Middle-East Journal of Scientific Research 2 (1): 37-42, 2007
ISSN 1990-9233

The Mortality Rate of Two Different Breeds of Broilers after Brooding Stage to Maturity

O.K. Awobajo, R.T. Akinrolabu, A.A. Mako, A.O. Igbosanu and O.T. Olatokunbo

Department of Agricultural Production and Management Science,
Tai Solarin University of Education, Ijebu-Ode, Ogun State, Nigeria

Abstract: This study critically examined whether there is any different in the mortality rate of two different breeds of broilers after the brooding stage to maturity. The experiment was performed in the Departmental Poultry farm of Tai Solarin University of Education, Ijebu-Ode, Ogun State under the same environment and Managemental condition. The birds were four weeks old at the commencement of the study and they were reared for seven weeks. The birds were divided into two groups based on their breeds. In-group A we have the Arbour Acres and in group B, Anak 2000. The research started with 55 birds in-group A and ended with 48 birds and in-group B, there were 59 birds at the beginning of the research and ended with 55 birds. The results were analyzed using the percentage and Chi-square methods. The analysis revealed that there is very high significant different ($p<0.001$) in the mortality rate of the two breeds. It was also revealed that group A has higher mortality (12.73%) compare to group B with lower mortality (6.78%). Based on this, it can be concluded that the Anak 2000 is better than the Arbour Acres in terms of mortality rate pattern.

Key words: Mortality rate · broiler · breeds · brooding

INTRODUCTION

Poultry can be managed easily with little background knowledge. Large numbers of chicken are found roaming about all over the villages and towns but the production of poultry on a large scale is a comparatively new venture for most West Africa farmers. With increased demand for proteinous food, it is important that schools and colleges as well as local farmers should be encouraged to keep poultry because it is estimated that eggs and poultry meat rank with cows milk as the most economically produced animal protein.

The term poultry used in agriculture generally refers to all domesticated birds kept for egg or meat production. These include chickens (domestic fowls) turkey, ducks and geese. The most common of these are the domestic fowls. Sometimes the term poultry is considered synonymous with chickens, Turkey that are raised in West Africa on government experimental farms and sometimes by private farmers for sale as luxury meat, but turkey meat is not a popular sources of protein in West African diet.

It is highly important to note that broiler production is an aspect of poultry production in agriculture, which deserve better attention and which requires the hands of the experts. It is better explained as the study of principle and practices involved in the production, marketing and general management of broiler. Broilers are birds reared for the production of table meat, it is known for its early maturity (matures for Table at 8-10 weeks under good management). Broiler production is one of the most important especially in the contemporary world because of its quality and quantity of meat derived from it, which is a good source of animal protein for human consumption. Broilers generally need good management in order to profit the farmer. The type of breed used is a major determinant of mortality rate among the birds. Common breeds of broilers include; Red Sussex, Cornish Game, Dorking, Anak 40, Anak 2000, Arbour Acres, Ross, Lohmann, Hubbarb, Indian River etc. Anak 2000 and Arbour Acres were the two breeds of broilers that were used for this research work. The Anak 2000 which was originated from Israel is characterized by more breast meat, early adaptation to hot weather and excellent

Corresponding Author: Dr. O.K. Awobajo, Department of Agricultural Production and Management Science, Tai Solarin University of Education, Ijebu-Ode, Ogun State, Nigeria.

livability while the Arbour Acres originated from USA and characterized by fast growth, increased yield of saleable meat, disease resistance and white meat.

There is no stage of rearing that mortality cannot occur but always minimal after brooding stage (1^{st}-4^{th} weeks) the mortality rate after the brooding stage depends considerably on how effective, efficient and hygienic the management system and practice are;

- To determine the mortality rate of two breeds of broiler after brooding stage.
- To complete the mortality rate of the two breeds.
- To find possible causes of mortality.
- To find out the most viable breed.
- To suggest possible measures that can be undertaken to reduce mortality rate and increase maturity rate.

MATERIALS AND METHODS

Area of study: This research project that is the rate of mortality on two different breeds of broiler after brooding stage to maturity was carried out on the Agricultural Science Department poultry farm in Tai Solarin University of Education (TASUED) located at Ijagun Campus, Ijebu-Ode in Ogun State of Nigeria. This campus is located on the outskirts of Ijagun town, which is on latitude 50-450'N and longitude 3-57° E and about 4.5 km of Ijebu-Ode Local Government council. The Ijagun Campus of TASUED, Ijebu-Ode lies on the anti-climate axis of a gently undulating surface.

Materials used: The materials used in this research project practice were;

- Deep litter system e.g. wood shaving, sawdust etc.
- Grower's Mash
- Broiler's Finisher
- Sixty "Arbour Acres"
- Sixty "Anak 2000"
- Drinkers
- Feeders

Experimental design: The research project was conducted in the departmental poultry farm at Ijagun Campus between the periods of two months.

A week before the arrival of the birds, the whole pen was dusted, washed, swept and thoroughly cleaned and disinfected both the floor and the corners as well as the walls of the pen. Dried wood shaves and sawdust were spread on the floor to serve as deep litters. Moreover, the surrounding of the house was not left behind by clearing the bushes and draining properly the drainages. These birds were given a week to adapt to the environmental condition before the experimentation and data collection. The birds were studied time to time in order to compare the mortality rate, maturity rate and health condition. The same treatment such as feed, water and medications were given to all the birds throughout the experiment.

The birds were grouped into two equal parts on the basis of their breeds.

Group A "Arbour Acres and Group B "Anak 2000"

The feed used were obtained from the same source throughout in order to avoid effect of different feeds on bird performance. Feed from FA Feedmill Global Services, Ogbogbo/Ijari road, Behind St Luke Church Ogbogbo, Ijebu-Ode was used throughout the experiment

Management practices: The management practices carried out in this project include;

Serving of feed and water: For good health as against mortality, the birds were thoroughly fed with their feed. The feed were given to the birds very early in the morning, afternoon and evening everyday. Water was also served along with the feed. The researcher makes sure that the water was free from contamination in order to prevent convulsion or mortality that may occur in the research project work. Also, in order to maintain adequate hygiene, water troughs were washed every morning before serving water and feed during the period of research work. The wet litters were removed and replaced at every month while medications such as antibiotics and vitamins were regularly administered as follows, Lasota administered in water was given to the birds at the 5^{th} week anti Cocci and Gumboro in water were given at 6^{th} week and Lasota in water at 8^{th} week. Vitamin (vitalyte) was administered in water for the birds at the end of every treatment.

Mortality rate: This was easily discovered by counting the live birds, the death birds were also easily discovered on the litters. Also when there were sick ones such were isolated and catered for separately in order not to transfer the illness or sickness to others which may make the mortality rate increased. The maturity rate was also measured and scored by physical observation, scale and market size including the ages of the birds in rearing.

The Formular for calculating percentage mortality is given as:

$$\frac{\text{Number of dead birds in a group}}{\text{Initial number of birds in the group}} \times 100$$

Causes of death were confirmed from the veterinary doctor and they include; Bacteria infection, Sudden death i.e. no gross pathological lesion seen, paralyzed hind limbs (birds unable to reach feed and water)

Record keeping: The researcher took down and kept accurate records from the first day till the end of the rearing. Such records are population of the birds, date of commencement of the project work, age of the birds, feed consumption rate, maturity rate, medication used and all other records that aid in determining the mortality rate of the two different breeds of broilers after brooding stage to maturity.

The source of the feed that were given to the birds were not change throughout the duration of the experiment, though they were given broiler's starter, grower's mash and broiler's finisher. Strict sanitation was upheld in the experiment throughout. Day-in-day-out, the birds were observed and broilers production system of rearing was kept on a very high standard.

Cleaning of the poultry pen: The poultry droppings were packed on a regular basis in order to prevent disease outbreak. This was done successfully with the help of shovel by using it to scrape the floor and packed out of the pen and replaced with the fresh and well dried litters.

Analysis of data: All the data obtained from this experiment were critically analyzed using Chi-square test to compare the mortality rate of Group A (Arbour Acres) and group B (Anak 2000).

RESULTS AND DISCUSSION

In order to ascertain the hypothesis whether, there is significance relationship between the mortality rate and the breeds of broiler, scientific observations were carried out on the Agricultural Science Departmental poultry farm in Tai Solarin University of Education (TASUED) located at Ijagun Campus, Ijebu-Ode in Ogun state for seven weeks.

The research commenced on the fifth week of the broilers life (after brooding stage). It should however be knew that the birds were four weeks old at the commencement of the study and they were eleven weeks old on the seventh week of the study. The birds were therefore divided into two groups i.e. group A (Arbour Acres) and group B (Anak 2000) for easy monitoring. In group A, the researcher started with 55 broiler birds in stock and ended with 48 broiler and in group B, the researcher started with 59 broiler birds in stock and ended with 55 broiler birds.

Table 1: Percentage mortality in group a (Arbour acres)

Birds in stock	Number of dead birds	Remaining stock	Percentage mortality
55	7	48	12.73

Table 2: Percentage mortality in group b (Aanak 2000)

Birds in stock	Number of dead birds	Remaining stock	Percentage mortality
59	4	55	6.178

The presentation of the data collected from the two groups of the birds were as follows:

Table 1 above shows that the percentage of the birds at the beginning of the research work was rated to be 100% and at the conclusion of the research, the remaining stock of the broiler were 87.27% which shows that the percentage mortality was 12.73 during the seventh week of the observation.

Table 2 above shows that the percentage of the birds at the beginning of the research was rated to be 100% and at the conclusion of the research, the remaining stock of the broilers were 93.22% which shows that the percentage mortality was 6.78 during the seventh week of observation.

Methodology and hypotheses: The general notions of high mortality rate in the breeds of broilers have influenced the choice of this research study. The observations were made in two different groups within the departmental poultry farm and the total number of the birds in both groups were 114 broiler bird. The study utilizes Chi-square parametric statistics to simultaneously test the causes of high mortality rate in broiler breeds as well as whether there is difference in the mortality rate of the two different breeds.

The test statistics is given as:

$$X^2 = \frac{(Fo - Fe)^2}{Fe}$$

Where,

Fo = observed frequency
Fe = expected frequency

The decision rule is that if the calculated X^2 value is within the range of Chi-square tabulated at 5%,1% and 0.1% level of significance and the degree of freedom (V) is estimated as (numbers of rows-1 (numbers of columns-1), the null hypothesis will be adopted. This Formular was used to test the hypothesis;

- Ho: there is no significance difference between the mortality rate of the two breeds of broilers
- Hi: there is significance difference between the mortality rate of the two breeds of broilers

Test of hypothesis: To test for the homogeneity between the result of the observed two groups regarding whether there is no significance difference between mortality rate of the two breeds of broilers, the hypothesis was mathematically re-written as follows:

Ho: Gi = G2 = G (Not homogenous)
Hi: Gi = G2 = G (Homogenous)

Where,

Gi = Group A (Arbour Acres) and
G2 = Group B (Anak 2000)

The result of the observation conducted ere shown in Tables 3 & 4.

For the purpose of this study, we shall hereby compare the results of the two groups.

Table 5 above indicates that about 48.25% of the broiler breeds are in Group A (Arbour Acres) while the remaining 51.75% falls in group B (Anak 2000). This shows that the research study has a relatively close number of birds within both groups.

Using the Table 5 above, the X^2 expected frequencies were calculated using the Formular:

$$e = \frac{RT \times CT}{GT}$$

Where,
e = Expected frequency
RT = Row Total
CT = Column Total
GT = -Grand Total

Table 3: Group A (Arbour acres)

Week	1	2	3	4	5	6	7
Birds in stock	55	55	54	53	52	51	50
Mortality rate	-	1	1	1	1	1	2
Remaining stock	55	54	53	52	51	50	48

Table 4: Group B (Anak 2000)

Week	1	2	3	4	5	6	7
Birds in stock	59	59	59	58	58	57	56
Mortality rate	-	-	1	-	1	1	1
Remaining stock	59	59	58	58	57	56	55

Table 5: Observation results

Opinion	Group a	Group B	Total
Yes	55	59	114
No	48	55	103
Total	103	114	217

Table 6: X^2 Contingency table

Opinion	Group a	Group B	Total
Yes	(55) 54.11	(59) 59.89	114
No	(48) 48.89	(55) 54.11	103
Total	103.00	114.00	217

Sources: Field survey

The frequencies were calculated below:

$$e1 = \frac{103 \times 114}{217} = 54.11$$

$$e2 = \frac{103 \times 103}{217} = 48.89$$

$$e3 = \frac{114 \times 114}{217} = 59.89$$

$$e4 = \frac{114 \times 103}{217} = 54.11$$

The frequencies were now entered into the contingency table in parenthesis as follows;

To estimate the X^2 we apply the Formular

$$X^2 = \frac{E(o-e)^2}{e}$$

$$X^2 = \frac{(55-54.11)^2}{54.11} + \frac{(48-48.89)^2}{48.89} + \frac{(59-59.89)^2}{59.89} + \frac{(55-54.11)^2}{54.11}$$

$X^2 = 0.0146 = 0.0162+0.0132+0.0146$
$X^2 = 0.0586$

Computing the standard value of X^2, we have (2-1)(2-1) degree of freedom under the following percentage levels of significance;

The table value of 0.05, X^2 (0.05) = 3.841
The table value at 0.01, X^2 (0.01) = 6.635
The table value at 0.001, X^2 (0.001) = 10.827

The result of the Chi-square test reveals that the null hypothesis is not valid. Since the calculated value is less than tabulated value at 0.001% we therefore accept H1 and reject Ho which implies that there is a very high significant difference ($p<0.001$) between the mortality rate of the two breeds of broilers.

Table 1 and 2 shows the percentage mortalities of the two broiler breeds i.e. group A (Arbour Acres) and group B (Anak 2000). It is obvious that the percentage mortality is higher in-group A (12.73%) than in Group B (6.78%) at the end of the seventh week of the research work. This result confirms the report of Poultry International [1] that some breeds of fowls are prone to high death rate due to their genetic factors (breeds).

Tables 3 and 4 shows the mortality rate of the two breed of broiler as they advance in age. It is however, obvious that the mortality rates increase steadily at the end of the fourth week of the research i.e. 8 weeks old. This result is in line with the report of Poultry International [1] that the older the birds the greeter the inability to mobilize Calcium and Phosphorus and the greater the possibility of high death loses. The assertion is also in line with the report of the University of Georgia College of Agricultural and Environmental Science [2] in another review that the total flock mortality ranges as a result of factor such a as birds age, bird health, ventilation and season of the year

It can also be recalled in Tables 3 and 4 that it is not economically to raise broiler birds beyond 8 weeks of age since most death loses recorded occurred at the end of the eight week. This assertion is in line with the report of Akinwande [3] that broilers are known to be fast growing poultry birds that reach market weight of 1.6-2.0 kg within a period of 6-8 weeks of age.

CONCLUSIONS

Based on the findings, the result shows that the major difference in the mortality rate pattern between the two breeds is the genetic factor. It is observable that there are higher mortality rates in Group A (Arbour Acres) than in Group B (Anak 2000)

The major factors that determine the performances of the birds are the management practices and the age of the birds. Under good and effective management practices mortality rate which is inevitable can be reduced to the barest minimal. It could also be revealed that in the study that the two breeds of the birds suffer high mortality rate as a result of advancement in age. This has invariably resulted in problems such as sudden death, heart failure and disease, excessive fat deposited in the body of the birds among others.

Based on the findings of the research work, the following recommendations were offered as far as mortality rate is concern.

Broilers farmer should ensure rearing of the most viable breeds of broiler that posses such attributes as fast growth rate, efficiency of feed utilization, early maturing, low mortality rate, acceptable colour of flesh and feathering resistance to disease, good life expectancy, adaptation to the immediate weather condition etc. like the Anak 2000.

Broiler farmers should also put into considerations good and proper management practices, as these will ensure optimum performance of the broilers thereby reducing mortality rate that might occur as a result of poor management practices.

Since the production of broilers is uneconomical due to the advancement in age, broiler farmers are thereby advice to sell their birds immediately when they reach market weight of 1.6-2.0 kg within a period of 6-8 weeks of age. Government should endeavour to give loan to broiler farmers in order to expand their farm, have their own feedmill and purchase feed ingredients in bulk as this go a long way in reducing the mortality rate that might occur as a result of contamination of these materials from other farms or source Farmers should also be educated on the optimum farm size they can efficiently handle as this will guide against mortality that may occur as a result of improper monitoring.

From the study so far, it can be concluded that the group B (Anak 2000) is more viable than the group A (Arbour Acres) since there were less number of death loses in the Anak 2000 than the Arbour Acres. The Anak 2000 also posses those special attributes that need to be considered before choosing a breed of broiler for rearing.

It could also be concluded that adequate management practices can reduce the mortality rate of birds and thereby increasing the maturity rate. Morealso, broiler production becomes uneconomical to maintain as they advance in age. This is evident since most death

loses recorded increase with the advancement in age. The above assertions cannot however, be used to generalize all breed of broilers since only two breeds were used for the purpose of this research work.

REFERENCES

1. Poultry International, 1994. Broiler Industry of the Future. Ibadan The University of Georgia College of Agricultural and Environmental Science, 32: 48-49.
2. UGCAES, 1987. Broiler Production and Management. Georgia, 1: 1-16.
3. Akinwande, V.O., 1990. Journal on Animal Production Research. Tai Solarin University of Education Ijebu-Ode.