0.6
Total	2443	100

Table 3. Guinea fowl preference

Parameters	Modalities	Sample size	Frequency (%)
Guinea fowl color preference	White	1	1.7
	Gray	41	68.3
	Gray with white breast	3	5.0
	Ash	15	25.0
	Total	60	100
Reason for guinea fowl color preference	Tradition	16	26.7
	Personal preference	28	46.7
	Sale	7	11.7
	Calm	3	5.0
	Rapid growth	1	1.7
	Easy to identify	2	3.3
	Availability	1	1.7
	Strength	2	3.3
	Total	60	100

Table 4. Housing and feeding characteristics of the guinea fowl in the urban commune of Madarounfa

Parameters and variables	Sample size	Frequency (%)	Parameters and variables	Sample size	Frequency (%)
Housing of guinea fowl			**Production system**		
In the house with us	25	41.7	Scavenging	60	100
			Total	60	100
Outside the house	35	58.3	**Reason for choosing the production system**		
Total	60	100	Property	5	8.3
Supplement			Animal health	9	15.0
No	5	8.3	Economic	5	8.3
Yes	55	91.7	Lack of training	4	6.7
Total	60	100	Lack of infrastructure	31	51.7
Type of supplement			Tradition	6	10.0
Agricultural sub-products	56	93.3	Total	60	100
No supplement	4	6.7			
Total	60	100			

Table 5. Health monitoring of guinea fowl in the urban commune of Madarounfa

Parameters and variables	Sample size	Frequency (%)	Parameters and variables	Sample size	Frequency (%)
Vaccination of guinea fowl			**Mortality rate in case of diseases**		
Yes	10	16.7	<25%	3	5.0
No	50	83.3	25-50%	12	20.0
Total	60	100	>50%	45	75.0
Breeding inactivity period			Total	60	100
Yes	37	61.7	**Maladies courantes de la pintade**		
No	23	38.3	Fever of two days	9	15.0
Total	60	100	Cholera	43	71.7
Reason of breeding inactivity			Hypocalcemia	2	3.3
Sales difficulties	5	8.3	Avian influenza	2	3.3
Avian disease	32	53.3	Don’t know	4	6.7
Non-stop	23	38.3	Toral	60	100
Total	60	100			
Veterinary agents visit					
Once a year	2	3.3			
When need	1	1.7			
Never	57	95.0			
Total	60	100			

3.4.3 Guinea fowl egg management policy

Guinea fowl eggs are mainly intended for brooding (43%), sale (43%) and consumption (14%) (Fig.1).

3.5 Constraints and Solution of Guinea Fowl Production

Avian diseases constitute the largest obstacle of guinea fowl production for 32% of producers. Then comes the lack of training (22%), the lack of feed (17%), the lack of funding (17%), etc. Fig. 2 shows the various problems that hinder the raising of the guinea fowl in the urban commune of Madarounfa. These results are similar to the result found by Dao et al. [29] in Burkina Faso.

To address or combat these constraints related to guinea fowl farming, it is essential to train guinea fowl producers (28%), then support them with a minimum fund for livestock reconstitution (25%) with timely vaccinations (24%) and regular technical monitoring (23%). Fig. 3 summarizes the main solutions.

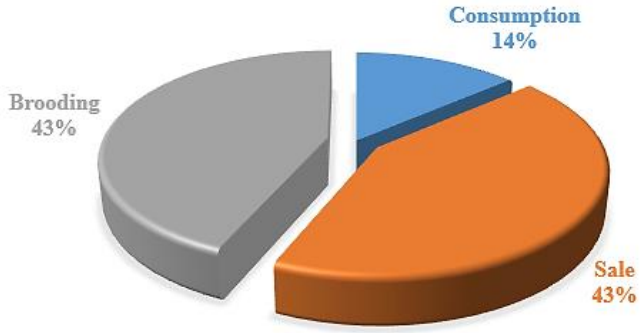

Fig. 1. Management of eggs laid by guinea fowl

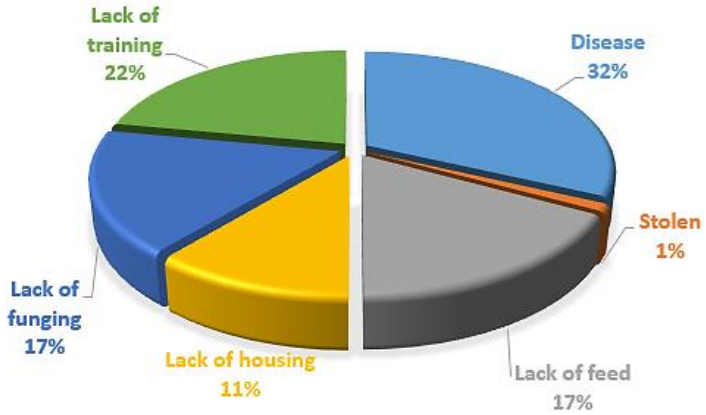

Fig. 2. Main constraints on guinea fowl breeding in the urban commune of Madarounfa

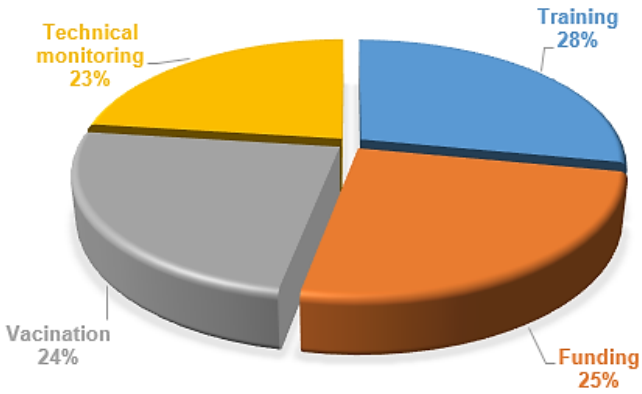

Fig. 3. Solution against the constraints of guinea fowl breeding in the urban commune of Madarounfa

4. CONCLUSION

This study falls within the framework of promoting guinea fowl breeding in Niger. It appears from this study that the breeding of guinea fowl in the urban commune of Madarounfa is essentially the prerogative of men, especially married men. Gray guinea fowl are the types most loved by the population. These guinea fowl are raised without a specific habitat with a scavenging production system. Guinea fowl breeding in village settings suffers from shortcomings in terms of health, food, production system and environment. The veterinary monitoring, the technical training and the financial support are parameters which

could allow a good improvement in productivity in the farming environment of guinea fowl breeding in Niger.

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc) and text-to-image generators have been used during writing or editing of manuscripts.

CONSENT

All the producers who participated in this survey were first informed about the main purpose of the study and their participation was voluntary and anonymous. A written agreement was obtained from each producer at the beginning of his interview.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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