integrity Research Journals

Journal of Animal Science and Veterinary Medicine
Volume 9(5), pages 263-269, October 2024
Article Number: 5D6E314F11
ISSN: 2536-7099
https://doi.org/10.31248/JASVM2024.464
https://integrityresjournals.org/journal/JASVM

Full Length Research

A survey on strains and performances of broiler chickens reared in Owerri, Imo State, Nigeria

Okere, P. C.*, Giwa, A. L., Onyemaechi, U. C., Ukwu, C.P. and Okoro, V. M. O.

Department of Animal Science and Technology, Federal University of Technology, P.M.B. 1526, Owerri, Nigeria.

*Corresponding author. Email: okerepeacefuto@gmail.com

Received 12th August 2024; Accepted 25th October 2024

ABSTRACT: A survey on the strains and performances of broiler chickens was carried out in Owerri West and Owerri North Local Government Areas of Imo State, Nigeria. The strains and their performances were determined in ten randomly selected poultry farms engaged consistently in large-scale broiler chicken production. Data were collected on the farmer's personal information, production information, biosecurity and disease management information, and production economics using a well-structured questionnaire. The data collected were analyzed using simple descriptive statistics that involved tables, percentages and frequency distributions. From the data collected, Arbor Acre Plus constituted about 50% of the strains in the locations. Ross 308 recorded 30% while Marshal and Cobb 500 recorded 10%. Arbor Acre Plus strain performed maximally in the intensive production system practised by the farmers. It recorded the lowest mortality rate, superior feed conversion ratio and the highest selling price with the lowest cost of production. Its performance was followed by Ross 308, Cobb 500 and then Marshal Strain. Most farmers argued that the performances of the strains were directly correlated to the management practices adopted by the farmers and not necessarily the type of strain. Data collected from the survey also showed that 70% of the farmers were males and single, 31 – 50 years of age and 50% attended tertiary institutions. In c**o**nclusion, the study bridged the paucity of information on the different strains of broiler chickens available and their performances in the study area; Owerri, Imo State. Again, relative to other strains located in the study area, the Arbor acre plus strain recorded the heaviest weight at the shortest interval. It is pertinent for farmers to select from strains that can respond to proper management and efficiently make use of the available resources to ensure food security.

Keywords: Broiler chickens, management, performances, poultry, strains.

INTRODUCTION

Broiler chicken production is one of the prevalent businesses among Nigerian entrepreneurs (Obi-Nwandikom *et al.,* 2021; Anyaegbu, *et al*., 2020). For farmers in Nigeria, poultry production plays an exceptionally important role with approximately 80% of rural households engaged in smallholder poultry production (Tamburawa *et al*., 2017). Broiler chickens are raised for their delectable meat which has a higher biological value than plant proteins (Olawumi and Fagbuaro, 2011). Broiler chicken production aside from providing high-quality animal proteins also generates quick returns of investment and employment opportunities due to its known short generation interval, strains and general acceptability as farmers require birds that will achieve high body weight with good carcass quality over the shortest possible time with a minimum amount of regular feed (Olawumi and Fagbuaro, 2011; Hristakieva, *et al.,* 2014). Breeders have selected traits such as growth rate, breast meat yield, feed utilization efficiency, skeletal quality, heart and lung function and livability (Ogbuewu, *et al.,* 2023). Feed resources also are a major input in poultry production systems and it is estimated to account for about 60/70 per cent of total production costs in the commercial poultry sector (Okere, 2019). Consequently, over the past 30 years, genetic selection for desirable characteristics in broiler chicken is estimated to have reduced the feed required for one ton of chicken meat from 20 to 8.5 tons; 2.4 fold reduction (Hristakieva *et al.,* 2014). Poultry

breeding which is one of the branches of the poultry industry is involved in upgrading the genetic makeup of the parent stock and is responsible for the development of strains of chickens that form the backbone of the poultry industry as their activities are shrouded in secrecy. When producing parent stock for developing countries, large global breeding companies tend to promote the strains that are used in developed countries, most of which have temperate climates, claiming that these strains are suitable for all environments (Pym, 2010). However, most of these strains have been selected for increased productivity and general robustness under relatively good management, nutrition and environmental conditions (Pym, 2010).

The profit levels in poultry enterprises have been constrained majorly by the little or no information available on strains of broiler chickens to choose from and how well they can perform. The choice of the farmer to have a broiler chicken that possesses the correct body conformation which will feather rapidly, and have a minimal mortality rate with other desirable traits is limited due to paucity of information on the performance of strains available considering the farmer's location and management.

Recent studies have investigated various aspects of broiler chicken production, shedding light on the factors that influence their performance. For instance, Musa *et al*. (2006) explored the effects of strain and sex on the meat quality of chickens, revealing significant ($p<0.05$) differences between strains and sexes; demonstrating that males and females of a certain strain showed different variations. Furthermore, Dawkins (2017) assessed animal welfare and efficient farming: Conflict inevitability, highlighting the importance of optimal nutrition and management strategies. Good animal husbandry and consideration of animal welfare can reduce suffering and premature mortality of chickens, increase production, and improve meat quality. Similarly, Abdel-Hafeez *et al*. (2016) examined the effects of high dietary energy, with high and normal protein levels on broiler performance and production characteristics, finding that broilers fed higher protein diets exhibited improved growth rates. These studies demonstrated the complexity of factors influencing broiler chicken performance.

Hristakieva *et al.* (2014) reported a significant effect of strain on the live weight of broiler chickens. Kadurumba *et al.* (2023) observed significant ($p<0.05$) differences among strains when they investigated the growth rate and feed efficiency of different broiler strains. Ross 308 had the highest growth rate while the Cobb strain had the best feed efficiency. Hence, this study is aimed at determining the different strains of broiler chickens reared in Owerri and their performances. It will assist in equipping farmers and researchers with a better understanding of the different strains of broiler chickens found in some of these areas and their performances so that decisions can easily be made on the hatchery to purchase from, considering the farmers' setting and management and further improvement needed to be done for better yield.

MATERIALS AND METHODS

Study area

The survey on the strains and performances of broiler chickens was conducted in Owerri West and Owerri North Local Government Areas of Imo State having their administrative headquarters at Umuguma and Orie Uratta communities respectively.

The survey area covered ten (10) poultry farms randomly selected from communities in Owerri West and Owerri North Local Government Areas of Owerri Zone in Imo State. The state lies within latitudes 4°45' N and 7°15' N and longitudes 6°50' E and 7°25' E (GPS coordinates: 7°15' and 7°25') with an area of around 5.288 kmsq and annual rainfall varying from 1500 to 2200 mm (Wikipedia, 2017). The State has an average annual temperature above 20°C with humidity reaching 90% in the rainy season. The towns covered in Owerri West were Umunguma, Ihiagwa, Irete and Obinze while in Owerri North; the survey took place in Emekuku, Agbala and Naze. (Wikipedia, 2017). Plate 1 shows the map of surveyed areas.

Data collection

The primary source of data collection was a well-structured questionnaire with open and close-ended questions, having sections on the farmer's personal information, production information, bio-security and diseases management information and economics of production; and through interviews, field visits and discussions. Secondary sources of data were from the internet, journals, articles, magazines and aid from administrative headquarters in locating the poultry farms in the local government areas. The farms where the data were collected were randomly selected and the farms chosen for the survey were on the basis of consistency and the availability of farm records.

Data analysis

The data collected were analysed using simple descriptive statistics such as percentages, averages and frequency distribution tables.

RESULTS

The distribution of farmers according to their personal information is shown in Table 1. Data collected from the farmers' personal information shows that 70% of the farmers visited were males while the remaining 30% constituted females.

Ten per cent (10%) of the farmers fall between the ages

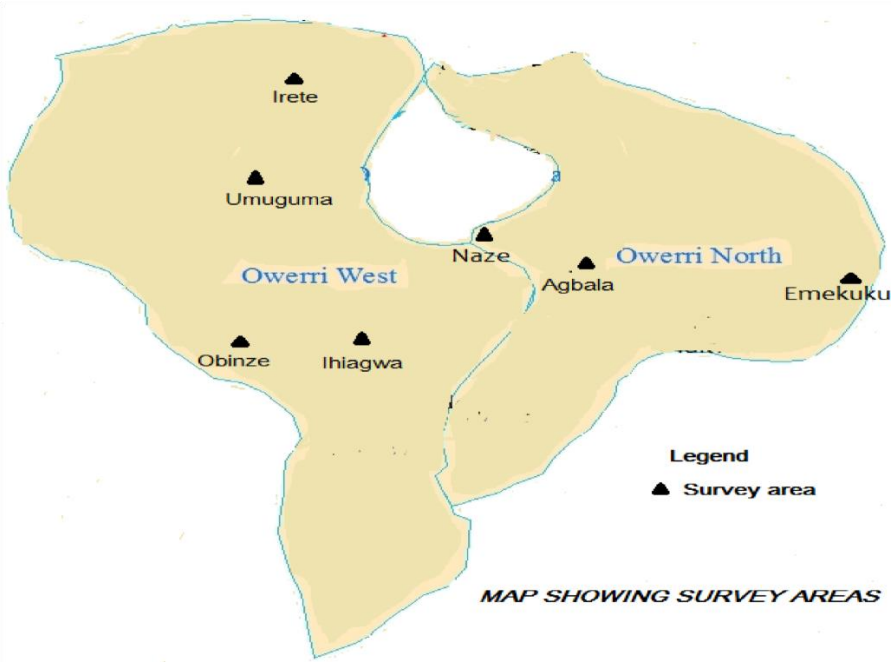

Plate 1. Map showing the study area.

Table 1. Distribution of farmers by gender, age, level of education, marital status, and years of experience in poultry enterprise in Owerri, (%) N=10.

Personal Information	Frequency	Percentages
Gender		
Male	7	70
Female	3	30
Age		
20-30	1	10
31-40	5	50
41-50	3	30
51-60	1	10
Above 60	0	0
Level of education		
Primary school	1	10
Secondary school	2	20
Tertiary institution	7	70
Never attended school	0	0
Marital status		
Single	6	60
Married	4	40
Divorced	0	0
Years of experience		
1-3	4	40
4-7	3	30
8 and above	3	30
Total	10	100

Source: Field Survey.

Table 2. Distribution of farmers production information in farms in Owerri (%) n = 10

Parameters	Number of farms	Percentage of farms
Litter materials		
Saw dust	6	30
Wood shavings	6	60
Mixture of both	1	10
Place of purchase of day old chicks		
Hatchery	2	20
Middlemen	6	60
Market	2	20
Total	10	100

Source: Field Survey.

Table 3. Distribution of broiler chicken strains reared by farms in Owerri, (%) n = 10.

Strain	Strain location	Number of farms	Percentage of farms
Marshal	Naze	1	10
Arbor Acre Plus	Irete, IRB, Emekuku, Obinze	5	50
Ross 308	Ihiagwa, Emekuku, Irete	3	30
Cobb 500	Naze	1	10
Total		10	100

Source: Field Survey.

Table 4. Distribution of the final weights of the different strains at market age in farms in Owerri, (%) n = 10.

Strain	Market age (weeks)	Final weight (kg)	Number of farms	Percentage of farms
Marshal	9 – 11	2.0 – 2.5	1	10
Arbor Acre Plus	8 – 10	2.5 – 3.0	5	50
Ross 308	8 – 10	2.5 – 3.0	3	30
Cobb 500	10 – 12	2.0 – 2.5	1	10
Total			10	100

Source: Field Survey.

of 20 – 30 years, 50% represented 31 – 40 years of age, 30% asserted their age to be 41 – 50 years while those between the ages of 51 – 60 constituted the remaining 10%. This signifies that the active populations between the ages of 31 – 51 were into broiler chicken production. About 10% of the farmers had only primary education, 20% had only secondary education and 70% had tertiary education. The farmers that were single constituted 60% while 40% represented those that were married. About 40% of the farmers had 1 – 3 years of experience in poultry farming, 30% indicated that they have had 4 – 7 years of experience while the remaining 30) had 8 years of experience and above.

Table 2 presents the farmers' production information. From the production information, all the poultry farms surveyed were involved in intensive broiler chicken production, carried out on a deep litter system. Wood shavings constituted about 60% of the litter materials used by the farmers, 30% make use of sawdust while only 10% of the farmers mix both wood shavings and sawdust. About 10% of the farmers making use of saw dust complained of coccidiosis occurring frequently in the flock. 60% of the farmers purchase day-old chicks from middlemen, while 20% purchase directly from the hatchery and the remaining 20% buy from the market.

Table 3 presents the distribution of broiler chicken strains reared by farmers in Owerri. About 50% of the farms use Arbor Acre Plus, 30% rear Ross 308 while 10% of the farmers use Cobb 500.

Table 4 shows the final weights of different broiler strains at market age in farms in Owerri. About 80% of the farms sell Arbor Acre Plus and Ross 308 strains at 8 – 10 weeks

Table 5. Distribution of mortality rates in farms in Owerri, (%) n = 10.

Strain	Flock number	Number of deaths	Common cause	Number of farmers	Percentage of farmers
Marshal	3000	20	Salmonellosis	1	20
	5000	30	Newcastle		
	9000	40	Salmonellosis		
Arbor Acre Plus	3000	20	Cold	5	60
	100	5	Coccidiosis		
	400	10	Newcastle		
	1000	10	Cold		
Ross 308	1600	13	Cold	3	20
	300	10	Newcastle		
Cobb 500	300	15	Newcastle	1	
Total				10	100

Source: Field Survey.

Table 6. Economics of production of different strains in farms in Owerri, (%) n = 10

Strain	Cost of production per bird (□)	Selling cost per bird (□)	Number of farmers	Percentage of farmers
Marshal	1200	2000	1	10
	1500	3000 – 4000		
	1000	1300		
Arbor Acre Plus	1700	2500 – 3000	5	50
	1200	2000 – 3000		
	1500	2200		
	1400	1800		
Ross 308	1500	2000 – 3500	3	30
	1600	2300 – 2500		
Cobb 500	1600	2000	1	10
Total			10	100

Source: Field Survey.

of age, having a final weight of 2.5 – 3.0 kg. The remaining 20% reach market age at 9 – 12 weeks of age with final weights of 2.0 – 2.5 kg. All the farms visited observe varying degrees of biosecurity which starts with penetrance restriction. The farmers bury animal carcasses while farms that were incorporated with fish farming, feed the carcass to the fishes. 40% of mortalities encountered in the farms were caused by Newcastle disease while the majority of the deaths were caused by Salmonellosis.

Table 5 presents the distribution of mortality rates in farms in Owerri. Gumboro and Lasota vaccines were the two regular vaccines administered. The economics of production entails the cost of production and selling cost per batch. Arbor Acre Plus strain was the broiler chicken with the highest selling price and least cost of production, followed by Ross 308. Table 6 shows the economics of production in farms in Owerri.

DISCUSSION

Data collected from the farmers' personal information shows more involvement of males in the poultry business compared to the number of females. This result agrees with the report of Udoh *et al.* (2024), who found that the majority of poultry farmers in Cross River State, were

males. The active populations which were between the ages of 31 – 51 were into broiler chicken production. The data also agrees with the report of Obi-Nwandikom *et al*. (2021) who found that 60% of broiler farmers in Imo State were within the age range of 30 – 51. A significant number of the poultry farmers were literate and had a good educational background. Udoh *et al.* (2018) also reported that 68% of poultry farmers in rural Nigeria were literate. More than 30% of the poultry farmers have stayed above 7 years in the business and they have acquired enough experience in poultry enterprise. Farmers with long years of experience perform better in the management of the poultry business than freshers.

From the results obtained in Table 2, all the poultry farms surveyed were involved in intensive broiler chicken production, carried out on a deep litter system in the poultry houses. This shows that all the farms visited, had a reasonable protection in terms of housing of the birds. This result agrees with the trend in modern-day commercial poultry production, where birds are kept in confinement (Ogundipe, 2012; Pym, 2010). Akidarju *et al.* (2018) also reported the deep litter system as the most popular system of chicken keeping.

About 10% of the farmers making use of sawdust as litter material, complained of coccidiosis occurring frequently in the flock. Coccidiosis is a common poultry disease caused by the Eimeria parasite, and sawdust as litter material can retain high levels of moisture and pH, creating a humid environment that fosters the growth and survival of Eimeria oocysts (Fatoba *et al.,* 2018).

Table 3 presents the distribution of broiler chicken strains reared by farmers in Owerri. The use of the Arbor Acre Plus by half of the farmers visited shows that the strain had lived up to expectations, unlike others. This agrees with the report of Katrine (2018).

Table 4 shows the final weights of different strains of broiler chickens at market age in farms in Owerri. Arbor Acre Plus and Ross 308 strains had a final weight of 2.5 – 3.0kg at 8 – 10 weeks of age. This agrees with the report of Kadurumba *et al.,* (2023) who observed significant ($P<0.05$) differences among strains when she investigated the live weight of different broiler strains. Arbor Acre had the highest body weight while the Ross 308 strain showed superiority in most carcass traits.

The majority of deaths were caused by Salmonellosis, according to Table 5. This also agrees with the report of Unamba-Oparah *et al.* (2018), when they surveyed the occurrences of poultry diseases in Imo State.

The economics of production entails the cost of production and selling cost per batch. Arbor Acre Plus strain was the broiler chicken with the highest selling price and least cost of production, followed by Ross 308. This was due to the weight that Arbor Acre Plus achieves within the shortest possible interval when compared to other strains. Kadurumba *et al*. (2023) recorded that Arbor Acres strain was higher than others in body weight (BW) while Ross 308 showed superiority in most carcass traits. The results of the study indicate that Arbor Acre and Ross 308 were the most commonly used strains in Owerri, Imo State. This is consistent with previous studies that have shown these strains to be popular in Nigeria (Kadurumba *et al*., 2023; Katrine, 2018; Ahamba *et al*., 2021)

Conclusion

In conclusion, the study bridged the paucity of information on the different strains of broiler chickens available and their performances in the study area; Owerri, Imo State. Arbor Acre Plus strain was observed to perform maximally in the intensive production system practised by all the farmers, as it recorded the lowest mortality rate, highest feed conversion ratio and the highest selling price with the lowest cost of production. However, the performances of the different strains surveyed greatly relied on the approach of the farmer towards the management of the birds, despite the fact that some strains under relative resources available, can actually perform better than others in these settings. These findings have important implications for farmers and policymakers in Nigeria. Firstly, they highlight the need for improved feed quality and management practices to optimize the performance of broiler chickens. Secondly, they suggest that there may be opportunities for genetic improvement of local strains to enhance their performance.

Recommendation

We recommend that further research be carried out to address some limitations in this study; additional studies on the impact of environmental conditions on broiler chicken performance would be beneficial.

CONFLICT OF INTEREST

The authors declare that they have no conflict interest.

REFERENCES

Abdel-Hafeez, H. M., Saleh, E. S. E., Tawfeek, S. S., Youssef, I. M. I., & Hemida, M. B. M. (2016). Effects of high dietary energy, with high and normal protein levels, on broiler performance and production characteristics. *Journal of Veterinary Medical Research*, *23*(1), 94-108.

Ahamba, S. I., Ekugba, C. U., Kadurumba, O. E., Ogundu, U. E., & Ekeh, J. C. (2021). Pattern of growth of Ross 308 strain of broilers in Owerri, Imo-State. *Nigerian Society For Animal Production (Nsap) 46th Annual Conference –Dutsin-Ma 2021 Book of Proceedings*. Pp. 309-313.

Ahmadu Bello University, Zaria, Nigeria. Pp. 27-45.

Akidarju, M. S., Onyemaechi, E. G., & Dauda, M. G. (2010). An assessment of some poultry management practices and disease recognition by poultry farmers in Maiduguri arid zone, Nigeria. *World's poultry science journal*, *66*(2), 285-296.

Dawkins, M. S. (2016). Animal welfare and efficient farming: is

conflict inevitable? *Animal Production Science*, *57*(2), 201-208.

Fatoba, A. J., & Adeleke, M. A. (2018). Diagnosis and control of chicken coccidiosis: a recent update. *Journal of Parasitic Diseases*, *42*(4), 483-493.

Hristakieva, P., Mincheva, N., Oblakova, M., Lalev, M., & Ivanova, I. (2014). Effect of genotype on production traits in broiler chickens. *Slovak Journal of Animal Science*, *47*(1), 19-24.

Kadurumba, O. E., Aligwekwe, I. S., Anyanwu, V. C., Ikpamezie, I. C., Okere, P. C., Egenuka, F. C., & Okafor, L. O. (2023). Prediction of the live weight of three strains of broiler chicken using carcass parts. *Nigerian Journal of Animal Production*, 166-169.

Katrine, N. (2018). Best breeds of broiler in Nigeria and easy steps to start poultry farming. Retrieved from https://www.legit.ng/1210627-best-breeds-broiler-nigeria-easy-steps-start-poultry-farming.html.

Musa, H. H., Chen, G. H., Cheng, J. H., Shuiep, E. S., & Bao, W. B. (2006). Breed and sex effect on meat quality of chicken. *International Journal of Poultry Science*, *5*(6), 566-568.

Obi-Nwandikom, C. O., Anyiam, K. H., Nwachukwu, E. U., & Oshaji, I. O. (2021). Analysis of profit of broiler production in Owerri Agricultural Zone of Imo State. *International Journal of Agriculture and Rural Development*, 24(1) 5476-5480.

Ogbuewu, I. P., Modisaojang-Mojanaga, M. M. C., Mokolopi, B. G., & Mbajiorgu, C. A. (2023). Nutritional and chemical composition of black velvet tamarind (Dialium guineense Willd) and its influence on animal production: A review. *Open Agriculture*, *8*(1), 20220174.

Ogundipe, S. O., & Sanni, S. A. (2002). Economics of poultry production in Nigeria. In: Gefu,J . O., Adeyinka I. A., & Sekoni, A. A. (eds). A *training manual on National Training Workshop on Poultry Production in Nigeria*. National Institute for Animal Production. Research Institute(NAPRI),

Okere, P. C. (2019). Studies on the Nutritional and Antimicrobial effects of *Moringa oleifera* leaf meal on broilers and laying hens. PhD Thesis. Federal University of Technology, P. M.B. Owerri, Imo State of Nigeria.

Olawumi, S. O., & Fagbuaro, S. S. (2011). Productive performance of three commercial broiler genotypes reared in the derived savannah zone of Nigeria. *International Journal of Agricultural Research*, *6*(11), 798-804.

Pym, R. (2010). Poultry genetics and breeding in developing countries. Retrieved from https://www.fao.org/4/al728e/al728e00.pdf.

Tamburawa, M. S., Abubakar, A. W., Hassan, A. M., & Madaki, S. (2017). Performance of Japanese quails fed diets containing Moringa oleifera leaf meal in Sudan Savannah region of Nigeria. *Nigerian Journal of Animal Production*, 503-505.

Udoh, E. D., Vihi, S. K., Dalla, A. A., Binuyo, G., & Mbah, J. J. (2024). Perception of Poultry Farmers' on Effectiveness of Poultry Extension Service Delivery in Calabar Municipal Area of Cross River State, Nigeria. *Journal of Applied Sciences and Environmental Management*, *28*(7), 2025-2032.

Unamba-Oparah, I. C., Unamba-Oparah, C., Odoemelam, V. U., & Ahiogu C. N. (2018). Retrospective study on the occurrence of infectious bursal disease and Newcastle disease in Orlu, Imo State. *Proceedings of 43rd Annual Conference of the Nigerian Society for Animal Production, Owerri. Published by Nigerian Journal of Animal Production*. Pp. 1415-1418.

Wikipedia (2017). Imo State Retrieved from http://en.m.wikipedia.org/wiki/imo-stat.com.