

Influence of Feed Type on Egg Production of Tswana Laying Chicken

A. A. Aganga, S. O. Tshwenyane and L. Molefhe
Botswana College of Agriculture, P/Bag 0027, Gaborone
E-mail: aaganga@bca.bw

Abstract: The experiment was done at estate management Unit in Sebele, Gaborone. Ten 23 weeks old laying Tswana chickens were bought from a local farmer and divided into two groups of five each, using complete randomized design. Group one was fed on layer mash and the other group was fed on composite local feed which was a mixture of sorghum, maize and sunflower traditionally used as a supplementary feed under free range system in Botswana. All layers were dewormed using Piperazine and treated with oxytetrazine to prevent disease. 250g of feed and 200ml of water were provided *ad-libitum*. The layers were individually caged to monitor daily feed and water intake. Collection and weighing of eggs were done every day for 90 days. Tswana layers fed on layers mash produced on average five eggs per week while those on composite local feed produced one egg per week that is 400% more production on layers compared to local supplementary feed.

Key words: Tswana chickens, egg production, crude protein

Introduction

African livestock population statistics for 1995 indicated that poultry was the most numerous species of farm animals. More than 80% of poultry were kept in rural areas and contribute substantially to annual egg and meat production (Sonaiya, 1997). Throughout Africa poultry production stems from ancient traditional practices. Domestic fowl are the most important type of poultry kept on the continent. In general, village producers keep small flocks of between 2 and 20 birds per household (Gueye, 1997). Women and children play a key role in their management. The fowl are generally raised on a free range management system and they survive as scavengers. Rudimentary coops or shelters may be provided to give some protection against bad weather and night predators such as reptiles (Gueye, 1998). Thus Tswana chicken are maintained with very low land, labour and capital inputs and can therefore be kept by even the poorest social strata of the rural population.

Aganga *et al.* (2000) stated that poultry keeping in villages in Botswana is a side-line occupation because of the dominance of the beef cattle industry in the society. However, as poultry production can be increased more rapidly than that of other farm animals, it offers an opportunity for rapid growth in a developing country demanding a higher standard of human nutrition. In Botswana, chicken and eggs has only limited religious connotations and is, therefore widely accepted as food for the human population.

In 1999 the population of Tswana chickens in Botswana was 700 thousand being kept under traditional extensive management. The mature live weight of mature males was on average 2.20 kg (range of 1.0-3.9 kg) and of mature females 2.0 kg (range 1.0 to 3.0 kg) (Aganga *et*

al., 2000). The Tswana chickens were heavier than the small African local fowl reported by Kuit *et al.* (1986) in Central Mail. Egg weight varied from 38-60 g. Average flock size was 9 chickens per holding which is similar to the national average reported by MOA (1995). The sex ratio was 1:3.9 (1 cock to about 4 hens) which is lower than the recommended one male to about 15-20 hens in order to optimize the use of cocks.

The data for production potential (Table 1) of the Tswana chickens are similar to the local chickens studied in Burkina Faso by Say (1987). Small egg size is a characteristic of indigenous tropical fowl breeds and that trait may be simply one of adaptation to the tropical climate (Smith, 1974). Indigenous fowl tend to be very robust and are well adapted to harsh environmental conditions such as hot or cold weather, rain and periodic feed shortages. Plumage colours of the indigenous fowl vary from simple colours (e.g white, black, red) to all possible combinations including gold, silver, fawn and mottling.

Indigenous chicken have low output, this low output is expressed as low egg production, egg of small size, slow growth rates and poor survival of chicks (Tadelle *et al.*, 2000). Under village conditions the annual egg production per bird ranges from 20-100 eggs with an average weight ranging from about 30-50g (Gueye, 1998). Egg production in rural areas follows a pattern of 8-10 week periods of production with intervening periods of broodiness. Because of low productivity, indigenous chicken production in Botswana has been neglected and is frequently considered by farmers as an insignificant occupation compared to other agricultural activities. The aim of the study was to find out if the different feed types can be used to improve egg production of the Tswana breed without altering the

Aganga et al.: Influence of Feed Type on Egg Production of Tswana Laying Chicken

Table 1: Reproduction characteristics of Tswana chickens under extensive management*

Reproduction characters	Mean±SE	Range
Age at sexual maturity (months)		
Cocks (males)	7.0±0.55	5-9
Hens (females)	6.0±0.74	5-8
Eggs laid per clutch (1st lay)	10.0± 0.42	8-12
Eggs laid in subsequent clutches	13.0± 0.57	10-15
Eggs laid/year	34.0± 0.36	28-38
Clutches/year	3.0± 0.00	-
Length of lay per clutch (Days)	16.0± 0.49	15-18
Incubation period (days)	21.0± 0.00	-
Chicks hatched from first incubations	6.0± 0.48	3-8
Chicks hatched from subsequent incubations	8.0± 0.63	5-13
Average hatching rate (%)	61.8	-
Rearing period (days)	85.0± 3.56	80-90
Recovery period (days)	19.0± 0.64	14-21

* Source Aganga et al. (2000)

Table2: Production of Tswana laying chickens on two types of feeds

	Group 1	Group 2
Feed Type	Composite feed	Layers' mash
Av. Feed intake/day (g)	206.2±10.8	173.5±31.9*
Av water intake/day (g)	164.2±35.2	108.0±39.7*
Av. Daily body wt gain/day (g)	0.14±0.03	0.15±0.05 NS
Egg production/week	1±0.5	5±0.7*
Av. egg Wt. (g)	46.6	49*
Feed conversion efficiency	1443.4	242.9*

*significant difference between means in the same row at (p< 0.05). NS - not significant

genetic makeup. Two feeds used were traditional composite and layers mash because they are available locally.

Materials and Methods

Location of study: The experiment was conducted at the estate management poultry unit in Sebele-Gaborone and it lasted for 90 days.

Feeds: Commercial (layers mash) and composite local feed were fed to the layers. Layers mash composition on dry matter basis (g/100g) crude protein 16, fat 3.9, fibre 3.6, ash 11, calcium 3.6, phosphorus 0.7 which are used traditionally to supplement Tswana chicken under free range system. Local feed mixture of sunflower, sorghum and maize grains with a composition (g/100g) crude protein 13.5, fat 12.1, fibre 10.3, ash 2.9, calcium 0.05, phosphorus 0.7 which are used traditionally to supplement Tswana Chicken under free range system.

Chickens: Ten 23 weeks old point of lay Tswana chickens were divided into two groups of five, each using complete randomized design. Ten Tswana chicken were bought locally from a local farmer thus all the chickens had the same background. Five hens were kept on local composite feed and others

were fed on layers mash. The chicken were left to adjust to their new environment and fed for seven days before data collection started. These chickens were kept individually in chicken cages to monitor feed intake and water intake per day per bird. In addition a measured volume of 200 millimeters and 250 grams of feed were provided *ad-libitum* from separate troughs. The chickens were weighed every two weeks, but eggs were collected and weighed every day.

Any sign of illness or symptom of diarrhea was treated with oxytetracycline and piperazine was used for roundworms at a dosage of 2g/l for three days for each hen. The hen house was washed and disinfected once a week. Means of data collected for the study were separated using t-test based on the procedure of Steel and Torrie (1980).

Results and Discussion

Egg production of Tswana layers is on average one egg per week when fed local composite feed. This is in line with the results of the study carried out at Burkino faso by Say (1987) on local chicken fed on local cereal-by products and he found out that hens layed on average one egg per week but the production varies according to the season. Tswana layers had low egg production due to the fact that the local composite feed has more fibre

than the recommended level. In addition calcium content of the local composite feed is low, thus the feed did not provide adequate nutrients for egg production in the Tswana laying chickens.

A number of studies have been reported with layers using different types of sun flower seed meals (SFM). Samples, which varied in chemical composition, processing and origin, ranged from unprocessed whole sunflower seed to a high protein (45%) and/or low fibre (11%) SFM. McNaughton and Deaton 1981 reported that SFM could be included at up to 30% in layer diets without adversely effecting body weight, egg production or egg weight. Diets based on sunflower on SFM or SFM and groundnut (50:50) produced better responses in terms of egg production, food intake, food efficiency and egg weight than diets with only groundnut meal as a protein source (Singh and Prasad, 1981). McNaughton and Deaton 1981 found out that using high fibre SFM (36% crude protein and 24% fibre) up to 30% in a layer diet significantly decreased food efficiency while egg production, egg weight, egg shell strength and mortality were not affected.

Feeding whole grain to poultry is not new and it was a standard practice for over 50-60 years, maize grain has high total digestible nutrient (T.D.N) content of 70-80% but a relatively low protein content. White maize has 8% crude protein and excellent food for egg laying bird and thus is often the basis of poultry diets in Botswana.

Sunflower seeds as contains 25-26% oil thus accounts for its exceptionally high metabolizable energy. Layer mash provides 16.5% crude protein. It is a medium energy ration for both heavy and light birds. High in calcium to ensure maximum egg production and good shell quality. Poultry have a tendency of choice feeding, that is an individual bird reared in a flock are able to select from various feed ingredients offered. This enables them to compose their own diet to their actual needs and production capacity. Table 2 shows the feed intake and feed conversion efficiency of the Tswana laying chickens in this study. Those layers fed on layers mash produced 5 eggs/layer per week based on adequate nutrition while those on composite feed produced 1 egg/layer per week.

Conclusion: Tswana laying chickens can be reared intensively to improve production and egg production can improve if fed on layers mash containing 16% crude protein.

References

- Aganga, A. A., U. J. Omphile, P. Malope, C. H. Chabanga, G. M. Motsamai and L. G. Motsumi, 2000. Traditional poultry production and commercial broiler alternatives for small-holder farmers in Botswana. *Livestock Research for Rural Development*, 12: 4 <http://www.cipav.org.co/Irrd/Irrd12/4/Aga124a.htm>
- Gueye, E. F., 1998. Village egg and fowl meat production in Africa. *World Poul. Sci. J.*, Vol. 54 :73-85
- Gueye, E. F., 1997. Diseases in village chickens: Control through ethno-veterinary medicine. *ILEIA NEWSLETTER*, 13: 20-21
- Kuit, H. G., A. Traore and R. T. Wilson, 1986. Livestock production in Central Mali: Ownership, management and productivity of poultry in the traditional sector. *Tropical Animal Health and Production*, 18: 222-231.
- McNaughton, J. L. and J. W. Deaton, 1981. Sunflower Poultry Applications. *Feed Management*, 32: 27-28
- MOA, 1995. Botswana Agricultural Survey Report. Division of Agricultural Planning and Statistics. Ministry of Agriculture, Central Statistics Office, pp: 22.
- Say, R. R., 1987. *Manual of Poultry Production in the Tropics*. CTA. Published by CAB International.
- Singh, K. S. and J. M. Prasad, 1981. Feeding value of sunflower and groundnut cakes for laying hens. *Anim. Feed Sci. Tech.*, 6: 63-71
- Smith, A. J., 1974. Changes in the average weight and shell thickness of eggs produced by hens exposed to high environmental temperatures. A review. *Tropical Animal Health and Production*, 6: 237-244.
- Sonaiya, E. B., 1997. African Network on Rural Poultry Development: Progress report, November 1989 to June 1995. Proceedings ANRPD workshop, Addis Ababa, Ethiopia, pp: 134-143
- Steel, R. D. and J. H. Torrie, 1980. *Principles and Procedures of Statistics: A Biometrical Approach*. 2nd edition. McGraw-Hill, New York.
- Tadelle, D., Y. Alemu and K. J. Peters, 2000. Indigenous chickens in Ethiopia: genetic potential and attempts at improvement. *World's Poul. Sci. J.*, Vol. 56, pp: 45-54.