THE EFFECT OF SEASONAL VARIATION ON PERFORMANCE OF EGG TYPE POULTRY: A Case Study of Mitchell Farms, Mosogar, Delta State, Nigeria.

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ABSTRACT

The study was designed to find out the effect of seasonal variation on poultry in Delta State of Nigeria. The variables considered were mortality rate, feed intake, egg production and egg hatchability in the wet and dry seasons of the year. Secondary data were also collected from records kept in the farm. Sites 4AH1-BLK, 5AK1-BLK, 9H/BF and 10H/BF were used for the study with each having an average of 2,500-3,500 birds of the same breed and sex aged 1-9 weeks and 21-52 weeks. The records were grouped into dry season (October-March) and wet season (April-September) covering three years, 1991-1994. The analysis of the result showed that seasonal variation does not have any significant effect ($P < 0.05$) on mortality and feed intake in the two seasons. However, percentage egg production and egg hatchability revealed a significant difference ($P < 0.05$) between the two seasons, with a mean % egg production and hatchability of 74 ± 0.03 and 80.6 in the wet season and 53.67 ± 0.01 and 55.9 respectively in the dry season. Recommendation is therefore made for proper planning which ensures the utilization of wet and dry season management practices to reduce the effect of high humidity and ambient temperature on production.

Keywords: Chicken Production, Seasonal Variation, Hatchability

INTRODUCTION

The business of poultry is attaining a greater status when compared to other livestock enterprises. This, however rests on the fact that of all farm animals, poultry can yield the quickest return (Okorie, 1983). Above all poultry business required less initial capital to start and also the meat and egg

produced from chicken are widely accepted as sources of protein (Ikpi and Akinwumi, 1979). Like any other enterprise, the poultry business is faced with numerous problems ranging from disease outbreak, feed availability and utilization, environmental effect, seasonal variation and managerial problems (Guobadia, 1991; Atteh and Ologbenla, 1993; and Hasford, 1991). It is a known fact that poultry birds are very sensitive to climatic changes since they are homeothermic (Williamson and Payne, 1978). Climate is a condition of a place with regards to its main elements which include rainfall, radiation (solar), temperature and humidity (Mozour and Asri, 1987, Schillo *et al*, 1992). These determine and influence to a great extent, livestock production in any one area. According to Spedding (1983), it is the fluctuation of the season which makes for notable epidemics of pest and diseases or the absence, or trouble usually considered endemic. Heat stress in birds is manifested by increased respiratory rate, panting, excessive salivation, prostration or heat stroke (Williamson and Payne, 1978). If care is not taken with respect to these condition, death may result (Hall, 1979). Research has shown that for optimal productivity and expression of potentiality, birds at different ages need a particular body temperature and humidity (Moule, 1970). The environment may become unduly hot or cold thus imposing stress on the birds (Smith, 1990).

In Nigeria, climatic conditions vary with season. The two prominent season are the dry season (Nov. - March) marked as period with high temperature, and wet season (April-Oct.) marking the rainy period (Odeyinka and Ademosun, 1993). However, these stated periods are not so authentic since the climatic conditions of Nigeria now vary considerably, this the agricultural scientists have attributed

to green house effect (Ojo, 1977). Since chickens are very sensitive to weather variation and less resistant to these changes, observing abnormal behaviour due to climatic changes is important so as to make necessary adjustments. The study is therefore designed to examine the influence of seasonal changes on mortality, feed intake, egg production and hatchability of chickens in Mitchell Farms, Delta State of Nigeria.

MATERIALS AND METHOD

Sample Population and Technique

This comprised the Mitchell Poultry Farm, Mosogar, Delta State. The criteria for selecting the farm included: It is one of the few farms with up to date records necessary for the objective of the study; It is one of the big farms in Delta State and indeed Nigeria; It is located in an area where the two seasons observed are easily demarcated.

In each of the sites chosen for the study, the population of birds was between 2,000 and 3,500 aged 1-52 weeks. These included sites

- a) *4AH₂-BLK*: which were mainly chicks of 3-6 weeks old. The birds in this site were used to determine the influence of seasonal variation on the mortality rate of the birds for the period of study.
- b) *5AH₁-BLK*: which were mainly growers of between 9-13 weeks of age. These were used to compare the rate of feed intake in two seasons.
- c) *9H/BF and 10H/BF*: These were layers of 18-36 and 40-52 weeks of age respectively and raised on deep litter. They were used to examine the percentage egg production and hatchability. The eggs were set in a single stage Western incubator at a temperature of 37.2°C and a relative humidity of 85%.

The feed composition for the layering birds throughout the period of the study was as follows:

Protein - 16.0%, fats - 5.0%, fibre - 6.5%, calcium - 3.5%, Av. phosphorus - 0.45%, ME - 2500 (min) kcal/kg.

Data Collection and Analysis

The data collected were based on the records kept in the farm. These included mortality rate of chicks, daily feed intake of birds, egg production and hatchability. These variables were those recorded for the wet and dry seasons of April, 1991 to March, 1994. The birds were all of the same breed, Rhode Island Red and sex, pullet.

The student's T-test (Hayslett, 1985) was used to analyse the information obtained from the records. This was used to compare the information got during the wet and dry seasons.

RESULTS AND DISCUSSION

Table 1 shows the mortality rate of the birds in the wet and dry seasons of the year. The results revealed higher rates at the onset of the rainy season (April and May) recording 1.38% and 0.99% respectively and towards the end of the dry season (February to March) with 0.65% and 1.23% being recorded respectively. The mortality rate was also generally seen to be higher in the wet season than the dry season with a mean mortality rate of 0.71% in the wet season and 0.56% in the dry season.

These results were found to be contrary to an earlier observation of Sainsbury (1990) that birds tend to be more vulnerable to heat stress in dry seasons which can lead to high rate of mortality than from cold stress in the wet season. The present finding may have been due to the fact that wet season in this area of Nigeria is often marked with high humidity because of high moisture content. This tends to favour bacterial and parasitic infections and, therefore, death of birds.

However, the difference in the mortality rate between the wet and dry seasons was found to be insignificant ($P > 0.05$).

Feed Intake

Table 2 shows the feed intake per bird per month for the wet and dry seasons. The wet season recorded higher values ($P > 0.05$) than the dry season with mean values than the dry

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TABLE 1: MORTALITY RATES IN THE WET AND DRY SEASONS

WET SEASON				DRY SEASON			
Months	Av Flk No	Av No Dead	Mortality Rate (%)	Months	Av Flk No	Av No Dead	Mortality Rate (%)
April	3023.1	41.72	1.38	Oct.	3941.4	7.43	0.19
May	2845.4	28.15	0.99	Nov.	3876.6	13.50	0.35
June	2526.6	11.66	0.46	Dec.	3777.3	18.62	0.49
July	2026.3	6.31	0.31	Jan.	3675.2	19.11	0.52
Aug.	2614.8	3.52	0.14	Feb.	3543.5	23.12	0.65
Sept.	2573.2	5.22	0.20	Mar.	3433.8	42.34	1.23
Mean $\pm$ SD	2263.9	16.10 $\pm$ 0.01	0.71	Mean $\pm$ SD	3708.6 $\pm$ 0.04	20.69 $\pm$ 0.01	0.56

TABLE 2: FEED INTAKE OF GROWING BIRDS IN THE WET AND DRY SEASONS

WET SEASON			DRY SEASON		
Months	Av no of birds	Av feed intake/bird/m(kg)	Months	Av no of birds	Av feed intake/bird/m (kg)
April	3119.41	2.46	Oct.	2622.2	2.82
May	2869.52	2.85	Nov.	2612.1	2.80
June	2755.11	2.82	Dec.	2605.3	2.51
July	2683.23	3.04	Jan.	2601.6	2.32
Aug.	2643.57	2.95	Feb.	2594.2	2.14
Sept.	2635.61	3.06	March	2585.1	2.62
Mean $\pm$ SD	2784.41 $\pm$ 0.04	2.86 $\pm$ 0.007	Mean $\pm$ SD	2572.3 $\pm$ 0.003	2.54 $\pm$ 0.012

season with values of 2.86kg per bird per month and 2.54 kg per bird per month for the wet and dry seasons respectively. High values of 3.06 kg and 3.04kg per bird per month were recorded in July and September respectively of the wet seasons.

The reduction in the feed consumption in the dry season compared to the wet season could be attributed to the effect of heat stress on the birds. McDowell (1979) and Williamson and Payne (1978) had reported that there is decrease in feed intake in birds with temperature up to 23.9°C. In addition, poor quality feed as prepared in the tropical regions scarcely provide adequate levels of nutrients for maintenance and production during the dry season (Odeyinka and Ademosun, 1993). The temperature of the poultry houses throughout the period of this study ranged between 24°C and 28°C. However, the employment of certain harsh weather checking gadgets in the farm rendered the difference in the feed intake between the wet and dry seasons insignificant.

Egg Production

Data collected for egg production showed that birds laid more eggs in the wet season than in the dry season. Average production was high all through the wet season during the period of this study with a range of 69.4%-79.4% and a mean percentage production of 74.3%. That of the dry season ranged between 42.0%-63.6% with a mean percentage production of 53.7% (Table 3). Egg production in the wet season was found to be significantly ($P < 0.05$) higher than that of the dry season. This may have been due to the fact that efficient feed conversion is usually observed in birds in the wet season than in the dry season and this often has positive effect on egg production (McDowell, 1979; Williamson and Payne, 1978). Smith (1990) also noted that at high ambient temperature reduction usually occurs in the number of eggs produced by laying hens. Usually if temperature rises above 24°C for lengthy periods, the total number of eggs laid and their weights and

TABLE 3: EGG PRODUCTION IN THE WET AND DRY SEASON

WET SEASON				DRY SEASON			
Months	No of birds	Eggs/day	%Egg/day	Months	No of birds	Eggs/day	%Egg/day
April	3067.4	2083.18	69.44	Oct.	2525.4	1249.4	49.67
May	2821.2	2143.96	76.78	Nov.	2500.4	1050.25	42.01
June	2725.1	2163.65	79.40	Dec.	2479.6	1210.54	48.82
July	2657.4	1920.21	72.27	Jan.	2463.1	1360.56	55.24
Aug.	2612.3	1966.83	75.07	Feb.	2457.2	1562.53	63.59
Sept.	2576.6	1955.96	75.93	Mar.	2442.2	1530.28	62.66
Mean $\pm$ SD	2743 $\pm$ 0.07	2037 $\pm$ 0.01	74 $\pm$ 0.03	Mean $\pm$ SD	1476 $\pm$ 0.001	1372.3 $\pm$ 0.014	53.67 $\pm$ 0.01

TABLE 4: WET AND DRY SEASON HATCHABILITY

WET SEASON				DRY SEASON			
Months	Av no of eggs	Av no of chicks hatched	%Hatchability	Months	Av no s of eggs	Av no of chicks hatched	%Hatchability
April	2157.4	1624.2	75.3	Oct.	2156.2	1222.8	56.7
May	2161.6	1668.8	77.2	Nov.	2019.6	1009.8	50.0
June	2411.8	1972.9	81.8	Dec.	1968.5	1248.03	63.4
July	2242.3	1910.2	85.2	Jan.	2216.6	1376.5	62.1
Aug.	2014.2	1623.5	80.6	Feb.	2182.2	1064.9	48.8
Sept.	2118.6	1766.9	83.4	Mar.	2191.6	1196.6	54.6
Mean $\pm$ SD	2184 $\pm$ 0.02	1761 $\pm$ 0.02	80.6	Mean $\pm$ SD	2122.5 $\pm$ 0.01	1186 $\pm$ 0.04	55.9

quality are affected (Sainsbury, 1990).

Egg Hatchability

Records also showed that egg hatchability was higher in the wet season than in the dry season. The mean percentage hatchability obtained in the wet season was 80.6% with the highest value of 85.2% in July. In the dry season, the mean percentage hatchability for the period of the study was 55.9% with the highest value of 63.4% in December (Table 4). The results indicate that hatchability was also affected by the seasonal variation. Egg hatchability decreased ($P < 0.05$) more in the dry season than in the wet season. This could be attributed to the high temperatures which are usually associated with the dry season. High temperatures to a great extent reduce the number of eggs hatched and the quality of the eggs with regards to shell thickness and weight (Smith, 1990; Mishra *et al*, 1990).

This study has further revealed that seasonal variation has an adverse effect on the

productivity of birds although to varying degree of significance. This fact therefore necessitates the proper planning of a strategic programme in poultry farms. By this dry and wet seasons management practices are employed in such a way that they minimise the harmful effects of high humidity and ambient temperatures on production of stock.

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