



RESEARCH ARTICLE

A STUDY ON TRADITIONAL PIGEON FARMING AND BREEDING PRACTICES IN GAMAWA L.G.A, BAUCHI STATE

Almajiri, I. M., Ibrahim, T., Ja'afar, A. M., *Shuaibu, A., Umar, H. A. and Ma'aruf, B. S.

¹College of Education Kangere P. M. B. 0316, Bauchi, Bauchi State, Nigeria

²Department of Animal Production Faculty of Agriculture, Abubakar Tafawa Balewa University, Bauchi, Nigeria

³Department of Animal Science Faculty of Agriculture, Federal University of Kashere, Gombe State, Nigeria

ARTICLE INFO

Article History:

Received 24th January, 2019

Received in revised form

20th February, 2019

Accepted 14th March, 2019

Published online 30th April, 2019

Keywords:

Pigeon, inbreeding,
Cross-breeding,
Location.

*Corresponding author: Shuaibu, A.,

ABSTRACT

A study was conducted among 315 randomly selected pigeon farmers across different locations in Gamawa L.G.A to investigate their traditional breeding methods, breeding objectives and traits preferences for selecting breeding stocks. The result obtained showed that majority (75.485%) of the farmers kept the local pigeon breeds over the cross breeds (20.70%) and exotic breeds (3.82%). Most of the farmers (42.99%) sourced their breeding stocks from within their flocks over other sources. Most (35.67%) of the farmers kept pigeon for hobby and for meat (32.48%) followed by other reasons. Most of the farmers accorded a higher priority for qualitative trait (Body colour) in selecting breeding males (38.85%) and females (31.55%) over other traits. However, some degrees of emphasis (16.88% and 16.24%) were given for productive traits (hatchability and quality of squabs respectively) in selecting breeding females. Majority (80.92%) of the farmers used cross breeding technique to genetically upgrade their birds, despite the fact that most of them (72.205%) had no knowledge of inbreeding. There was a very significant ($p < 0.001$) difference between the study locations across all the variables. The farmer's indigenous breeding strategies should be harnessed in designing a breeding programme in the study area for better result and sustainability.

INTRODUCTION

In Nigeria, there is hardly any household in the rural and peri-urban areas that does not keep one form of poultry or the other. Animal protein consumption varies from country to country. It has been reported that protein intake in developing countries is only between 12 and 20 grams or 2 to 3 times lower than the developed countries (FAO, 2008). Nigeria is animal protein deficient nation. There is the need to rapidly increase animal protein production in the country to meet the demand of the ever increasing human population. Any other means of achieving this goal must be through breeding of animal with shorter generation interval. Nigerians have many varieties of poultry including pigeons. It is reported that poultry ranks highest in the number of domestic animals kept, mostly 80-90% owned by small scale farmers Anonymous (1991). Therefore, the numerical advantage of the poultry species can be maximally exploited to serve as the avenue for rapid transformation of animal protein production in the country (Ahemen *et al.*, 2011). Pigeon (*Columba livia*) have the potentials of ameliorating animal protein deficiency in Nigeria, especially in the rural areas as prolificacy, short reproduction cycle and less disease occurrence are their key attributes. The contributions of pigeon have not yet been considered in relation to the contribution of livestock sub-sector and poultry production (Asaduzzaman *et al.*, 2009). Pigeon (*Columba livia*) commonly called "baru" in Hausa language, rock pigeon in other places (Hassan, 2002) are raised by many peasant farmers. The word pigeon is derived from the latin word "pippio" meaning young cheeping bird. They can fly to an altitude of 6000ft or more (Audu, 2004), breed all year round,

with peak breeding in spring and summer and they lay two white eggs that are incubated by both parents for 17-19 days. Pigeon are used for beautification, and as ornamental birds, source of palatable, delicious and easily digestible animal protein, source of bio-fertilizer especially for family gardening and used as laboratory animals in case of genetic and hormonal studies. Hence, profitable pigeon farming may be an easy and reliable source of employment opportunity, way of family labour utilization and as source of income (Asaduzzaman *et al.*, 2009). The breeding of pigeons for the purposes of enhancing size, shape, colour or behavior is thought to have started over 3000 years ago, but little historical evidence exists. Despite all the unique attribute of pigeons in both economic and social sense and with their huge potentials to ameliorate animal protein deficiency in Africa and Nigeria especially in the rural and peri-urban areas, there is a continued decline in pigeon industry and pigeon meat consumption in Nigeria (Omojola *et al.*, 2009). A lot of people know very little about the prolific nature of the bird talk less of their potentials as an alternative protein source (Omojola *et al.*, 2007). There is paucity of information on the systems of raising and breeding pigeons in the rural settings (El-Hanoun *et al.*, 2008). The lack of understanding of the socio-economic content of the production system is a major factor in the failure of research to have an impact on poor farmer's livelihoods (Biggs, 1995). This means in practice that researchers have to explore ways to actively engage with pigeon keepers to understand their breeding objectives, selection criteria and trait preferences for improving their birds and to also understand their perceptions and hence the need to develop a technical-biological aspect with social context as well as their interaction (Whyte, 2002).

Therefore, this study was aimed to identify and characterize production system and breeding practice of pigeon farmers in Gamawa Local Government Area of Bauchi State.

MATERIALS AND METHODS

Description of the study area

The study was conducted in Gamawa Local Government Area of Bauchi State, Nigeria. It is about 300km away from the state capital (Bauchi) and lies at latitude 12.13°N to 12.53°N and longitude 10.53°E to 10.72°E. Gamawa Local Government had an annual rainfall of 800mm which last for 4-5 months (May to September) and a total land mass of about 2,925km².

Data collection and analysis

Three hundred and twenty pigeon farmers were randomly selected from six districts of Gamawa Local Government Areas of Bauchi State namely; Gamawa, Udubo, Wabu, Zindiwa, Raga and Gadiya. Farmers were individually interviewed, information on type of pigeon kept by farmers, source of breeding stocks, breeding objectives, most preferred traits during selection and farmers’ knowledge on cross and in-breeding practice using a semi-structured questionnaire.

Prior to the research, a pilot survey was conducted to test the reliability of the instrument (questionnaire) in the study area. The data obtained were analyzed using Chi-square (χ^2) statistics of Minitab Version 15.

RESULTS

Presented in Table 1, 2, 3, 4 and 5 are the distribution of pigeon breeds kept by farmers, source of breeding stock, breeding objectives, most preferred traits during selection and farmers’ knowledge on cross breeding and inbreeding according to location. Significant (P<0.001) effect of location was observed on all the variables measured. The most preferred pigeon breed kept by the farmers was the indigenous varieties (75.48 %) and the cross bred types (20.70 %), only few manage the exotic breeds (3.82 %). Majority (42.99 %) of the farmers sourced breeding stocks from their own flocks, only few purchased from breeding/research centers (6.69 %). The major objective of pigeon farming in the study area was for hobby (35.67 %) and the most preferred trait used during selection of breeding males was body colour (38.85 %). While for females, hatchability (16.88 %) in addition to body colour (31.85 %) were used for selection. Most of the farmers cross bred their birds with superior genotype even though they lack the knowledge of inbreeding (72.20 %).

Table 1. Distribution of pigeon breeds kept by farmers in some villages in Gamawa LGA

Location	Breed			Total	χ^2	LOS
	Local	Cross bred	Exotic			
GMW	50 (84.75)	8 (13.56)	1 (1.69)	59 (18.79)	100.32	***
UDB	47 (94.00)	3 (6.00)	0 (0.00)	50 (15.92)		
GDA	20 (33.33)	31 (51.67)	9 (15.00)	60 (19.11)		
WAB	31 (62.00)	18 (36.00)	1 (2.00)	50 (15.92)		
RAG	39 (86.67)	5 (11.11)	1 (2.22)	45 (14.33)		
Total	237 (75.48)	65 (20.70)	12 (3.82)	314 (100)		

*** = P<0.001, χ^2 = Person chi-square value, LOS = Level of Significance, GMW = Gamawa, UDB = Udubo, GDA = Gadiya, WAB = Wabu, ZDW = Zindiwa, RAG = Raga and N = Number of observation. Figures in Parenthesis are in Percentages.

Table 2: Distribution of Sources of Breeding Stocks by Location among Pigeon Farmers in Gamawa LGA

Location	Own flock	Source			Total	χ^2	LOS
		Neighbour	Market	B/R Center			
GMW	29 (49.15)	14 (27.73)	13 (22.03)	3 (5.08)	59 (18.79)	90.65	***
UDB	31(62.00)	5 (10.00)	14 (28.00)	0 (0.00)	50 (15.92)		
GDA	25 (41.67)	21 (35.00)	9 (15.00)	5 (8.33)	60 (19.11)		
WAB	26 (52.00)	6 (12.00)	9 (64.00)	9 (18.00)	50 (15.92)		
ZDW	5 (10.00)	13 (26.00)	32 (64.00)	0 (0.00)	50 (15.92)		
RAG	19 (42.22)	19 (42.22)	3 (6.67)	4 (8.89)	45 (14.33)		
Total	137(42.99)	78 (24.84)	80 (25.48)	21 (6.69)	314 (100)		

*** = P<0.001, χ^2 = Person chi-square value, LOS = Level of Significance, GMW = Gamawa, UDB = Udubo, GDA = Gadiya, WAB = Wabu, ZDW = Zindiwa, RAG = Raga, B/R = Breeding/Research and N = Number of observation. Figures in Parenthesis are in Percentages.

Table 3. Distribution of Pigeon Farmers Breeding objectives in Some Villages in Gamawa LGA

Location	Meat	Breeding objectives			Income	Total	χ^2	LOS	
		Hobby	Aesthetic value	Trade					
GMW	17 (28.81)	20 (33.90)	1 (1.68)	6 (10.17)	15 (25.42)	0 (0.00)	59 (17.79)	123.7	***
UDB	21 (42.00)	5 (10.00)	1 (2.00)	13 (26.00)	10 (20.00)	0 (0.00)	50 (15.92)		
GDA	26 (43.33)	28 (46.67)	1 (1.67)	0 (0.00)	2 (3.33)	3 (5.00)	60 (19.11)		
WAB	24 (48.00)	18 (36.00)	1 (2.00)	3 (6.00)	3 (6.00)	1 (2.00)	50 (15.92)		
ZDW	5 (10.00)	17 (34.00)	10 (20.00)	1 (2.00)	12 (24.00)	5 (10.00)	50 (15.92)		
RAG	9 (20.00)	24 (53.33)	0 (0.00)	2 (4.44)	10 (22.22)	0 (0.00)	45 (14.01)		
Total	102 (32.48)	112 (35.67)	14 (4.46)	25 (7.96)	52 (16.56)	9 (2.87)	314 (100)		

*** = P<0.001, N = Number of observation, χ^2 = Pearson chi-square value, LOS = Level of Significance, GMW = Gamawa, UDB = Udubo, GDA = Gadiya, WAB = Wabu, ZDW =Zindiwa and RAG = Raga. Figures in Parenthesis are in Percentages.

Table 4. Distribution of farmer's traits preference in selecting Breeding stocks of Pigeons in some villages in Gamawa LGA

Location	Traits Preference For Breeding Male						Traits preferences for Breeding Female									
	BCF	BC	BW	QP	MA	Others	Total	BCF	BC	QS	HBT	MA	BW	CS	Others	Total
GMW	9 (15.25)	22 (37.29)	14(23.73)	14 (23.73)	0 (0.00)	0 (0.00)	59 (18.79)	7 (11.86)	8 (13.56)	11 (18.64)	12 (20.34)	3 (5.08)	3 (5.08)	4 (6.78)	0 (0.00)	59 (18.79)
UDB	4 (8.00)	16 (32.00)	25 (50.00)	5 (10.00)	0 (0.00)	0 (0.00)	50 (15.92)	1 (2.00)	13 (26.00)	15 (30.00)	11 (22.0)	5 (10.00)	0 (0.00)	3 (6.00)	2 (4.00)	50 (15.92)
GDA	10 (16.67)	15 (25.00)	26 (43.33)	9 (15.00)	0 (0.00)	0 (0.00)	60 (19.14)	4 (6.67)	12 (20.00)	15 (25.00)	16 (26.67)	2(3.33)	4 (6.67)	4 (6.67)	2 (3.33)	60 (19.11)
WAB	4 (8.00)	16 (32.00)	20 (40.00)	8 (16.00)	1 (2.00)	1 (2.00)	50 (15.92)	16 (32.0)	14 (28.0)	6 (12.00)	7 (14.00)	1 (2.00)	2 (4.00)	3 (6.00)	1 (2.00)	50 (15.92)
ZDW	11 (22.00)	38 (76.00)	0 (0.00)	1 (2.00)	0 (0.00)	0 (0.00)	50 (15.92)	9 (18.00)	38 (76.00)	2 (4.00)	0 (0.00)	1 (2.00)	0 (0.00)	0 (0.00)	0 (0.00)	50 (15.92)
RAG	3 (6.67)	15 (33.33)	18 (40.00)	7 (15.56)	2 (4.44)	(0.00)	45 (14.33)	3 (15.00)	15 (33.33)	2 (4.44)	8 (17.78)	2 (4.44)	12 (26.67)	1 (2.22)	2 (4.44)	45 (14.33)
Total	41 (13.06)	122 (38.85)	103(32.80)	44 (14.01)	3 (0.96)	1 (0.32)	314 (100)	40 (12.74)	100 (31.85)	51 (16.24)	53 (16.88)	23 (7.36)	21 (6.69)	14 (4.46)	11 (3.50)	314 (100)

BCF = Body conformation, BC = Body colour, BW = Body weight, CS = Clutch size, QP = Quality of progeny, QS = Quality of squab, HBT = Hatchability, MA = Maturity age and CS = Clutch size. Figures in parenthesis are in percentages.

Table 5. Distribution of Pigeon Farmers in some villages of Gamawa L.G.A, based on their cross breeding practice and knowledge of inbreeding

Locations	Cross Breeding Practice				Knowledge of Inbreeding					
	Yes	No	Total	χ^2	LOS	Yes	No	Total	χ^2	LOS
GMW	45 (76.27)	14 (23.73)	59 (8.7)	95.16	***	27 (45.76)	32 (54.24)	59 (18.85)	119.65	***
UDB	43 (86.00)	7 (14.00)	50 (15.9)			9 (18.00)	41 (82.00)	50 (15.97)		
GDA	55 (91.67)	5 (8.33)	60 (19.11)			11(18.64)	48(81.36)	59 (18.85)		
WBA	49 (98.00)	1 (2.00)	50 (15.92)			0(0.00)	50(100.00)	50 (15.97)		
ZDW	48 (96.00)	2 (4.00)	50 (15.92)			2(4.00)	48(96.00)	50 (15.97)		
RAG	14(31.11)	31(68.89)	45 (14.33)			38 (84.44)	7 (15.56)	45 (14.38)		
Total	254 (80.89)	60 (19.11)	314 (100)			87 (27.80)	226 (72.20)	314 (100)		

χ^2 = Chi-square value, LOS = Level of significant, N = Number of observation, *** = P<0.001, GMW = Gamawa, UDB =Udubo, GDA = Gadiya, WBA = Wabu, ZDW = Zindiwa and RAG = Raga. Figures in Parenthesis are in percentages.

DISCUSSION

The fact that most of the respondent preferred local strains than cross bred types and exotic breeds as observed in the current study could be attributed to the educational level of the farmers. Farmers in the study area had low level of education and less contact with extension agents which affect the adoption of exotic breeds besides high cost of obtaining pair and inadaptability of these genotypes in tropical environment. This result agrees with the findings of Zaharadeen *et al.* (2011) and Amal *et al.* (2014) who reported in their separate studies on turkey in Nigeria and pigeon in Egypt, respectively, found a high preference for local breeds by rural farmers. Nakkazi *et al.* (2014) also reported a higher preference for local chickens over the exotic breeds in Uganda. The result of the present study showed that most of the farmers sourced breeding stock from their own flock which indicates that pigeon farming is an age long activity in the study area. This contradicts the work of Yakubu *et al.*(2014) who reported that 53% of village guinea fowl farmers in Nassarawa state sourced foundation stocks from the market. The results of this study which shows that majority of farmers kept pigeons for hobby buttress the fact that this poultry species have multiple functions in our society. This finding agrees with earlier report of Asaduzzaman *et al.*(2009) that pigeons were used in natural beautification and as source of recreation. The finding also signifies the importance of pigeon as a secondary source of animal protein in Nigeria (Omjola *et al.*, 2012). The results obtained from this study on most preferred trait in the selection of breeding stocks agrees with the earlier work of Dana *et al.* (2010) who reported high preferences for

morphological traits such as plumage colour in chickens native to Ethiopia. Similarly, Jiang (1999) and Akilu (2007) in a separate studies reported high preferences for plumage colour in chicken. This has also buttress the fact that, since most pigeons were kept for hobby, hence body colour would naturally be expected to accord higher priority. The absence of proper record keeping and the low educational level of the farmers could be the factor why quantitative traits were not prioritized. In females, the most preferred traits by pigeon farmers after body colour was hatchability. The emphasis shown on this trait in selecting breeding females could be based on the facts that, the females were kept longer in the flock as they were not disposed easily as the males. This practice allows the keepers to familiarize themselves with the productivity of their birds better. The low preferences for clutch size as selection criteria should naturally be expected for the fact that no variation exist or has been reported for this trait in pigeons. All pigeons have homogeneity for clutch size of two (2) eggs. The results obtained in this study showed that farmers cross bred their pigeons with superior genotype for genetic gain. It is well known fact among the pigeon farmers in the study area that exotic breeds attract high premium price because of their sizes and conformation, but poorly adapted to the local environment and highly susceptible to endemic diseases. These attributes could be what the pigeon farmers in the study area most have observed and were apt to apply cross breeding techniques to create or obtain a hybrid vigor in their flocks. This contradicts the work of Zaharadeen *et al.* (2011) who reported lower cross breeding rate of local turkey with exotic breeds in Jos, Plateau, Nigeria. Also, Yakubu *et al.* (2011) reported that farmers in villages have devised a way of improving their stocks. The fact that farmers had no prior information on detrimental effect of in-breeding as observed in

this study indicated that this situation (inbreeding) might have existed in their flocks without noticing. This could be as a result of poor extension services, particularly on poultry and livestock genetic resource management and the low level of education among the farmers. Dana *et al.* (2010) reported high rate of inbreeding among some village chicken population in Ethiopia. The authors associated this to lack of knowledge on the negative effects of inbreeding on production and survival traits among the local farmers.

Conclusion

Pigeon farmers in the study area employed traditional breeding methods in improving the productivity of their flocks, although they had no basic knowledge of animal breeding and were conservative in adopting exotic breeds. The main objectives of production if for hobby. Even though cross breeding is practiced in the study area, but farmers had no knowledge on negative impact of inbreeding in pigeon farming and lastly, breeding stocks are selected from owned flock.

Recommendation

The indigenous knowledge of breeding possessed by pigeon farmers in the study area should be harnessed in making informed decisions towards genetic improvement programmes of pigeons in the study area. Extension services towards animal genetic resource management should be intensified to boost local pigeon production. Studies on comparative growth pattern and other reproductive indices between the local breeds, the exotic ones and their crosses should be made in the study area, so as to obtain an informed index for guiding pigeon farmers in the study area so as to boost productivity. Government and other relevant stake holders should invest heavily in pigeon farming as an avenue of generating employment and reducing poverty among the rural dwellers. Government should continue the ban on importation of frozen poultry products in order to boost local production and conserves the country's foreign exchange value.

REFERENCES

- Akilu, H. A. 2007. Village Poultry in Ethiopia. Socio-terminal analysis and learning with farmers (unpublished PhD thesis, Wageningen University).
- Amal, S., sahar, A., EL-Rahim Y. A. A. and Aggour, W. 2014. A field study on pigeon production systems governorate, *Egypt Egyptian Poultry Science Journal*, 34(4): 1040-1053.
- Anonymous, (1991). The only pigeon ranch in the world. The stand Magazine. April, pp.534-535.
- Asaduzzaman, M., Mahiuddin, M., Howlider, M. A. R., Hossain, M. M. and Yeasmin, T. 2009. Pigeon farming in gouripur upazila of Mymensingh district. *Bangladesh Journal of Animal Science*, 38(1-2): 142-150.
- Audu, P. A., Oniye, S. J. and Okechukwu, P. U. 2004. Helminth parasites of domesticated pigeons (*Columba livia domestica*) in Zaria, Nigeria. *Journal of Pest, Disease and Vector Management*, 5: 356-360.
- Biggs, S. 1995). Participatory Technology Development: Reflection on current advocacy and past Technology Development. Paper for the limits of participation Workshop, 23 March 1995. *Intermediate Technology Development Group*, London, UK
- Dana, N., liesbeth, H., dessie, T. and Van Arendonk, A. M. 2010. Production objectives and trait preferences of village poultry producers of Ethiopia: implication for designing breeding schemes utilizing indigenous chicken genetic resources. *Tropical Animal Health and Production Journal*, 2(42): 1519-1529.
- El-Haroun, A. H. J., Hassanein, M. N. F. and Sabra, Z. A. M. 2008. Studies on native pigeon under Egyptian village Nile Delta conditions. *Egyptians Poultry Science Journal*, 28(3): 883-900.
- FAO (2008). Poultry sector: Country review based on poultry industry in Nigeria. FAO Animal Production and Health Division.
- Jiang, X. 1999. Broiler breeding: breeding goals, selection schemes and the usefulness of local breeds of china. Unpublished Ph. D. thesis, Wageningen University.
- Nakkazi, C., kayitesi, A., Mulindwa, H.E., Kugonza, D. R. and Okot, M.W. 2014): the status of local chicken (*Gallus domesticus*) production in notches Uganda. *Livestock Research for Rural Development*, 26(11).
- Nasiru, M. 2012. Economies of livestock marketing in Gamawa local government Area, Bauchi state, nosier, 8th AFMA congress, November 25-29, 2012, Nairobi Kenya, No. 159412. African form management assertion (AFMA).
- Omojola, A. B. 2007. Carcass and organoleptic characteristics of duck meat as influenced by breed and sex. *International Journal Poultry Science*, 6(5): 329-334.
- Omojola, A. B., Adesehinwa, A. O. K., Madu, H. and Attah, S. 2004. Effect of sex and slaughter weight on broiler chicken carcass. *Journal of Food, Agriculture and Environment*, 2(3-4): 61-63.
- Omojola, A. B., Isa, M. A., Jibir, M., Ajewole, B. T., Garba, S., Kassim, O. R., Omotoso, A. B., Adeyemo O. A. and Akinleye, S. B. 2012. Carcass characteristics and meat Attributes of pigeon (*Columba livia*) as influenced by strain and sex. *Journal of Animal Science Advances*, 2(5): 475-480.
- Whyte, M. 2002. Poultry studies and anthropological research strategies. Characteristics and parameters of family poultry production in Africa. IAEA, Vienna, Austria, pp.187-192.
- Yakubu, A., Azara-musa I.S. and Haruna, H.S. 2014. Village guinea fowl (*Numidia meleagris*) production systems in Nassarawa state, morn centra Nigeria: Flock characteristics husbandry and productivity. *Livestock Research for Rural Development*, 26(3).
- Zaharadeen, D., Ahemen, T. and Aliyu, P. I. 2011. On-farm studies on breeding characteristics of turkey (*Meleagris gallopardo*) in parts of Jos Plateau, Nigeria. *Advances in Applied Science Research*, 2(2).
