



Breeding practice and productivity of domestic pigeon (*Columba livia domestica*) in the urban area of Abeche city.

NIDEOU Dassidi¹, Madjina TELLAH¹, LENG Tchang², DJASRANGUE Sandjibaye¹, MOPATÉ Logténé Youssouf³

1 Institut National Supérieur des Sciences et Techniques d'Abéché (INSTA), Département des Sciences et Techniques d'Élevage BP: 130 Abéché, Tchad

2 Université de N'Djaména, Branche Alexandrie, Faculté de Médecine Vétérinaire et Agronomie, BP: 1117 N'Djaména, Tchad. Laboratoire de Zootechnie et des Productions Animales de l'IREDA.

3 Institut de Recherche en Élevage pour le Développement (IREDA), BP: 433 N'Djaména, Tchad. Laboratoire de Zootechnie et des Productions Animales de l'IREDA

Corresponding Author: nideoudass@gmail.com

Submission 7th July 2023. Published online at <https://www.m.elewa.org/Journals/> on 31st August 2023. <https://doi.org/10.35759/JABs.188.3>

ABSTRACT

Objective: In this study, the aim was to evaluate the productivity of domestic pigeon (*Columba livia domestica*) farming in Abeche city to improve family poultry farming practices.

Methodology and Results: A total, 99 households participated were included in this study. The data collected focused on the breeder's profile, age at onset of egg-laying, number of eggs laid, laying frequency, hatching rate, incubation period, weaning of squabs, breeding management and constraints. Data were analysed using XL-STAT software (version 6.1.9). This study revealed that men (77.78%) with a mean age of 35.43±0.45 years predominantly practice poultry farming. The breeders were mostly married (84.85%), with the majority being schooled (81.82% secondary), and with a working experience of 6.24±0.75 years in pigeon farming. The breeding objective was consumption and sale. Health monitoring of 70.41% is ensured through both vaccination and preventive treatment (70.41%) and secondly only preventive treatment (22.45%). The age at onset of egg laying is 5.01±0.21 months. The squab lays 1.75±0.12 eggs per clutch with a frequency of 7.56±0.27 clutches per year. A total egg laid per hen pigeon per year was 14.01±1.03. The hatching rate is 87.50% after 17-19 days of incubation. Parasitosis (52.50%), coccidiosis (35.39%) and lack of technical support, feeding, and disease management were considered the main limiting factors for domestic pigeons' productivity in Abeche city.

Conclusion and application of results: Pigeon farming was practiced mostly by men who have secondary level of education. The main constraints of pigeon breeding were Diseases, predator problem, theft and lack of technical support. Technical support, including training in farming practices and biosafety measures, as well as the availability of necessary inputs, will be crucial for enhancing pigeon productivity. Furthermore, conducting techno-economic investigations will help determine the economic advantages of this farming Practice for farmers.

Keywords: Practice, productivity, domestic pigeons, Abeche city, Chad.

INTRODUCTION

In sub-Saharan Africa, family poultry farming remains the most accomplished despite the important development of industrial poultry farming in recent years (Missohou *et al.*, 2002; Fotsa *et al.*, 2007). It occupies a remarkable place in development strategies and may contribute to alleviating poverty and human malnutrition because of the little capital it requires at the start, its short production cycle, and the possibility it can offer to cover certain family needs. (Kondombo *et al.*, 2003). In addition, despite the low productivity of family poultry, it can provide the population with meat and eggs, which constitute a significant source of protein and source of income in the rural area. In Chad, the total population of poultry was estimated at 93.8 million chickens (FAO, 2018) and 2.265.753 pigeons (RGE, 2016). For socio-cultural reasons, the breeding of pigeons in the tropics regions was lower than those of other poultry. However, pigeon breeding can also effectively contribute to food security and poverty alleviation among disadvantaged rural populations. The *Columba livia domestica* pigeon is a Columbidae bird family, diurnal and very widespread in Africa.

It is raised for its meat and for the fertilizer droppings (Ciminari *et al.*, 2005). Pigeons are raised in backyard systems characterized by small-scale production practiced by households using little labour. These pigeons roam freely scavenge around the compound of household, feeding on anything available like residues from the harvest. The breeder provides the supplement. This production is generally intended for family food but also generates family income. In Abéché, most households raise a small number of pigeons and this implies that this production would contribute to improving the income of these households. Even if this sector remains marginal and traditional, it is constantly evolving and deserves scientific investigations to better understand its outline. It is in this perspective that this study was undertaken to understand the characteristics of this family poultry farming as well as the productivity of the pigeons raised in Abeche city. The general objective of this study was to determine the production practices and productivity of pigeons in Abeche city.



Pigeon (*Columba livia domestica*) of the study area.

MATERIALS AND METHODS

Description of the study area: This study was conducted in Abeche town. Abeche city is the capital of the Ouaddaï region. It extends between 13° 20'0" North latitude and 20°40'0" East longitude. This study area is under the influence of an intertropical climate with a dry season that lasts 9 months (October to June) and a rainy season of 3 months (July to September). The coldest months are November, December, January, and February but the warmest months are March, April, May, and June. The regime of these two seasons is defined by the fluctuations between the masses of dry air from the north (the harmattan) and the masses of moist maritime air from the southwest (the monsoon). Abeche city receives an amount of average annual rainfall of about 300 mm/year. The average annual temperature in Abeche city is around 28°C with a variation in the cold season (December to February), between 16 and 35°C, in the dry season (April and May) between 25 and 41°C. The city is divided into seven districts and is populated by approximately 1.048.962 inhabitants (RGPH2 2009).

Methods of data collection: This study was conducted by survey using a structured questionnaire. A total, of 99 households participated in the interview and 424

indigenous pigeons were inventoried. The data collection focused mainly on the profile of the farmers (sex, age, level of education, marital status, length of professional experience, and, other activities, origin of pigeons, and structure of the backyard), the management of the flock, and productivity of domestic pigeons; (age of entry into laying, number of eggs laid, frequency of annual laying, hatching rate, duration of incubation and weaning of the youngsters) and on the difficulties and the prospects for improving their production. The diseases encountered in the pigeon farms were revealed based on suspicion with regard to the symptoms described by the breeders.

Statistical analysis: The data collected was analysed using XLSTAT software (6.1.9). The descriptive analysis was used to determine the dispersion parameters (mean \pm standard deviation, extremes, and frequencies). The parameters measured were duration of professional experience, duration of brooding, age of entry into laying, number of eggs laid, frequency of annual laying, hatching rate, duration of incubation and weaning of the youngsters. When the means of dispersion parameters were statistically different, the means were further compared using the Newman-keuls test (SNK) at a 5% threshold.

RESULT

Breeder's profile: The present investigation showed that breeder of the pigeons was practiced mostly by men (77.78%). The number of women was significant lower (22.73%) than the men. The average age of pigeon farmers was 35.43 years with 6.24

years of pigeons breeding experience (Table 1). The majority interviewed are married and educated (secondary 55%) (Table 1). In addition, agriculture coupled with livestock was the major occupation revealed in the survey followed by trade (Table 2).

Table 1: Profile of respondent in Abeche city.

Parameter	Number (n=99)	Proportion (%)
Sex of respondents (%)		
Men	77	77.78
Women	22	22.22
Average age of respondents (year)	35.34±0.60	
Years of local pigeon producers experience	6.24±0.45	
Marital status		
Married (%)	84	84.85
Single (%)	11	11.11
Widowed (%)	4	4.04
Educational level (%)		
Illiterate	9	9.09
Primary education	6	6.06
Secondary	55	55.55
High school	29	29.30

Table 2: Distribution of respondents by major occupation

Occupation	Number (n=99)	Percentage
Agriculture coupled with animal breeding	42	42.43
Student	31	31.31
Trade	26	26.26

Source of supply for pigeon and Production objectives: Figure 1 shows that pigeon's farmers surveyed have markets and secondly a donation as their main source of supply for

breeder birds. The present investigation revealed the breeding of pigeon's objective is intended both family consumption and sales (figure 2).

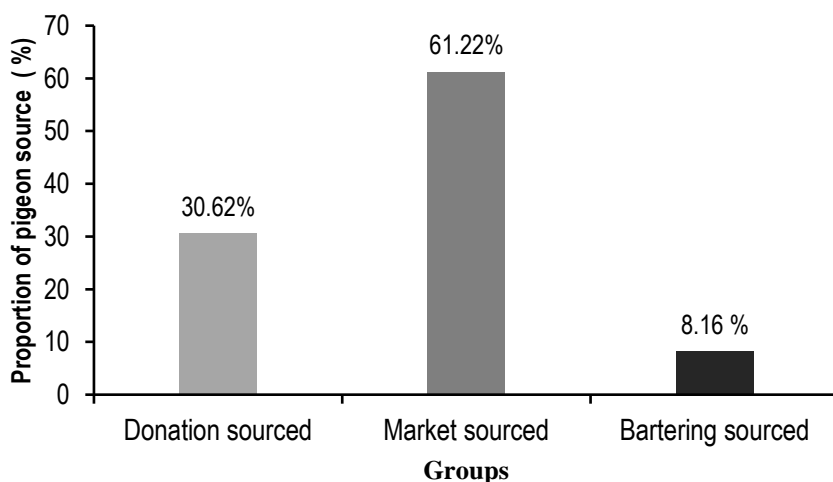


Figure 1: Source of breeder local pigeon

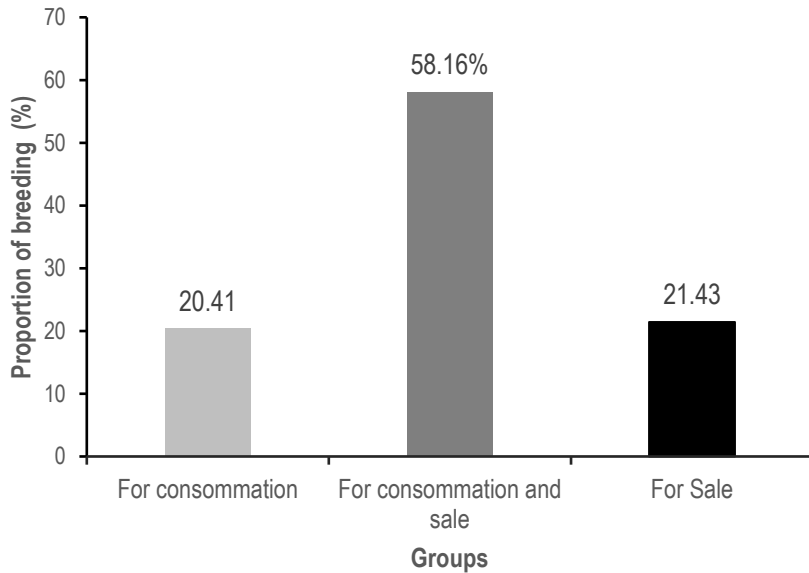


Figure 2: Production objective

Feeding pigeon and prophylactic practice:

The present study showed that penicillary millet, groundnuts, rice, watermelon seeds, sesame, rice followed by a mixture of rice and millet are the most used ingredients in the feed of pigeons (figure 3). The results revealed that

the majority of breeders treat and vaccinate (70.41%) their animals followed by a small proportion who treat their animals (22.45%) and little proportion of breeders practice only vaccination (figure 4).

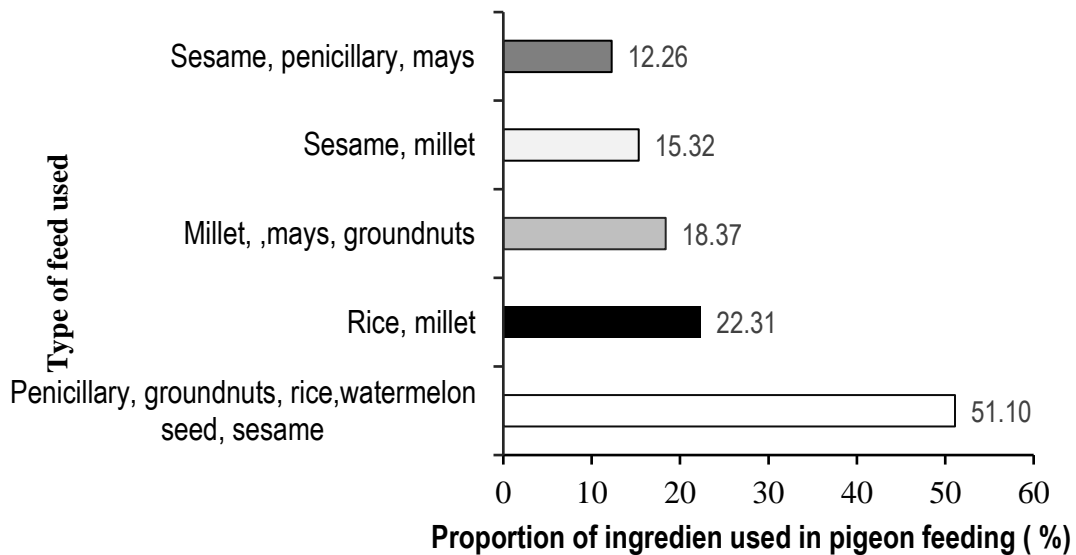


Figure 3: Different types of feed used in pigeon feeding

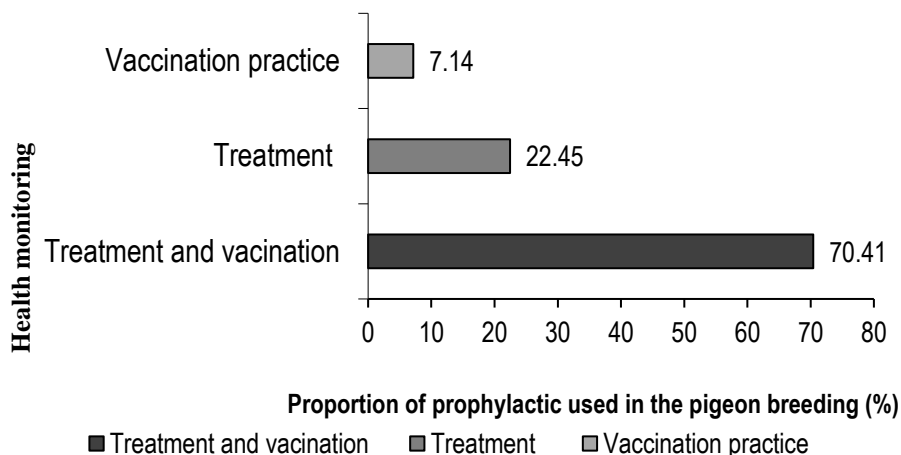


Figure 4: Health monitoring in the pigeon breeding.

Performance of local pigeon: The results of present study revealed the age of the first egg was 5 months (Table 3). As shown in Table 3, the average egg number laid per hen pigeon per clutch in the present study was 1.75 ± 0.12 with

a total of 14.01 ± 1.23 eggs per year at 7.56 clutches per hen per year. The average hatchability of pigeon was 87.50% after 17-19 days of incubation (Table 3).

Table 3: Performance of local pigeon

Parameter	Number
Age at first egg (month)	5.01 ± 0.21
Egg number per clutch	1.75 ± 0.12
Clutch number per female pigeon per year	7.56 ± 0.27
Egg number per female pigeon /year	14.01 ± 1.03
Hatchability (%)	87.50 ± 1.22

Constraints of pigeon breeding and prospects to improve pigeon production:

The main constraint to pigeon breeding included the both diseases and predation (76.54%) followed by only diseases (76.54%) (Figure 5). In addition, other constraints in the study area (Abeche) have been reported breeders like lack technical supervision and

feed formulation. Diseases like parasitosis (52.50%), coccidiosis (35.39%) followed by coryza (12.11%) were considered the main limiting factors for domestic pigeons' productivity in Abeche city (Figure 6). The present study showed that majority of respondents expressed a desire to improve pigeon production (Figure 7).

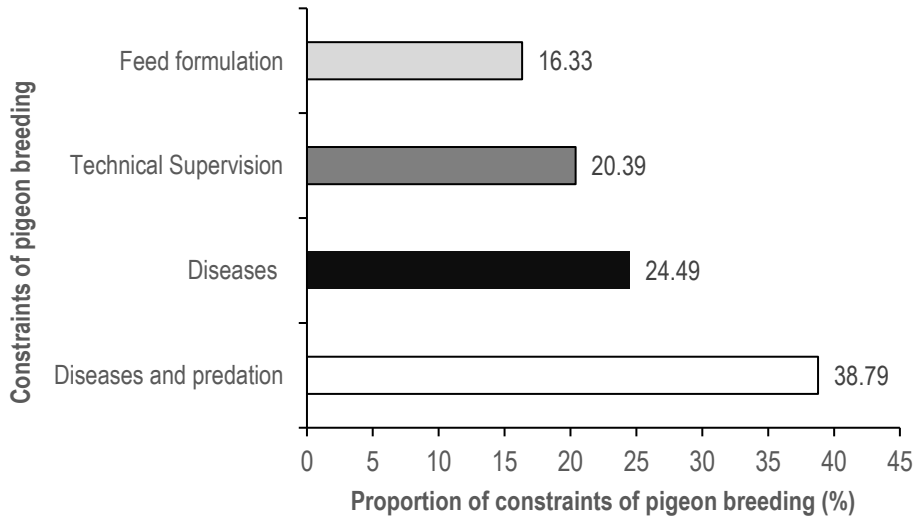


Figure 5: Main constraints of pigeon breeding

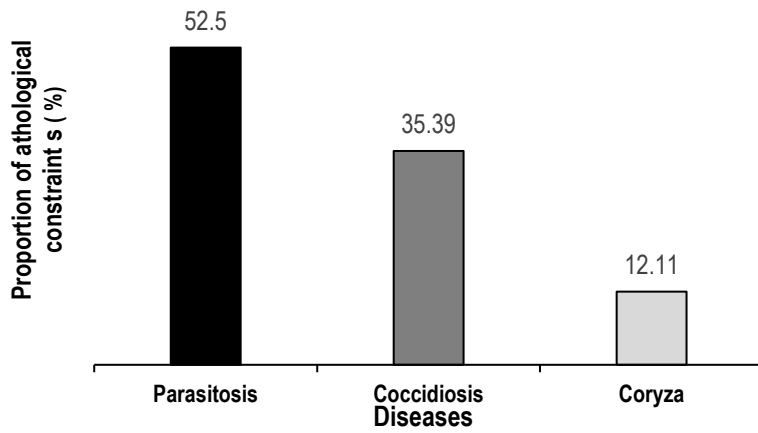


Figure 6: Pathological constraints of pigeon breeding

Prospects to improve pigeon production

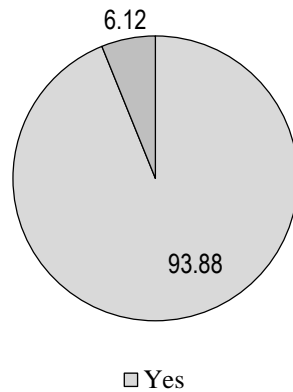


Figure 7: Desire to improve pigeon breeding

DISCUSSION

Breeders' Profile: The results regarding the breeders' profile revealed that pigeon farming in Abeche city is predominantly practiced by men. Similar results were obtained in Chad by Mopaté and Maho (2005), indicating that family poultry farming is mainly practiced by men. This result could be attributed, on the one hand, to the culture of the indigenous people of Abeche city. In addition, pigeon farming requires less investment than raising livestock. The breeders were mostly married (84.85%), with the majority being schooled (81.82% secondary), and with a working experience of 6.24 ± 0.75 years in pigeon farming. This result is similar to that obtained by Mopaté (2010), highlighting that the majority of pigeon farmers are married (81%) and have 4 years of experience. Furthermore, the results indicate that the majority of pigeon breeders have agriculture as their main activity, coupled with breeding. This result perfectly illustrates the agro-pastoral vocation of Chad.

Origin of Domestic Pigeons and band Structure: This study highlights that pigeon farming in Abeche city is primarily aimed at both commercialization and consumption and secondly for sale. Our results are similar to those obtained by Moula *et al.* (2012) and Dinka *et al.* (2010) in Congo and Ethiopia, respectively. The results showed that pigeons were acquired through purchases. Our findings confirm those of Mopaté and Maho (2005) in Chad, indicating that the initial stock in the band consists of purchased pigeons. In poultry farming, nutrition remains the most important factor as it can significantly influence the performance of the birds. The results of this study showed that most pigeon breeders use a combination of penicillary millet, peanuts, rice, sesame, watermelon seeds and water. This result can be attributed to the fact that these ingredients are readily available and cost-effective in Abeche city. In addition, the feed (millet penicillary, peanuts watermelon seeds, sesame) served to pigeon is produced or

purchased by producers. Regarding medical care, the majority of respondents stated that they treat their animals, while a minority both treat and vaccinate their pigeons. Similar observations were made in Abeche by Nideou *et al.* (2023) about indigenous chickens. The results revealed that the age at onset of egg laying for female pigeons was 22 weeks. In contrast to Merabet *et al.* (2011), these results indicate an egg-laying age of 20 weeks. This difference could be attributed to environmental and nutritional effects. According to this study, the average number of eggs laid per clutch was two. This was followed by an incubation period ranging from 17 to 19 days and a hatching rate of 88 to 90%. The number of squabs at weaning was 1.87, sometimes two, with a relatively low mortality rate. Our results are similar to those obtained by Merabet *et al.* (2011), who found that the clutch size was 2 eggs, with nearly 2 squabs at weaning and a zero-mortality rate.

Main Constraints and Prospects for Improvement: Diseases, poor feeding, and technical support posed the biggest challenges to traditional pigeon farming in Abeche city. This result is similar to the findings of Ndayisenga (2010) in Senegal. This similarity could be attributed to common environmental factors in the two studied areas. Parasitosis and coccidiosis were the main diseases encountered in pigeon farms in Abeche city. This result confirms the assertion of Alabi and Issas (2002) that in tropical Africa, Parasitosis and coccidiosis are among the diseases that hinder family and industrial poultry farming. Apart from diseases, pigeon losses were caused by predators such as hawks and mice. These causes may be related to the poor design of poultry houses and squab vulnerability. Furthermore, the majority of respondents expressed a desire to improve pigeon production. This improvement can only be achieved if synthetic medications are available in Abeche city at a lower cost (reducing taxes

on veterinary products). In addition, knowledge of managing a flock of pigeons and understanding biosecurity measures could help mitigate pigeon farming problems. This study results are consistent with those obtained by

Ndayisenga (2010), who highlighted that most pigeon farmers wish to improve pigeon production through training in breeding techniques and poultry health monitoring.

CONCLUSION AND APPLICATION OF RESULTS

In conclusion, this study provides insights into domestic pigeon farming practices and productivity in Abeche city. It highlights the participation of married men engaged in agriculture and pigeon farming. Additionally, the study emphasized the importance of addressing diseases and predator control to mitigate pigeon losses. Understanding the age of onset of egg laying, incubation duration, and

hatching rates contributes to our knowledge of pigeon farming. Technical support, including training in farming practices and biosafety measures, as well as the availability of necessary inputs, will be crucial for enhancing pigeon productivity. Furthermore, conducting techno-economic investigations will help determine the economic advantages of this farming Practice for farmers.

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