DETERMINATION OF ECONOMIC AGE OF MARKETING LOCAL BROILER TURKEYS

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ABSTRACT
This study was conducted to determine the economic age of marketing for local broiler turkeys. The age groups used were 16, 20, 24 and 28 weeks. Three rations; turkey starter, grower and finisher were formulated. Eighty four poults were fed the three rations in the study which lasted 28 weeks. A Completely Randomised Design with the age groups (16, 20, 24 and 28 wks) as the treatments and weeks 1 to 28 as replicates was adopted. Significant differences ($P<0.05$) existed among the values of all the parameters evaluated. With the exception of cost benefit ratio which decreased with age, the values of other parameters increased with age. There was no significant difference ($P>0.05$) in the final weight of birds at 20, 24 and 28 (3631.20, 4501.20 and 5011.20g/bird) weeks but that at 24 and 28 weeks were significantly higher ($P<0.05$) than the final weight at 16 weeks of age (2671.20g/bird). Total feed intake of birds at 28 weeks (28.79kg/bird) was significantly greater ($P<0.05$) than others whereas that at 16 weeks (9.31kg/bird) was the least. Cost of production was significantly highest ($P<0.05$) at 28 weeks (₦1611.82/bird) while that at 16 weeks (₦548.38/bird) was the least. The revenue and gross margin at 28 weeks (₦4259.52/bird and ₦2647.70/bird) were respectively higher than others with those at 16 weeks (₦2270.52/bird and ₦1722.16/bird) being the least. Cost per kg weight gain at 16 weeks (₦209.30) was significantly lower ($P<0.05$) than others while that at 28 weeks (₦324.96) was the highest. Feed conversion ratio of the birds at 16 weeks (3.55) was statistically not different ($P>0.05$) from that at 20 weeks (4.39) but was significantly lower than that at 24 and 28 weeks respectively (5.08 and 5.80). Cost benefit ratio at 16 weeks (3.14) was significantly higher ($P<0.05$) than that at 20 (2.47), 24 (2.02) and 28 weeks (1.64). It is recommended that turkey famers could market local broiler turkeys at 16 week of age since it was the most economic age.

Key words: Economic age, Marketing, Local Turkeys

INTRODUCTION
Growth in turkey production in Nigeria has not been at the expected rate due to some reasons. High cost of feed ingredients resulting from low production levels and competition between man, industries and feedmills for the ingredients such as grains and proteins concentrates has adversely affected turkey production as well as other poultry species. Poultry production depends largely on finished or compound feed unlike ruminants (cattle, sheep and goats) whose nutrition is mainly based on forages. As a result, feed alone accounts for about 65 percent of the total cost of poultry production (Olomu, 1995). Lack of adequate motivation by government and financial houses such as high interest rate on capital lending and no subsidy on feed and drugs contribute to slow rate of growth in turkey production.

Since emphasis is now being shifted from production of broiler and laying chickens to other species of poultry as a means of addressing inadequate protein consumption of Nigerians, turkey production in Nigeria should therefore be taken seriously. This is because broiler chicken production in Nigeria in the recent past has suffered terrible set-back due to the abandonment of large scale farms by their owners which resulted in mass importation of frozen chickens and turkeys into the country (Obioha, 1992; Ojewola *et al*., 2001 and Olomu, 2003). Efforts should therefore be geared towards exploiting the potentials available in other species like turkeys, guinea fowls, ducks and geese to meet the protein needs of Nigerians.

Increased turkey production in Nigeria should be encouraged taking advantage of the bird's large size, fast growth rate, high fecundity and excellent meat quality. Turkeys are very efficient in converting dietary protein to edible carcass protein (Summers *et al*., 1985). Since the yield of edible protein is the ultimate measure of success in livestock production (Summers and Spratt, 1990) and turkey meat contains high percentage of edible carcass protein, turkey production therefore is a good way of meeting man's protein requirements.

There are reports that turkeys undergo considerable changes in body composition as they grow older (Ferket and Sell, 1989). Moreover, birds seem to lay down different nutrients in their tissue at different times of their life (Amubode, 1981; Kroydahl and Dalsgard, 1981 and Ojewola and Longe, 1999). There has been the problem of lack of information on the most economic age of culling or marketing local turkeys which are the strains that are currently available and commonly used by farmers in Nigeria. As a result, farmers market turkeys at different ages of the life without regard to the most economic age of marketing the birds

It is therefore necessary to determine at what age in the life of local turkeys in Nigeria that the farmer could market turkeys in order to ensure adequate deposition of nutrients in the tissues and to maximize profit. The objective of this study is to determine at what age in the life of local turkeys the farmer could market the mature birds in order to maximize profit with least cost.

MATERIALS AND METHODS

The experiment was conducted at the Teaching and Research Farm of Michael Okpara University of Agriculture, Umudike. Eighty-four turkey poults purchased from a hatchery at Owerri, Imo State of Nigeria were used in the trial. The birds were brooded for the first four weeks of age in a brooding/rearing house which was cleaned, washed with water mixed with disinfectant and the walls covered with tarpaulin before the arrival of the poults. Three different rations; starter, grower and finisher (Table 1) were formulated according to the nutrient requirements of turkeys recommended by (NRC, 1984; Aduku, 1993 and Olomu, 1995). The turkey starter ration was fed the birds from 1-8 weeks, grower ration from 9-16 weeks while finisher ration was fed from 17-28 weeks of age. Feed and water were supplied to the birds *ad libitum* during the experiment. Completely Randomized Design (CRD) was adopted with the ages (16, 20, 24 and 28wks) as the treatment and weeks starting from week 1 as replicates. An analysis of Variance (ANOVA) was used to test for significance and Duncan multiple Range Test to separate the means (Steel and Torrie, 1980 and Duncan, 1985).

The birds were vaccinated with New Castle Disease Vaccine intra-occula (NDV 1/0) at day old. New castle Disease vaccine lasota was given to the birds via drinking water at the 21st day (Eruvbetine *et al*., 1996). Antibiotic (Anicilin), anti-coccidal drug (Amprolium, 2000) and vitamin drug (Vitalyte) were administered to the birds at different times according to the health conditions of the animals. Daily feed intake of the birds was determined which was used to calculate the total feed intake at 16, 20, 24 and 28 weeks respectively (Table2). The birds were weighed on arrival and the weight recorded as initial weight. Weekly weight-taking of the birds was conducted and was used to determine the total weight gain of the birds at the various ages. The average cost of feed consumed by the birds at the ages was determined by using the cost per kg of the starter, grower and finisher rations respectively. Revenue was determined by adopting the market price of ₦ 850/kg live turkey at the time of study.

Gross margin was calculated by finding the difference between the revenue and cost of production per bird. Cost per weight gain and feed conversion ratio were also calculated. Cost benefit ratio was determined as a ratio of cost of production to gross margin per bird. Curves 1and 2 were plotted to show cost per weight gain of turkey (fig. 1) and cost: benefit ratio of producing the turkeys (fig. 2).

RESULTS AND DISCUSSION

With the exception of cot: benefit ratio which decreased with age, there was increase in the values of the other parameters as the turkeys grew older (table 2). Significant differences ($P < 0.05$) existed among the values of all the parameters evaluated. There was no significant difference ($P < 0.05$) in the

final weight of birds at 20, 24 and 28 but the final weight at 24 and 28 weeks were respectively significantly higher ($P < 0.06$) than that at 16 weeks of age. The final weight of birds at 16 weeks was however not significantly different from that at 20 weeks of age. Total feed intake of the birds at 28 weeks was significantly greater ($P < 0.05$) than others followed by that at 24 weeks whereas the feed intake at 16 weeks was the least. The result was in agreement with reports on turkeys in particular and poultry in general that growth brings about increase in number of cells which demands for corresponding increase in feed intake and dietary energy as birds grow older (leeson and summers, 1980; Frandson, 1981; NRC, 1984; Summer *et al*., 1985, 1989; Aduku, 1993; Mc Donald *et al*., 1995; Olomu, 1995, 2003). The feed intake the local turkeys at the respective ages was about half (18.82, 32.40, 48.25, 68.95kg) what was recorded by (Olumu, 2003) for improved breed of turkeys.

Cost of production followed the same trend with feed intake because cost of feed consumed was directly related to the quantity of feed consumed (Ojewola *et al*., 2003 Ukachukwu *et al*., 2003; Ugwuene *et al*., 2005). The cost differential between the ages was least between 16 and 20 weeks which supported the report of Summers *et al*., (1989) that any time between 16 and 20 weeks of age was the most economic age of marking heavy boiler turkeys.

The total weight gain of the turkeys also increased with age but the differences in weight gain between the ages decreased with increase in age. The difference in weight gain between 16 and 20 weeks was higher than others. This differed from the report of Leeson and Summers (1980) and Olomu (2003) that diminishing weight gain sets in after 20 weeks of age. This was probably because these authors worked with improved breeds of turkeys as against local turkeys used on this study. Daily weight gain increased with age up to 24 weeks but decreased thereafter at 28 weeks of age.

The cost per weight gain and feed conversion ratio increased with age. The cost incurred for realizing a unit weight gain (cost per weight gain) at 16weeks was significantly lower ($P<0.05$) than others. Similarly, efficiency of conversion of feed to unit weight gain was highest at 16 week of age. This implies that investment in turkey production was most efficient at 16 weeks. This was in agreement with the report of Ukachukwu *et al* (2003) that the feed or the age that encouraged the best growth rate also gave the least cost for weight gain and also had the best feed-cost saving potential (Esonu and Udedibie, 1993).

The revenue and gross margin of producing the turkeys increased with age. However, the cost benefit ratio, which was the amount of profit made for incurring a unit cost of production decreased as the birds grew older. The cost benefit ratio at 16 weeks was significantly higher ($P<0.05$) then others followed by that at 20 weeks of age. This means that more profit was made when a unit amount of money was spent in keeping the turkeys to 16 weeks than to the other ages. This trend could have been due to increase in feed conversion ratio (decrease in efficiency of feed conversion) with increase in age. Since 16 weeks of age gave the highest cost: benefit ratio, it could be said to be the best economic age to market local turkeys. This is justifiable since farmers aim at maximizing profit at reduced cost of production and at the shortest possible time (Ojewola *et al*, 2001, 2003; Ukachukwu *et al*, 2003 and Ugwuene *et al*., 2005).

The result of this study showed that marketing local turkeys at 16 weeks of age will save time and give greater return on investment. This agreed with the report of Summers *et al*., (1989) that considering production cost, broiler turkeys should be culled before 20 weeks of age. This was also in conformity with the recommendation of Christainsen *et al.,* (1996) that broiler turkeys should be marketed at about 16.4 weeks of age adding that it was the most economic age giving feed conversion ratio of 2.6 for exotic turkeys.

Figure 1 shows that the cost per weight gain of turkeys indicates geometric ingrease of cost per unit weight gain from 16 to 28 weeks of age with that at 16 weeks of age being the least. The cost benefit ratio figure (fig. 2) indicates a downward trend of profit made for incurring a unit amount of money for keeping the turkey at 16, 20, 24 and 28 weeks of age respectively. The cost benefit ratio was highest at 16 weeks and least at 28 weeks of age.

CONCLUSION

Since the aim of poultry farmers is to maximize profit at least cost and keeping the turkeys in this study to 16 weeks of age gave the highest profit per unit amount of money spent, marketing local broiler turkeys at 16 weeks of age is hereby recommended.

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Table 1: Percentage Composition of the Rations

Ingredients	**Starter**	**Grower**	**Finisher**
Maize	40	58	68
Soybean meal	51	33	24.5
Fish meal	5.5	5.5	4
Bone meal	3	3	3
Salt	0.25	0.25	0.25
Vit/min. premix	0.25	0.25	0.25
Total	100	100	100
Cal C. P. (%)	28.59	22.65	19.01
Cal. ME (Kcal/kg)	2891	30.19	30.85

Table 2: Effect of Age on Economic Parameters of Turkeys

	Age (weeks)				
Parameters	**16**	**20**	**24**	**28**	**SEM**
Initial weight (g/bird)	51.20	51.20	51.20	51.20	0.48
Final weight (g/bird)	2671.20^{b}	3631.20^{ab}	4501.20^{a}	5011.20^{a}	166.31
Total feed intake (kg/bird)	9.31^{d}	15.72^{c}	22.60^{b}	28.79^{a}	2.01
Av. cost of feed cons. (₦/kg)	58.90	56.61	56.09	55.99	0.52
Cost of production (₦/bird)	548.36^{d}	889.89^{bc}	1267.70^{b}	1611.82^{a}	30.71
Total weight gain (kg/bird)	2.62^{c}	3.58^{bc}	4.45^{ab}	4.96^{ab}	0.34
Av. Daily weight gain (g/bird)	23.39^{b}	25.57^{a}	26.49^{a}	25.30^{ab}	0.32
Revenue (₦/bird)	2270.52^{d}	3086.52^{c}	3826.02^{b}	4259.52^{a}	136.34
Gross margin (₦/bird)	1722.16^{c}	2196.63^{b}	2558.32^{b}	2647.70^{a}	121.50
Cost: Benefit ratio	3.14^{a}	2.47^{b}	2.02^{c}	1.64^{c}	0.084
Cost per kgwt gain (₦)	209.30^{c}	248.57^{b}	284.88^{b}	324.96^{a}	7.34
Feed conv. ratio	3.55^{b}	4.39^{ab}	5.08^{a}	5.80^{a}	0.54

a-d: means in the row with different superscripts are significantly (P<0.05) different from one another

SEM: standard error of mean

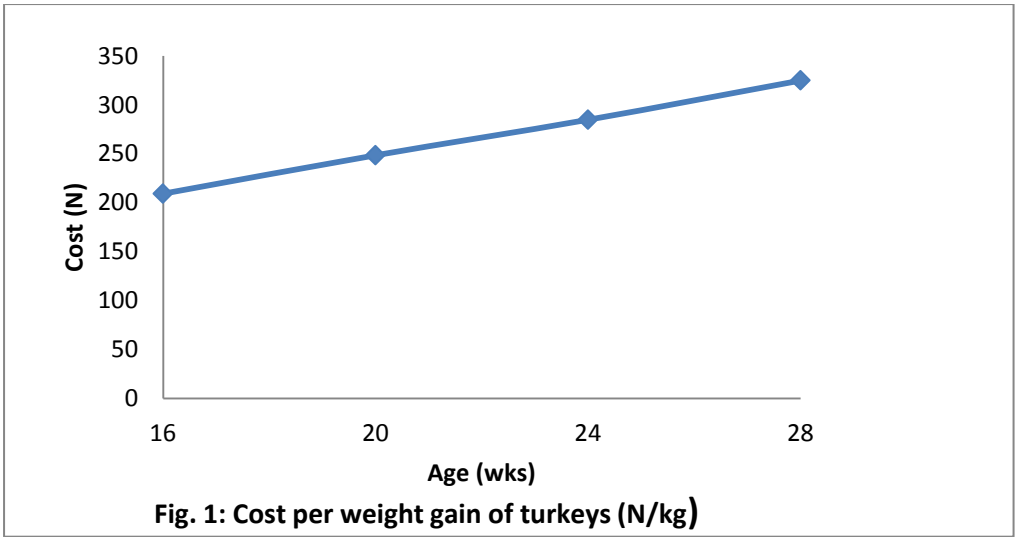

Fig. 1: Cost per weight gain of turkeys (N/kg)

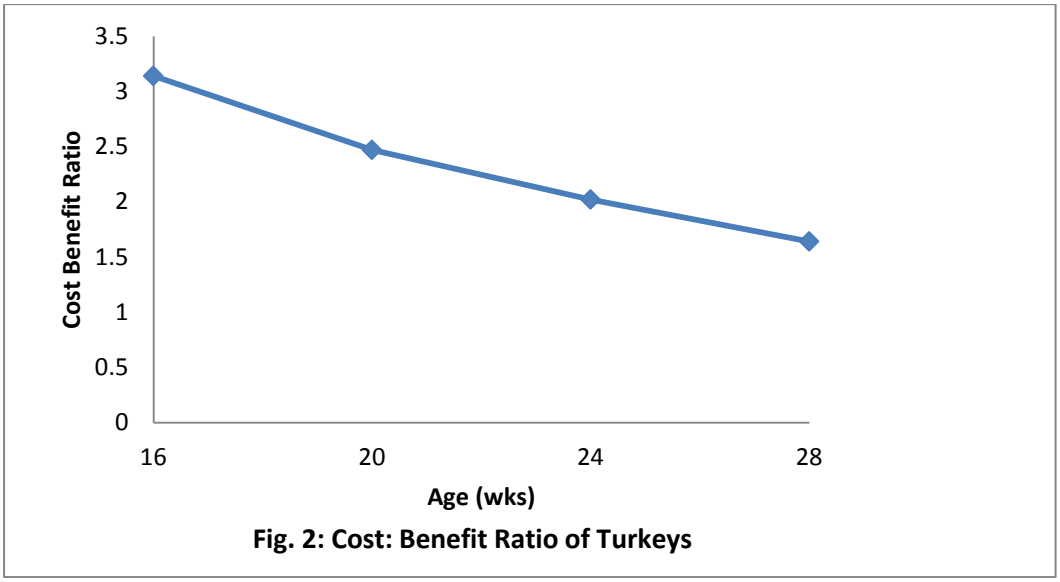

Fig. 2: Cost: Benefit Ratio of Turkeys